Application for Resource Consent

Central Interceptor - Storage Area

NES Soil - Controlled activity resource consent application and AEE

44 and 54 Greenwood Road, Mangere

October 2020

Tonkin & Taylor Ltd

Document Control

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1 Introduction

1.1 Overview of proposed works

This Assessment of Effects on the Environment (AEE) report has been prepared on behalf of Watercare Services Limited (Watercare) to support a resource consent application for the disturbance and removal of potentially contaminated soil associated with the development of a storage area, as part of the Central Interceptor (CI) project at 44 and 54 Greenwood Road, Mangere Bridge (the site).

The proposal exceeds the maximum permitted volumes for soil disturbance and removal under Regulation 3 of the NES Soil[1]. Resource consent is therefore required as a controlled activity under the NES Soil.

This resource consent application and Assessment of Effects on the Environment (AEE) report has been prepared in fulfilment of section 88 of the Resource Management Act 1991 (RMA), and in accordance with Tonkin & Taylor Ltd's (T+T) letter of engagement dated 14 October 2020.

1.2 Background

CI[2] is a fundamental part of Watercare's long-term strategy to effectively manage wastewater within the Auckland region, to protect public health and the environment, and to provide for growth. CI is a 14.7-kilometre long and 4.5-metre wide tunnel that runs between Grey Lynn and the Māngere Wastewater Treatment Plant (MWTP), collecting and transferring wastewater for treatment and safe disposal. It will have permanent shafts for operational use and future access – these will collect and transfer wastewater from the existing network into the tunnel providing a more direct route to the MWTP.

Watercare is planning on using the site at Greenwood Road for the storage of construction material, including basalt rock, as part of the CI project. The basalt rocks have been excavated from various areas for the CI project and will be stored at the site throughout the duration of the CI project. Basalt rocks is proposed to be stored onsite alongside other construction material such as pipes.

The Greenwood Road site is owned by Watercare and designated by Watercare for '*Wastewater purposes…Area 1B and 2 odour buffer area and application of biosolids*' in the Auckland Unitary Plan (AUP). The site is in 'Area 2' of designation 9503. As the storage of construction materials, including basalt rock, is not provided for in designation 9503, district plan land use rules apply. The site is zoned Business – Light Industrial in the AUP and storage of construction materials in this zone is permitted[3].

[1] National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health – Regulations 2011

[2] Works for the construction and operation of the CI project are authorised by the following regional and district consents - R/LUC/2012/2846, R/LUC/2012/2846/1, PRC40962, PRC40963, 40834, 40835, 40836, 40837, 40838, 40839, 40840, 40841, 40842, 40843, 40844, 40845, 40846, 40848, 40849 and 40850

[3] Watercare sought and was issued a Certificate of Compliance (ref. CER70016990) confirming that the storage of basalt rocks is a permitted activity under the AUP and can be lawfully carried out without a resource consent.

A ground contamination assessment[4] (**Appendix B**) for the site identifies that is more likely that not to be a HAIL[5] site due to past activities. Hence, the proposed disturbance works are subject to the requirements set out in the NES Soil[6].

The current proposal for the basalt rock storage area involves up to 1,400 m^2 of earthworks on the site at 54 Greenwood Road, however Watercare wishes to future-proof for additional minor works on site by consenting up to the maximum area and volume of earthworks permitted under Chapter E12 of the AUP – i.e. 2,500 m^2 and 2,500 m^3 across the two sites on Greenwood Road. Hence, for the purposes of this application for resource consent under the NES Soil, the proposed works involve up to 2,500 m^2 and 2,500 m^3 of soil disturbance and potential offsite removal.

The total area of the Watercare properties at 44 and 54 Greenwood Road is 40,000m^2. Based on a total area of 20,000 m^2 (being the 'piece of land' subject to the HAIL activities)[7], the proposed works exceed the permitted disturbance threshold of 1000 m^3 and the removal threshold of 200 m^3 under Regulation 3 of the NES Soil and accordingly resource consent is required as a controlled activity under Regulation 9 of the NES Soil.

1.3 Applicant and property details

Table 1.1: Applicant and property details

Applicant	Watercare Services Ltd
Owner and occupier of application site	Watercare Services Ltd
Site address	44 and 54 Greenwood Road, Mangere Bridge
Site area	44 Greenwood Road – 2 ha 54 Greenwood Road – 2 ha
Legal description	44 Greenwood Road - Lot 12 DP 16117 54 Greenwood Road - Lot 11 DP 16117
Record of Title reference	NA444/225, NA401/145
Council / Plans	Auckland Council Auckland Unitary Plan Operative in Part (AUP)
Address for service during consent processing	Tonkin + Taylor Ltd Attention: Laila Alkamil Phone: 09 352 2948 Email: LAlkamil@tonkintaylor.co.nz
Address for service during consent implementation and invoicing	Watercare Services Ltd Attention: Xenia Meier Phone: 021 574 585 Email: xenia.meier@water.co.nz

We attach copies of the relevant Record of Titles in **Appendix A**.

[7] For the purposes of this application, the 'piece of land' is the site at 54 Greenwood Road (20, 000 m^2) in which HAIL activities are more than likely than not to have occurred.
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1.4 Overview of resource consent requirements

Resource consent is required from Auckland Council under the NES Soil as follows:

- Regulation 9: Based on a total area of 20,000 m^2 (i.e. the 'piece of land' subject to the HAIL activities), the proposed works exceed the permitted disturbance threshold of 1000 m^3 and the removal threshold of 200 m^3 under Regulation 3 of the NES Soil and accordingly resource consent is required as a controlled activity under Regulation 9 of the NES Soil.

Overall, resource consent is required from Auckland Council under the NES Soil as a **controlled** activity. Resource consent for a controlled activity must be granted, subject to conditions relevant to the specified matters of control.

Pursuant to Section125(1) of the Resource Management Act 1991 (RMA), a standard lapse date of 5 years is sought.

2 Environmental setting

2.1 Site location and description

Construction materials are proposed to be stored at a site located at 44 and 54 Greenwood Road, Mangere Bridge. The site is located to the east of Watercare's Mangere Resource Recovery Facility (RRF) and is recognised as 'Area 2' in designation 9503 (see Figures 2.1 and 2.2 below).

Figure 2.1: 'Area 2' of Designation 9503 (approximate site boundary in white). (Source: Auckland Council Geo Maps, 2020).

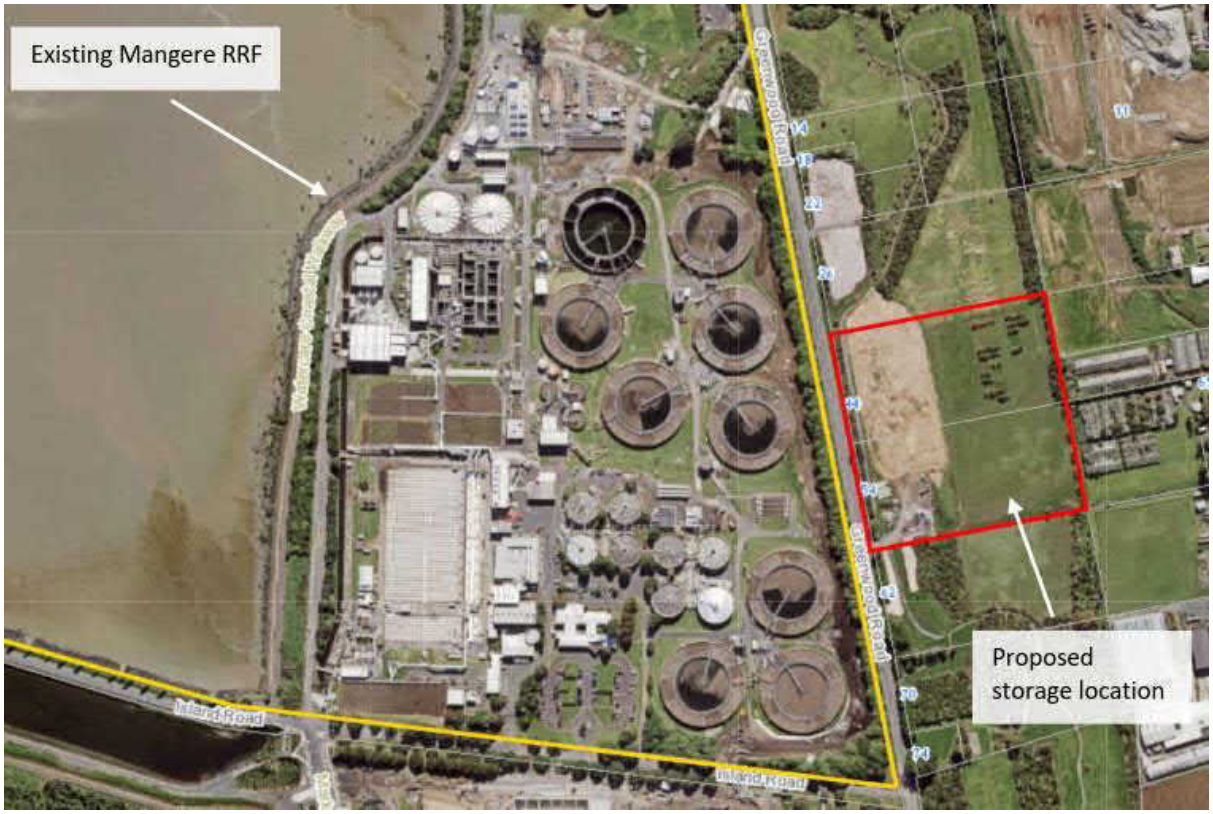

Figure 2.2 Site location plan (approximate site boundaries in red) in relation to the Mangere RRF. (Source: Auckland Council Geo Maps, 2020)

The site is surrounded by light industrial activities, including the Mangere RRF, and is zoned Business – Light Industry in the AUP.

The site is vacant, with the exception of a weather station located on the northern section of the site and a dog bath at the entrance to the site (see Figure 2.2). Watercare is not currently utilising the site, however it has previously been used in to store pipes and construction material.

Watercare currently provides for public access through the site via a walkway connecting the site to Greenwood/Ascot Road and the public uses the site for dog walking. The construction materials will be stored close to the entrance of the site and the existing walkway will be rerouted around the storage area to allow continued use of the walkway by the public.

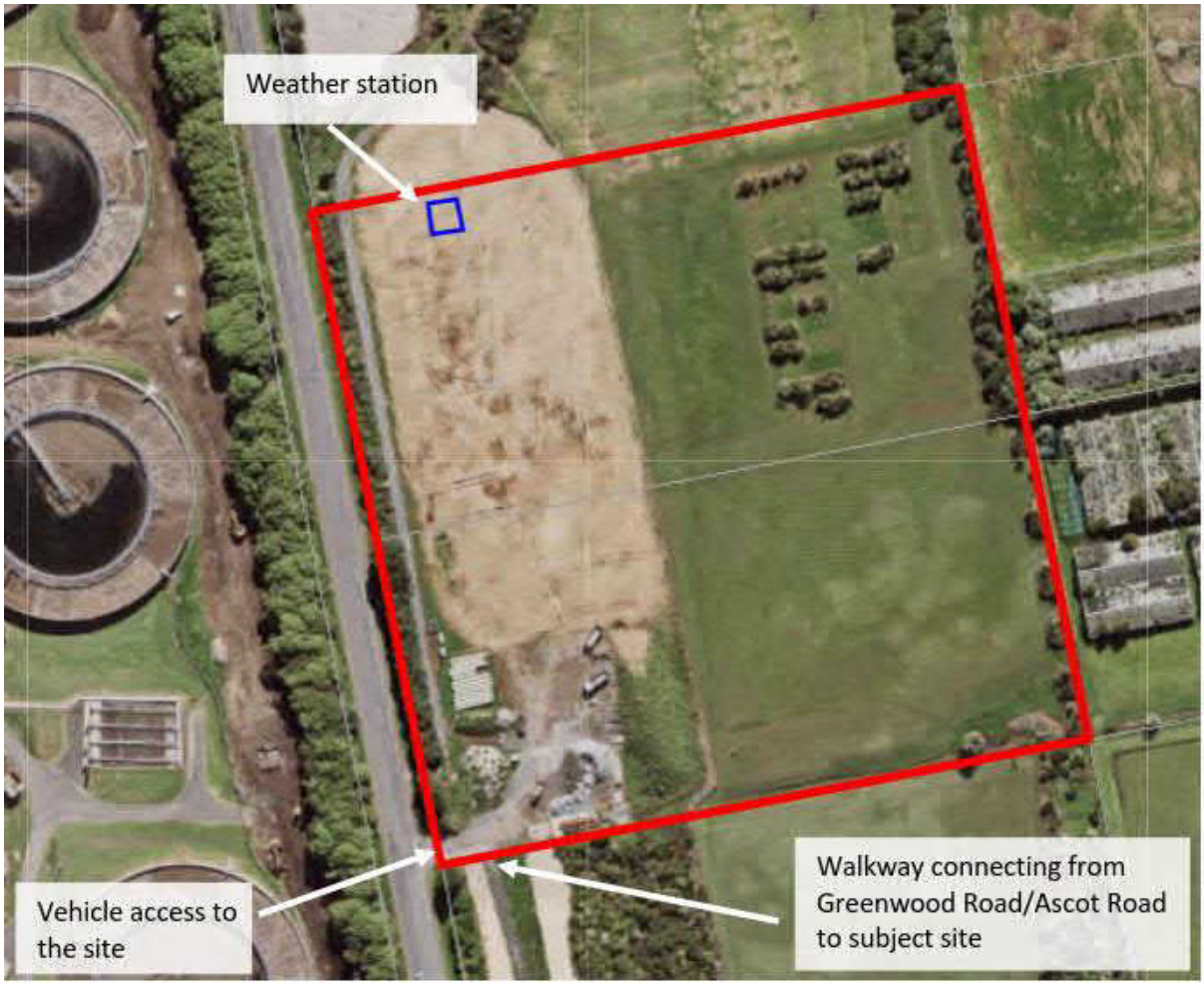

Figure 2.2: Site layout. (Source: Auckland Council Geo Maps, 2020).

2.2 Geology, topography and hydrogeology

The site is located on Puketoka Formation (Pup), which is largely characterised by pumiceous mud, sand and gravel with muddy peat and lignite.

The site itself is generally flat with some undulations, and an elevation of approximately 9 m above sea level. The hydrogeology of the site follows a similar pattern to the surface topography, with regional groundwater flow anticipated to be in a western direction towards the Manukau Harbour.

2.3 Cultural and archaeological values

The site is not within an area of significant cultural value or within a statutory acknowledgement area. A review of ArchSite[8] database shows there are no identified archaeological items within the site.

Given the site's proximity to the Manukau Harbour, the area was popular with early Māori settlement. The site has been long-designated and used by Watercare for activities associated with the MWTP, including the storage of construction material. However in the unlikely event any historical items are uncovered during the proposed works, the Accidental Discovery Protocol set out under the AUP will be adhered to and any necessary heritage authorities will be obtained.

[8] Archaeological Site Recording Scheme: http://www.archsite.org.nz/

2.4 Site history and ground contamination

A ground contamination assessment (see **Appendix B**) has been undertaken for the site, which determined that HAIL activities are more than likely than not to have presently or historically occurred on the 'piece of land'[9] subject to this application from the following activities:

- A10 – Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds.
- I – Storage of aggregate and construction materials.

Soil testing confirmed the presence of very minor contamination on site. In summary:

- The human health guidelines were not exceeded for heavy metals at any tested location for the intended land use. The AUP permitted activity soil acceptance criteria were not exceeded for environmental receptors.
- Heavy metal concentrations exceeded the natural background concentrations at one sampled location only (for lead). Note: Cadmium also exceeded TP153 background concentrations at one location, however due to the very marginal exceedance this is still likely to represent background concentrations);
- Asbestos and TPH were not detected on site;
- PAH analytes and DDT isomers were found to be below the relevant risk acceptance criteria; and
- The soil material onsite is considered suitable for commercial/industrial reuse on site subject to site management protocols. Excess material requiring disposal will likely require disposal at a managed fill facility if not reused onsite.

Contamination risk will be managed in accordance with the measures set out in the Contaminated Land Site Management Plan (CLSMP)[10] (see **Appendix C**). The CLSMP will also assist in the event of any accidental contamination discovery during site excavation works due to previous HAIL activities on the site.

[9] For the purposes of the ground contamination assessment, the 'piece of land' subject to this investigation is considered to be the area of the site where HAIL activities are 'more likely than not' to have occurred.

[10] Beca Limited. Contaminated Land Site Management Plan. Central Interceptor Project – Main Project Works. Ghella Abergeldie JV, 2019 (CLSMP).

3 Description of proposed works

3.1 Proposed works

The proposed works involve the following:

- Underlaying of geotextile fabric for a 3,600 m^2 temporary storage area (note – no soil disturbance / stripping of topsoil is proposed for the storage area, see Figure 3.1 below);
- Topsoil stripping across an area of 1,400 m^2 to enable the construction of a haul road up to a volume of 210 m^3; and
- Laying thin aggregate (maximum of 1500mm thickness), where required.

Additional development may occur the site at 44 and 54 Greenwood Road as the project proceeds, but earthworks will not exceed the AUP permitted activity limits for earthworks, being 2,500m^2 of soil disturbance and 2,500m^3 of topsoil removal.

The soil material onsite is considered suitable for commercial/industrial reuse on site subject to site management protocols. Excess material requiring disposal will likely require disposal at a managed fill facility if not reused onsite. Appropriate procedures are set out in the CLSMP.

The works will be managed in accordance with the controls set out in the CLSMP. If required, the CLSMP would be updated to reflect any changes and additional controls.

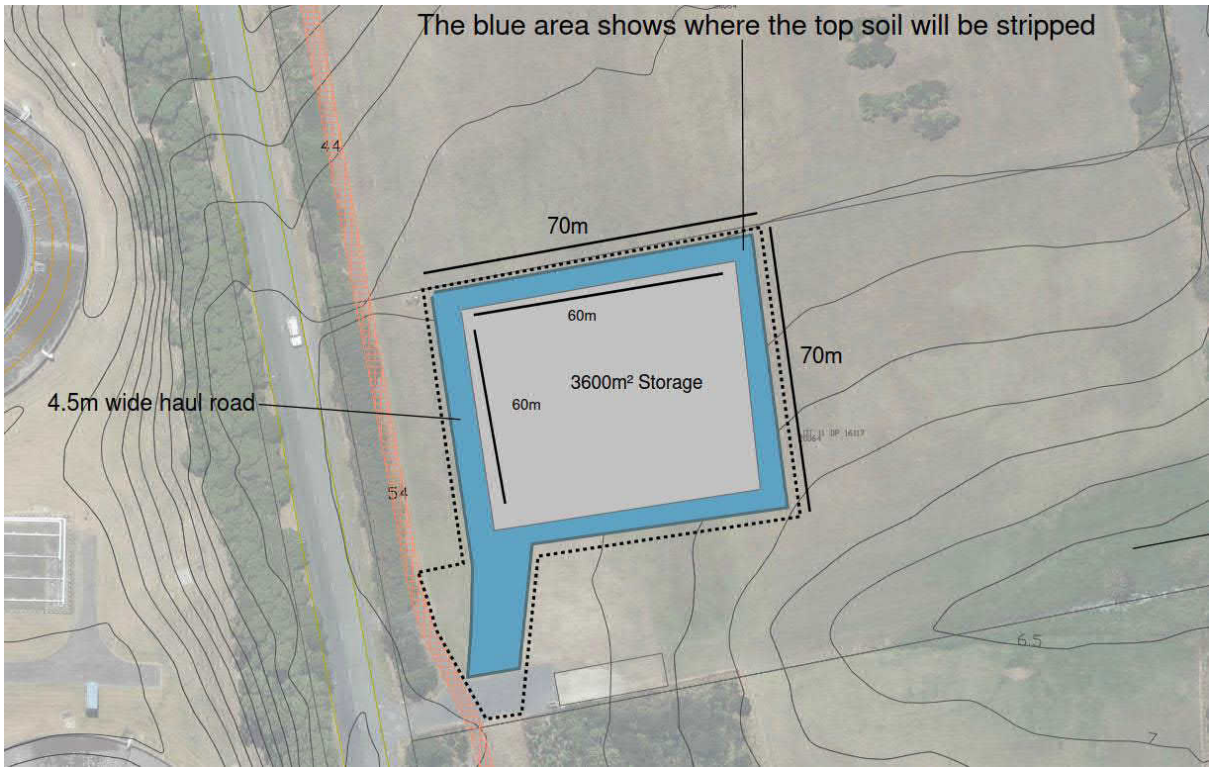

Figure 3.1: Area of proposed works. (Source: Ghella Abergeldie JV, 2020).

The proposed storage area will be located near the entrance of the site and will be enclosed by a fence. There will also be signage placed along the fence advising the public to not enter the storage area and the existing walkway on the site will be rerouted around the storage area. The storage area will be used for the duration of the CI project to store basalt rock and other construction material such as pipes.

Materials will be transported to the site via trucks and will enter through accessway on Greenwood Road. Traffic management will be in place to provide that trucks enter 'right in' and exit 'left out' to ensure all traffic leaving the site exits in a forward-facing motion. The number of truck movements will be limited and on an as required basis.

3.2 Erosion and sediment controls

Appropriate erosion and sediment control measures shall be implemented in accordance with Auckland Council's '*Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region'* (GD05). These measures shall include:

- Where required, installing a silt fence for the duration of the earthworks and stabilisation of the site;
- Keeping the site clean;
- Avoiding work in the heavy rain;
- Maintaining grass surfaces throughout the area of the site not being utilised for storage purposes; and
- Ensuring erosion and sediment controls are checked regularly and maintained in good working condition.

In accordance with the relevant permitted activity standards, erosion and sediment controls measures shall remain in place until earthworks are complete and the area of earthworks stabilised.

4 Resource consent requirements

4.1 AUP zoning and notations

The requirements for resource consents are determined by the rules in the AUP and NES Soil. The rules which apply are determined by the zoning of the site, any identified notations in the plan and the nature of the activities proposed. The relevant zones and planning limitations are identified in Table 4.1 below.

Table 4.1: Zoning and planning notations

Zoning/planning limitation	Comment
Business – Light Industry Zone	Applies across the entire site
Mangere Puhinui Precinct	Applies across the entire site Purpose of this precinct is to protect significant geological features from adverse effects associated with further development.
Designation – 9503 (Area 2)	Applies across the entire site. Purposes of this designation is 'Odour Buffer Area and Application of Biosolids'.

4.2 NES Soil

The ground contamination assessment (**Appendix B**) determined the following HAIL activities occurred historically on the site:

- A10 – Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds.
- I – Storage of aggregate and construction materials.

The results of soil testing indicate the presence of heavy metals above expected background concentrations (for lead) in one sampled location (cadmium was also very marginally above stated background concentrations at one location although this is likely to still represent background levels). Therefore, the NES Soil applies to this site.

Table 4.2: Resource consents required

Proposed activity	Rule reference / description	Activity status
Earthworks to enable the construction of a haul road and storage area	**Regulation 9** If a requirement described in any of regulation 8(1) to (3) is not met, the activity is a controlled activity while the following requirements are met: a a detailed site investigation of the piece of land must exist: b the report on the detailed site investigation must state that the soil contamination does not exceed the applicable standard in regulation 7: c the consent authority must have the report:	**Controlled** The proposed works exceed the maximum permitted volumes for soil disturbance and removal offsite described in regulation (3). A ground contamination assessment has been prepared for the site and states that soil contamination does not exceed the applicable standard in Regulation 7.

Proposed activity	Rule reference / description	Activity status
	d conditions arising from the application of subclause (2), if there are any, must be complied with	The ground contamination assessment is attached in Appendix D and meets the conditions arising in subclause (2).

4.3 Permitted activities

As discussed in Section 1.2, the storage of construction materials, including basalt rocks, is not provided for in designation 9503. Therefore, as district plan land use rules apply, Watercare sought and was issued a CoC confirming that the storage of basalt rocks and construction materials on site is a permitted activity under the AUP and can be lawfully carried out without a resource consent. A full assessment against the relevant permitted activity standards is provided in the CoC (see **Appendix D**).

The proposed earthworks comply with the maximum earthworks area and volume (2,500 m^2 and 2,500 m^3 respectively) under Rules E12.4.1 (A5) and E12.4.1 (A9) of the AUP.

As indicated in the ground contamination assessment (**Appendix B**), the concentration of heavy metals on site complies with the permitted activity soil acceptance criteria as set out under Standard E30.6.1.4 of the AUP and therefore the works are permitted under Rule E30.4.1 (A4) of the AUP.

4.4 Other consents and approvals required

No other consents or approvals are required for the proposed works.

5 Assessment of effects on the environment

5.1 Introduction

The following assessment identifies and assesses the types of effects that may arise from the proposed works. This assessment also outlines the measures that the applicant proposes to avoid, remedy or mitigate any potential adverse effects on the environment.

The consent authority has reserved its control to the matters set out in Regulation 9(2) of the NES Soil, as follows:

- The adequacy of the detailed site investigation, including-
  - Site sampling:
  - Laboratory analysis:
  - Risk assessment;
- How the activity must be –
  - Managed, which may include the requirement of a site management plan;
  - Monitored;
  - Reported on:
- The transport, disposal and tracking of soil and other materials taking in the course of the activity;
- The duration of the resource consent.

Based on these matters of control, the actual and potential effects on the environment are considered below.

5.2 Detailed site investigations

5.2.1 Site sampling

As discussed in Section 2.4, site sampling has been undertaken as part of the ground contamination assessment. This sampling has been undertaken in accordance with the NES Soil and relevant Ministry for the Environment guidelines. All investigations were undertaken by a Suitably Qualified and Experienced Practitioner (SQEP) in contaminated land investigations.

Site sampling indicated minor site contamination, with the concentration of heavy metals found to be in exceedance of natural background concentrations (for lead only with cadmium still representing background levels).

5.3 Human health effects

Exposure to contaminated soil has the potential to increase risk to human health for workers undertaking the proposed works.

The ground contamination assessment indicates that contamination levels on site are below levels that would pose a risk for workers and/or visitors to the site (see **Appendix B**). Notwithstanding this, the CLSMP contains procedures for the handling and disposal of material excavated from the site. These procedures include implementing good hygiene practices and following accidental discovery protocols if any unexpected contamination is discovered.

Given the low levels of contamination found on site and the control measures set out in the CLSMP, the effects on human health is considered to be less than minor.

5.4 Site management

As soil will be exposed during the works, there is potential for sediment transport to occur. As discussed in Section 3.2, the proposed works will be undertaken in accordance with Auckland Council's GD05 guidelines.

The site management protocols are set out in the CLSMP (**Appendix C**), which include the following:

- Earthworks procedures in instances where contamination is identified or suspected;
- Procedures for the stockpiling of contaminated or potentially contaminated soil on site;
- Dust control;
- Accidental discovery protocols in the event unexpected contamination is encountered during works; and
- Any stormwater and sediment control required, including implementing controlled site exit points and wheel washing equipment if required.

Given the temporary and small-scale nature of the works, the topography of the site (generally flat) and the control measures that will be in place, any adverse are considered to be less than minor.

5.5 Transport, disposal and tracking of material offsite effects

The use of earthworks machinery, exposing bare ground and the transportation of soil off-site has the potential for the generation of dust, for tracking of soil off-site onto the surrounding road network and the disposal of soil to a landfill that may not be authorised to receive the soil. These poses a potential health risks to the general public including future users of the landfill that accepts soil from the site.

The implementation of procedures and controls set out in the CLSMP will manage these effects. These measures include:

- Earthwork procedures;
- Dust control procedures, which include limiting the amount of contaminated soil to be excavated as much as practicable and utilising water sprays to dampen dust during dry and windy conditions;
- Erosion and sediment control procedures;
- Disposal procedures;
- Odour control in the event that odour material is uncovered; and
- Accidental contamination discovery protocols in the event that any unexpected contamination is noted during site excavations works.

As noted above, the land disturbance activities are very small-scale with very limited contamination identified on site. With the implementation of the measures in the CLSMP (see **Appendix C**), potential effects from transport, soil tracking and disposal are considered to be less than minor.

5.6 Consent duration and review

The proposed works involve minor earthworks within the permitted activity threshold across land assessed to have a very low-level of contamination. CI is a major infrastructure project and the proposed works are required to support this project. Accordingly, a consent duration of 10 years is sought. As per Section 1.4, a standard lapse date of 5 years is sought.

Considering the small-scale nature of the works and the controlled activity status, a specific review clause beyond the standard clause typically included in consent conditions is not required.

5.7 Conclusion

The proposed works enable the development of a storage area as part of the wider CI project. CI project has numerous positive effects, including providing for network capacity for growth and development, addressing asset risk to the ageing Western Interceptor and substantially reducing wastewater overflows to the stream environment in the catchment it serves.

CI is integral to the ongoing operation of the wastewater network in Auckland over the next 50 years and beyond. The wastewater network enables the communities of Auckland to provide for their ongoing health and wellbeing and for continued economic growth and development across Auckland.

The proposed works will be managed in accordance with best practice erosion and sediment control measures, as well as the protocols set out in the CLSMP. Given these controls and the very low-level of contamination assessed on site, adverse effects are considered to be less than minor.

6 Statutory assessment

6.1 RMA assessment

Section 104 of the RMA sets out the matters to which a consent authority must have regard to, subject to Part 2 of the RMA, when considering an application for resource consent. These are:

- Any actual and potential effects on the environment of allowing the activity (refer Section 5 above);
- Any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity;
- Any relevant provisions of:
  - a national environmental standard;
  - a national policy statement;
  - the AUP; and
- Any other matter the consent authority considers relevant and reasonably necessary to determine the application.

These matters are addressed in the following sections.

6.1.1 Part 2 of the RMA

Part 2 of the RMA sets out the purpose and principles of the Act. The purpose of the RMA is to promote the sustainable management of natural and physical resources. The AUP has been prepared recently and is clear and directive, and clearly deals with Part 2 subject matter such that recourse to Part 2 is not considered likely to add anything to the assessment set out below.

6.1.2 National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health

The NES Soil provides national planning controls that direct the requirement for consent or otherwise for activities on contaminated or potentially contaminated land. The proposal is a controlled activity under the NES Soil, as described in Section 4 above.

There are no other National Environmental Standards of relevance to this proposal.

6.1.3 National Policy Statements

There are no National Policy Statements of relevance to this proposal.

6.1.4 Auckland Unitary Plan assessment

An assessment against key relevant objectives and policies of the AUP is set out in Table 6.1 below.

Reference	Comment
Chapter B3 – Infrastructure, transport and energy	
B3.2.1 Objective (2) – The benefits of infrastructure are recognised, including: a Providing essential services for the functioning of communities, businesses and industries within and beyond Auckland; …..	The proposed works will enable the development of a storage area in which construction materials will be stored as part of the CI project. The CI project is a piece of regionally significant infrastructure which will directly support the social, economic, environmental and cultural well-being of communities within Auckland.

Reference	Comment
d Providing for public health, safety and the well-being of people and communities	
B3.2.2 Policy (1) – Enable the efficient development, operation, maintenance and upgrading of infrastructure	The proposed works are required in order to construct a storage area, which will be used to store materials as part of the CI project. The use of a Watercare property that is designated for 'Wastewater purposes' and has previously been used for storage purposes is considered to be an efficient approach.
Chapter E30 – Contaminated Land	
E30.2 Objective (1) – The discharge of contaminants from contaminated land into air, or into water, or onto or into land are managed to protect the environment and human health and to enable land to be used for suitable activities now and in the future.	The proposed works will be managed in a manner that ensures the protection of the environment and human health, while enabling the land to be used for a suitable purpose as storage area. Adequate measures set out in the CLSMP will be in place for the removal of soil off-site to ensure that adverse effects on the environment are avoided.
E30.3 Policy (2) (g) – Require any use of development of land containing elevated levels of contaminants resulting in discharges to air, land or water to manage or remediate the contamination to a level that: (c) avoid, remedies or mitigates significant adverse effects on ecological values, water quality, human health and amenity values, while Taking into account all of the following: (g) whether adequate measures are in place for the transport, disposal and tracking of contaminated soil and other contaminated material removed from the site to prevent adverse effects on the environment.	
Chapter E26 – Infrastructure	
E26.2.1 Objective (4) – Development, operation, maintenance, repair, replacement, renewal, upgrading and removal of infrastructure is enabled.	The proposed works are for the purposes of developing a storage area, which enables the wider CI wastewater upgrades.
Chapter E12 – Land disturbance (District)	
E12.2 Objective (1) Land disturbance is undertaken in a manner that protects the safety of people and avoids, remedies or mitigates adverse effects on the environment	The proposed works will be undertaken in accordance with the measures set out in the CLSMP in order to protect the safety of people and avoid, remedy or mitigate adverse effects on the environment.
E12.3 Policy (3) Enable land disturbance necessary for a range of activities undertaken to provide for people and communities social, economic and cultural well-being, and their health and safety.	The proposed earthworks are necessary for the development of a storage area that will contribute to the wider CI project. The CI is a piece of regionally significant infrastructure which will provide for people and communities social, economic and cultural well-being, and their health and safety.

6.2 Non-notification assessment

Public notification is precluded in both Regulation 9(5) of the NES Soil. Therefore, in accordance with section 95A(5)(b) of the RMA, this application must be processed without public notification.

For applications that are not publicly notified, under section 95B, the consent authority must determine whether to give limited notification of an application to any affected parties. Section 95B identifies a four step process. In relation to these steps we note the following:

- The application does not need to be notified to any parties under section 95B(4). The proposed change will not affect any customary rights;
- The proposed activity is not on or adjacent to, or does not affect, land that is the subject of a statutory acknowledgement;
- There are no applicable rules or national environmental standards precluding limited notification. We note however that 95B(6)(b)(i) precludes the limited notification of controlled activity resource consents. However this is where consent is required under a district plan and does not appear to extend to the NES Soil; and
- No special circumstances are considered to exist in relation to the application that warrant notification of the application to any other persons not already determined to be eligible for limited notification.

In terms of Section 95E(1), the application is for minor earthworks on a HAIL site for the purposes of developing a storage area. The site is owned and designated by Watercare, and contamination is assessed as very low. As outlined in Section 5 above, adverse effects on the receiving environment are assessed as being less than minor. Therefore, no person is considered to be adversely affected by the application and the proposal meets the tests of the RMA to be processed without limited notification.

Following the steps set out in sections 95A and 95B, we consider that the application must be processed without public notification and should be processed without limited notification.

7 Conclusion

This AEE report has been prepared on behalf of Watercare Services Ltd to accompany a resource consent application to Auckland Council for the disturbance and removal of potentially contaminated soil associated with the development of a storage area for construction materials as part of the CI project. The activity requires consent from Auckland Council as a controlled activity under Regulation 9 of the NES Soil.

The Ground Contamination Assessment indicates that human health guidelines were not exceeded for heavy metals at any tested location for the intended land use. The AUP permitted activity soil acceptance criteria were not exceeded for environmental receptors. Heavy metal concentrations exceeded the natural background concentrations at one sampled location only (but were still well within the AUP permitted acceptance criteria).

This AEE report draws the following conclusions:

- The works are consistent with Part 2 of the Resource Management Act 1991;
- The works will have a less than minor effect on the environment and will contribute to the wider CI project which will provide numerous positive effects in relation to improving Auckland's wastewater infrastructure;
- The proposed works involve small-scale earthworks and the disturbance and removal of soil with very minor contamination; and
- The works are consistent with the relevant objectives and policies of the AUP.

The works are a controlled activity and therefore consent must be granted, subject to conditions relevant to the specified matters of control.

We would appreciate the opportunity to comment on draft conditions prior to consent being granted.

8 Applicability

This report has been prepared for the exclusive use of our client Watercare Services Limited, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that this report will be submitted to Auckland Council in support of an application for resource consent for the works described herein and that council will rely on this report for the purposes of assessing that application.

Tonkin & Taylor Ltd

Environmental and Engineering Consultants

Report prepared by:	Authorised for Tonkin & Taylor Ltd by:
	
.....	.....
Laila Alkamil	Karen Baverstock
Planner	Project Director

27-Oct-20

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Appendix A: Record of Titles

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**NA401/145**
Land Registration District	**North Auckland**
Date Issued	13 October 1924

Prior References
NA63/249

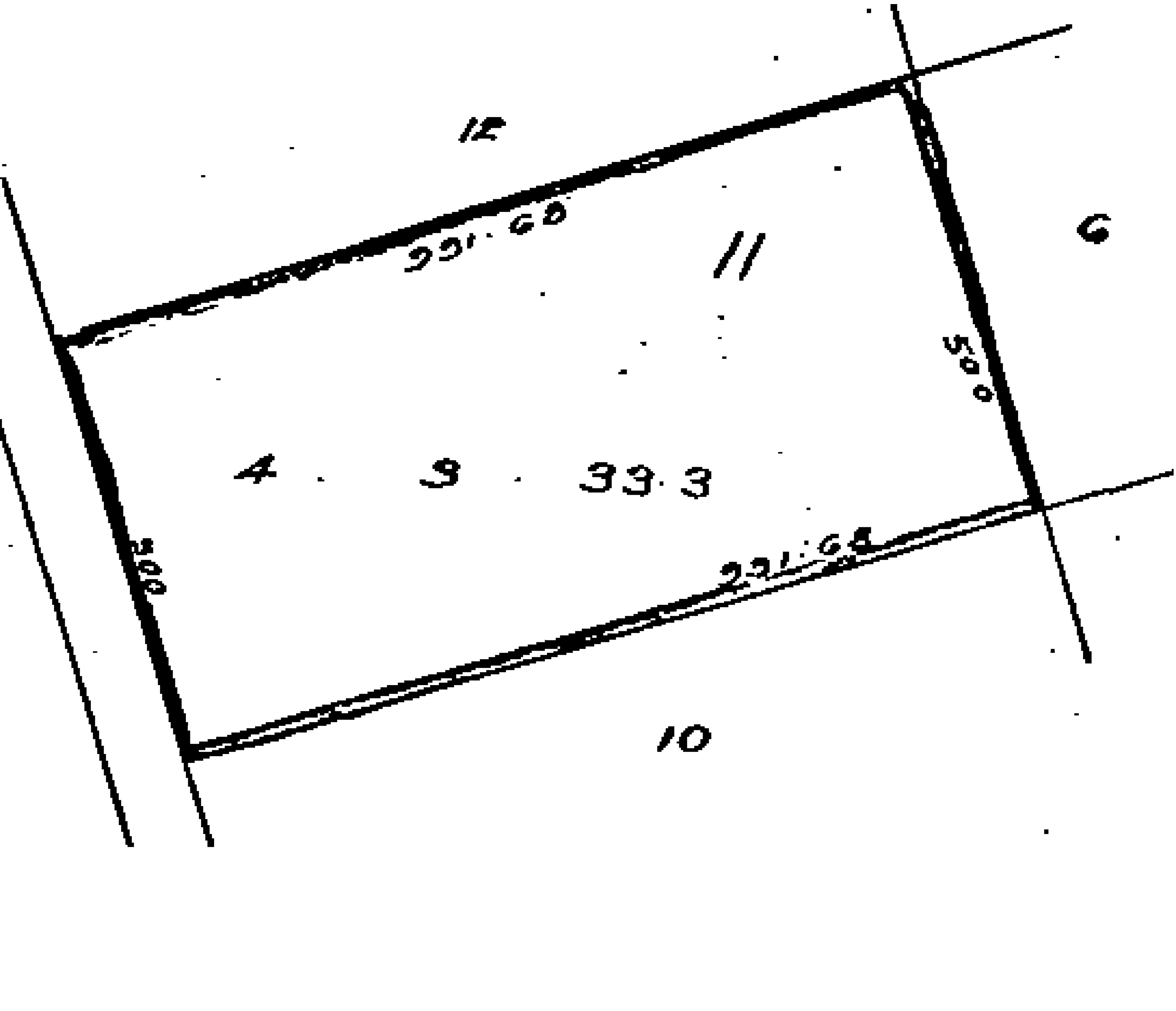
Estate	Fee Simple
Area	2.0065 hectares more or less
Legal Description	Lot 11 Deposited Plan 16117

Registered Owners
Watercare Services Limited

Interests

Fencing Agreement in Transfer 183147 - 13.10.1924

D531583.1 Notice pursuant to Section 23 Public Works Act 1981 - 10.8.2000 at 3.09 pm



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RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**NA444/225**
Land Registration District	**North Auckland**
Date Issued	08 October 1926

Prior References
NA63/249

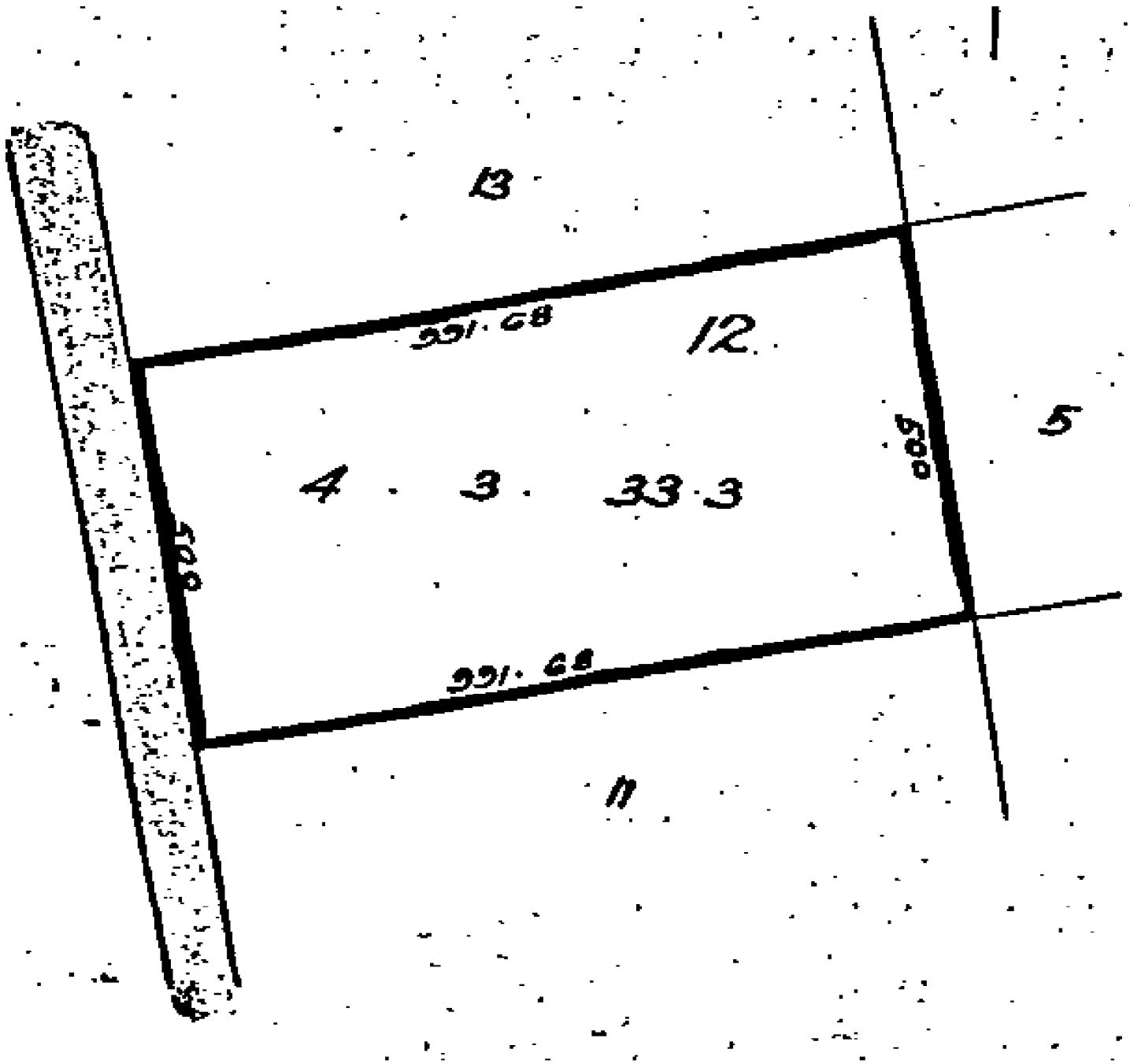
Estate	Fee Simple
Area	2.0065 hectares more or less
Legal Description	Lot 12 Deposited Plan 16117

Registered Owners
Watercare Services Limited

Interests

Fencing Agreement in Transfer 206149 - 8.10.1926

D531583.2 Notice pursuant to Section 23 Public Works Act 1981 - 10.8.2000 at 3.09 pm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Appendix B: Preliminary Site Investigation (Ground Contamination Assessment)

Preliminary Site Investigation and Soil Contamination Assessment

54 Greenwood Road, Mangere

Central Interceptor Project

October 2020

Babingtons

CIVIL AND ENVIRONMENTAL CONSULTANTS

Prepared for: **Sandra Edwards**
Environmental Manager

Prepared by: **Sean Toland**
Senior Environmental Consultant, SQEP

Reviewed and Approved by: **Malcolm Todd**
Director, SQEP
BE (Env.) BSc (Earth Sciences)

Statement:
This preliminary site investigation and soil contamination assessment has been completed in accordance with the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations, 2011. The investigation has been overseen by a suitably qualified and experienced practitioner in contaminated land investigations, and is reported in accordance with the current edition of the *Contaminated Land Management Guidelines No. 1 – Reporting on Contaminated Sites in New Zealand*, Wellington, Ministry for the Environment, 2011.

Date: 9th October 2020
Status: Final
Revision: 0

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Parnell
Auckland, New Zealand
Telephone: 09 360 7130

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List of Abbreviations

Executive Summary

List of Abbreviations

% w/w	% weight for weight
ACM	Asbestos Containing Material
ACOP	Approved Code of Practice
AUP (OP)	Auckland Unitary Plan (Operative in Part)
BaP TEF	Benzo(a)pyrene Toxic Equivalence
BRANZ	Building Research Association of New Zealand
CCME	Canadian Council of Ministers of the Environment
CEQG	Canadian Environmental Quality Guidelines
CIP	Central Interceptor Project
CLMG	Contaminated Land Management Guidelines
CLSMP	Contaminated Land Site Management Plan
CoC	Chain of Custody
CSM	Conceptual Site Model
CT	Certificate of Title
DDT	Dichlorodiphenyltrichloroethane
DP	Deposited Plan
DQO	Data Quality Objectives
FENZ	Fire and Emergency New Zealand
FOI	Freedom of Information
GAJV	Ghella Abergeldie Joint Venture
HAIL	Hazardous Activities and Industries List
HIL	Health-based Investigation Levels
HM	Heavy metals
JSEA	Job Safety and Environmental Assessment
IANZ	International Accreditation New Zealand
m	metres
m^2	Square metres
m^3	Cubic metres
m b.g.l.	metres below ground level
MfE	Ministry for the Environment
mg/kg	milligrams per kilogram
NEPM	The Australian National Environmental Protection Measure

NES:CS	National Environmental Standard: Contaminated Soil
NOHSC	National Occupational Health and Safety Commission (Australia)
NZG	New Zealand Guidelines
NZGD	New Zealand Geotechnical Database
OIG	Oil Industry Guidelines
QA/QC	Quality Assurance / Quality Control
OCP	Organochlorine Pesticides
ONP	Organonitrogen Pesticides
OPP	Organophosphorous Pesticides
PAC	Permitted Activity Criteria
PAH	Polycyclic Aromatic Hydrocarbons
PPE	Personal Protective Equipment
PSI	Preliminary Site Investigation
RMA	Resource Management Act
SCS	Soil Contaminant Standards
SGV	Soil Guideline Values
SQEP	Suitably Qualified and Experienced Practitioner
SSESCP	Site Specific Erosion and Sediment Control Plan
TCLP	Toxicity Characteristic Leaching Procedure
TP153	Auckland Council Technical Publication No. 153
TPH	Total Petroleum Hydrocarbons
WSL	Watercare Services Limited

Executive Summary

Babingtons were engaged by Ghella Abergeldie Joint Venture (GAJV) ("the client") to undertake an preliminary site investigation (PSI) and soil contamination assessment to assess the potential for soil contamination risk at a 'piece of land' at 54 Greenwood Road, Mangere, Auckland ("the site"). It is understood that this section of the site will be developed as part of the Central Interceptor Project (CIP) ("the project") for the purposes of stockpiling basalt rock. The CIP is being constructed under existing resource consents R/LUC/2012 /2846/1, PRC40963 and 40843 for Watercare Services Limited (WSL) ("Watercare").

The current plans for the site development are included in Appendix 1. The site is planned to be used as a basalt rock storage yard. This portion of the site where the site works are proposed to take place is the 'piece of land' subject to this investigation. The 'piece of land' is estimated to cover 4,900 m^2 of site as a whole, of which 1,400 m^2 will involve topsoil stripping to enable construction of a haul road for access. The 3,600 m^2 basalt rock storage area will be underlain with geotextile fabric, however the topsoil will not be stripped in this area. The earthworks volume proposed for these activities is estimated at 210 m^3 of topsoil stripping for the haul road.

The following scope of work was developed and completed:

- Undertake this investigation in accordance with the NES:CS and relevant Ministry for the Environment (MfE) guidelines to inform GAJV as to the concentrations of soil contamination at the site prior to the development works at the site.

This investigation was undertaken by Babingtons to:

- Assess the soil contamination risks in relation to potential HAIL activities at the proposed site on the 'piece of land' at 54 Greenwood Road, Mangere;
- Assess any risk to human health and the environment for these activities through a soil contamination investigation; and
- To support the relevant consenting requirements for the proposed site redevelopment works.

This involved applying DQOs to develop an appropriate sampling and analysis programme. Laboratory analytical results were considered against Tier 1 risk acceptance criteria for determination of risk to human health and the environment.

Based on the findings of this investigation, the following conclusions can be drawn:

- It is considered 'more likely than not' that the site is a HAIL site due to past activities (HAIL A10 and I – horticultural and storage of aggregate and construction materials) on the 'piece of land' to be developed;

- The shallow soil at the site comprises of at least 0.15 m of topsoil at all of the locations investigated;
- Asbestos analytes were not detected in the four soil samples that were analysed;
- Heavy metal concentrations exceeded the natural background concentrations at one sampled location;
- At two out of three sampling locations, the soil concentrations of PAH analytes were detected above the laboratory detection limits, but below the relevant risk acceptance criteria;
- TPH analytes were not detected in the three soil samples that were analysed;
- DDT isomers were detected above the laboratory detection limits in all of the seven samples that were analysed, but below the relevant risk acceptance criteria;
- Soil disturbance volumes (210 m^3 removal) associated with the works will exceed NES:CS disturbance and removal thresholds;
- The proposed works and likely soil disturbance at this HAIL site triggers the application of the NES:CS;
- The in-situ topsoil on the 'piece of land' is contaminated with heavy metals, OCP and PAH and will require disposal at a managed fill facility if not reused onsite;
- This spoil material is intended be managed in accordance with sustainability hierarchy No. 4 – *Removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material*; and
- Pending Council approval the material could also be managed in accordance with sustainability hierarchy No. 5 – *Management Strategy* – where it could remain onsite and used to reinstate the site when the works are completed.

Based on these conclusions the following recommendations are made:

The soil material onsite is considered suitable for commercial/industrial reuse on the site, pending Council approval. Any reuse of soil onsite will require site management systems in place for the works and for the protection of site workers.

Any excess soil material requiring disposal will likely require to be disposed as managed fill. Soil disposal will require confirmation of suitability for disposal with the chosen waste disposal facility operator.

The project CLSMP will assist the management of contamination risks for the site works. This CLSMP will also assist in the event of any accidental contamination discovery during site excavation works due to previous HAIL activities at the site.

1. Introduction

1.1. Background

Babingtons were engaged by Ghella Abergeldie Joint Venture (GAJV) ("the client") to undertake an preliminary site investigation (PSI) and soil contamination assessment to assess the potential for soil contamination risk at a 'piece of land' at 54 Greenwood Road, Mangere, Auckland ("the site"). It is understood that this section of the site will be developed as part of the Central Interceptor Project (CIP) ("the project") for the purposes of stockpiling basalt rock. The CIP is being constructed under existing resource consents R/LUC/2012 /2846/1, PRC40963 and 40843 for Watercare Services Limited (WSL) ("Watercare").

The *National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health 2011*[1] (NES:CS) governs sites where activities listed on the Hazardous Activities and Industries List (HAIL) have taken place, with the intention of protecting human health in the context of sites with soil contamination issues. Any site development activities involving soil disturbance are affected by the requirements of the NES:CS.

The purpose of this investigation is to investigate potential soil contamination issues through a soil sampling investigation at the site. Babingtons were commissioned to investigate the potential for soil contamination at the site where the proposed development is intended to be located. The soil samples analysed were compared to Tier 1 acceptance criteria in accordance with *Ministry for the Environment (MfE) Contaminated Land Management Guideline No. 2, Hierarchy and Application in New Zealand of Environmental Guideline Values (Revised 2011).*

For the purposes of the NES:CS, the area where site works are proposed to take place was considered to constitute the 'piece of land' where contamination may have occurred.

1.2. Purpose

The purpose of this investigation was to:

- Inform GAJV of the soil contamination hazards at the site; and
- To support relevant consenting requirements for the proposed construction works.

[1] Ministry for the Environment 2012. *Users' Guide: The National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.* Wellington: Ministry for the Environment.

1.3. Objectives

The objectives of the investigation included the following:

- Identify potentially contaminating activities that have occurred at the site and determine the risks to human health and environmental receptors from potential contamination sources identified;
- Assess the potential risks to human health through comparison of soil analytical results with New Zealand and international risk based soil acceptance criteria;
- Assessment of soil contaminant concentrations and determine appropriate soil disposal or management options if necessary; and
- Provide a report which could be used to support consent application for future development at the site.

1.4. Scope of Work

In order to achieve the project objectives, the following scope of works was developed:

- Undertake this investigation in accordance with the NES:CS and relevant Ministry for the Environment (MfE) guidelines;
- Assessing the presence of soil contamination through an intrusive surface soil sampling investigation;
- Laboratory analytical testing of selected samples for the identified contaminants of concern;
- Assess the likelihood of soil contamination and identifying any potential risks to human and/or environmental receptors; and
- Preparing this report presenting the findings and recommendations.

A full scope of works is detailed in Section 3: Investigation Methodology of this report.

2. Statutory Context

2.1. The National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health – Regulations 2011 (NES:CS)

The NES:CS regulates activities to be undertaken on potentially contaminated land and provides nationally consistent human health risk based criteria for the assessment of human health risk.

The NES:CS is designed to be implemented by each territorial and unitary authority in accordance with their Section 31 functions under the RMA in relation to contaminated land, specifically Section 31 (b) (iia) "The prevention or mitigation of any adverse effects of the development, subdivision or use of contaminated land". The NES:CS includes criteria for the protection of human heath, but not environmental protection. The NES:CS incorporates relevant Ministry for the Environment (MfE) guidelines for site assessment such as the *Contaminated Land Management Guidelines (CLMG)* which are based upon a tiered approach to assess the risks to human health and the environment. The CLMG are intended to ensure consistency of reporting on the investigation, assessment and remediation of contaminated sites in New Zealand.

The NES:CS contains a national set of Soil Contaminant Standards ($SCS_{(Health)}$) consisting of 12 priority contaminants for five standard land use scenarios, including significant excavation works. $SCS_{(health)}$ criteria are prescribed for the 12 contaminants in the NES:CS. For other contaminants, the *Ministry for the Environment (MfE) Contaminated Land Management Guidelines No. 2*[2] provides a hierarchy for the application of other acceptance criteria, and the NES:CS refers to the methodology for deriving standards for contaminants in soil protect human health (MfE, June 2011) that is to be used to derive SCS health criteria for other contaminants.

The NES:CS applies to a 'piece of land' on which any activity in the HAIL[3] has likely occurred and involves the following activities:

- Removing or replacing an underground fuel storage system;
- Disturbing soil;
- Subdividing the land;
- Changing land use; and
- Sampling of soils for contamination assessment.

[2] Contaminated Land Management Guidelines No. 2. *Hierarchy and Application in New Zealand of Environmental Guideline Values.* 2001 (revised 2011). Prepared by the Ministry for the Environment.
[3] HAIL - http://www.mfe.govt.nz/sites/default/files/hazards/contaminated-land/is-land-contaminated/hazardous-activities-industries-list.pdf

The intention of the NES:CS is to allow for contaminated land to be used safely, and to ensure that contaminated land is appropriately assessed prior to development, and if necessary, the land is made safe for human activity.

As the NES:CS regulates activities on potentially contaminated sites it is necessary to ascertain whether any HAIL activities are 'more likely than not' to have occurred onsite. The determining of whether the NES:CS applies to this site is described in the *Ministry for the Environment, Contaminated Land Management Guidelines No. 5*[4]. This investigation sought to clarify if a HAIL activity occurred within the project area of the site, and also to assess the contamination risks of the HAIL activity, if any, during the site redevelopment works.

The NES:CS consenting requirements will be triggered during this project because the 25 m^3 disturbance and 5 m^3 removal volumes will be exceeded when removing the soil, with an estimated volume of 210 m^3.

2.2. Auckland Unitary Plan (AUP) (Partially Operative)

The AUP[5] replaces various Auckland Council District and Regional Plans including the Air, Land Water Plan (ALWP). The AUP was made partially operative on 15th November 2016 and must be considered when developing proposals. The AUP requires management of both the use of land containing elevated concentrations of contaminants and the discharge of contaminants from land containing elevated concentrations of contaminants in addition to those of the NES:CS. The AUP outlines permitted activity soil acceptance criteria in Chapter E, Section E30 (Contaminated Land), Rule 6.1.2. The provisions of the AUP are intended to protect the environment and are applicable to the Auckland region. These provisions are in addition to the human health requirements under the NES:CS.

The AUP specifies rules that relate to the discharges of contaminants from disturbing soil on land containing elevated levels of contaminants. The AUP is operative in part and the contaminated land component has immediate legal effect. The AUP allows only minor disturbance of contaminated land as a permitted activity. It requires management of larger scale contaminated soil disturbance to protect the environment and human health. Schedule 10: Permitted Activity Criteria (refer Table

[4] Contaminated Land Management Guidelines No. 5. *Site Investigation and Analysis of Soils.* 2001 (revised 2011). Prepared by the Ministry for the Environment.
[5] Auckland Unitary Plan - https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/unitary-plan/Pages/default.aspx

E30.6.1.4.1 in AUP - Permitted Activity Soil Acceptance Criteria[6]) of the ALWP have been incorporated into Chapter E, Section E30 (Contaminated Land), Rule (6.1.2.) of the AUP and are considered in this report.

2.3. Technical Publication No. 153 (T153)

Auckland Regional Council Technical Publication No. 153[7] provides guideline values for naturally occurring (background) concentrations of a number of trace elements in Auckland soils. Comparison of soil total recoverable metal concentrations for this project against the relevant TP153 concentrations inform the applicability of the NES:CS. For the purposes of this investigation the soil volcanic range were selected to best represent the soil conditions at the site.

2.4. Australian National Environmental Protection Measure

In the absence of New Zealand risk based human health criteria for nickel and zinc, the *Australian National Environment Protection Measure 2013*[8] *(NEPM)* guidelines have been adopted for this investigation, in accordance with *CLMG No. 2*. This is required as nickel and zinc are potential heavy metal contaminants of concern based upon the HAIL activities identified for the project.

The intention of the NEPM is to enable safe use of contaminated land to ensure that contaminated land is appropriately assessed prior to development. The NEPM covers a range of land uses. For the purposes of this assessment, the NEPM Health-based Investigation Levels D (HIL D) (commercial/industrial) for nickel and zinc have been selected based on the site attributes and surrounding land uses, to best represent likely human exposure pathways.

2.5. Canadian Environmental Quality Guidelines (CEQG)

In the absence of New Zealand risk based human health criteria for tin, the *Canadian Environmental Quality Guidelines*[9] *(CEQG)* have been adopted for this investigation, in accordance with *CLMG No. 2*. This is required as tin is a potential contaminants of concern based upon the project soil disposal requirements. For the purposes of this assessment, the CEQG industrial guidelines for tin has been selected based on the site attributes and surrounding land uses.

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[6] Auckland Unitary Plan – (AUP – OP) Permitted Activity Soil Acceptance Criteria - https://unitaryplan.aucklandcouncil.govt.nz/Images/Auckland%20Unitary%20Plan%20Operative/Chapter%20E%20Auckland-wide/5.%20Environmental%20Risk/E30%20Contaminated%20land.pdf
[7] Auckland Regional Council Technical Publication No. 153 (October 2001) (TP153). *Background Concentrations of Inorganic Elements in Soil from the Auckland Region*. Auckland, New Zealand.
[8] National Environmental Protection (Assessment of Site Contamination) Measure 1999 (amended 2013) *Schedule B (1); Guideline on the Investigation Levels for Soil and Groundwater.*
[9] Canadian Environmental Quality Guidelines. 2011. *Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health.* Canadian Council of Ministers of the Environment.

2.6. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (OIG)

The NES:CS requires that petroleum hydrocarbon contamination be assessed in accordance with the Oil Industry Guidelines (OIG)[10]. The OIG in New Zealand were prepared to help both industry and regulatory authorities develop uniform and suitable methods of site investigation, contamination assessment, risk assessment, modelling and site management. The guidelines focus on sites that have stored, handled or distributed petroleum products. For the purpose of this investigation, Total Petroleum Hydrocarbons (TPH) and Polycyclic Aromatic Hydrocarbons (PAH) have been selected for soil analysis for the Commercial/Industrial criteria for a selection of samples taken from the site as part of this investigation.

2.7. Health and Safety at Work (Asbestos) Regulations 2016

"Friable asbestos or ACM is asbestos or ACM in powder form, or able to be crumbled, pulverised or reduced to a powder by hand pressure when it is dry."[10] It is more common to encounter non-friable ACMs in buildings. In relation to the management of asbestos containing material (ACM) in buildings, <10 m² of non-friable ACM may be removed by a competent contractor. ACM work must be undertaken in accordance with the *Health and Safety at Work (Asbestos) Regulations 2016*[11], *Worksafe*, *Approved Code of Practice (ACOP), Management and Removal of Asbestos*[12]. Work procedures must be designed to minimise the generation of dust release and spread of ACM fibres.

The *Health and Safety at Work (Asbestos) Regulations 2016* is not an RMA regulation for contaminated land risk, however should be taken into consideration when undertaking work where there is a risk of encountering asbestos containing materials or fibres.

2.8. BRANZ New Zealand Guidelines for Assessing and Managing Asbestos in Soil 2017

The *BRANZ Asbestos in Soil*[13] *guidelines* are used for the assessment and management of information where asbestos fibres may be detected in the soil. These guidelines are intended to ensure the correct safety measures are taken when disturbing, sampling and removing asbestos-impacted soil. The guidelines contains soil guideline values for asbestos in soil. In this case, fibres in

[10] Ministry for the Environment (Revised 2011). Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, Module 4 – Tier 1 Soil Screening Criteria. Wellington: Ministry for the Environment.
[11] New Zealand Government (2016) Health and Safety at Work (Asbestos) Regulations 2016. Wellington, New Zealand.
[12] New Zealand Government (2016) *Approved Code of Practice (ACOP). Management and Removal of Asbestos*. Worksafe New Zealand.
[13] BRANZ (2017) New Zealand Guidelines for Assessing and Managing Asbestos in Soil, Porirua, New Zealand.

the soil are considered to be friable if they are >1% w/w FA and/or AF in soil as given by Table 6 in the BRANZ document.

There is a likelihood that soils at the CIP project sites will contain asbestos if the following conditions are met; if there were buildings present before the year 2000, if there are indications from asbestos surveys, the presence of fill and any observation from site walkovers or investigations. In more recent investigations for the project, asbestos presence has been confirmed by sampling and laboratory analysis.

Soil analytical testing for ACM has been completed as part of this investigation due to the possibility that soils at the site could contain asbestos.

3. Investigation Methodology

All aspects of this investigation were overseen and undertaken by a Babingtons Suitably Qualified and Experienced Practitioner (SQEP) in contaminated land investigations, and in accordance with the NES:CS and MfE guidelines.

This investigation was carried out in accordance with the *Contaminated Land Management Guidelines (CLMG) No. 1: Reporting on Contaminated Sites in New Zealand*[14] and the *Contaminated Land Management Guidelines (CLMG) No. 5: Site Investigation and Analysis of Soils*. Minor adaptations were implemented to reflect site specific conditions, as described below and in section 6: Site Investigation of this report.

The desktop investigation was undertaken through a review of publicly available information, including Auckland Council site and soil contamination searches on the HAIL and a Council property file review. A thorough review of readily available information was undertaken from multiple sources of the site, including a Fire and Emergency NZ (FENZ) Freedom of Information (FOI) request and a review of the certificates of title for the site.

A review of historical aerial photography of the site from the Auckland Council GeoMaps and the Retrolens aerial photography archives was undertaken. A review of published geology, topography, hydrology and hydrogeology of the surrounding area was also undertaken, this included a review of the surrounding land uses to assess potential offsite environmental impacts to the site. A previous site investigation that included the site was also reviewed.

As a result of this information review, potential contaminants of concern were identified based on historical land use at the site and any potential risks were assessed for human and/or environmental receptors. Following the review of readily available information in the desktop study a plan was prepared to assess the potential sources of contamination at the site. A site visit were undertaken to investigate the current condition of the site and whether indications of contamination were present and to note any potential HAIL activities at the site.

Prior to the site visit taking place a risk assessment was conducted to assess the likelihood of contaminated soil and/or groundwater at the site based upon a review of the information obtained.

[14] Ministry for the Environment (2001). *Contaminated Land Management Guidelines No. 1. Reporting on Contaminated Sites in New Zealand (Revised 2011)*. Wellington: Ministry for the Environment.

The risk assessment indicated the need for further investigation at the site and made recommendations on soil sampling requirements.

4. Site Description and Condition

4.1. Site Identification and Location

The overall site is located at 54 Greenwood Road, Mangere. Figure 1 shows the site location plan.

The surrounding land use is described as follows:

- North – Mangere Bridge Residential, Ambury Park, Mangere Mountain.
- East – Mangere, Mangere East Residential.
- South – Mangere Residential, Mangere Industrial.
- West – Mangere Waste Water Treatment Plant, Manukau Harbour.

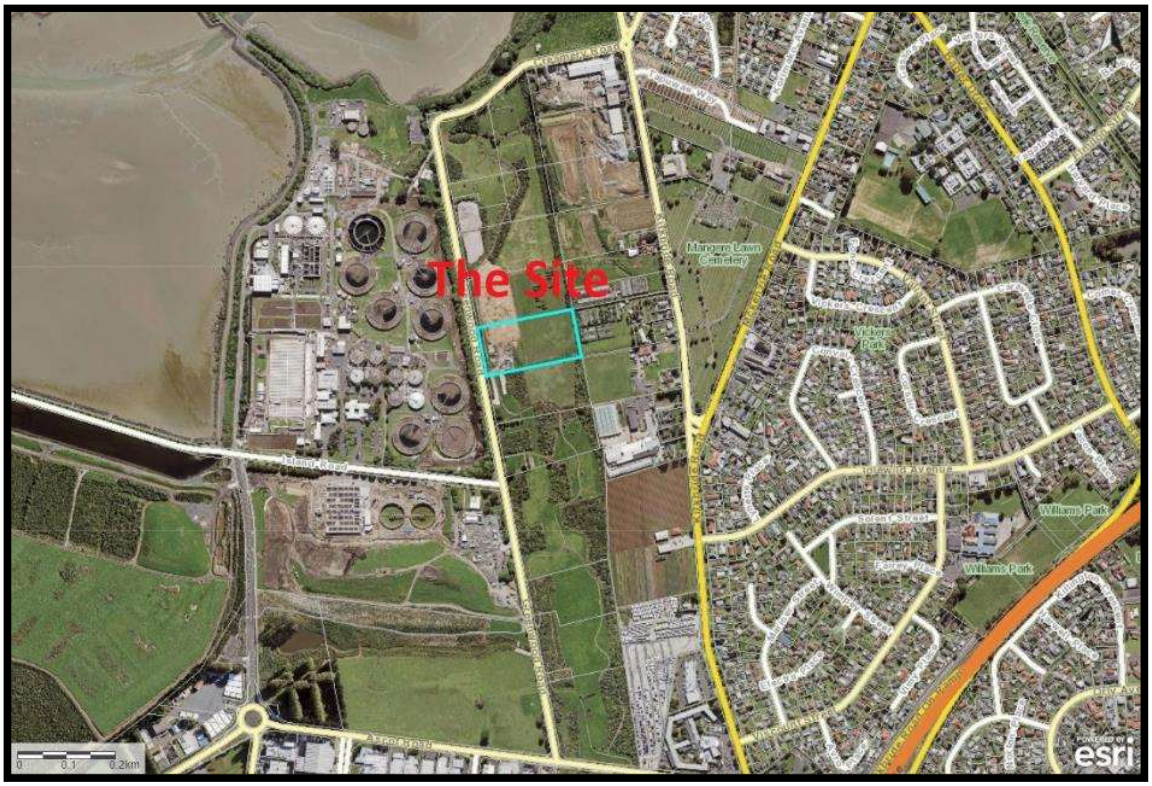

Figure 1: Site Location Plan

4.2. Existing Land Use and Zoning

The land parcel at the site is zoned Business - Light Industry Zone in the Auckland Unitary Plan[15] as shown in Figure 2 below.

[15] Auckland Unitary Plan - https://unitaryplanmaps.aucklandcouncil.govt.nz/upviewer/

Figure 2: Land Parcel Zoning

4.3. Proposed Activity and Land Use

The current plans for the site development are included in Appendix 1. The site is planned to be used as a basalt rock storage yard. This portion of the site where the site works are proposed to take place is the 'piece of land' subject to this investigation and is highlighted in Figure 3 below. The 'piece of land' is estimated to cover 4,900 m^2 of site as a whole, of which 1,400 m^2 will involve topsoil stripping to enable construction of a haul road for access. The 3,600 m^2 basalt rock storage area will be underlain with geotextile fabric, however the topsoil will not be stripped in this area. The earthworks volume proposed for these activities is estimated at 210 m^3 of topsoil stripping for the haul road.

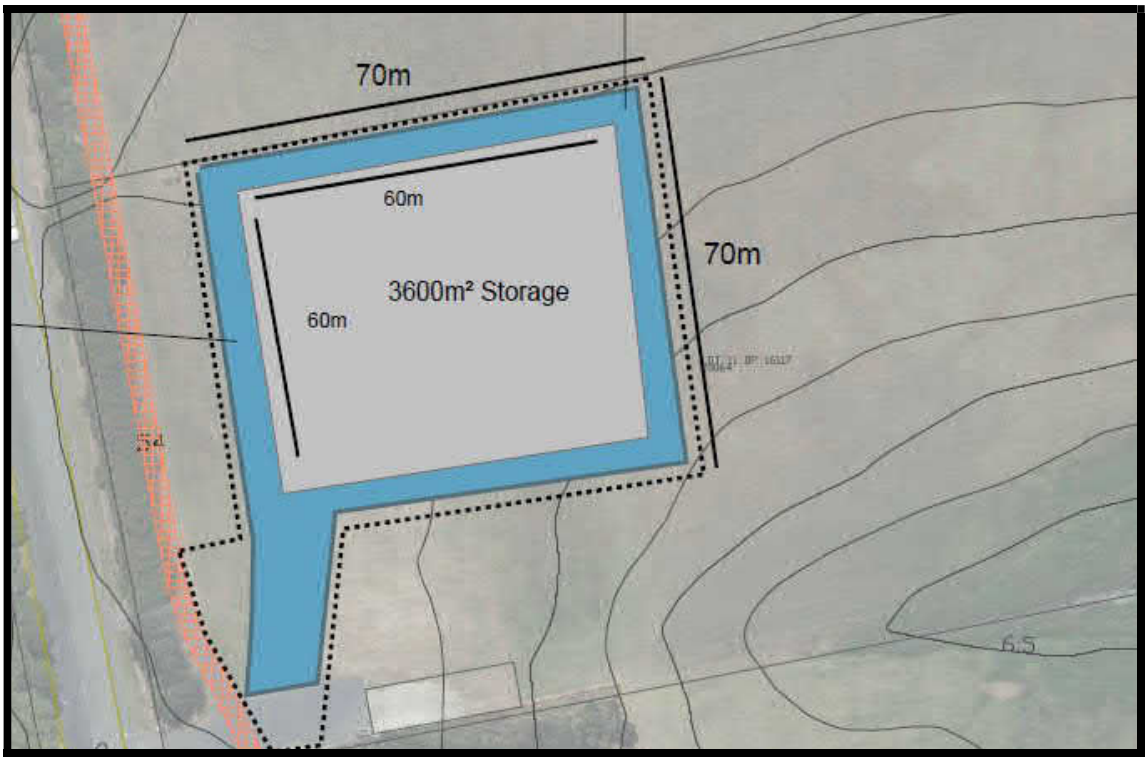

Figure 3: The 'piece of land' subject to the investigation.

5. Desktop Investigation

The desktop investigation for this report comprised a review of readily available information which included historical aerial imagery, Fire and Emergency information, certificates of title, a previous site investigation report, property files and an overview of the local geology, topography, hydrology and hydrogeology at the site.

5.1. Historic Certificate of Title

Current and historic Certificates of Title (CTs) were obtained from Terranet[16] on 9th July 2020. The full CT information is included in Appendix 2. The historic title refers to previous market gardeners as owners of the site in 1982, but no further information is provided.

Address	54 Greenwood Road, Mangere Bridge, Auckland, 2022
Legal Description	Lot 11 DP 16117
Certificate of Title	NA401/145
Land Area	2 hectares
Owners	Watercare Services Limited
Local Board	Mangere-Otahuhu

Table 1: Site Legal Description

5.2. Property File

The site property files were obtained from Auckland Council and contained a previous site investigation for a pipeline project which intersected the site. The results of this investigation are discussed in section 5.8 of this report.

5.3. Historic Aerial Imagery

The following section investigates the history of the site as a whole from 1940 until 2017 by means of historical aerial imagery. Most of the images are supplied by the Auckland Council and were accessed via the GeoMaps online GIS viewing platform[17]. The image from 1940 was obtained from the Retrolens[18] website. The site is highlighted in the following images.

[16] Terranet - http://www.terranet.co.nz/terranet3/
[17] Auckland Council GeoMaps - https://geomapspublic.aucklandcouncil.govt.nz/viewer/index.html
[18] Retrolens – Historical Image Resource - http://retrolens.nz/

1940 – The site is a HAIL site with horticultural activities being undertaken there, with associated site buildings. The MWWTP is mostly undeveloped, and the land reclaimed from the sea.

1959 – Horticultural activities (HAIL) are still present at the site. The surrounding land is more developed with more horticulture present. To the west, MWWTP is undergoing extensive earthworks.

1996 – Horticultural activities (HAIL) are stil being undertaken at the site and in neighbouring properties to the north, east and south.

2001 – Horticultural activities appear to have ceased at the site. MWWTP has been developed further.

2003 – It appears that the buildings have been removed from the site, though the image is blurry.

2006 – It appears that the site and its neighbouring site have been ploughed over, potentially mixing and blending surface soil contaminants.

2015 – The site is being used to stockpile aggregates, topsoil and other construction materials. Construction vehicles are also present to the north of the site. Soil is exposed to the west of the site.

2017 – The western end of the site is being used for aggregate storage with stockpiles present.

5.4. Site Geology

The site is located on Puketoka Formation (Pup) and is described as follows:

"Pumiceous mud, sand and gravel with muddy peat and lignite; rhyolite pumice including non-welded ignimbrite, tephra and alluvial pumice deposits; massive micaceous sand."

The underlying site geology is shown in Figure 4 below.

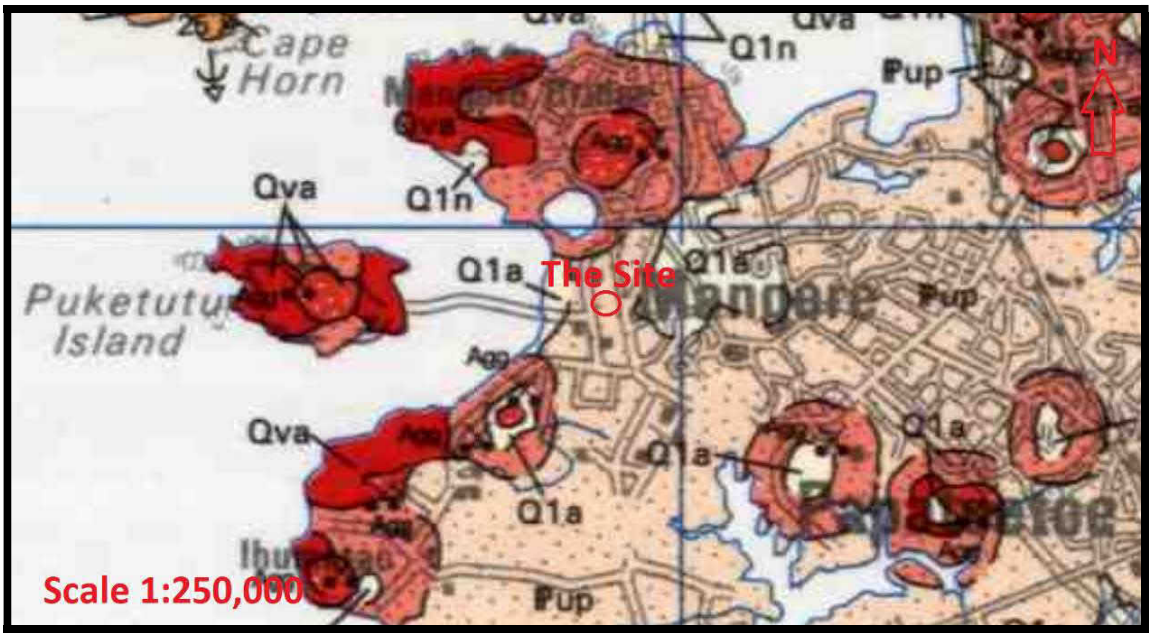

Figure 4: Geological Setting of the Site

5.5. Hydrogeology

Given the proximity of the site to the coast, regional groundwater flow is anticipated to be in a generally western direction towards the Manukau Harbour, approximately 0.55 km from the site, and is likely a groundwater discharge zone. In general, the hydrogeology of an area follows a similar pattern to the surface topography. The topography of the site and surrounding area is shown in Figure 5 below and indicates that the slope of the area flows generally west.

The site is adjacent to a significant area of land reclamation where the MWTTP is located and would likely have an effect on the local hydrogeological conditions.

5.6. Topography and Hydrology

The site itself is generally flat with some undulations, and an elevation of approximately 9 m above sea level. The contours and hydrology of the site and area surrounding the site are presented in Figure 5[19] below.

Figure 5: Site Topography

5.7. Site Contamination Enquiry

A request for information from the Auckland Council contaminated land register was submitted to assess potentially or known contaminated sites within 200 m of the project area. The register is ongoing and is not comprehensive but provides additional evidence for consideration in identifying potential contamination hazards. The register does not include land information that is held by the territorial authority. The Council response, included in Appendix 3, indicated that the following activities may have occurred adjacent to the site or at the site:

- A10 - Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds.

[19] Auckland Council GeoMaps - https://geomapspublic.aucklandcouncil.govt.nz/viewer/index.html

5.8. Previous Site Investigation Reports

The property file contained a previous site investigation report[20] from 2014 related to a pipeline which passed through the western boundary of the site.

One surface soil sample was taken at the site and there were no exceedances of the natural background concentrations for heavy metals. However, organochlorine pesticides (OCP) in the form of DDT analytes were present above the laboratory detection limits. Organonitrogen pesticides (ONP) and organophosphorus pesticides (OPP) analytes were not detected above the laboratory detection limits in the sample. The tabulated soil laboratory results are included in Appendix 8 of this report.

5.9. New Zealand Geotechnical Database

Information from the New Zealand Geotechnical Database[21] (NZGD) indicated that two boreholes were located in close proximity to the site (Figure 6). One borehole, BH_66988, is located adjacent to 'the piece of land' subject to this investigation and another borehole, BH_68857, is located at the eastern end of the site. Topsoil was found to be present at BH_66988 down to 0.8 m. A copy of these boreholes are included in Appendix 4.

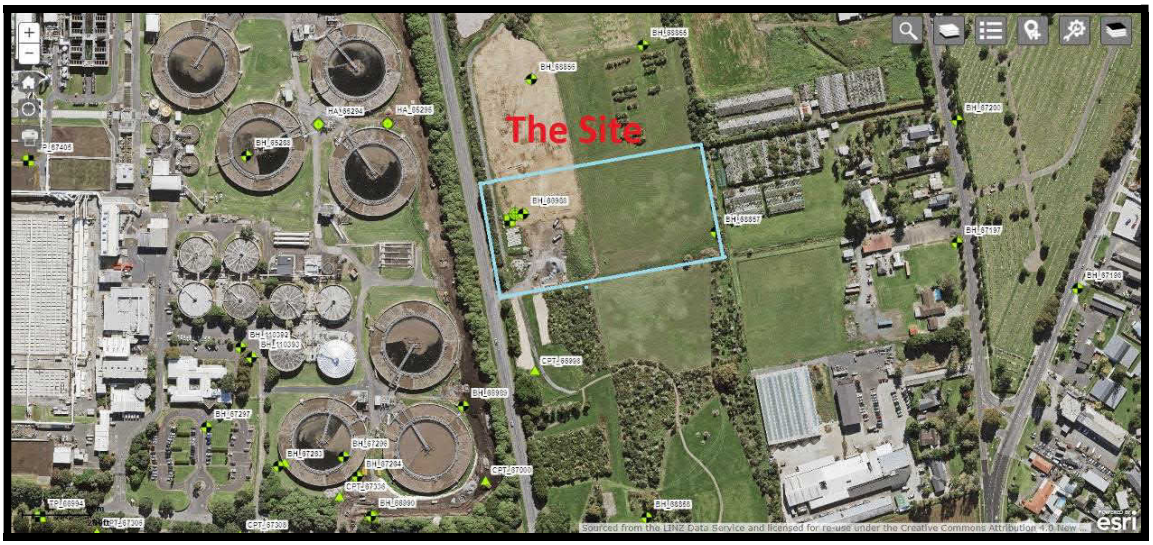

Figure 6: NZGD detail of boreholes proximal to the site.

[20] CH2M Beca Ltd. Detailed Site Investigation (Contamination) – Mangere Wastewater Treatment Plant SEF Pipeline. Watercare Services Limited. June 2014.
[21] New Zealand Geotechnical Database - https://www.nzgd.org.nz/ARCGISMapViewer/mapviewer.aspx

5.10. Fire and Emergency NZ Incident Reports

A Freedom of Information (FOI) request from Fire and Emergency NZ (FENZ) was requested for the site for site contaminating incidents and the response is included in Appendix 5. There were no incidents of note recorded for site by FENZ.

5.11. Sensitive Receptors and Preferential Pathways

The site walkover and aerial photography review did not identify preferential pathways at the site or in the surrounding area. There were no sensitive receptors of note present in the immediate site area when considering the surrounding land use. The site and surrounding area have been highly modified in the past in the form of human activities related mostly to horticultural activities. It is noted that effective site erosion and sediment control measures should be in place prior to development works commencing to prevent contaminant runoff from the site.

5.12. HAIL Activity Summary

From the evidence in the aerial imagery, horticultural land use has taken place on the site since at least 1940. The site has been used as a construction and aggregate storage yard since at least 2015. There is also some risk that asbestos was present in the buildings at the site since at least 1959.

Based on the desktop study and site walkover inspection components of this investigation, the site appears to harbour some risk with regards the likelihood of HAIL activities occurring there in the past. HAIL activities which have been identified during this investigation as being 'more likely than not' to have presently or historically occurred on the 'piece of land' intended for the proposed activity include the following:

- A10 - Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds.
- I – Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment.

It should be noted that, for the purposes of this investigation, the 'piece of land' subject to this investigation is considered to be that area of the site where the HAIL activities are 'more likely than not' suspected to have occurred.

5.13. Primary Contaminants of Concern

From the above HAIL activities the following contaminants of concern were identified. The list consists of a list of contaminants that were considered to pose some risk at the site as a result of previous activities at the site.

- Asbestos Containing Material (ACM);
- Heavy metals; and
- Total Petroleum Hydrocarbons / Polycyclic Aromatic Hydrocarbons (TPH / PAH).

It should be noted that boron, cobalt and tin were selected as secondary contaminants of concern for analysis based on the waste acceptance criteria for the Puketutu fill site, rather than any actual risk of those contaminants being present in the fill in significant concentrations.

5.14. Conceptual Site Model

A Conceptual Site Model (CSM) is used to communicate information about a site where contamination may pose a risk to human health and the environment. The model provides details of contamination source(s) on the site, the potential pathways these contaminants could travel through and the potential pathways they could affect. The purpose of this investigation was to collect data to enable an assessment to be made as to whether these exposure pathways were potentially complete and the implications for contaminant management and/or remediation. From the CSM below (Figure 7) there is some risk that these pathways are complete and risk management will be required during the site redevelopment works to mitigate these risks.

Sources
54 Greenwood Road, Mangere, Auckland. The presence of heavy metals, hydrocarbons and organochlorine pesticides from historical horticultural and other construction activities at the site.

↓

Transport Pathways	***Exposure Pathways***
Physical removal/disturbance of soil Mobilisation due to soil disturbance, removal from site, site traffic Mobilisation due to rainfall and wind action Mobilisation of contaminated dust into the air, soil and water	Ingestion (direct) Inhalation of contaminated dust through wind action and soil disturbance Dermal contact with soil during works

↓

Receptors
Site workers and site visitors Environment

Figure 7: Conceptual Site Model

6. Soil Contamination Investigation

6.1. Investigation Methodology

The investigation included the following procedures:

- A site specific Job Safety Environmental Analysis (JSEA) plan was developed to manage risks associated with the intrusive test pitting and stockpile sampling investigation;
- Following the review of readily available information, a plan of the potential sources of contamination and a site specific sampling plan tailored to these locations or areas and existing information were prepared;
- A Tier 1 risk assessment by comparison of soil laboratory analytical results with published risk based soil acceptance criteria was conducted;
- Discussion of Data Quality Objectives (DQO) took place; and
- A Conceptual Site Model (CSM) was prepared.

The following procedures were undertaken for the soil and stockpile sampling investigation:

- Seven surface topsoil samples were selected judgementally at the site. The number of sampling locations was selected in accordance with the *Ministry for the Environment Contaminated Land Management Guideline No. 5* recommendations, and referencing the BRANZ asbestos in soil guidelines;
- Adoption of standard Babingtons sampling procedures in order to minimise cross contamination between soil sampling locations;
- Decontamination of all sampling equipment with water and Decon90 solution between sampling locations in order to minimise the risk of cross contamination between sampling locations;
- Observed soil conditions were logged following the methods and procedures in the *New Zealand Geotechnical Society 'Guidelines for the Field Description of Soils and Rock in Engineering Use'*;
- Conduct visual observations and assessment to determine the presence of any materials that might harbour contaminants, and keeping vigilant for gross contamination indicators in the topsoil;
- All soil samples were collected from all locations using Babingtons standard operating procedures for environmental soil sampling, including the use of fresh nitrile gloves for each soil sample taken;
- Samples were collected into laboratory supplied sampling jars, clearly labelled, securely stored in chilli bins to ensure sample preservation and delivered directly to RJ Hill Laboratories Ltd. in Auckland under Chain of Custody (CoC) documentation;
- Laboratory analytical testing of soils was conducted by an International Accreditation New Zealand (IANZ) accredited laboratory – RJ Hill Laboratories Ltd. in Auckland;
- Laboratory analytical testing of selected samples took place for the identified contaminants of concern;

- The remainder of the samples were stored under controlled conditions at the laboratory to allow for follow up analysis, if required;
- Samples were analysed for ACM, heavy metals, TPH, PAH and OCP; and
- Preparing an interpretive report summarising the findings of the investigation.

6.2. Data Quality Objectives

This investigation was undertaken with consideration of the following Data Quality Objectives (DQO):

- Identify activities that may have led to soil contamination being present onsite which may impact on the desired works during or after the project is completed;
- Provide soil contaminant data to gauge the significance of the risk to human health from the primary contaminants of concern during the redevelopment works at the site;
- In the event that significant contamination was identified in targeted soils at the site, consideration was given to the need for further soil analysis; and
- Analytical results obtained will inform management of the risks to human health during redevelopment works at the site and soil management options.

7. Investigation Results Summary

7.1. Site Walkover Inspection

On 29th September 2020 a soil sampling programme was undertaken by a Babingtons environmental consultant to investigate potential soil contamination issues at the site.

Seven surface topsoil samples were taken from the top 0.15m of the proposed site. The site was observed to be completely grassed over and in tidy condition on the day of the inspection and sampling round. At the site entrance a concrete building platform was observed to be present but the buildings had been removed from the site previously, and may have contained asbestos in the building materials. The weather was blustery and the ground surface was wet with pools of water present on the day of the walkover.

A selection of images from the site investigation are included below.

Image 1: The topsoil at the site was sampled

Image 2: Facing towards the site entrance

Image 3: Facing south along the site

Image 4: The site surface was grassed over

7.2. Sampling Location Plan

The soil sampling location plan is shown in Figure 8 below where sampling was undertaken on the soil surface at the site.

7.3. Observed Soil Conditions

The complete soil descriptions are included in Appendix 6. Topsoil was encountered at all of the surface sampling locations at the site.

7.4. Soil Analytical Results

The following section provides a summary of the soil analytical results from the soil contamination investigation. The soil laboratory analytical transcripts are included in Appendix 7 and the tabulated results compared with the relevant guideline criteria are presented in Appendix 8. All of the soil analytical results in this report are presented as mg/kg dry weight or % w/w.

Seven soil samples collected were analysed for heavy metals and OCPs to provide a broad overview of heavy metal and pesticide content over the proposed development area, the 'piece of land'. Three soil samples were analysed for TPH / PAH analytes. Four soil samples were analysed for asbestos analytes due to potential presence of asbestos in the soil from previous activities at the site.

7.4.1. Asbestos Containing Material

Four soil samples were assessed for the presence of asbestos and analysed in accordance with the BRANZ NZG semi-quantitative methodology. Asbestos analytes were not detected in any of the soil samples analysed.

7.4.2. Heavy Metals

Seven soil samples were analysed for a range of heavy metal analytes. Comparison of each heavy metal against NES:CS Soil Contaminant Standards (SCS) and Soil Guideline Values (SGV) is discussed below. The human health guidelines were not exceeded for heavy metals at any tested location for the intended land use. The AUP permitted activity soil acceptance criteria were not exceeded for environmental receptors.

<u>Arsenic</u>

Laboratory analysed total arsenic concentrations ranged from 4 to 9 mg/kg and did not exceed the SGV at any sampled location.

LATEST REVISION DETAILS	NAME	DATE
1. Issued for Information	ST	06/10/20

CLIENT:

Ghella 5 Generations of Tunnelers ABERGELDIE

Figure 8: Soil Sampling Location Plan

Central Interceptor Project
54 Greenwood Road, Mangere

Babingtons
CIVIL AND ENVIRONMENTAL CONSULTANTS

DESIGNED: ST	Issued For Information
CHECKED: MT	DRAWN: WA
APPROVED: MT	SURVEYED:
JOB NUMBER:	SCALE: 1:1000 @ A3
ISSUED: 06/10/2020	
DWG. NO. E-001	REV. 1

Boron

Laboratory analysed total boron concentrations did not exceed the laboratory detection limits in any of the samples analysed.

Cadmium

Laboratory analysed total cadmium concentrations ranged from 0.32 to 0.69 mg/kg. The natural background concentrations were exceeded at one sampled location.

Chromium

Laboratory analysed total chromium concentrations ranged from 53 to 74 mg/kg and did not exceed the SGV in any of the samples analysed.

Cobalt

Laboratory analysed total cobalt concentrations ranged from 29 to 41 mg/kg and did not exceed the SGV in any of the samples analysed.

Copper

Laboratory analysed total copper concentrations ranged from 37 to 71 mg/kg and did not exceed the SGV in any of the samples analysed.

Lead

Laboratory analysed total lead concentrations ranged from 17.3 to 210 mg/kg. The natural background concentrations were exceeded at one sampled location.

Mercury

Laboratory analysed total Mercury concentrations marginally exceeded the laboratory detection limits at one sampled location.

Nickel

Laboratory analysed total nickel concentrations ranged from 42 to 66 mg/kg and did not exceed the SGV in any of the samples analysed.

Tin

Laboratory analysed total tin concentrations ranged from 1.4 to 3 mg/kg and did not exceed the SGV in any of the samples analysed.

Zinc

Laboratory analysed total zinc concentrations ranged from 81 to 340 mg/kg and did not exceed the SGV in any of the samples analysed.

7.4.3. Heavy Metal Discussion

The soil laboratory results for the samples analysed show that the concentrations of heavy metals present at the site did not exceed the human health criteria for the intended land use scenario. The AUP permitted activity soil acceptance criteria for heavy metals were not exceeded and do not represent a risk to environmental receptors. The natural background concentrations were exceeded for heavy metals in one of the samples analysed.

7.4.4. Polycyclic Aromatic Hydrocarbons (PAH)

Three samples were analysed for PAH analytes and two exceeded the laboratory detection limits. However, there were no exceedances of the relevant risk acceptance criteria.

7.4.5. Total Petroleum Hydrocarbons (TPH)

Three samples were analysed for TPH analytes. There were no exceedances of the laboratory detection limits in any of the samples analysed.

7.4.6. Organochlorine Pesticides (OCP)

Seven samples were analysed for OCP analytes and all of the samples exceeded the laboratory detection limits for DDT isomers in low concentrations. There were no exceedances of the relevant risk acceptance criteria in any of the samples analysed.

7.5. Contaminant Distribution

Heavy metals exceeded the natural background concentrations at one sampling location. PAH analytes were detected in low concentrations above the laboratory detection limits but below the relevant guidelines criteria at two tested locations. ACM analytes were not detected in any of the samples analysed. OCP analytes (DDT isomers) were detected in low concentrations in all of seven samples that were analysed.

It is important to note that soil contamination may in exist in areas of the site outside of the sampling area. The CLSMP[22] for the project provides contingency procedures for contractors during the site works for any unexpected contamination discoveries.

7.6. Statutory Context – Summary of Contamination

The proposed activity involves disturbance and removal of soil for the construction of a haul road

The site has been identified as a HAIL site as a result of horticultural and other activities at the site in the past. The soil disturbance that will take place during the site works will exceed the permitted activity volume threshold under the NES:CS. Due to contaminants being present at concentrations greater than natural background concentrations, the soil disturbance and removal will become a restricted discretionary activity under the NES:CS. The total earthworks volume proposed for the site are estimated to be 210 m^3.

[22] Beca Limited. Contaminated Land Site Management Plan. Central Interceptor Project – Main Project Works. Ghella Abergeldie JV. 2019

8. Soil Management Options

8.1. Sustainability Hierarchy

The hierarchy of controls for sustainability as set out in the project CLSMP, defined in Appendix 9 of this report, have been considered in the context of contaminated soil management onsite. It is understood that the excavated spoil material will be removed from the site, if not planned for reuse at a later date. Soil contaminant concentrations were determined to be present in the soil at the site above the natural background concentrations.

This material could be managed in accordance with sustainability hierarchy No. 4 – *Removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material.*

Alternatively, pending Council approval, the material could also be managed in accordance with sustainability hierarchy No. 5 – Management Strategy – where it could remain onsite and used to reinstate the site when the works are completed.

8.2. Soil Reuse Onsite

The measured heavy metal, hydrocarbon and pesticide concentrations were generally below the adopted acceptance criteria at the site and do not pose an unacceptable risk to human health or environmental receptors. Given that the soil contaminant concentrations for some of the heavy metal results are above the soil background concentration values at one location, indicating low levels of contamination, the reuse of excavated soil onsite could be considered acceptable for the project, given appropriate site controls as the soil risks are considered relatively low. Council approval for soil reuse onsite will be required. Soil disposal management options are discussed below.

8.3. Soil Disposal Management

The suitability of the material removed for waste disposal is determined by the concentrations of the contaminants observed. The concentrations of heavy metal contamination at the site exceeded the natural background concentrations. PAH and OCP analytes were detected in the soil above the laboratory detection limits in general at the site, but did not exceed the relevant risk acceptance criteria.

It should be noted that contamination may exist in areas of the site not yet investigated.

As the soil material assessed during this investigation contained contaminants above the natural background concentrations for heavy metals, OCP and PAH, it will not be suitable for disposal at a cleanfill[23] facility and will require disposal at a managed fill facility.

Managed fills and landfills accept material that contains concentrations of contamination up to their specified waste acceptance criteria which are determined by their consent conditions. Any soil disposal will require confirmation of suitability for disposal by the chosen waste disposal facility operator.

[23] Ministry for the Environment (2002). *A Guide to the Management of Cleanfills*. Ministry for the Environment, Wellington.

9. Conclusions and Recommendations

This investigation was undertaken by Babingtons to:

- Assess the soil contamination risks in relation to potential HAIL activities at the proposed site on the 'piece of land' at 54 Greenwood Road, Mangere;
- Assess any risk to human health and the environment for these activities through a soil contamination investigation; and
- To support the relevant consenting requirements for the proposed site redevelopment works.

This involved applying DQOs to develop an appropriate sampling and analysis programme.

Laboratory analytical results were considered against Tier 1 risk acceptance criteria for determination of risk to human health and the environment.

Based on the findings of this investigation, the following conclusions can be drawn:

- It is considered 'more likely than not' that the site is a HAIL site due to past activities (HAIL A10 and I - horticultural and storage of aggregate and construction materials) on the 'piece of land' to be developed;
- The shallow soil at the site comprises of at least 0.15 m of topsoil at all of the locations investigated;
- Asbestos analytes were not detected in the four soil samples that were analysed;
- Heavy metal concentrations exceeded the natural background concentrations at one sampled location;
- At two out of three sampling locations, the soil concentrations of PAH analytes were detected above the laboratory detection limits, but below the relevant risk acceptance criteria;
- TPH analytes were not detected in the three soil samples that were analysed;
- DDT isomers were detected above the laboratory detection limits in all of the seven samples that were analysed, but below the relevant risk acceptance criteria;
- Soil disturbance volumes (210 m^3 removal) associated with the works will exceed NES:CS disturbance and removal thresholds;
- The proposed works and likely soil disturbance at this HAIL site triggers the application of the NES:CS;
- The in-situ topsoil on the 'piece of land' is contaminated with heavy metals, OCP and PAH and will require disposal at a managed fill facility if not reused onsite;
- This spoil material is intended be managed in accordance with sustainability hierarchy No. 4 – *Removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material*; and

- Pending Council approval the material could also be managed in accordance with sustainability hierarchy No. 5 – Management Strategy – where it could remain onsite and used to reinstate the site when the works are completed.

Based on these conclusions the following recommendations are made:

The soil material onsite is considered suitable for commercial/industrial reuse on the site, pending Council approval. Any reuse of soil onsite will require site management systems in place for the works and for the protection of site workers.

Any excess soil material requiring disposal will likely require to be disposed as managed fill. Soil disposal will require confirmation of suitability for disposal with the chosen waste disposal facility operator.

The project CLSMP will assist the management of contamination risks for the site works. This CLSMP will also assist in the event of any accidental contamination discovery during site excavation works due to previous HAIL activities at the site.

10. Limitations and Assumptions

This report has been prepared for the sole benefit of our client, Ghella Abergeldie JV, and Auckland Council for review purposes and shall not be relied upon for used out of context by any other person without permission from Babington and Associates (2004) Limited.

The methodology for this site investigation was developed with consideration to the following assumptions:

- The observations made are representative of the activities that have occurred or are occurring onsite;
- Information obtained from third parties is complete and accurate; and
- The observed and inferred site conditions are representative of actual site conditions.

This investigation has been compiled on the assumption that all recorded data associated with the site is correct and free from significant error or omission. The information from these sources has been used to inform this report, and contributed to the conclusions and recommendations for ongoing use of the site.

11. References

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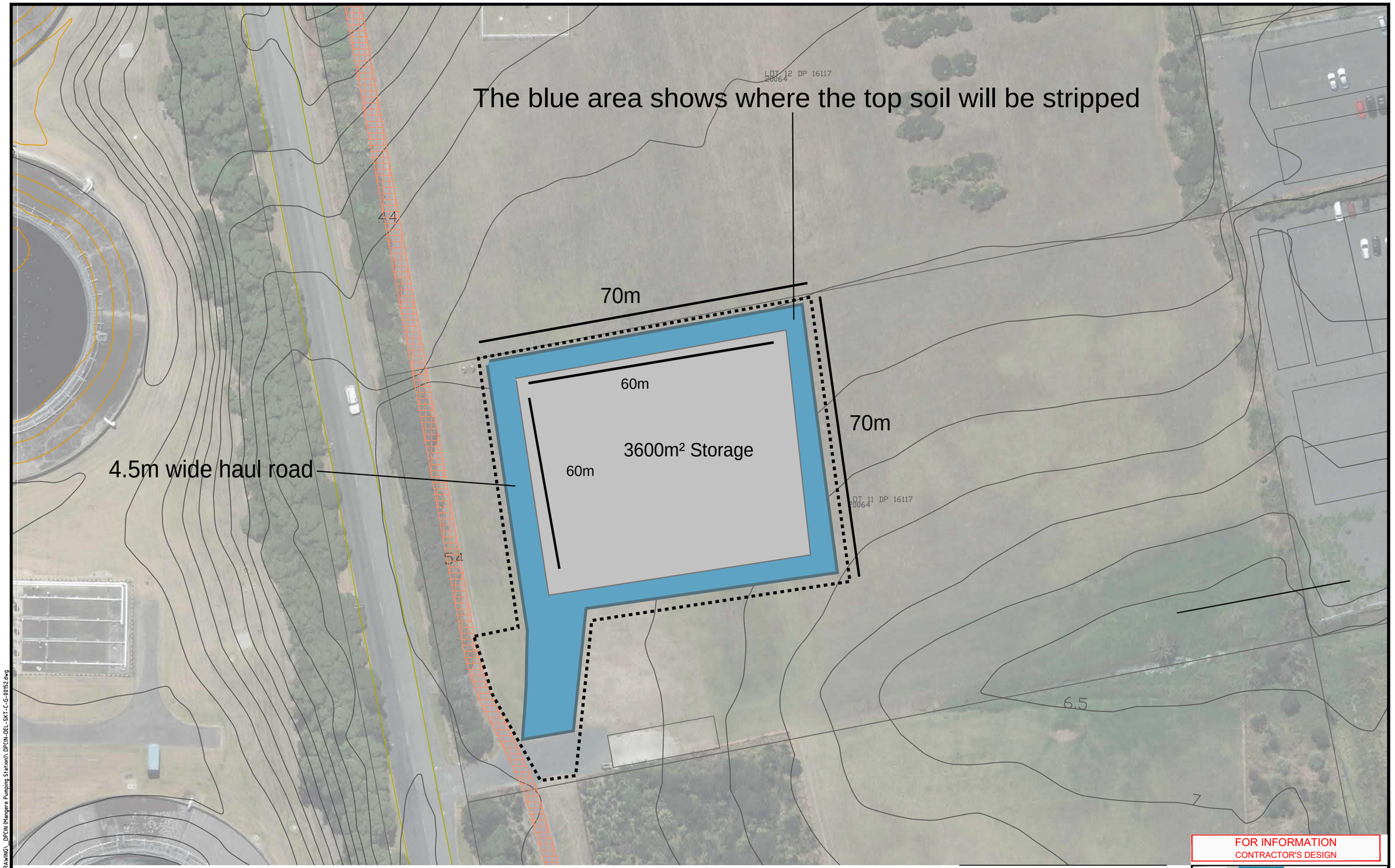
- New Zealand Government (2016) *Health and Safety at Work (Asbestos) Regulations 2016*. Wellington, New Zealand.
- New Zealand Government (2016) *Approved Code of Practice. Management and Removal of Asbestos*. Worksafe New Zealand.
- Retrolens Historical Image Resource - http://retrolens.nz/
- Terranet - http://www.terranet.co.nz/terranet3/

Appendix 1: **Site Layout Plan**



FOR INFORMATION
CONTRACTOR'S DESIGN

Ghella | ABERGELDIE

ISSUE	DATE	AMENDMENT

DPCIN – MANGERE PUMPING STATION
TEMPORARY WORKS
54 GREENWOOD SITE LAYOUT

CAD FILE	DPCIN-DEL-SKT-C-G-00152.DWG
REF No.	ORIGINAL SCALE A1
SKETCH No.	ISSUE
DPCIN-DEL-SKT-C-G-00152	B

Plot Date: Aug 25, 2020 - 11:08am C:_DRAWING_DPCIN (Mangere Pumping Station)\DPCIN-DEL-SKT-C-G-00152.dwg

Appendix 2: **Certificates of Title**

Terranet document ordering service

Certificate of Title with diagram: 401/145

CoreLogic Reference: 2880658/1

Processed: 23 September 2020

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General of Land

Identifier **NA401/145**
Land Registration District **North Auckland**
Date Issued 13 October 1924

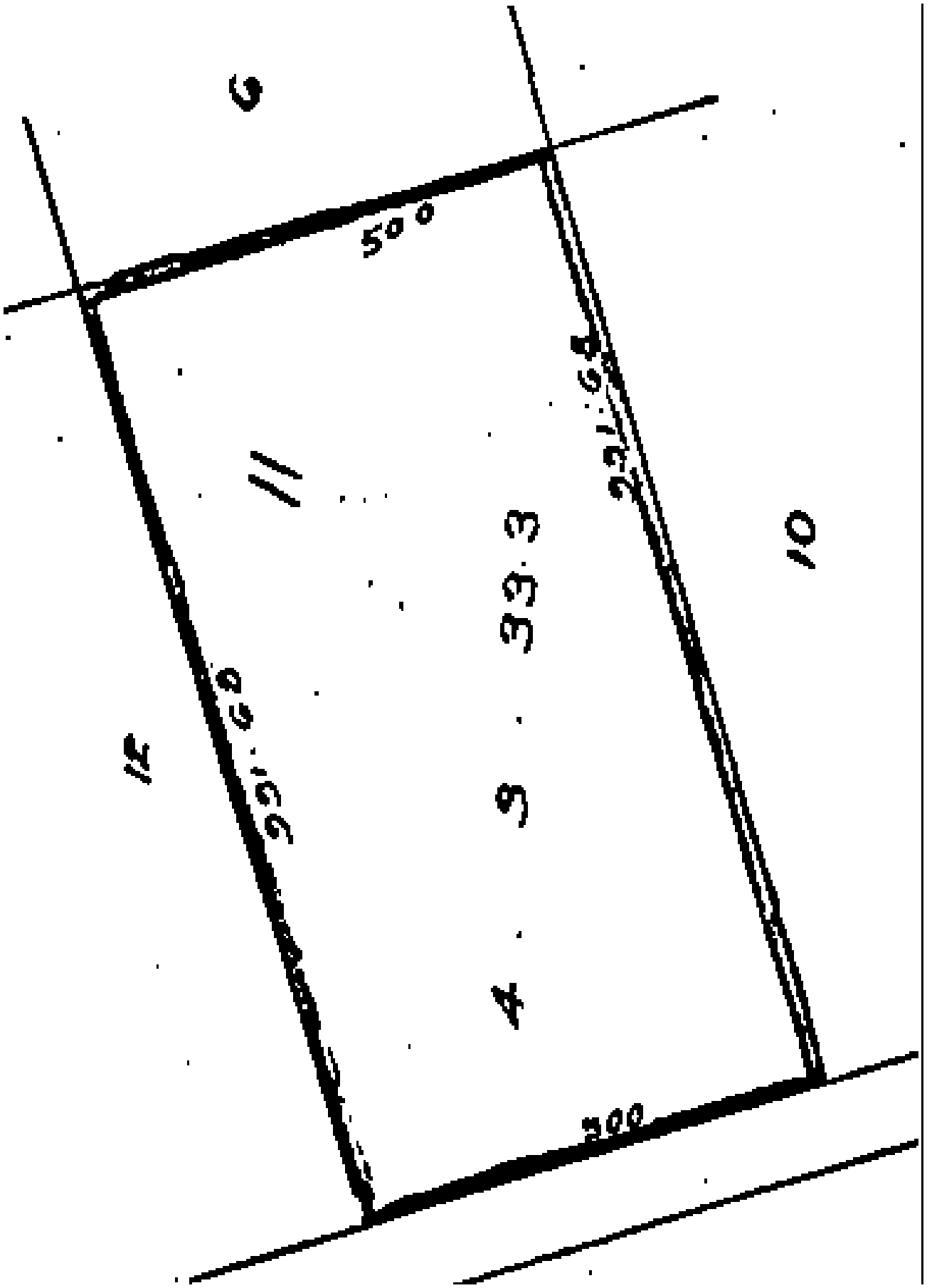
Prior References
NA63/249

Estate Fee Simple
Area 2.0065 hectares more or less
Legal Description Lot 11 Deposited Plan 16117
Registered Owners
Watercare Services Limited

Interests

Fencing Agreement in Transfer 183147 - 13.10.1924

D531583.1 Notice pursuant to Section 23 Public Works Act 1981 - 10.8.2000 at 3.09 pm


6
500
10
393
9
4
300

Terranet document ordering service

Historic Title: 401/145

CoreLogic Reference: 2880658/2

Processed: 23 September 2020

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Historical Search Copy

R.W. Muir
Registrar-General of Land

Constituted as a Record of Title pursuant to Sections 7 and 12 of the Land Transfer Act 2017 - 12 November 2018

Identifier **NA401/145**
Land Registration District **North Auckland**
Date Issued 13 October 1924

Prior References
NA63/249

Estate Fee Simple
Area 2.0065 hectares more or less
Legal Description Lot 11 Deposited Plan 16117
Original Registered Owners
Watercare Services Limited

Interests
Fencing Agreement in Transfer 183147 - 13.10.1924
D531583.1 Notice pursuant to Section 23 Public Works Act 1981 - 10.8.2000 at 3.09 pm

REGISTER

[Land and Deeds—4.
[Form B.

NEW ZEALAND.

Reference: Vol. 63, Folio 249
Transfer No. 183147
Application No.
Order for N/C No.

Office
Register-book,
Vol. 401 folio 145

401/145

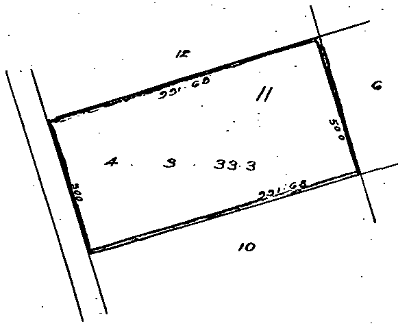
CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT.

This Certificate, dated the thirteenth day of October, one thousand nine hundred and twenty-four under the hand and seal of the District Land Registrar of the Land Registration District of Auckland Witnesseth that WILLIAM ERNEST JOHN HARVEY of Auckland master mariner

is seised of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial under written or endorsed hereon, subject also to any existing right of the Crown to take and lay off roads under the provisions of any Act of the General Assembly of New Zealand) in the land hereinafter described, as the same is delineated by the plan hereon bordered green, be the several admeasurements a little more or less, that is to say: All that parcel of land containing Four acres three roods thirty-three perches and three-tenths of a perch more or less being Lot Eleven (11) on a plan deposited in the Land Registry Office at Auckland as No. 16117 and being part of Section 23 of the Suburbs of Mangere

District Land Registrar.

METRIC AREA IS 2.0064 ha
2.0061 ha



Scale 3 Chains to an Inch
Delt. A.M.

All dispositions of the above-described land are subject to the restrictions imposed by Part XIII of "The Land Act 1908"

D.L.R.

Agreement as to fencing contained in Transfer No. 183147

D.L.R.

Mortgage No. 146504 William Ernest John Harvey to Elizabeth Muir produced 13 October 1924 at 12 noon

DISCHARGE Produced 14/8/1929

D.L.R.

Transmission No 23330 of mortgage No 146504 to Thornton Jackson and Edward Francis Muir Entered 16/11/25 at 3 pm.

Mortgage No 198700 William Ernest John Harvey to Margaret Wilson Morton, produced 28 ... at 11.4 A.M.

DISCHARGE Produced 23/10/1961 A.L.R.

Z83174 Transmission of Mortgage 198700 to Thomas Manders & Thornton Jackson of Auckland solicitor as executor Entered 25.11.1957 at 9.42 o/c

A.L.R.

Transfer 648716 to William Renalo Barnett of Auckland, market Gardener Produced 28-10-1960 at 1.51 p.m.

A.L.R.

over

Over

REGISTER

401/145

Mortgage 494287 to Melville Barnett DISCHARGE produced 28-10-1960 at 1.52 o'c

1184069 Settled as a Joint Family Home under The Joint Family Homes Act 1964 on William Renals Barnett abovenamed and ... whom the within land is ... entered 1960 at ...

A.L.R.

DISCHARGE

Mortgage 508552 to ... Co-operative Terminating Building Society produced 8-8-1961 at 2.55

A.L.R.

A190432 Mortgage to The Northern ... Terminating Building Society produced 16-7- ... 11.52 o'c DISCHARGE

A.L.R.

A189647 Statutory ... Charge under the Rating Act 1925 Entered 1-12-... at 9.00 o'c DISCHARGE

A.L.R.

A263489A Statutory Land Charge under the Rating Act 1925 entered 12-12-... DISCHARGE

A.L.R.

A331018 Statutory Charge under the Rating Act ... by Manukau City Council DISCHARGE 10.10.1968 at 2.15 o'c

A.L.R.

A.480018 Mortgage to the State Advances Corporation of New Zealand - 13.7.1970 at ... DISCHARGE

A.L.R. 6128

113974.1 The within land is now revested in William Renals Barnett pursuant to Section 10(1)(a) of the Joint Family Homes Act 1964 - 29.8.1972 at 12.02 o'c.

A.L.R.

519985.3 Statutory Land Charge under Section 96 of the Rating Act 1967 - 15.9.1976 at 9.12 o'c DISCHARGE

for A.L.R.

Reg 13/10 547347

524606.1 Certificate under Section 96 of the Rating Act 1967 - 27.10.1976 at ... DISCHARGED

for A.L.R.

653016.3 Certificate under Section 96 of The Rating Act 1967 - 19.10.1977 at 11.08 DISCHARGED

B060852.1

for A.L.R.

463620/CERTIFICATE under section 96 of the Rating Act 1967 produced 15.11.77 at ... o'clock. DISCHARGED

B060852.1

A.L.R.

B011733.1 Mortgage to Wallace McLean Bawden & Partners Nominees Limited - 1.12.1981 at 12.20 DISCHARGED

A.L.R.

B.097899.2 Transfer to William Lee (as to an undivided 3/8ths share) and to Peter Lee (as to an undivided 5/8ths share) both of Mangere, market gardeners as tenants in common in the said shares - 23.8.1982 at 10.34 o'c

A.L.R.

B.097899.3 Transfer to Peter Lee abovenamed - 23.8.1982 at 10.34 o'c

A.L.R.

D531583.1 Notice under Section 23 Public Works Act 1981 10.8.2000 at 3.09

for RGL

D630033.1 Transfer to Watercare Services Limited 9.8.2001 at 3.48

for RGL

Appendix 3: **Auckland Council Contamination Response**

28 September 2020

Babingtons
Level 3, 20 Augustus Terrace
AUCKLAND 1050

Attention: Sean Toland

Dear Sean

Site Contamination Enquiry – *54 Greenwood Road, Mangere Bridge*

This letter is in response to your enquiry requesting available site contamination information within Auckland Council records for the above site. Please note this report does not constitute a site investigation report; such reports are required to be prepared by a (third-party) Suitably Qualified and Experienced Practitioner.

The following details are based on information available to the Contamination, Air & Noise Team in the Resource Consent Department. The details provided may be from former regional council information, as well as property information held by the former district/city councils. For completeness the relevant property file should also be requested to obtain all historical records and reports via 09 3010101 or online at:

https://www.aucklandcouncil.govt.nz/buying-property/order-property-report/Pages/order-property-file.aspx.

1. Hazardous Activities and Industries List (HAIL) Information

This list published by the Ministry for the Environment (MfE) comprises activities and industries that are considered likely to cause land contamination as a result of hazardous substance use, storage, and/or disposal.

Council's records indicate this site has possibly been subject to the following activity that falls within the HAIL:

- HAIL Item (A.10) – Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds.

Records indicate the site 54 Greenwood Road, Mangere Bridge, has been utilised for historical horticultural activity. This was undertaken as early as 1940 which is visible in the aerial below. This activity is still visible in aerials from 1996.

<u>Please note:</u>

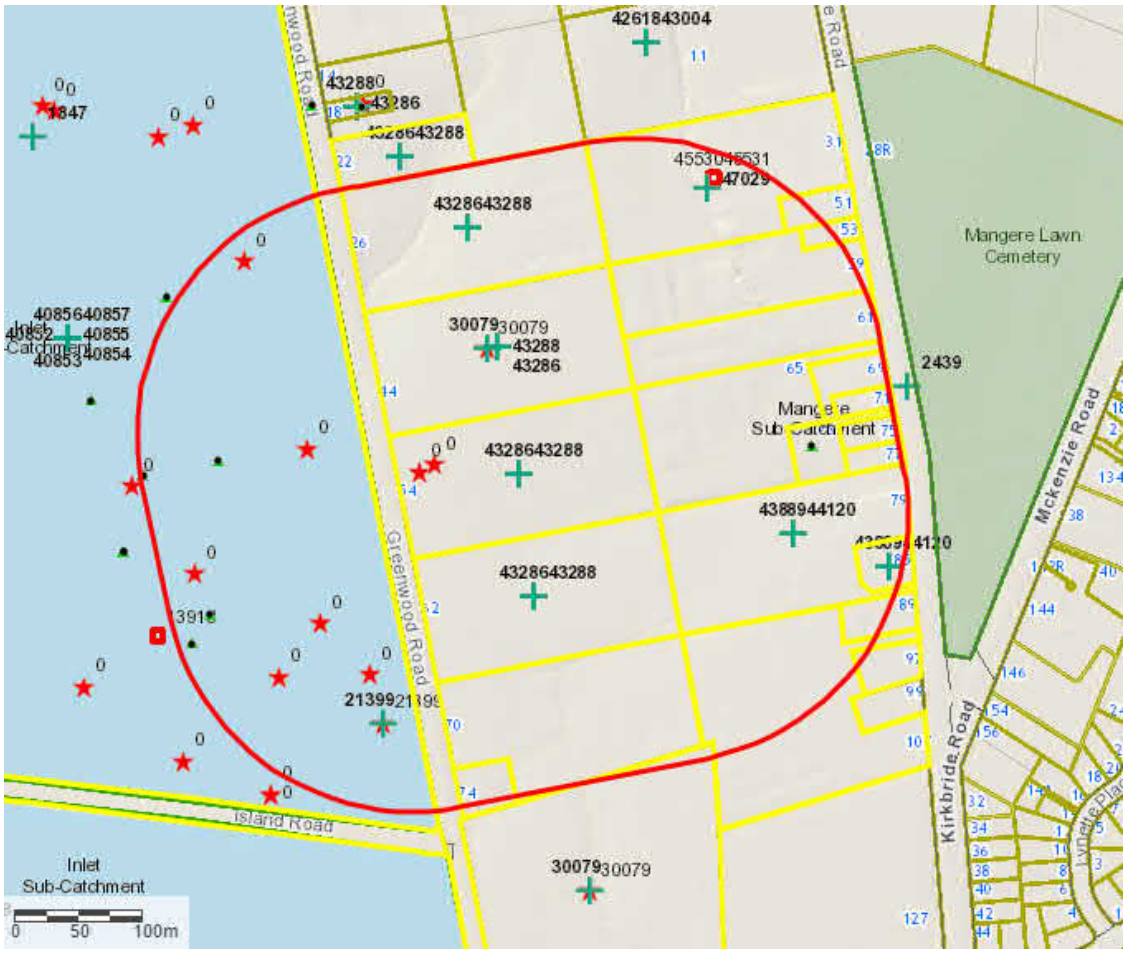
- *If you are demolishing any building that may have asbestos containing materials (ACM) in it, you have obligations under the Health and Safety at Work (Abestos) Regulations 2016 for the management and removal of asbestos, including the need to engage a Competent Asbestos Surveyor to confirm the presence or absence of any ACM.*
- *Paints used on external parts of properties up until the mid-1970's routinely contained lead, a poison and a persistent environmental pollutant. You are advised to ensure that soils affected by old, peeling or flaking paint are assessed in relation to the proposed use of the property, including high risk use by young children.*

2. <u>Consents and Incidents Information (200m radius of the selected site)</u>

The Council database was searched for records of the following activities within approximately 200 metres of the site:

- Pollution Incidents (including air discharges, oil or diesel spills)
- Bores
- Contaminated site and air discharges, and industrial trade process consents
- Closed Landfills

- Air quality permitted activities



Legend:

All Consents
All Applications
All Permitted Activities
All Bores
Closed Landfill (Auckland Council owned)
Closed Landfill (Privately owned)

Relevant details of any pollution incidents and consents are appended to this letter (Attachment A). Please refer to the column titled 'Property Address' on the spreadsheet to aid in identifying corresponding data on the map.

While the Auckland Council has carried out the above search using its best practical endeavours, it does not warrant its completeness or accuracy and disclaims any responsibility or liability in respect of the information. If you or any other person wishes to act or to rely on this information, or make any financial commitment based upon it, it is recommended that you seek appropriate technical and/or professional advice.

If you wish to clarify anything in this letter that relates to this site, please contact contaminatedsites@aucklandcouncil.govt.nz. Any follow up requests for information on other sites must go through the online order process.

Should you wish to request any of the files referenced above and/or listed in the attached spreadsheet for viewing, please contact the Auckland Council Call Centre on 301 0101 and note you are requesting former Auckland Regional Council records (the records department requires three working days' notice to ensure the files will be available).

Please note Auckland Council cost recovers officer's time for all site enquiries. As such an invoice for $128 for the time involved in this enquiry will follow shortly.

Yours Sincerely,

Contamination, Air and Noise Team
Specialist Unit | Resource Consents
Auckland Council

Appendix 4: **Borehole Logs**

CH2M Beca

BOREHOLE No: BH10005

MACHINE BOREHOLE LOG

SHEET 1 of 2

PROJECT: Mangere BNR Upgrade
JOB NUMBER: 6518575
SITE LOCATION: Mangere WWTP
CLIENT: Watercare

CIRCUIT: NZTM
COORDINATES: N 5,907,636.754 m
E 1,758,522.017 m
BOREHOLE LOCATION: Across Greenwood Rd from Southern WWTP
R L: 9.25 m
DATUM: MSL

DRILLING: FLUID LOSS	WATER LEVEL	CORE RECOVERY	METHOD	RQD	CASING	IN-SITU TESTS: SV	τ (kPa)	SPT 'N'	SAMPLES	DEPTH (m)	GRAPHIC LOG	USCS	MOISTURE	SOIL / ROCK DESCRIPTION	GEOLOGICAL UNIT	R L (m)
		100 %	OB			120	199					MH	M	'Firm', clayey SILT, some organics, trace coarse gravel; brown; moist, high plasticity. Organics: rootlets. Trace organics; orangish brown.	Topsoil	9
						140+	227+			1		ML	M	'Stiff', SILT, minor clay, trace coarse gravel; orangish brown; moist, low plasticity.	AVF	8
		100 %	SPT			140+	227+	1 2 2 3 3 4 N=12				CH	M	Stiff, silty CLAY; light orangish brown; moist, high plasticity.	Puketoka Formation	
		90 %	OB							2						7
		0 %	SPT			140+	227+	0 0 0 0 0 0 N=0		3				No recovery in SPT.		6
		100 %	OB									MH	M	'Soft', clayey SILT; brownish grey mottled orange and dark grey; moist, high plasticity, sensitive. Residual volcanic texture, pumaceous, completely weathered. 3.7m: whitish grey. No residual volcanic texture.		
		100 %	PUSH			126/12	206/18		U1	4						5
		100 %	SPT					0 0 0 0 0 0 N=0				OH	W	'Soft', organic SILT, some clay; black; wet, high plasticity, extra sensitive. Organics: amorphous, wood fragments. 4.5m: push tube taken. Very soft.		
		100 %	OB							5						4
		50 %	SPT					5 5 6 3 2 1 N=12				ML	M	Medium dense, fine sandy SILT; light brownish grey speckled black; moist, non plastic. Volcanic ash.		
		100 %	OB							6						3
		100 %	SPT					0 2 6 10 13 13 N=42				OH	W	'Firm', organic clayey SILT; black; wet, high plasticity. Organics: amorphous, wood fragments.		
		75 %	OB							7						2
		100 %	PUSH						U2			ML	S	Dense, fine sandy SILT; light brownish grey speckled black; saturated, non plastic. Volcanic Ash.		
		100 %	SPT					1 0 1 1		8						1
												OL	W	Firm, organic SILT, minor clay; black; wet, low plasticity. Organics: amorphous, wood fragments. Push tube taken.		
										9						0

DATE STARTED: 9/5/14
DATE FINISHED: 9/5/14
LOGGED BY: OKD
SHEAR VANE No: Geo 613

DRILLED BY: Pro-Drill
EQUIPMENT: Kubota 4x4 Tractor Mounted
DRILL METHOD: Rotary
DRILL FLUID: Water
DIAMETER/INCLINATION: 100 mm / 90°

COMMENTS:
Coordinates obtained from handheld GPS. Elevation taken from Auckland Council GIS Viewer. Groundwater not measured. Existing piezometer within 5m of the borehole. Borehole ended at target depth. AVF = Auckland Volcanic Field.

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET

Revision A

A4 Scale 1:50

MACHINE_BOREHOLE P:\65\16518575\TGE\WP03 - SEF PIPE ROUTE EVALUATION\GI\MANGERE BNR UPGRADE BOREHOLE LOGS.GPJ BECA.GDT 6/16/14

CH2M Beca

BOREHOLE No: BH10005

MACHINE BOREHOLE LOG

SHEET 2 of 2

PROJECT: Mangere BNR Upgrade
JOB NUMBER: 6518575
SITE LOCATION: Mangere WWTP
CLIENT: Watercare

CIRCUIT: NZTM
COORDINATES: N 5,907,636.754 m
E 1,758,522.017 m
BOREHOLE LOCATION: Across Greenwood Rd from Southern WWTP
R L: 9.25 m
DATUM: MSL

DRILLING: FLUID LOSS	WATER LEVEL	CORE RECOVERY	METHOD	RQD	CASING	IN-SITU TESTS: SV	τ (kPa)	SPT 'N'	SAMPLES	DEPTH (m)	GRAPHIC LOG	USCS	MOISTURE	SOIL / ROCK DESCRIPTION	GEOLOGICAL UNIT	R L (m)
		100 %	OB					1 2 N=5				OL	W			
		100 %	SPT					0 1 2				MH	M	'Firm', clayey SILT; greyish brown; moist, high plasticity.		-1
								3 2 3 N=10		11		ML	M	Stiff, fine sandy SILT, minor clay; light greenish grey; moist, low plasticity.		
		60 %	OB													-2
		100 %	SPT					1 0 1 1		12		ML	W	Medium dense, SILT, minor fine sand; brownish grey; wet, non plastic.		-3
		100 %	OB					2 7 N=11					D	Thin (20mm) lens of 'stiff', SILT; white; dry, non plastic. Volcanic Ash.		
												OL	W	'Firm', organic SILT; minor clay; greyish brown; moist, low plasticity. Organics: amorphous.		
										13		ML	M	'Stiff', SILT, whitish grey; moist, non plastic. Volcanic ash.		
												OL	M	'Stiff', organic SILT, minor clay; dark brown; moist, low plasticity. Organics: amorphous.		-4
												ML	M	'Stiff', SILT, trace clay; light brownish grey; moist, non plastic, sensitive.		
		100 %	SPT			140+	227+	1 2 4				ML	S	Medium dense, fine sandy SILT; whitish grey; saturated, non plastic, dilatent. Volcanic Ash.		
								4 5 5 N=18		14						-5
		85 %	OB									MH	M	Very stiff, clayey SILT; grey; moist, high plasticity.		
		100 %	SPT			140+	227+	0 0 1 2 2 1 N=6		15						-6
														END OF LOG @ 15.45 m		
										16						-7
										17						-8
										18						-9
										19						-10

Puketoka Formation *(Contd.)*

DATE STARTED: 9/5/14
DATE FINISHED: 9/5/14
LOGGED BY: OKD
SHEAR VANE No: Geo 613

DRILLED BY: Pro-Drill
EQUIPMENT: Kubota 4x4 Tractor Mounted
DRILL METHOD: Rotary
DRILL FLUID: Water
DIAMETER/INCLINATION: 100 mm / 90°

COMMENTS:
Coordinates obtained from handheld GPS. Elevation taken from Auckland Council GIS Viewer. Groundwater not measured. Existing piezometer within 5m of the borehole. Borehole ended at target depth. AVF = Auckland Volcanic Field.

FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS SEE KEY SHEET

Revision A

A4 Scale 1:50

MACHINE_BOREHOLE P:\65\16518575\TGE\WP03 - SEF PIPE ROUTE EVALUATION\GI\MANGERE BNR UPGRADE BOREHOLE LOGS.GPJ BECA.GDT 6/16/14

LOG OF BOREHOLE

JOB NO: AJ359200
PDP ID No: 61

HOLE NO. **MW3**

CLIENT: Watercare Services Ltd

LOCATION: 54 Greenwood Road, Mangere

START DATE: 16/12/04
END DATE: 16/12/04

COORDINATES: 301609.33E 690449.16N

TOTAL DEPTH: 3.2m

LOGGED BY: C.G.

SHEET 1 OF 1

GROUND LEVEL: 6.84m

RL TOP OF CASING: 7.60m

INTERPRE-TATION	DESCRIPTION OF SOIL / ROCK (based on cuttings etc.)	GRAPHIC LOG	DEPTH (m)	RL (m)	SAMPLES	TESTS	WATER LEVEL GAIN / LOSS	INSTALLATION
	SOIL. Greyish brown silt, very stiff, slightly moist.		0.0					Raised Toby Box
	SILT with some sand. Light reddish brown, stiff, slightly moist.							Bentonite
	SANDY SILT. Dark greyish brown, crumbles easily, moist.			6				Casing
	No recovery, tried several times.		1.0				22/12/04 (1.17) 02/02/05 (1.22)	
				5				
			2.0					Gravel Pack (2mm)
								Screen
	CLAY with some silt. Light brown, firm, slightly moist.			4				
	CLAY. Light grey, soft, wet.		3.0					Sand

END OF BOREHOLE AT 3.2m

Drilled By: Drillwell
Diameter: 150mm
Method: Cored
Datum: Mt Eden 1949
Notes: Ground very soft as noted by driller, for hand probing at ~1m down.

KEY
- Groundwater Level
- Water Gain
- Water Loss
- Grab sample
- PID Reading (ppm)

PATTLE DELAMORE PARTNERS LTD

Logs based on New Zealand Geomechanics Society Field Description Guidelines (1988)

NZGD ID: BH_68857

Appendix 5: **FENZ Response**

National Headquarters
Level 12
80 The Terrace
PO Box 2133
Wellington
New Zealand
Phone +64 4 496 3600

6 October 2020

Sean Toland

By email: sean@babingtons.co.nz

Dear Sean

Information Request – 54 Greenwood Road, Mangere

I refer to your official information request dated 23 September 2020 asking for a site search for 54 Greenwood Road, Mangere.

In accordance with the provisions of the Official Information Act 1982, I *enclose* the information you requested.

You have the right to seek an investigation and review by the Ombudsman of this decision. Information about how to make a complaint is available at www.ombudsman.parliament.nz or freephone 0800 802 602.

Yours sincerely

Jenny Stevens
National Manager, Ministerial & Executive Services

encl

OIA 2020-00002885 - Incidents at 54 Greenwood Road, Mangere, Auckland

						Quantity Leaked		Disposal Method	
CAD#	**Date/Time**	**Address**	**Incident Type**	**Unsi**	**Trade Name**	**QL Code**	**QL Description**	**DM Code**	**DM Description**
F2239169	3/02/17 20:29	GREENWOOD ROAD, MANGERE	False Alarm: Good Intent K-46-1						
A257255	18/11/01 0:34	GREENWOOD ROAD, IHUMATAO	Mobile Property Fire						

Appendix 6: **Soil Descriptions**

Surface Sample Location	Soil Profile Descriptions	Samples
SS1	0.0 – 0.15m – TOPSOIL. SILT with some rootlets, moist to wet, firm, non plastic, friable, brown to dark brown.	0.15m – 1 x soil jar, 1 x ACM jar.
SS2	0.0 – 0.15m – TOPSOIL. SILT with some rootlets, moist to wet, firm, non plastic, friable, brown to dark brown.	0.15m – 1 x soil jar, 1 x ACM jar.
SS3	0.0 – 0.15m – TOPSOIL. SILT with some rootlets, moist to wet, firm, non plastic, friable, brown to dark brown with minor orange mottles.	0.15m – 1 x soil jar, 1 x ACM jar.
SS4	0.0 – 0.15m – TOPSOIL. SILT with some rootlets, moist to wet, firm, non plastic, friable, brown to dark brown with minor orange mottles	0.15m – 1 x soil jar, 1 x ACM jar.
SS5	0.0 – 0.15m – TOPSOIL. SILT with some rootlets, moist to wet, soft to firm, non plastic, friable, light brown to brown with white mottles.	0.15m – 1 x soil jar, 1 x ACM jar.
SS6	0.0 – 0.15m – TOPSOIL. SILT with some rootlets, moist to wet, firm, non plastic, friable, brown to dark brown.	0.15m – 1 x soil jar, 1 x ACM jar.
SS7	0.0 – 0.15m – TOPSOIL. SILT with some rootlets, moist to wet, soft to firm, non plastic, friable, brown.	0.15m – 1 x soil jar, 1 x ACM jar.

No obvious contamination present from visual inspection.

Appendix 7: **Soil Laboratory Analytical Transcripts**

Hill Laboratories
TRIED, TESTED AND TRUSTED

R J Hill Laboratories Limited
28 Duke Street Frankton 3204
Private Bag 3205
Hamilton 3240 New Zealand

T 0508 HILL LAB (44 555 22)
T +64 7 858 2000
E mail@hill-labs.co.nz
W www.hill-laboratories.com

Certificate of Analysis

Client:	Babington & Associates (2004) Limited	**Lab No:**	2445946	SPv1
Contact:	Sean Toland	**Date Received:**	29-Sep-2020	
	C/- Babington & Associates (2004) Limited	**Date Reported:**	02-Oct-2020	
	PO Box 37019	**Quote No:**	106399	
	Parnell	**Order No:**		
	Auckland 1151	**Client Reference:**	54GRM	
		Submitted By:	Sean Toland	

Sample Type: Soil

Sample Name:		SS1 - 0.15m 29-Sep-2020	SS2 - 0.15m 29-Sep-2020	SS3 - 0.15m 29-Sep-2020	SS4 - 0.15m 29-Sep-2020	SS5 - 0.15m 29-Sep-2020
Lab Number:		2445946.1	2445946.2	2445946.3	2445946.4	2445946.5
Individual Tests						
Dry Matter	g/100g as rcvd	77	79	76	75	79
Total Recoverable Boron	mg/kg dry wt	< 20	< 20	< 20	< 20	< 20
Total Recoverable Cobalt	mg/kg dry wt	29	41	29	29	30
Total Recoverable Tin	mg/kg dry wt	1.5	1.5	2.2	1.5	1.4
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	6	6	4	4	4
Total Recoverable Cadmium	mg/kg dry wt	0.39	0.48	0.32	0.38	0.48
Total Recoverable Chromium	mg/kg dry wt	56	58	74	56	55
Total Recoverable Copper	mg/kg dry wt	54	52	37	39	41
Total Recoverable Lead	mg/kg dry wt	30	28	21	18.9	17.6
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Nickel	mg/kg dry wt	42	42	66	42	40
Total Recoverable Zinc	mg/kg dry wt	104	100	111	81	84
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013
alpha-BHC	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013
beta-BHC	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013
delta-BHC	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013
gamma-BHC (Lindane)	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013
cis-Chlordane	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013
trans-Chlordane	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013
2,4'-DDD	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013
4,4'-DDD	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013
2,4'-DDE	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013
4,4'-DDE	mg/kg dry wt	0.019	0.017	0.030	0.021	0.021
2,4'-DDT	mg/kg dry wt	< 0.013	< 0.013	0.049	< 0.014	< 0.013
4,4'-DDT	mg/kg dry wt	< 0.013	< 0.013	0.33	0.016	0.022
Total DDT Isomers	mg/kg dry wt	< 0.08	< 0.08	0.41	< 0.08	< 0.08
Dieldrin	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013
Endosulfan I	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013
Endosulfan II	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013
Endosulfan sulphate	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013
Endrin	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013
Endrin aldehyde	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013
Endrin ketone	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013
Heptachlor	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013
Heptachlor epoxide	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013
Hexachlorobenzene	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013

Sample Type: Soil						
Sample Name:		SS1 - 0.15m 29-Sep-2020	SS2 - 0.15m 29-Sep-2020	SS3 - 0.15m 29-Sep-2020	SS4 - 0.15m 29-Sep-2020	SS5 - 0.15m 29-Sep-2020
Lab Number:		2445946.1	2445946.2	2445946.3	2445946.4	2445946.5
Organochlorine Pesticides Screening in Soil						
Methoxychlor	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.014	< 0.013
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.3	-	< 0.4	-	-
1-Methylnaphthalene	mg/kg dry wt	< 0.013	-	< 0.013	-	-
2-Methylnaphthalene	mg/kg dry wt	< 0.013	-	< 0.013	-	-
Acenaphthylene	mg/kg dry wt	< 0.013	-	< 0.013	-	-
Acenaphthene	mg/kg dry wt	< 0.013	-	< 0.013	-	-
Anthracene	mg/kg dry wt	< 0.013	-	< 0.013	-	-
Benzo[a]anthracene	mg/kg dry wt	< 0.013	-	< 0.013	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.013	-	< 0.013	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.03	-	< 0.04	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.03	-	< 0.04	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	< 0.013	-	0.013	-	-
Benzo[e]pyrene	mg/kg dry wt	< 0.013	-	< 0.013	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.013	-	< 0.013	-	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.013	-	< 0.013	-	-
Chrysene	mg/kg dry wt	< 0.013	-	< 0.013	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.013	-	< 0.013	-	-
Fluoranthene	mg/kg dry wt	< 0.013	-	0.023	-	-
Fluorene	mg/kg dry wt	< 0.013	-	< 0.013	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.013	-	< 0.013	-	-
Naphthalene	mg/kg dry wt	< 0.07	-	< 0.07	-	-
Perylene	mg/kg dry wt	< 0.013	-	< 0.013	-	-
Phenanthrene	mg/kg dry wt	< 0.013	-	0.014	-	-
Pyrene	mg/kg dry wt	< 0.013	-	0.023	-	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 8	-	< 8	-	-
C10 - C14	mg/kg dry wt	< 20	-	< 20	-	-
C15 - C36	mg/kg dry wt	< 40	-	< 40	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	-	< 70	-	-

Sample Name:		SS6 - 0.15m 29-Sep-2020	SS7 - 0.15m 29-Sep-2020			
Lab Number:		2445946.6	2445946.7			
Individual Tests						
Dry Matter	g/100g as rcvd	76	79	-	-	-
Total Recoverable Boron	mg/kg dry wt	< 20	< 20	-	-	-
Total Recoverable Cobalt	mg/kg dry wt	29	30	-	-	-
Total Recoverable Tin	mg/kg dry wt	1.5	3.0	-	-	-
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	4	9	-	-	-
Total Recoverable Cadmium	mg/kg dry wt	0.55	0.69	-	-	-
Total Recoverable Chromium	mg/kg dry wt	54	53	-	-	-
Total Recoverable Copper	mg/kg dry wt	43	71	-	-	-
Total Recoverable Lead	mg/kg dry wt	17.3	210	-	-	-
Total Recoverable Mercury	mg/kg dry wt	< 0.10	0.10	-	-	-
Total Recoverable Nickel	mg/kg dry wt	32	38	-	-	-
Total Recoverable Zinc	mg/kg dry wt	91	340	-	-	-
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.013	< 0.013	-	-	-
alpha-BHC	mg/kg dry wt	< 0.013	< 0.013	-	-	-
beta-BHC	mg/kg dry wt	< 0.013	< 0.013	-	-	-
delta-BHC	mg/kg dry wt	< 0.013	< 0.013	-	-	-

Sample Type: Soil						
Sample Name:		SS6 - 0.15m 29-Sep-2020	SS7 - 0.15m 29-Sep-2020			
Lab Number:		2445946.6	2445946.7			
Organochlorine Pesticides Screening in Soil						
gamma-BHC (Lindane)	mg/kg dry wt	< 0.013	< 0.013	-	-	-
cis-Chlordane	mg/kg dry wt	< 0.013	< 0.013	-	-	-
trans-Chlordane	mg/kg dry wt	< 0.013	< 0.013	-	-	-
2,4'-DDD	mg/kg dry wt	< 0.013	< 0.013	-	-	-
4,4'-DDD	mg/kg dry wt	< 0.013	0.050	-	-	-
2,4'-DDE	mg/kg dry wt	< 0.013	< 0.013	-	-	-
4,4'-DDE	mg/kg dry wt	0.041	0.156	-	-	-
2,4'-DDT	mg/kg dry wt	< 0.013	0.032	-	-	-
4,4'-DDT	mg/kg dry wt	0.030	0.134	-	-	-
Total DDT Isomers	mg/kg dry wt	< 0.08	0.37	-	-	-
Dieldrin	mg/kg dry wt	< 0.013	< 0.013	-	-	-
Endosulfan I	mg/kg dry wt	< 0.013	< 0.013	-	-	-
Endosulfan II	mg/kg dry wt	< 0.013	< 0.013	-	-	-
Endosulfan sulphate	mg/kg dry wt	< 0.013	< 0.013	-	-	-
Endrin	mg/kg dry wt	< 0.013	< 0.013	-	-	-
Endrin aldehyde	mg/kg dry wt	< 0.013	< 0.013	-	-	-
Endrin ketone	mg/kg dry wt	< 0.013	< 0.013	-	-	-
Heptachlor	mg/kg dry wt	< 0.013	< 0.013	-	-	-
Heptachlor epoxide	mg/kg dry wt	< 0.013	< 0.013	-	-	-
Hexachlorobenzene	mg/kg dry wt	< 0.013	< 0.013	-	-	-
Methoxychlor	mg/kg dry wt	< 0.013	< 0.013	-	-	-
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	-	< 0.3	-	-	-
1-Methylnaphthalene	mg/kg dry wt	-	< 0.013	-	-	-
2-Methylnaphthalene	mg/kg dry wt	-	< 0.013	-	-	-
Acenaphthylene	mg/kg dry wt	-	< 0.013	-	-	-
Acenaphthene	mg/kg dry wt	-	< 0.013	-	-	-
Anthracene	mg/kg dry wt	-	< 0.013	-	-	-
Benzo[a]anthracene	mg/kg dry wt	-	0.016	-	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	0.021	-	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	< 0.03	-	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	< 0.03	-	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	-	0.024	-	-	-
Benzo[e]pyrene	mg/kg dry wt	-	0.022	-	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	-	0.015	-	-	-
Benzo[k]fluoranthene	mg/kg dry wt	-	< 0.013	-	-	-
Chrysene	mg/kg dry wt	-	0.018	-	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	-	< 0.013	-	-	-
Fluoranthene	mg/kg dry wt	-	0.036	-	-	-
Fluorene	mg/kg dry wt	-	< 0.013	-	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	0.015	-	-	-
Naphthalene	mg/kg dry wt	-	< 0.07	-	-	-
Perylene	mg/kg dry wt	-	< 0.013	-	-	-
Phenanthrene	mg/kg dry wt	-	0.014	-	-	-
Pyrene	mg/kg dry wt	-	0.036	-	-	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	-	< 8	-	-	-
C10 - C14	mg/kg dry wt	-	< 20	-	-	-
C15 - C36	mg/kg dry wt	-	< 40	-	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	< 70	-	-	-

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request.
Unless otherwise indicated, analyses were performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1-7
Total of Reported PAHs in Soil	Sonication extraction, GC-MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1, 3, 7
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1-7
Total Recoverable Boron	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	20 mg/kg dry wt	1-7
Total Recoverable Cobalt	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.4 mg/kg dry wt	1-7
Total Recoverable Tin	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	1.0 mg/kg dry wt	1-7
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	BaP Potency Equivalence calculated from; Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.002 mg/kg dry wt	1, 3, 7
Benzo[a]pyrene Toxic Equivalence (TEF)*	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b) fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.002 mg/kg dry wt	1, 3, 7
TPH Oil Industry Profile + PAHscreen	Sonication extraction, GC-FID and GC-MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.002 - 70 mg/kg dry wt	1, 3, 7
Heavy Metals with Mercury, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-7
Organochlorine Pesticides Screening in Soil	Sonication extraction, GC-ECD analysis. Tested on as received sample. In-house based on US EPA 8081.	0.010 - 0.06 mg/kg dry wt	1-7
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	8 mg/kg dry wt	1, 3, 7
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	1, 3, 7
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	1, 3, 7
Total hydrocarbons (C7 - C36)	Calculation: Sum of carbon bands from C7 to C36. In-house based on US EPA 8015.	70 mg/kg dry wt	1, 3, 7

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed between 01-Oct-2020 and 02-Oct-2020. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.

Kim Harrison MSc
Client Services Manager - Environmental

Hill Laboratories
TRIED, TESTED AND TRUSTED

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Certificate of Analysis

Client:	Babington & Associates (2004) Limited	**Lab No:**	2445947	A2Pv1
Contact:	Sean Toland	**Date Received:**	29-Sep-2020	
	C/- Babington & Associates (2004) Limited	**Date Reported:**	01-Oct-2020	
	PO Box 37019	**Quote No:**	106399	
	Parnell	**Order No:**		
	Auckland 1151	**Client Reference:**	54GRM	
		Submitted By:	Sean Toland	

Sample Type: Soil

Sample Name:		SS1 - 0.15m 29-Sep-2020	SS5 - 0.15m 29-Sep-2020	SS6 - 0.15m 29-Sep-2020	SS7 - 0.15m 29-Sep-2020	
Lab Number:		2445947.1	2445947.5	2445947.6	2445947.7	
Asbestos Presence / Absence		Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	-
Description of Asbestos Form		-	-	-	-	-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	-
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	-
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	-
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001	-
As Received Weight	g	731.1	819.7	803.4	659.6	-
Dry Weight	g	570.1	630.9	614.6	520.1	-
Moisture	%	22	23	24	21	-
Sample Fraction >10mm	g dry wt	18.5	< 0.1	< 0.1	82.1	-
Sample Fraction <10mm to >2mm	g dry wt	216.0	99.6	83.9	207.8	-
Sample Fraction <2mm	g dry wt	333.8	529.9	529.2	229.3	-
<2mm Subsample Weight	g dry wt	56.6	59.5	59.6	57.8	-
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	-
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	-
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001	-

Glossary of Terms

- Loose fibres (Minor) - One or two fibres/fibre bundles identified during analysis by stereo microscope/PLM.
- Loose fibres (Major) - Three or more fibres/fibre bundles identified during analysis by stereo microscope/PLM.
- ACM Debris (Minor) - One or two small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
- ACM Debris (Major) - Large (>2mm) piece, or more than three small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
- Unknown Mineral Fibres - Mineral fibres of unknown type detected by polarised light microscopy including dispersion staining. The fibres detected may or may not be asbestos fibres. To confirm the identities, another independent analytical technique may be required.
- Trace - Trace levels of asbestos, as defined by AS4964-2004.

For further details, please contact the Asbestos Team.

Please refer to the BRANZ New Zealand Guidelines for Assessing and Managing Asbestos in Soil.
https://www.branz.co.nz/asbestos

The following assumptions have been made:

1. Asbestos Fines in the <2mm fraction, after homogenisation, is evenly distributed throughout the fraction
2. The weight of asbestos in the sample is unaffected by the ashing process.

Results are representative of the sample provided to Hill Laboratories only.

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request.
Unless otherwise indicated, analyses were performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Wgt of Asbestos as Asbestos Fines in <10mm >2mm Fraction*	Measurement on analytical balance, from the <10mm >2mm Fraction. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.00001 g dry wt	1, 5-7
New Zealand Guidelines Semi Quantitative Asbestos in Soil			
As Received Weight	Measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g	1, 5-7
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g	1, 5-7
Moisture	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1, 5-7
Sample Fraction >10mm	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g dry wt	1, 5-7
Sample Fraction <10mm to >2mm	Sample dried at 100 to 105°C, 10mm and 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g dry wt	1, 5-7
Sample Fraction <2mm	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g dry wt	1, 5-7
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1, 5-7
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1, 5-7
Weight of Asbestos in ACM (Non-Friable)	Measurement on analytical balance, from the >10mm Fraction. Weight of asbestos based on assessment of ACM form. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1, 5-7
Asbestos in ACM as % of Total Sample*	Calculated from weight of asbestos in ACM and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1, 5-7
Weight of Asbestos as Fibrous Asbestos (Friable)	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1, 5-7
Asbestos as Fibrous Asbestos as % of Total Sample*	Calculated from weight of fibrous asbestos and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1, 5-7
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1, 5-7
Asbestos as Asbestos Fines as % of Total Sample*	Calculated from weight of asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1, 5-7
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	Calculated from weight of fibrous asbestos plus asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1, 5-7

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed on 01-Oct-2020. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

Dexter Paguirigan Dip Chem Engineering Tech
Laboratory Technician - Asbestos

Appendix 8: **Soil Laboratory Results Summary Tables**

54 Greenwood Road, Mangere

Soil Analytical Results Summary Table
Heavy Metals and Organochlorine Pesticides
Appendix 8

Central Interceptor Project
Ghella Abergeldie JV

				Heavy Metals											Organochlorine Pesticides	
Sample No.	**Sample name**	**Depth (m)**	**Date**	**Arsenic**	**Boron**	**Cadmium**	**Chromium**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Nickel**	**Tin**	**Zinc**	**Dieldrin**	**Total DDT**
1	SS1 - 0.15m	0.15	29/09/2020	6	<20	0.39	56	29	54	30	<0.1	42	1.5	104	<0.013	<0.08
2	SS2 - 0.15m	0.15	29/09/2020	6	<20	0.48	58	41	52	28	<0.1	42	1.5	100	<0.013	<0.08
3	SS3 - 0.15m	0.15	29/09/2020	4	<20	0.32	74	29	37	21	<0.1	66	2.2	111	<0.013	0.41
4	SS4 - 0.15m	0.15	29/09/2020	4	<20	0.38	56	29	39	18.9	<0.1	42	1.5	81	<0.014	<0.08
5	SS5 - 0.15m	0.15	29/09/2020	4	<20	0.48	55	30	41	17.6	<0.1	40	1.4	84	<0.013	<0.08
6	SS6 - 0.15m	0.15	29/09/2020	4	<20	0.55	54	29	43	17.3	<0.1	32	1.5	91	<0.013	<0.08
7	SS7 - 0.15m	0.15	29/09/2020	9	<20	0.69	53	30	71	210	0.1	38	3	340	<0.013	0.37
8 *	HA103 - 0.25m	0.25	1/05/2014	4	-	0.5	61	-	54	18.1	<0.1	33	-	91	<0.01	0.3
Tier 1 Risk Acceptance Criteria																
NES:CS SCS Commercial/Industrial				*70*	*>10,000*	*1,300*	*6,300*		*>10,000*	*3,300*	*4,200*				*160*	1,000
TP153 - Natural Background Concentrations - Volcanic Range				*12*	*260*	*0.65*	*125*	*170*	*90*	*65*	*0.45*	*320*	*4*	*1,160*		
AUP Permitted Activity Soil Acceptance Criteria				*100*		*7.5*	*400*		*325*	*250*	*0.75*	*105*		*400*		12
NEPM Commercial/Industrial HIL D								*4000*				*4,000*		*400,000*		
CCME Industrial													*300*			

Notes:
Laboratory Transcripts in Appendix 7
All results are in mg/kg
* 2014 result from Beca Investigation

Ghella 5 Generations of Tunnellers
ABERGELDIE COMPLEX INFRASTRUCTURE

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54 Greenwood Road, Mangere

Soil Analytical Results Summary Table
PAH / TPH
Appendix 8

Central Interceptor Project
Ghella Abergeldie JV

				Polycyclic Aromatic Hydrocarbons			Total Petroleum Hydrocarbons			
				Benzo(a)pyrene BaP TEF	Pyrene	Naphthalene	C7-C9	C10-C14	C15-C36	C7-C36
Sample No.	**Sample name**	**Depth (m)**	**Date**							
1	SS1 - 0.15m	0.15	29/09/2020	<0.03	<0.013	<0.07	<8	<20	<40	<70
2	SS3 - 0.15m	0.15	29/09/2020	<0.04	0.023	<0.07	<8	<20	<40	<70
7	SS7 - 0.15m	0.15	29/09/2020	<0.03	0.036	<0.07	<8	<20	<40	<70

Tier 1 Risk Acceptance Criteria

NES:CS SCS 2011 Commercial Industrial		35						
AUP Permitted Activity Soil Acceptance Criteria		20						
OIG Commercial/Industrial PAH - Sandy SILT <1 - All Pathways		11	NA	210				
OIG Commercial/Industrial TPH - Sandy SILT <1m - All Pathways					500	1700	NA	

Notes:

All results are in mg/kg

Laboratory Transcripts in Appendix 7

Ghella 5 Generations of Tunnelers ABERGELDIE COMPLEX INFRASTRUCTURE

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Soil Analytical Results Summary Table
Asbestos Containing Material
Appendix 8

Central Interceptor Project
Ghella Abergeldie JV

Sample No.	Sample name	Depth	Date	Detection	Results
1	SS1 - 0.15m	0.15	29/09/2020	Asbestos NOT Detected	<0.001
2	SS5 - 0.15m	0.15	29/09/2020	Asbestos NOT Detected	<0.001
3	SS6 - 0.15m	0.15	29/09/2020	Asbestos NOT Detected	<0.001
4	SS7 - 0.15m	0.15	29/09/2020	Asbestos NOT Detected	<0.001

Tier 1 Risk Acceptance Criteria

BRANZ 2016 Commercial Industrial	0.001 % w/w

Notes:

Laboratory Transcripts in Appendix 7

All results are in % w/w

Ghella 5 Generations of Tunnelers

ABERGELDIE COMPLEX INFRASTRUCTURE

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Appendix 9: **Sustainability Hierarchy**

Contamination Hierarchy Definitions

Remediation Options	Definition
1. On-site treatment (favourable)	Soil is treated* at site under assessment, so the contaminant is destroyed, or the associated risk is reduced to an acceptable level. This includes not touching parts of site that may contain contaminants if at all possible with regard to construction methodology (may only be possible for some contaminants).
2. Off-site treatment before return to site	Soil is taken off site under assessment** and treated* so the contaminant is destroyed, or the associated risk is reduced to an acceptable level. The soil is then returned to the site from which it came.
3. Consolidation and isolation	Soil is isolated on-site from humans and damage to the environment. Soil with mobile contamination (e.g. oils, hydrocarbons, and other leaching contaminants) is moved and isolated using a properly designed barrier (e.g. concrete cell or installation of impermeable barrier). Some forms of contaminated soil (e.g. asbestos) could be reused on site and covered/identified (e.g. geotextile layer) then landscaped and planted.
4. Removal and replacement	Soil is removed from site and disposed of at an approved site or facility, before being replaced with clean material if necessary.
5. Management strategy (unfavourable)	Where assessment indicates remediation would have no net environmental benefit, or would have a net adverse environmental effect - soil remains on-site and a management plan is developed in order to manage material long-term so that environmental and human health risks are minimised.

* Treatment options must be overseen by a SQEP and could include, but are not limited to:
  - Biodegradation to reduce hydrocarbons
  - Changing the pH level (e.g. adding lime)
  - Mixing soil with other materials
  - Stabilising soil (e.g. mixing with concrete/cement/other binding material)

** Includes moving soil to another area of project (e.g. from May Road to Mangere Pump Station) or to a third-party site.


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Appendix C: Contaminated Land Site Management Plan

Xenia Meier - Watercare Services
Jun 25, 2020, 11:26 AM GMT+12:00

Contaminated Land Site Management Plan

Central Interceptor Project – Main Project Works

Issued For Review

Watercare Services Limited
73 Remuera Road, Remuera
Auckland 1050, New Zealand
Private Bag 92521 Wellesley Street,
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www.watercare.co.nz

Document Number
GAJV-PLN-00026

Revision 1.1

No Objection

Jon Sickling - Watercare Services
Jun 29, 2020, 4:08 PM GMT+12:00

Note: refer to Annex E of the Contract for further details on Engineer's reviews. Where 'Objection' is indicated, this shall constitute a "notice of objection" pursuant to Section 4.2 of Annex E

Central Interceptor

Doc No: GAJV-PLN-00026 (previously CI-EN-2004)

Version: [1.1 Final]

Watercare
An Auckland Council Organisation

Ghella 5 Generations of Tunnelers
ABERGELDIE COMPLEX INFRASTRUCTURE

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APPENDIX E - Additional Site Investigations

Revision History

Review and Approval – Beca

FUNCTION	POSITION	NAME	SIGNATURE	DATE
Prepared by	Contaminated Land Specialists, Beca Limited	Phillip Ware & Curtis Blyth (Beca Limited)		23/07/2019
Reviewed By	Contaminated Land Specialist, Beca Limited	Phillip Ware (Beca Limited)		24/07/2019
Approved by	Job Director, Beca Limited	Quintin Blackburn		24/07/2019

Review and Approval – Ghella Abergeldie JV

FUNCTION	POSITION	NAME	SIGNATURE	DATE
Coordinated by	Compliance Advisor, Ghella Abergeldie JV	Sarah Blair		24/07/2019
Reviewed by	Environmental Manager, Ghella Abergeldie JV	Sandra Edwards		24/07/2019
Approved by	Project Director, Ghella Abergeldie JV	Alfonso Pupi		24/07/2019
Revision drafted by	Environmental Advisor. Ghella Abergeldie JV	Alex Palma		07/04/2020
Revision reviewed by	Environmental Manager, Ghella Abergeldie JV	Sandra Edwards		14/04/2020
Revision approved by	Project Director, Ghella Abergeldie JV	Francesco Saibene		23/04/2020

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Revision Status

VERSION	DATE	STATUS	AMENDMENT DESCRIPTION
0.1	20/05/2019	Draft	Draft for internal review
0.2	5/06/2019	Final Draft	For Watercare review
0.3	1/07/2019	Final	For submission to Auckland Council

0.4	24/07/2019	Final	Amended following Auckland Council comments
1.1	22/06/2020	For Review	Issued to WSL for review. Include new contamination investigation results and spoilmanagement decision making process

Where review and revision is deemed warranted, i.e. such as comments received from the Client, or where necessary to reflect changes in contractual or Project requirements, or as a result of an incident then these revisions shall be reviewed by the respective Project Manager and approved by the Construction Manager.

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2	Client Rep	Engineer to Contract	Select Date

1. Information

1.1 Definitions and abbreviations

Abbreviation	Detail
ACM	Asbestos Containing Material
AMP	Asbestos Management Plan
Babingtons	Babingtons – Civil and Environmental Consultants
BRANZ	Building Research Association of New Zealand - reference to the New Zealand Guidelines for Assessing and Managing Asbestos in Soil
CLSMP	Contaminated Land Site Management Plan
CMP	Construction Management Plan
CSO	Combined Sewer Overflows
DSI	Detailed Site Investigation
ESC	Erosion and Sediment Control
ESR	Excavation Summary Report
(FA/AF)	Fibrous asbestos/asbestos fines
HAIL	Hazardous Activities and Industries List
HSM	Health and Safety Manager
ISCA	Infrastructure Sustainability Council of Australia
MfE	Ministry for the Environment
NESCS	National Environmental Standard for Assessing and Managing Contaminants in soil to Protect Human Health
OCP	Organochlorine pesticides
PAH	Polyaromatic hydrocarbons
PPE	Personal Protective Equipment
PSI	Preliminary Site Investigation
SQEP	Suitably Qualified and Experienced Practitioner
SVOC	Semivolatile organic compounds
TPH	Total Petroleum hydrocarbons
T&T	Tonkin and Taylor Limited
VOC	Volatile organic compounds

2. Introduction

2.1 Project background

Watercare Services Limited ('**Watercare**') has obtained designations and resource consents the construction and operation of a new wastewater tunnel to collect wastewater flows from the Auckland isthmus area and transfer them to the Māngere Wastewater Treatment Plant (WWTP). Referred to as the Central Interceptor Project (**'Central Interceptor**' or '**the Project**'), the proposed works involve a wastewater tunnel that will run between Western Springs and the Māngere Wastewater Treatment Plant ('**WWTP**'). It includes the construction of the 13km underground wastewater tunnel, above ground facilities, and two link sewers referred to as Link Sewer B and Link Sewer C. Along the route the Central Interceptor will connect to the existing wastewater network, which will divert flows and overflows into the tunnel. Construction of the Project will take approximately 6 years. The extent of the Central Interceptor project is shown in Figure 2.

This Contaminated Land Site Management Plan ('**CLSMP**') has been prepared by Beca Limited for the Ghella Abergeldie Joint Venture ('**Ghella Abergeldie JV**' or '**the Contractor**'), the construction contractor for the Project. The CLSMP is a requirement of resource consents R/LUC/2012/2846/1, PRC40963, and 40843. The specific conditions are set out in Table 1 of this plan.

2.2 Purpose and objectives of this CLSMP

This Contaminated Land Site Management Plan ('**CLSMP**') is based on the initial Site Management Plan[1] prepared by Tonkin and Taylor ('**T&T**') during the consenting phase of the Project in 2012.

This CLSMP will assist in managing the excavation, handling and disposal of any contaminated material encountered as part of the Central Interceptor Project, and is required to satisfy resource consent conditions of consents R/LUC/2012/2846/1, PRC40963, and 40843.

The T&T Site Management Plan was provided to support the statutory approvals process undertaken for the Project in 2012. This Plan has been adapted to include the results and assessment of the investigations that have occurred since then.

The assessments undertaken for the Project as identified above, indicated that contaminated soils are unlikely to pose a human health risk to workers undertaking the works or to the general public. Additional focus across the industry and from regulators has been placed on the potential risks from inground asbestos since 2012 when the main identification of contaminated site risks were identified by T&T. As well as this additional focus, new regulations[2] have been implemented. These asbestos regulations and how they influence each site are further discussed in Section 5.

The objective of this CLSMP is to provide procedures for the excavation, handling and disposal of any contaminated or potentially contaminated soil that may be encountered during the construction of the Central Interceptor on a site-by-site basis.

[1] Central Interceptor Site Management Plan, Tonkin & Taylor, December 2012
[2] New Zealand Guidelines for Assessing and Managing Asbestos in Soil, BRANZ, November 2017

The scope of this report is to provide procedures for:

- Identifying the presence of contaminants and sites of potential concern;
- Undertaking excavations in areas potentially containing contaminated soils;
- Managing and containing contaminated soils encountered during the development of the site;
- Controlling potential effects during the works such as odour, dust and tracked soil;
- Managing health and safety during the works; and
- Validating/monitoring the works, as necessary, to ensure appropriate disposal of surplus soil.

2.3 Consent requirements

Table 1 identifies the conditions that specify what is to be included in the CLSMP and which sections of the CLSMP address these conditions.

Table 1: Resource consent conditions relevant to the CLSMP

Resource consent condition	Condition Text	Relevant CLSMP section
8.1	This consent shall expire on 28 November 2048 unless it has lapsed, been surrendered or been cancelled at an earlier date pursuant to the RMA.	-
8.2	Any amendments to the documents listed in General Condition 1.1 shall be submitted to the Manager prior to implementation, for approval that it complies with the Ministry for the Environment Contaminated Land Management Guideline No. 1 and the conditions of this consent: a) changes to the documents shall not be implemented until confirmation has been received; b) notwithstanding (a), changes may be implemented if 10 working days have passed since the documents were submitted and no correspondence has been received from the Council regarding the changes or immediately in the case of an emergency; and c) all confirmed changes shall be incorporated into respective replacement documents.	Section 4.2
8.3	The Consent Holder shall review The Central Interceptor Project Contaminated Land Site Management Plan (Rev 1) dated December 2012 ("the CLSMP"), prepared by Tonkin & Taylor, and submit a revised or final CLSMP prior to commencement of any Project stage. The CLSMP shall include mitigation measures to ensure that discharges from the sites to land or water are minimised, and to ensure that the risks to the health of workers on the site and nearby sites is less than minor. Where minor enabling works or isolated works are to be undertaken prior to commencement of the main works, a site specific CLSMP may be prepared, commensurate with the scale and effects of the proposed works. The CLSMP or plans shall be submitted to the Manager for approval. The CLSMP shall include, but not be limited to:	This plan
8.3 (a)	measures to be undertaken in the handling, storage and disposal of contaminated surficial soils excavated during the construction works;	Sections 5, 6, 7
8.3 (b)	soil validation testing and groundwater testing;	Sections 5.4 and below8.3

Resource consent condition	Condition Text	Relevant CLSMP section
8.3 (c)	a process for confirming potential for contamination and soil testing at the identified potentially contaminated sites to determine the nature of the excavated soil and potential reuse or disposal options;	Sections 5.2 and 5.4
8.3 (d)	measures to be undertaken in the event of unexpected contamination being identified during construction activities; and	Sections 5.4 and 7.4
8.3 (e)	measures to be undertaken for the handling of asbestos containing material.	Sections 7.10 and 8.2
8.4	The Consent Holder shall engage a suitably qualified and experienced practitioner (SQEP) as defined in the User's Guide: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (April, 2012). In accordance with the User's Guide, the SQEP shall be a person with a tertiary degree in environmental science or engineering or a related field and at least five years' experience in environmental investigations. The SQEP shall carry out any soil and groundwater sampling work and observe construction site earthworks in areas identified in the CLSMP, including the excavation and removal of contaminated surficial soils from the site. The SQEP shall be available during the excavation works and be in regular contact with the Watercare Project Manager and/or contractor over the course of the project to ensure that the procedures set out in the CLSMP are being followed.	Section 4.1 Note: SQEP to be confirmed
8.5	Confirmatory soil sampling and testing shall be undertaken at the following construction sites prior to works commencing at these sites, or as described in the CLSMP: • Rawalpindi Reserve; • Mt Albert War Memorial Reserve; • Lyon Avenue; • Haverstock Road; • Walmsley Park; • PS25 (Miranda Reserve); • Keith Hay Park; • PS23 (Frederick Street); • ~~Western Springs Depot~~; and • Miranda Reserve. The sites at Mt Albert War Memorial Reserve, Lyon Avenue and Haverstock Road, shall be investigated prior to any construction activities, rather than during construction. Where sampling is undertaken during construction, the excavated soil shall be treated as potentially contaminated while awaiting laboratory results and relevant procedures set out in the CLSMP shall be followed. Sampling and testing shall be undertaken as outlined in the CLSMP. The results of these investigations shall determine appropriate handling and surplus soil disposal locations as well as appropriate health and safety requirements at these sites. For the sites at Mt Albert War Memorial Reserve, Lyon Avenue and Haverstock Road the findings of the investigations and any site-specific requirements shall be provided to the Construction Manager prior to the commencement of excavation works.	Section 5 Note: The Western Springs Depot site is no longer applicable to this project

Resource consent condition	Condition Text	Relevant CLSMP section
8.6	The Consent Holder shall ensure that excavation workers (which excludes workers associated with excavations in natural uncontaminated ground for underground tunnelling or shaft construction works) are appropriately informed and trained regarding potential health and safety risks and corresponding mitigation measures associated with contamination, in accordance with the CLSMP.	Section 6
8.7	The Consent Holder shall ensure that the public is excluded from the work area.	Refer to the CMP
8.8	When excavating actual or potentially contaminated soil (which excludes excavations in natural uncontaminated ground for underground tunnelling or shaft construction works), the contractor shall maintain weekly records of the excavation areas, the type and volume of soil removed to landfill, and the location of the landfill. The records shall be retained and provided to the Auckland Council on request.	Section 9
8.9	During the works, regular inspections of the excavation of actual or potentially contaminated areas (which excludes excavations in natural uncontaminated ground for underground tunnelling or shaft construction works) shall be carried out to ensure that the site management procedures are implemented in accordance with the CLSMP.	Section 7.9
8.10	For sites where asbestos has previously been identified, or could potentially be present, or is discovered during the works, all excavation work shall be observed by a person certified under the Asbestos Regulations (Health and Safety in Employment Act (Asbestos) Regulations 1998, and Department of Labour Guidelines for the Management and Removal of Asbestos 1999).	Sections 7.4 and 7.10
8.11	All excavation works shall be carried out in a manner that will minimise the potential for mixing contaminated soils with uncontaminated soils.	Section 7.1
8.12	Where possible, contaminated soils identified for off-site disposal shall be loaded directly onto trucks. Any contaminated soil removed from the site shall be covered during transportation.	Section 7.1
8.13	Stockpiling of contaminated soil shall be avoided so far as practicable. If required, the stockpiles shall follow the procedures set out in the CLSMP.	Section 7.2
8.14	Any contaminated material removed from the site shall be disposed of in accordance with the CLSMP, at a facility which holds a consent to accept the relevant level of contamination, unless it has been appropriately demonstrated that the materials removed from the site meet the definition of 'clean fill', as described in 'A Guide to the Management of Clean fills', Ministry for the Environment (2002).	Section 9
8.15	Any excavated material re-used on site shall have soil concentrations that are the lower of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health for the site final land use or the Auckland Council Regional Plan: Air, Land and Water Schedule 10 permitted activity criteria.	Section 7.1
8.16	All imported fill shall:	Section 7.3

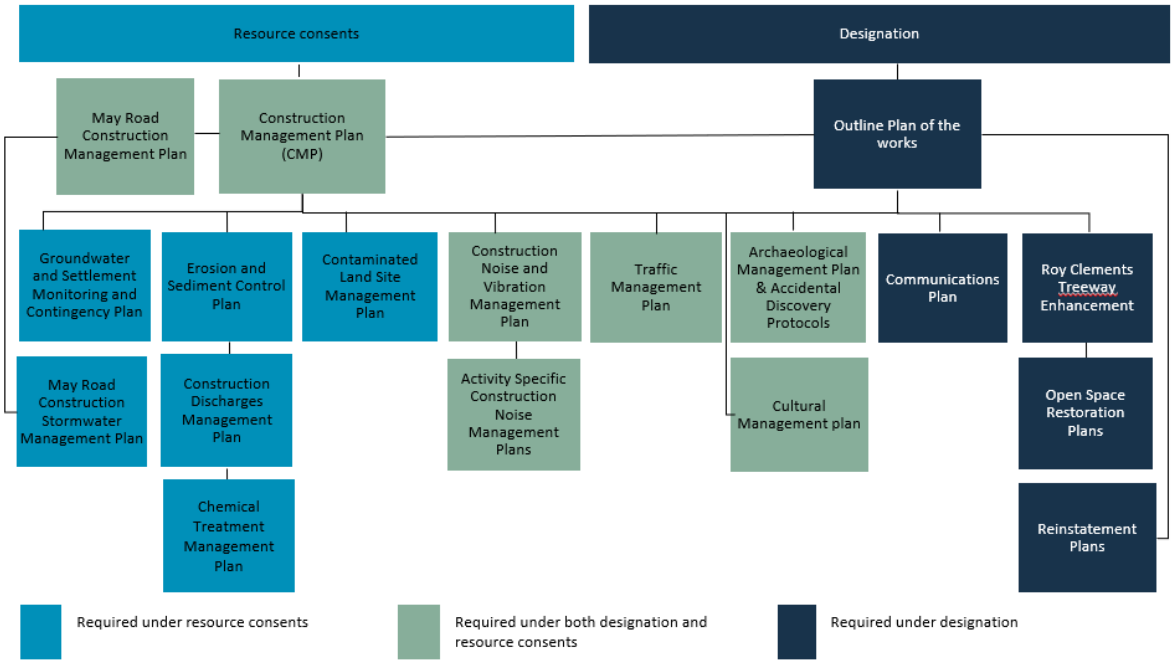
Resource consent condition	Condition Text	Relevant CLSMP section
	a) comply with the definition of 'clean fill' as per 'A Guide to the Management of Clean fills', Ministry for the Environment (2002); b) be solid material of an inert nature; and c) not contain hazardous substances or contaminants above natural background levels of the receiving site.	
8.17	The Consent Holder shall ensure that any groundwater, perched groundwater or stormwater which may become contaminated through contact with contaminated soil or some other means shall be isolated while work is in progress. The water shall be tested prior to discharge to the stormwater system. In accordance with the CLSMP, if contaminant concentrations meet the 80% trigger level for protection of freshwater species in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality ("ANZECC") (2000), the water shall be allowed to be discharged to the stormwater system. In the absence of confirmatory testing, or if levels exceed the ANZECC criteria, the water shall be disposed to trade waste/sewer.	Section 7.7
8.18	Should any unexpected contamination be found during the works, the appointed SQEP is to be consulted and is to advise on the best option for managing the affected material (including sampling and testing, if required), in accordance with the CLSMP.	Sections 5.4 and 7.4
8.19	All sampling, testing and analysis carried out in accordance with this consent shall be: a) undertaken or supervised by the SQEP; and b) in accordance with Contaminated Land Management Guidelines No.5, Ministry for the Environment, revised 2011.	Section 5.4
8.20	The Consent Holder shall notify the Manager within 10 working days of identification of any contamination which was not identified in the reports submitted with the application, or subsequent investigations, including contaminated soil, surface water or groundwater. If the contamination is considered by the SQEP to pose significant environmental and/or health and safety issues, the Manager shall be notified immediately.	Sections 5.4 and 7.4
8.21	In the event that unexpected contaminated material is encountered, a further review of site procedures is to take place to ascertain if additional measures are required, and the SMP updated accordingly.	Sections 4.2 and 5.4
8.22	With the exception of soils excavated as part of the underground tunnelling works, the Consent Holder shall submit to the Manager separate Excavation Summary Reports for each construction site identified as contaminated no later than three months after the completion of the earthworks at each site. The Reports shall be prepared in accordance with the Ministry for the Environment Guidelines for Reporting on Contaminated Sites in New Zealand (Revised 2011) and include: a) results of any soil and groundwater testing and imported material testing carried out to ensure compliance with the CLSMP; b) volumes of soil removed from the site and confirmed disposal location as well as disposal receipts; and	Section 10

Resource consent condition	Condition Text	Relevant CLSMP section
	c) reports of any non-compliance with the CLSMP procedures or complaints received while undertaking the works.	
8.23	On completion of the excavation works in sites of identified contamination, the Consent Holder shall ensure that plant and equipment is cleaned and decontaminated in a controlled area of the site and that any residues are collected and properly disposed of.	Section 7.1

2.4 Relationship to other management plans

Figure 1 shows how this plan fits under the broader construction management plan structure provided by the designation and resource consents for the Project.

Figure 1: Construction management plan framework



2.5 Sustainability

Watercare are seeking an Infrastructure Sustainability Council of Australia ('**ISCA**') Infrastructure Sustainability rating for the Project. Full details about the rating scheme and methods to achieve the accreditation are included in the Project's Sustainability Management Plan. The Sustainability Management Plan is not a designation/resource consent compliance requirement, however, this CLSMP does include Project sustainability aspects, and they are outlined in **Appendix A**.

3. Project Description

3.1 Overview

The Central Interceptor main project works involve the construction and commissioning of a bulk wastewater interceptor and associated activities. In summary, the Project involves constructing a 13 km gravity sewer tunnel with two link sewer tunnels extending from the main tunnel westward, a series of connections to the existing trunk sewer network to pick up wastewater flow, and a new pump station at the Māngere WWTP. Figure 2 provides a general location plan.

A full description of construction activities and methodologies for each of the 16 shaft sites is detailed in the Construction Management Plan ('**CMP**').

Figure 2: Central Interceptor project alignment and shaft sites

3.2 Contamination investigation background

Ground contamination assessments have been completed for the Project and are documented in the following reports:

- Hereby referred to as the T&T assessment (**Appendix C**):
  - Tonkin and Taylor Ltd, July 2012, Desk study and ground contamination assessment – Main works Central Interceptor Project; and
  - Tonkin and Taylor Ltd, July 2012, Desk study and ground contamination assessment – Combined sewer overflows ('**CSO**') points Central Interceptor Project.
- Hereby referred to as the Jacobs assessment (**Appendix D**):
  - Jacobs NZ Ltd, Aecom NZ Ltd and McMillen Jacobs Ltd, February 2017, Central Interceptor: Main Project Work Detailed Design – Geotechnical Factual Report; and,
  - Jacobs NZ Ltd, Aecom NZ Ltd and McMillen Jacobs Ltd, February 2017, Central Interceptor: Main Project Work Detailed Design – Geotechnical Interpretive Report.

The initial T&T contamination assessments were targeted to the sites being designated by Watercare for construction. At the time it was known that construction activities would disturb near-surface soils which could have been contaminated by current and/or historic activities listed on the Ministry for the Environment's ('**MfE**') Hazardous Activities and Industry List ('**HAIL**'). T&T's assessment was predominantly desk based and involved the review of available information on record for all Central Interceptor sites. T&T included further intrusive investigation of four of these sites as they were raised as a priority at the time.

Following T&T's assessment and the consenting of the project in 2012, Jacobs were commissioned in 2015 to undertake sampling of all sites as required by consent conditions. This assessment assessed the potential risk of contaminated soils to human health and environmental receptors and provided disposal option recommendations.

4. Plan and Management Control

4.1 Roles and responsibilities (RC8.4)

Implementation of this CLSMP shall be the responsibility of the Ghella Abergeldie JV.

Ghella Abergeldie JV has appointed a suitably qualified and experienced practitioner (**SQEP**) in the contaminated land field as defined in the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 to address specific contamination issues outlined in this report and in accordance with Condition 8.4 of the consent. The SQEP shall be in regular contact with the Environmental Manager over the course of the project to ensure that the procedures set out in this CLSMP are being followed.

In particular, the SQEP shall carry out the following work required by the CLSMP:

- identifying potential contaminated land once the micro-tunnelling and trenching work route for the main is confirmed;
- carry out confirmatory sampling and testing for the identified potentially contaminated land where required;
- inspecting the earthworks on an as-required basis, dependent on the level of contamination expected or identified in the area of works;
- working with the project team to assist in defining suitable options for landfill locations to dispose of the contaminated soils from the project; and
- preparing any necessary site validation reports (or 'Earthworks Closure Reports').

Ghella Abergeldie JV, in consultation with the SQEP, shall train all staff involved with earthworks to ensure they are aware of and understand ways in which contamination can be identified on site (refer Section 6).

The Ghella Abergeldie JV have produced a Health and Safety Plan which addresses contamination issues outlined in this plan.

The table below sets out the specific responsibilities under this CLSMP.

Table 2: Responsibility matrix

Responsibility	Position	Name
Final approval of this CLSMP	Project Director	Francesco Saibene
Nominated as responsible for managing the construction works associated with this CLSMP	Construction Manager	Stefano Vittor
Nominated responsible "Owner" of this CLSMP **(required to ensure regular review of this document when aspects of the document need amending)**	Environmental Manager	Sandra Edwards
Nominated as responsible for the development and communication of emergency procedures to all personnel involved on site and the provision of personal protective equipment	Health and Safety Manager	Duane Rogers
Appointed Contaminated Land SQEP	Senior Environmental Consultant, Babingtons – Civil and Environmental Consultants	Sean Toland

4.2 Review and update (RC8.2, RC8.21)

This CLSMP shall be considered a live document and shall be reviewed prior to work commencing on each site and as necessary to cater for changes in ground conditions and operation procedures.

Commitment and continuous improvement to the environmental culture by management is critical to its success and continuation. As part of continuous improvement changes to the CLSMP may be appropriate during the course of the project.

These changes may be a result of:

- Any significant changes to construction activities or methods;
- Key changes to roles and responsibilities within the Project;
- Changes in industry practise standards;
- Changes in legal or other requirements (social and environmental legal requirements, consent conditions, and relevant policies, plans, standards, specifications and guidelines);
- Results of inspection and maintenance programmes, logs of incidents, corrective actions, internal or external assessments; and
- The outcome of investigations relating to contaminated land management.

Reasons for making changes to the CLSMP will be documented. A copy of the original CLSMP document and subsequent versions will be kept for the Project records and marked as obsolete. Each new/updated version of the CLSMP documentation will be issued with a version number and date to eliminate obsolete CLSMP documentation being used.

Any substantial amendments to the CLSMP shall be approved by the Manager in writing, at least 10 working days prior to implementation.

4.3 Distribution

At least one (master) copy of the CLSMP shall be held by the Ghella Abergeldie JV.

A copy of the CLSMP shall be kept onsite by the Ghella Abergeldie JV Site Managers at all times.

It is the responsibility of Ghella Abergeldie JV to distribute the CLSMP to site workers or subcontractors carrying out the construction works and to ensure everyone on site is made aware of the requirements of this plan through regular site training (Section 6).

5. Ground Contamination (RC8.5)

5.1 Further desktop assessment

Through reviewing the previous assessments undertaken for the Project, it is acknowledged that potential contaminating activities may have been undertaken on any of the sites after the assessment dates, in particular, after Jacobs soil sampling assessment in 2015.

In order to assess the potential for contamination having occurred on site after these assessments took place a review of historical aerials and a statement from Watercare, as landowners, has been provided in **Appendix B**. Watercare have confirmed that no activities have changed on the below sites that is of relevance to the validity of the previous assessments: 10 Camden Road; 54 Roma Road; 22 Gregory Place; 39 Frederick Street; 2 and 4 Haycock Avenue; and, 500 Island Road. The sites not controlled by Watercare are either Auckland Council Parks or in the road reserve and therefore have a very low likelihood of land use changes during this period. A review of historical aerials from between 2012 – 2019 also found that it is unlikely that activities have occurred at any of the subject sites over this time that could have contaminated soils more than what has been identified in the existing assessments.

It is therefore concluded that the results provided in the historical investigations are appropriate to be used for the development of this CLSMP. It should also be taken into consideration that a number of the sites will have additional sampling conducted as detailed in this report.

5.2 Actual and potential ground contamination

The investigations undertaken by T&T, Jacobs and Babingtons have been reviewed and summarised on a site by site basis in Section 5.3. In undertaking this review, each site has been assessed to enable the necessary management controls outlined in this plan to be identified. Table 3 identifies which sites are considered to pose a potential risk, or in contrast, which sites do not have sufficient indication of contamination presence to require the implementation of this plan.

The assessment undertaken by Jacobs satisfies the condition of consent to undertake additional sampling of certain sites. It is considered however, given the regulation changes in the risk assessment and management of asbestos, that several of the sites require additional asbestos sampling to further inform potential risk and management protocols. These sites are identified in Table 3 below as amber or red classification. It is considered appropriate for these additional sampling works to be undertaken prior to site establishment in those areas.

The potential for contamination in the deep tunnelling works has been considered low because soils (or rock) at the proposed tunnelling depths are highly unlikely to be influenced by any surface activities. There is a low potential for auxiliary works within the road corridors (such as during micro-tunnelling and/or trenching) to encounter contaminated ground and/or groundwater (e.g. migration from neighbouring industrial or service station sites). These auxiliary works can be managed as they arise or through accidental discovery protocol outlined in Section 7.4.

Table 3: Contaminated Land Management Plan applicability and sampling recommendations

Trench	Site ID	Site Name	Whats HAILs have been identified?	Has there been a sufficient assessment?	Sampling recommendation	CLSMP Status
Link Sewer 1	~~L1S1~~	Removed from Project				
	~~L1S2~~	Removed from Project				
Link Sewer 2	L2S1	Rawalpindi Reserve	Wastewater overflows	Yes	Optional sampling for disposal savings	The procedures set out in this CLSMP are required to mitigate and manage potential effects
	L2S2	Norgrove Avenue	Wastewater overflows	Yes	Optional sampling for disposal savings	
Link Sewer 3	L3S1	Pump station 25	Wastewater overflows	Yes	Optional sampling for disposal savings	
	L3S2	Miranda Reserve	No	Yes	Optional sampling for disposal savings	CLSMP not required – Accidental Discovery protocol to be in place within overarching Construction Management Plan
	L3S3	Whitney Street	No	Yes	Optional sampling for disposal savings	
	L3S4	Dundale Avenue	No	Yes	Optional sampling for disposal savings	
	L3S5	Haycock Avenue	HAIL E1, I, asbestos, lead paint in building materials, filling	Yes	Sampling completed – Refer to Section 5.3, detailed site Investigation report for 2 – 4 Haycock Ave completed by Babingtons (GAJV-RPT-00081) and Asbestos demolition reports for both 2 and 4 Haycock (GAJV-RPT-00079 and GAJV-RPT-00080)	The procedures set out in this CLSMP are required to mitigate and manage potential effects
Main Tunnel	WS1	Western Springs Playing Field	Unknown Fill	Not for asbestos	2x Asbestos samples tested - 1 positive. ACM not observed. Requires more shallow asbestos sampling for risk and disposal assessment – SQEP to be consulted	Sampling suggested prior to mobilising to site. Could mobilise onsite with conservative measures outlined in section 7.10 of this CLSMP. Class B Asbestos protocol required. Sampling may reduce costs of disposal and determine H&S and management requirements
	WS2	May Road Stage 1	HAIL I – related to uncontrolled historical filling, nearby pollution incidents	Yes	Sampling completed – Refer to section 5.3 and contamination reports – Jacobs (Appendix D), Soil & Rock (GAJV-RPT-00084) and Babingtons memorandum (GAJV-RPT-00085)	The procedures set out in this CLSMP are required to mitigate and manage potential effects
		May Road Stage 2 (105 May Road)	HAIL I – related to uncontrolled historical filling, nearby pollution incidents	Yes	Sampling completed - Refer to Section 5.3 and detailed site Investigation report for May road completed by Babingtons (GAJV-RPT-00122)	The procedures set out in this CLSMP are required to mitigate and manage potential effects
	WS3	Māngere Pump Station	HAIL A17, G6 and I, unknown fill, Sludge dewatering and reclamation 1950's	Yes	Sampling conducted - Refer to Section 5.3 and Supplementary site investigation conducted for Māngere completed by Babingtons (GAJV-RPT-00082)	The procedures set out in this CLSMP are required to mitigate and manage potential effects

		Twin Rising main	HAIL G6 and I, wastewater activities, filling activities	Yes	Sampling conducted - Refer to Section 5.3 and Environmental site investigation conducted for Twin rising main completed by Babingtons (GAJV-RPT-00083)	The procedures set out in this CLSMP are required to mitigate and manage potential effects
	AS1	Mt Albert War Memorial/Centre	Unknown fill, Nearby UST	Yes	4x Asbestos tested – all negative. Shallow basalt and hardfill detected under existing pavement. Optional sampling for disposal savings	The procedures set out in this CLSMP are required to mitigate and manage potential effects
	AS2	Lyon Ave	Unknown fill, electroplating manufacturing, nearby UST	Not for asbestos	3x samples tested – 2 positive. ACM observed in soil. Requires more shallow asbestos sampling for risk and disposal assessment – SQEP to be consulted	Requires asbestos sampling prior to mobilising to site. Sampling for confirmation risk and disposal assessment will inform requirements within this CLSMP
	AS3	Haverstock Road	Pesticides and radioactive material associated with horticultural research	Yes	ACM not tested, not observed, not anticipated. Optional sampling for disposal savings	The procedures set out in this CLSMP are required to mitigate and manage potential effects
	AS4	Walmsley Park	HAIL activity I, filling	Yes	Sampling conducted - Refer to Section 5.3 and Environmental site investigation conducted for Walmsley completed by Babingtons (GAJV-RPT-00086)	CLSMP not required – Accidental Discovery protocol to be in place within overarching Construction Management Plan
	AS5	Keith Hay Park	HAIL E1 & I Unknown Fill, wastewater overflows	Yes	Sampling conducted - Refer to Section 5.3 and Environmental site investigation conducted for Keith Hay Park completed by Babingtons (GAJV-RPT-00078)	The procedures set out in this CLSMP are required to mitigate and manage potential effects
	AS6	Pump Station 23	Reclamation and wastewater overflows	Not for asbestos	ACM not observed. Not tested. Requires more shallow asbestos sampling for risk and disposal assessment – SQEP to be consulted	Sampling suggested prior to mobilising to site. Could mobilise onsite with conservative measures outlined in section 7.10 of this CLSMP. Class B Asbestos protocol required. Sampling may reduce costs of disposal and determine H&S and management requirements
	~~AS7~~	~~Kiwi Esplande + Ambury Regional Park~~	Removed from Project			

5.3 Site specific reviews

5.3.1 Rawalpindi Reserve

Rawalpindi Reserve was included in the T&T Assessment in 2012. This site was identified as having potential wastewater overflows and no other potentially contaminating activities. The Jacobs assessment involved the collection of samples throughout the extent of the proposed works area in Rawalpindi Reserve. No indications of contamination were identified during the investigation. Results indicate a low human health risk and environmental discharge risk.

Results indicate surface overburden spoil is appropriate for disposal to clean fill or managed fill pending acceptance from the landfill operator.

Standard management procedures outlined in Section 7 and health and safety protocol outlined in Section 8.1 are required.

Rawalpindi Reserve			
Fill Classification	Clean fill or Managed fill	**Management procedures**	Standard management procedures in Section 7 and 8.1 of the CLSMP
Justification	Exceedance of nickel above Auckland non-volcanic but within volcanic criteria.		
Previous Assessments	Sufficient assessment completed - optional sampling for disposal savings.		

5.3.2 Norgrove Avenue

Norgrove Avenue was included in the T&T Assessment in 2012. This site was identified as having potential wastewater overflows and no other potentially contaminating activity. The Jacobs assessment involved the collection of one sample within the extent of the proposed works area at Norgrove Avenue. The samples were analysed for heavy metals and Organochlorine pesticides (OCP) compounds. Exceedance of lead above Auckland non-volcanic and volcanic criteria was identified during the investigations. Results indicate a low human health risk and environmental discharge risk. environmental discharge risk.

Results indicate surface overburden spoil is appropriate for disposal to clean fill or managed fill pending acceptance from the landfill operator.

Standard management procedures outlined in Section 7 and health and safety protocol outlined in Section 8.1 are required.

Norgrove Ave			
Fill Classification	Clean fill or Managed fill	**Management procedures**	Standard management procedures in Section 7 and 8.1 of the CLSMP
Justification	Exceedance of lead above non-volcanic and volcanic criteria.		
Previous Assessments	Sufficient assessment completed - optional sampling for disposal savings.		

5.3.3 Pump Station 25

Pump Station 25 was included in the T&T Assessment in 2012. This site was identified as having potential wastewater overflows and no other potentially contaminating activity. The Jacobs assessment involved the collection of samples throughout the extent of the proposed works area at the Pump Station 25 site. The samples were analysed for heavy metals, nitrogen compounds, polyaromatic hydrocarbons (PAH) compounds, semi-volatile organic compounds (SVOC), and volatile organic compounds (VOC). Exceedance of nickel above Auckland non-volcanic criteria, but within volcanic criteria was identified during the investigations. Results indicate a low human health risk and environmental discharge risk.

Results indicate surface overburden spoil is appropriate for disposal to clean fill or managed fill pending acceptance from the landfill operator.

Standard management procedures outlined in Section 7 and health and safety protocol outlined in Section 8.1 are required.

Pump Station 25			
Fill Classification	Clean fill or Managed fill	**Management procedures**	Standard management procedures in Section 7 and 8.1 of the CLSMP
Justification	Exceedance of nickel above Auckland non-volcanic criteria, but within volcanic criteria.		
Previous Assessments	Sufficient assessment completed - optional sampling for disposal savings.		

5.3.4 Miranda Reserve

Miranda Reserve was included in the T&T Assessment in 2012. The site was assessed to have no potentially contaminating activity having occurred and the site was not tested. The Jacobs assessment involved the collection of samples through the extent of works. The samples were analysed for heavy metals, and OCP compounds. No indications of contamination were identified during the investigations. Results indicate a low human health risk and environmental discharge risk.

Results indicate surface overburden spoil from the site is appropriate for disposal to clean fill pending acceptance from the landfill operator.

The CLSMP is not required to be followed in full for this site as no potentially contaminating activities were identified and follow up sampling concluded a low risk. Unexpected discovery protocols should however be in place should an area of potential contamination be discovered during works.

Miranda Reserve			
Fill Classification	Clean fill	**Management procedures**	CLSMP is not required to be followed in full
Justification	No HAIL, No exceedances.		
Previous Assessments	Sufficient assessment completed - optional sampling for disposal savings.		

5.3.5 Whitney Street

Whitney Street was included in the T&T Assessment in 2012. The site was assessed to have no potentially contaminating activity having occurred and the site was not tested. Jacobs Assessment (2017) involved the collection of samples from one borehole. The samples were analysed for heavy metals, PAH compounds, OCP compounds, SVOC, and VOC. Exceedance of lead above Auckland non-volcanic and volcanic criteria was identified during the investigations. Results indicate a low human health risk and environmental discharge risk.

Results indicate surface overburden spoil is appropriate for disposal to clean fill or managed fill pending acceptance from the landfill operator.

The CLSMP is not required to be followed in full for this site as no potentially contaminating activities were identified and follow up sampling concluded a low risk. Unexpected discovery protocols should however be in place should an area of potential contamination be discovered during works.

Whitney Street			
Fill Classification	Clean fill or Managed fill	**Management procedures**	Standard management procedures in Section 7 and 8.1 of the CLSMP
Justification	Exceedance of Lead above Auckland non-volcanic and volcanic criteria.		
Previous Assessments	Sufficient assessment completed - optional sampling for disposal savings.		

5.3.6 Dundale Avenue

Dundale Avenue was included in the T&T Assessment in 2012. The site was assessed to have no potentially contaminating activity having occurred and the site was not tested. Jacobs Assessment (2017) involved the collection of samples from one borehole. The samples were analysed for heavy metals and OCP compounds. Exceedance of arsenic above Auckland non-volcanic and volcanic criteria and nickel above Auckland non-volcanic criteria, but within volcanic criteria were identified during the investigations. Results indicate a low human health risk and environmental discharge risk.

Results indicate surface overburden spoil is appropriate for disposal to clean fill or managed fill pending acceptance from the landfill operator.

The CLSMP is not required to be followed in full for this site as no potentially contaminating activities were identified and follow up sampling concluded a low risk. Unexpected discovery protocols should however be in place should an area of potential contamination be discovered during works.

Dundale Ave			
Fill Classification	Clean fill or Managed fill	**Management procedures**	Standard management procedures in Section 7 and 8.1 of the CLSMP
Justification	Exceedance of arsenic above Auckland non-volcanic and volcanic criteria and nickel above Auckland non-volcanic criteria, but within volcanic criteria.		
Previous Assessments	Sufficient assessment completed - optional sampling for disposal savings.		

5.3.7 Haycock Avenue

Haycock Avenue was included in the T&T Assessment in 2012 and Jacobs Assessment in 2017. The samples were analysed for heavy metals, OCP compounds and Asbestos Containing Materials (ACM). No indications of contamination were identified during the investigations. The site was then included in a detailed site investigation conducted by Babingtons – Civil and Environmental Consultants ('Babingtons') in February 2020 (Appendix E). The investigation found most of the onsite material will likely be accepted as managed fill, if not reused onsite. Any soil disposal will require confirmation of suitability for disposal by the chosen waste disposal facility operator.

- It is considered 'more likely than not' that the site is a HAIL site due to past and current site activities (HAIL E1, I, asbestos, lead paint in building materials, filling) on the 'piece of land' at the site.
- Heavy metal concentrations exceeded the natural background concentrations at two sampling locations
- Lead concentrations exceeded the AUP PAC at one location, indicating a risk to environmental receptors
- At five sampling locations, the soil concentrations of PAH analytes were found to be above the laboratory detection limits, but below the relevant risk acceptance criteria;
- At one sampling location, the soil concentrations of Total Petroleum Hydrocarbons (TPH) analytes were found to be above the laboratory detection limits, but below the relevant risk acceptance criteria;
- A limited investigation in 2015 did not detect soil contamination of note at the site for ACM, heavy metals or OCPs;

Due to the presence of two buildings containing asbestos materials there is potential for ACM to be present in the footprint of the demolished buildings onsite, including the garden shed at 4 Haycock Avenue. It is acceptable to scrape the extent of the building footprints by 150 mm and dispose of this presumed ACM contaminated soil separately.

The project CLSMP will assist the management of contamination risks for the site works. This CLSMP will also assist in the event of any accidental contamination discovery during site excavation works due to previous HAIL activities at the site.

Haycock Ave			
Fill Classification	Managed fill/Contaminated fill	**Management procedures**	Standard management procedures in Section 7 and 8.1 of the CLSMP
Justification	Contaminants above the natural background concentrations for heavy metals and TPH/PAH, and is presumed to contain ACM.		
Previous Assessments	Sufficient assessment completed.		

5.3.8 Western Springs Playing Field

The Western Springs Playing Field site was included in the T&T Assessment in 2012. This site was identified as containing unknown fill. T&T undertook an investigation throughout the extent of works in this site in 2011 which was subsequently assessed again by Jacobs in 2015. Soil samples were collected across the extent of the works on 2 occasions. The samples were analysed for heavy metals, PAH compounds, SVOC, and VOC. Exceedance of chromium, copper, lead, and nickel above Auckland non-volcanic criteria were observed. Other than asbestos, soil analysis results indicate a low human health risk and environmental discharge risk.

Both investigations assessed only 2 samples for asbestos risk, one of which returned a positive asbestos result, albeit at a low concentration. Further sampling for asbestos contamination in soil is recommended throughout the extent of work in order to properly assess asbestos risk and assist in soil disposal options.

Results indicate surface overburden spoil is appropriate for disposal as managed fill or contaminated fill, pending further asbestos assessment.

Management procedures outlined in Section 7, with particular reference to Section 7.10, and health and safety protocol outlined in Section 8.2 are required should work occur on this site prior to additional sampling taking place. Any sampling conducted prior to mobilisation will help inform or refine these procedures in future revisions of this plan.

Western Springs			
Fill Classification	Managed fill or Contaminated fill	**Management procedures**	Management procedures in Sections 7 (with particular reference to 7.10) and 8.2 of the CLSMP are required should work occur prior to additional sampling.
Justification	Exceedance of chromium, copper, lead, and nickel above Auckland non-volcanic criteria. Detection of asbestos.		
Previous Assessments	Insufficient assessment. Requires shallow asbestos sampling for risk and disposal assessment – SQEP to be consulted.		

5.3.9 May Road

The May Road Construction Site covers two sites; 54 Roma Road (owned by Watercare) and 105 May Road (leased land). It will be utilised as one of the main tunnel boring locations and associated removal of spoil generated throughout the operation. The work is split into two stages, the Stage 1 temporary platform is located fully within 54 Roma Road, it has been consented based on the previous assessments and is included in this CLSMP. The leased land at 105 May Road is only available for activities which comply with the permitted activity standards, for example, additional laydown area and egress from the site. No consents have been obtained for the Stage 2 portion of the site.

The May Road Stage 1 Site was included in the T&T Assessment in 2012. This site was identified as containing unknown fill and a nearby pollution incident. T&T undertook an investigation throughout the extent of proposed works area for this site in 2012 which was subsequently assessed again by Jacobs in 2015. Both investigations assessed only 4 samples for asbestos risk, two of which returned positive asbestos result.

Soil & Rock conducted a further supplementary site investigation to characterise the asbestos risk in 2019. This investigation found 20 positive results above the natural background concentrations for asbestos in soil out of the 66 samples analysed for ACM. Of those 20 positive results, 11 exceeded the BRANZ human health guidelines for fibrous asbestos/asbestos fines (FA/AF). Heavy metal analytes were generally detected above the laboratory detection limits at all sampling locations and exceeded the natural background concentrations at 7 locations. TPH/PAH analytes did not exceed the guideline criteria at any sampling location, however, the laboratory detection limits for these analytes were exceeded. The class B asbestos contamination area was removed by Ward Demolition and the relevant portion of the site validated by Babingtons in 2019.

All of the soil material assessed during this investigation contained contamination above the natural background concentrations for heavy metals and hydrocarbons. The material where ACM has been identified will not be accepted as managed fill, and landfill disposal will be required in Redvale or Hampton Downs.

Stage 2 works was initially investigated by T&T in 2012 and 2014 (Appendix C) which found ACM on site, Heavy metals and hydrocarbons above background concentrations and recommended further testing of surface soils for asbestos.

A further detailed site investigation followed in March 2020 (Appendix E) to assess the potential for soil contamination risk at 105 May Road. Based on the findings of this investigation, the following conclusions can be drawn:

- ACM was detected in two soil samples that were analysed, one of which exceeded the human health guidelines
- Lead and zinc concentrations exceeded the AUP PAC at one location, indicating a risk to environmental receptors
- At thirteen sampling locations, the soil concentrations of PAH analytes were found to be above the laboratory detection limits, but below the relevant risk acceptance criteria;
- At nine sampling location, the soil concentrations of TPH analytes were found to be above the laboratory detection limits, but below the relevant risk acceptance criteria

In relation to the risk of asbestos in soil in the hotspot area recorded above the human health guidelines, it is recommended that the soil surface should be scraped by 300 mm, and the asbestos contaminated soil be disposed at Redvale Landfill under Class B asbestos removalist supervision in accordance with the asbestos regulations.

The project CLSMP will assist the management of contamination risks for the site works. This CLSMP will also assist in the event of any accidental contamination discovery during site excavation works due to previous HAIL activities at the site.

May Road			
Fill Classification	Managed fill or Contaminated fill	**Management procedures**	Standard management procedures in Section 7 and 8.1 of the CLSMP
Justification	Exceedances of Heavy Metals, ACM, PAH and TPH.		
Previous Assessments	Sufficient assessment.		

5.3.10 Māngere Pump Station

The Māngere Pump Station site was included in the T&T Assessment in 2012. This site was identified as being reclaimed from the Manukau Harbour in the 1950s and has also been used historically for sludge dewatering from the nearby wastewater operations. T&T undertook an investigation throughout the extent of works in this site in 2012 which was subsequently assessed again by Jacobs in 2015 however, neither investigation included the potential assessment of asbestos in reclamation fill.

A separate supplementary site investigation was conducted by Babingtons in October 2019 (Appendix E) in order to properly assess asbestos risk and assist in soil disposal options for this site. Based on the findings of this investigation, the following conclusions can be drawn:

- It is considered ‘more likely than not’ that the site is a HAIL site due to past and current site activities (HAIL A17, G6 and I) on the ‘piece of land’ at the site;
- At ten sampling locations, heavy metal concentrations exceeded what is considered to be typical natural background concentrations for the Auckland region;
- At thirteen sampling locations, heavy metal concentrations exceeded the AUP permitted activity criteria;
- At nine sampling locations, AF fibres were detected in low concentrations below the human health criteria; and

- The soil contaminant concentrations for PAH and SVOC were found above the laboratory detection limits but below the risk acceptance criteria.

The project CLSMP will assist with the management of contamination risks for the site works. It will also assist in the event of any accidental contamination discovery during the site excavation works due to previous HAIL activities at the site.

Māngere Pump Station			
Fill Classification	Managed fill or Contaminated fill	**Management procedures**	Standard management procedures in Section 7 and 8.1 of the CLSMP
Justification	Exceedances of Heavy Metals, ACM, PAH and TPH.		
Previous Assessments	Sufficient assessment.		

5.3.11 Māngere Twin Rising Main

The Māngere Twin Rising Main is an extension of pipe from the new Pump Station into the existing Māngere WWTP. The work to lay the rising main pipe involves excavating a trench along the coastal marine area which then connects to the current WWTP.

The Twin Rising Main trench was included in the T&T Assessment in 2012. This site was identified as containing unknown fill and a portion of its length passes through the operational area of the current WWTP to the confluence chamber. Jacobs assessment involved the collection of four samples along the extent of works for the Twin Rising Main. The previous investigation reports for the site by Tonkin + Taylor and Jacobs show concentrations of contaminants in soil at the site above the natural background concentrations and AUP PAC, similar to what was observed in the current investigation discussed below.

It was identified in the T&T assessment that the site has potential construction fill, however no sampling for asbestos was conducted. In March 2020 Babingtons conducted an Environmental Site Investigation (Appendix E) to characterise the asbestos risk in 2020. This investigation confirmed the site is a HAIL site on reclaimed land, with uncontrolled fill and residual wastewater sludge, present at the site. The concentrations of heavy metal contamination recorded at the site were generally above the soil background concentrations and permitted activity criteria. TPH, PAH, SVOC and AF were measured in the soil in low concentrations above the natural background concentrations.

This material will not be accepted as managed fill due to the presence of ACM in the soil, and landfill disposal will be required in disposal facilities such as Redvale or Hampton Downs, if soil not safely reused onsite. Any soil disposal will require confirmation of suitability for disposal by the chosen waste disposal facility operator.

The project CLSMP will assist the management of contamination risks for the site works. This CLSMP will also assist in the event of any accidental contamination discovery during site excavation works due to previous HAIL activities at the site.

Māngere Rising Main			
Fill Classification	Contaminated fill	**Management procedures**	Standard management procedures in Section 7 and 8.1 of the CLSMP
Justification	Exceedances of Heavy Metals, ACM, PAH and TPH.		
Previous Assessments	Sufficient assessment.		

5.3.12 Mt Albert War Memorial / Centre

Mt Albert Reserve was included in the T&T Assessment in 2012. This site was identified as containing potential unknown fill and also has a nearby underground storage tank (outside of the works area). The Jacobs assessment involved the collection of samples throughout the extent of works. The samples were analysed for heavy metals, PAH compounds, SVOC, VOC, and ACM. No indications of contamination were identified during the investigation. Review of geotechnical logs from the Jacobs assessment found predominantly hardfill placed directly on an impenetrable layer of basalt from as shallow as 0.1 – 1m below ground level. Four samples were tested for asbestos in this site, all of which showed no presence of asbestos in soil. Results indicate a low human health risk and environmental discharge risk.

Given the identification of hardfill beneath the current road surface and shallow basalt at this site, it is considered any potential risk of encountering contaminants in the hardfill is low and further sampling for asbestos contamination in soil is therefore not required.

Results indicate surface overburden spoil is appropriate for disposal to clean fill or managed fill pending acceptance from the landfill operator.

Standard management procedures outlined in Section 7 and health and safety protocol outlined in Section 8.1 are required.

Mt Albert War Memorial/Centre			
Fill Classification	Clean fill or Managed fill	**Management procedures**	Standard management procedures in Section 7 and 8.1 of the CLSMP
Justification	No exceedances.		
Previous Assessments	Sufficient assessment – Optional sampling for disposal savings.		

5.3.13 Lyon Ave

Lyon Avenue was included in the T&T Assessment in 2012. This site was identified as containing potential unknown fill, has a portion of its boundary within the neighbouring site which has been used previously for electroplating manufacturing and also has a records of a now-removed underground storage tank. The Jacobs assessment involved the collection of samples from two hand auger locations within the extent of works. Demolition material and potential asbestos containing fibre board was observed in the Jacobs investigation. The samples were analysed for heavy metals, PAH compounds, SVOC, VOC, nitrogen compounds, and ACM. Asbestos (chrysotile) was detected and will need to be sampled and reassessed. Other than asbestos risk, results indicate a low human health risk and environmental discharge risk.

Three samples were tested for asbestos in this site, two of which showed the presence of asbestos in soil. The assessments conducted to date are insufficient and this site will require further analysis of contaminants, including asbestos. This sampling will assess contaminant risk and assist in soil disposal options for this site.

Based on current results, excavated surface overburden spoil is appropriate for disposal as contaminated fill, pending further asbestos assessment.

Management procedures outlined in Section 7, with particular reference to Section 7.10, and health and safety protocol outlined in Section 8.2 are required should work occur on this site prior to additional sampling taking

place. Any sampling conducted prior to mobilisation will help inform or refine these procedures in future revisions of this plan.

Lyon Ave			
Fill Classification	Contaminated fill	**Management procedures**	Management procedures in Sections 7 (with particular reference to 7.10) and 8.2 of the CLSMP are required should work occur prior to additional sampling.
Justification	Asbestos detection, to be sampled and reassessed. Some organics would register as managed fill.		
Previous Assessments	Insufficient assessment – Requires shallow asbestos sampling for risk and disposal assessment – SQEP to be consulted.		

5.3.14 Haverstock Road

Haverstock Road site was included in the T&T Assessment in 2012. This site was identified as being a portion of the Horticulture and Food Research Institute of New Zealand site with potential pesticide use for various horticultural studies. Jacobs assessment involved the collection of samples throughout the extent of works. The samples were analysed for heavy metals, and OCP compounds. Exceedance of mercury above Auckland volcanic criteria was identified during the investigations. Results indicate a low human health risk and environmental discharge risk.

Results indicate surface overburden spoil is appropriate for disposal to clean fill or managed fill pending acceptance from the landfill operator.

Standard management procedures outlined in Section 7 and health and safety protocol outlined in Section 8.1 are required.

Haverstock Road			
Fill Classification	Clean fill or Managed fill	**Management procedures**	Standard management procedure in Sections 7 and 8.1 of the CLSMP
Justification	Exceedance of mercury above Auckland volcanic criteria.		
Previous Assessments	Sufficient assessment – ACM not observed, not tested, not anticipated. Optional sampling for disposal savings.		

5.3.15 Walmsley Park

Walmsley Park site was included in the T&T Assessment in 2012. This site was identified as containing unknown fill. Jacobs assessment involved the collection of samples throughout the extent of works. The samples were analysed for heavy metals, PAH compounds, SVOC, VOC, and ACM. Exceedance of arsenic, copper, and lead above Auckland volcanic criteria was identified during the investigations. Results indicate a low human health risk and environmental discharge risk. Seven samples were tested for asbestos in this site, all of which showed no presence of asbestos in soil. No evidence of construction rubble was identified in all investigation locations.

In December 2019 Babingtons conducted an Environmental Site Investigation (Appendix E) to assess asbestos risk and assist in soil disposal options for this site. This investigation confirmed the site is considered 'more likely than not' that the site is a HAIL site due to past and current site activities (HAIL activity I, filling) on the 'piece of

land' at the site. The soil contaminant concentrations for ACM were below the laboratory detection limits for the eight samples that were analysed which aligns with previous studies.

This material will likely be accepted as managed fill, if not reused onsite. Any soil disposal will require confirmation of suitability for disposal by the chosen waste disposal facility operator.

The project CLSMP will assist the management of contamination risks for the site works. This CLSMP will also assist in the event of any accidental contamination discovery during site excavation works due to previous HAIL activities at the site.

Walmsley Park			
Fill Classification	Managed fill	**Management procedures**	CLSMP not required. Accidental Discovery protocol to be in place within Construction Management Plan
Justification	Contaminants above the natural background concentrations for heavy metals and PAH, it will not be suitable for disposal at a clean fill facility.		
Previous Assessments	Sufficient assessment.		

5.3.16 Keith Hay Park

Keith Hay Park was included in the T&T Assessment in 2012. This site was identified as containing unknown fill and also subject to wastewater overflows. Jacobs assessment involved the collection of samples throughout the extent of works. The samples were analysed for heavy metals, nitrogen compounds, OCP compounds, SVOC, and VOC. Exceedance of arsenic and nickel above Auckland non-volcanic criteria was identified during the investigations. Other than asbestos, soil analysis results indicate a low human health risk and environmental discharge risk.

Because the site has potential construction fill from the demolition of 5 houses in 2012, and no sampling for asbestos had been conducted, Babingtons were engaged in 2020 (Appendix E) to conduct further sampling for asbestos contamination. Based off this Environmental site investigation the following conclusions can be drawn:

- It is considered 'more likely than not' that the site is a HAIL site due to past and current site activities (HAIL E1, I) on the 'piece of land' at the site;
- Non-friable ACM cement fragments were observed in soil during the initial site development works;
- At seven sampling locations on the site surface, AF fibres were detected in low concentrations below the human health criteria;
- At one sampling location on the site surface, AF was detected in soil in concentrations above the human health criteria requiring class B removal contractor for that area; and
- At one sampling location, heavy metal concentrations marginally exceed what is considered to be typical natural background concentrations for the Auckland region.

This material will not be accepted as managed fill without further delineation of ACM due to the presence of ACM / AF in the soil, and landfill disposal will be required at disposal facilities such as Redvale or Hampton Downs. Any soil disposal will require confirmation of suitability for disposal by the chosen waste disposal facility operator.

The project CLSMP will assist the management of contamination risks for the site works. This CLSMP will also assist in the event of any accidental contamination discovery during site excavation works due to previous HAIL activities at the site.

Keith Hay Park

Fill Classification	Managed fill or Contaminated fill	**Management procedures**	Standard management procedure in Sections 7 and 8.1 of the CLSMP
Justification	Contaminants above the natural background concentrations for heavy metals, PAH and AF. Will not be accepted as managed fill without further delineation of ACM.		
Previous Assessments	Sufficient assessment.		

5.3.17 Pump Station 23

Pump Station 23 was included in the T&T Assessment in 2012. This site was identified as being reclaimed land and also subject to wastewater overflows. Jacobs assessment involved the collection of two samples from one location within the site. The samples were analysed for heavy metals, nitrogen compounds, TPH, SVOC, and VOC. Exceedance of arsenic and lead above Auckland non-volcanic criteria was identified during the investigations. Other than asbestos, soil analysis results indicate a low human health risk and environmental discharge risk.

As it has been identified that the site has unknown fill from the reclamation of this area from an unknown source, and no sampling for asbestos has been conducted, further sampling for asbestos contamination in soil is recommended throughout the extent of works. This sampling will assess asbestos risk and assist in soil disposal options for this site.

Results indicate surface overburden spoil is appropriate for disposal as managed fill or contaminated fill, pending further asbestos assessment.

Management procedures outlined in Section 7, with particular reference to Section 7.10, and health and safety protocol outlined in Section 8.2 are required should work occur on this site prior to additional sampling taking place. Any sampling conducted prior to mobilisation will help inform or refine these procedures in future revisions of this plan.

Pump Station 23			
Fill Classification	Managed fill or Contaminated fill	**Management procedures**	Management procedures in Sections 7 (with particular reference to 7.10) and 8.2 of the CLSMP are required should work occur prior to additional sampling.
Justification	Exceedance of arsenic and lead above Auckland non-volcanic criteria. ACM not tested.		
Previous Assessments	Insufficient assessment, Requires asbestos sampling for risk and disposal assessment – SQEP to be consulted.		

5.4 Confirmation of ground contamination (RC8.3c, RC8.19)

5.4.1 Sites not previously assessed (RC8.18 and RC8.21)

Additional work to check the potential for contamination may be necessary for works relating to any micro-tunnelling and/or trenching activity of new (or adjacent) sites not included in the existing assessments. Work on any auxiliary or new sites not covered by the original consent or historical assessments are outside the scope of this CLSMP and will require additional work.

A Preliminary Site Investigation (‘**PSI**’) may be required if additional construction sites are required or changes in the construction sites occur. A brief assessment shall be undertaken by a SQEP to determine whether a PSI is required. If required, a PSI shall be undertaken by the SQEP and shall comprise:

- a site walkover; and
- review of readily available published information including Auckland Council hazard maps, geological information and historical aerial photographs.

If the PSI identifies that an activity defined in the Ministry for the Environment's HAIL is more likely than not to have occurred on the land subject to soil disturbance, then confirmatory soil sampling works or a Detailed Site Investigation ('**DSI**') shall be undertaken. Any new sites will be discussed with the SQEP and Resource Consent Planner early to avoid project delays.

5.4.2 Confirmatory soil sampling (RC8.3c)

Further sampling is recommended for the sites identified as having potential asbestos contamination in Table 3 (amber or red highlighted). Alternatively, should urgent works be required on a case by case basis they could be undertaken on these sites but would require Class B Licenced Asbestos work controls which mandates the use of a licenced asbestos contractor, and more stringent controls than what may be necessary (as outlined in Section 7.10). This level of control cannot be determined based on the limited sampling and assessment undertaken in the previous investigations.

Any additional sampling conducted must be undertaken in accordance with MfE's Contaminated Land Management Guidelines and BRANZ Asbestos Management Guidelines including appropriate sampling density. The Project's SQEP shall be consulted to ensure the sampling methodology is appropriate.

When confirmatory soil sampling is undertaken prior to mobilisation onsite, the results of any soil testing, including asbestos in soil, will not be available for at least five working days. If soil testing is undertaken during the construction process, the excavated soil shall be treated as potentially contaminated while awaiting laboratory confirmatory results and relevant procedures set out in Section 7.2 for the containment and isolation of soil should be followed. Any licenced Disposal Facility Operator will require the results of spoil to be disposed prior to it being taken to their site. Further leachability testing may also be required if soil contaminant levels exceed their screening criteria. The number of soil samples needed for each site to satisfy the Disposal Facilities will be agreed with the Disposal Facilities prior to excavation.

Any confirmatory sampling conducted will be reported as outlined in Section 5.4.5 and allow for an update of this CLSMP.

5.4.3 Sampling procedure (RC8.19a, RC8.19b)

All sampling works to confirm if contamination is present shall be directed and undertaken by the SQEP in accordance with the MfE Contaminated Land Guidelines. The soil sampling strategy (including depth, sampling method and analytes) for the areas of excavation shall be based on the findings of the previous assessments and the extent of works within that specific site.

5.4.4 Classification of soils

Laboratory results should be assessed against the following:

- The National Environmental Standard for Assessing and Managing Contaminants to Protect Human Health ('**NESCS**') Soil Contaminant Criteria for commercial/industrial outdoor workers to conservatively establish if soils would pose a health risk to site workers;
- The NESCS Soil Contaminant Criteria for recreational or commercial/industrial land use to determine if soils can be re-used on site; and
- Auckland Background Concentrations (for the assessment of clean fill acceptance) and specific landfill criteria (managed fill and hazardous waste criteria) should soils be removed from site.

5.4.5 Reporting (RC8.20)

Auckland Council will be notified of any unexpected contamination (including contaminated soil, surface water or ground water) within 10 days of the contamination being identified or immediately if the contamination is considered by the SQEP to pose a significant environmental and/or health and safety issue.

Results of any ground contamination confirmatory testing will be made available on request. If the testing shows that additional measures need to be implemented, the CLSMP shall be revised according. The SQEP and Environmental Manager will communicate results and implications of results as they arise.

6. Staff Training (RC8.6)

Environmental training for all staff working on the project shall be undertaken as part of the site induction programme. All workers shall be made aware of the potential for contamination and understand ways in which contamination can be identified on site. This training is particularly important if sampling and testing of the material cannot be undertaken prior to excavations on the potentially contaminated sites or if contamination is encountered during the course of works on sites where potentially contaminating activities have not been identified, including any works within the road corridor.

Toolbox meetings will be held regularly and attended by all Project staff and subcontractors. Regular reminders on identification of contamination and procedures in this CLSMP shall also be included during these meetings.

6.1 Contamination indicators

If any of the following are noted in the excavation, or the excavated soils, it is an indication that contamination may be present:

- A solvent or hydrocarbon odour (petrol, diesel, kerosene type odour, etc);
- Other abnormal odours not normally associated with soil (e.g. putrescible or sewerage);
- Abnormal or unnatural coloured soil;
- Soil with waste material or building debris (i.e. plastics, metal, bricks, timber etc) indicating the ground has been filled;
- An oily substance or sheen on the surface of soil, or on the surface of water in the excavation;
- Intact or broken drums and containers; and
- Fibrous material (Asbestos Containing Materials ('ACM') as fragments or free fibre).

See Figure 3 below for examples of obvious contaminated land discovery.

If any of the above indications of contamination are identified when not anticipated, actions outlined in Section 7.4, Accidental Discovery Protocol, shall be followed.

Figure 3: Contamination photos, clockwise from top left: excavated construction rubble; excavated potential ACM; 'blue billy' cyanide staining beneath concrete; green stained groundwater; white stained groundwater; municipal waste filling.

7. Site Management Procedures

Site management procedures are outlined to ensure proper handling of contaminated materials and potentially contaminated materials throughout the Project works area.

7.1 Earthwork procedures (RC8.11, RC8.12, RC8.15, RC8.23)

The following general handling procedures should be followed where contamination is identified, is suspected, or has not been able to be confirmed:

- Soil concentrations are required to be below the lower of the NESCS soil contamination standards for the site final land use and the AUP Permitted Activity Criteria to be reused onsite. If the soil is not able to be reused on the site, it shall be loaded directly onto trucks for offsite disposal (Section 9), or temporarily stockpiled (Section 7.2). The SQEP shall be consulted where soil can be reused onsite to inform validation (Section 10).
- Trucks shall be loaded within the site where runoff and possible spills during loading can be controlled and contained.
- Trucks wheels shall be free of mud and debris prior to leaving the site.
- Each truck will have a tracking document signed onsite and collected at the receiving facility to track each load of material.
- Trucks shall have their loads covered by tarpaulins during transport of material to licensed landfill. These shall be affixed before leaving site.
- Approval shall be obtained by the contractor from the landfill destination prior to transportation. The contractor is responsible for obtaining this approval and recording disposal docket quantities.
- On completion of excavation works in sites of identified contamination, plant and equipment will be cleaned and decontaminated in a controlled area of the site. Any residues will be collected and disposed of in accordance with Section 9.

7.2 Stockpiling of contaminated or potentially contaminated soil (RC8.13)

Stockpiling of contaminated soil will be avoided as far as practicable. If stockpiling of contaminated soil on site is required, it shall be managed by the contractor as follows:

- Sediment control measures shall encircle the stockpile, this may include:
  - earth bunds with a minimum height of 0.3m;
  - silt fences; and/or
  - proprietary products such as filter socks etc;
- If the stockpile is to remain for more than 1-2 days, the stockpile will be covered with clean soil, geotextile or a polythene cover to prevent rainfall induced erosion and dust;
- If the stockpile is to remain for more than 1-2 days, the stockpile will be clearly labelled or signposted;
- The stockpile will be fenced or otherwise secured so that the general public cannot access the stockpile;
- The stockpile material shall be placed on sheeting or sacrificial geotextile to prevent contamination of underlying clean material; and
- Muck bays can be used to contain contaminated soil onsite prior to removal. These muck bays will be managed in the same manner as stockpiles and will require a permanent means to cover the muck bay during rain and the ability to retain any sediment runoff. These muck bays will be located as close to the primary excavation point as possible and will be in restricted entry areas.

7.3 Imported material procedure (RC8.16)

Material imported to the site for the purposes of filling and landscaping shall be certified clean fill. Records must be provided by the Contractor to demonstrate that any imported material is obtained from a quarry or other certified source. Material shall not be imported from any site that is, or would be considered, a HAIL site, unless sampled by a SQEP to show that it is suitable for the intended land use.

Basecourse/hardfill does not require testing, provided it is sourced directly from a quarry.

7.4 Accidental discovery protocol (RC8.3d, RC8.10, RC8.18)

The procedures outlined below provide the Contractor with protocols to identify potential contamination if suspected contaminated soils or hazardous materials are discovered during the excavation works other than contaminated soils already identified in the previous assessments as outlined in this CLSMP. These protocols will enable the appropriate action to avoid exposure of contaminants to site workers or the dispersion of contaminants into the surrounding environment.

Contamination indicators or hazardous materials may include but are not limited to the following:

- Unusual odours;
- Discoloured or stained water seeps and soils;
- Petroleum hydrocarbon contaminated soil and/or free product;
- Liquid waste, putrescible waste, household refuse and any material that normally would be sent to a licensed landfill;
- Suspected ACM not previously recorded; or
- Intact or broken drums, containers or structures.

During the earthworks on site, the Contractor shall actively monitor for the conditions/materials specified above. In the event that one of these is identified, the Contractor should take the following actions:

- Stop all earthworks within a 5m radius of the area where the suspected material/emission/discharge has been recorded.
- Immediately notify the Site Supervisor.
- Cordon off the area as practicable with a suitable barrier.
- Work shall not resume or commence within a 5m radius of the area unless authorised by the Ghella Abergeldie JV Construction Manager.

The Site Supervisor and Environmental Manager will consult with SQEP and advise on the appropriate course of action. The SQEP shall:

- Notify the regulatory authorities (Auckland Council's Compliance Team) in consultation with the Ghella Abergeldie JV and Watercare within 2 working days, that confirmed contamination has been discovered and contingency action is being implemented in accordance with resource consent condition 8.20.
- Characterise the contamination by collecting samples for chemical laboratory analysis.
- If appropriate, advise the Contractor to excavate the suspected contaminated material and stockpile (as detailed in Section 7.2) or place in a covered container to allow works to continue with minimum delay.
- If stockpiling/containerising is inappropriate, advice construction work to proceed to an area clear of contamination indicators until material testing, as necessary, defines the material characteristics.
- When the material characteristics have been established, advise the Site Supervisor as to whether the materials may remain on site or what remedial measures are required to manage this material onsite, or the options available to dispose of this material offsite (as per Section 9).

- Instruct relevant staff so that all appropriate information such as location and quantity of material and offsite weighbridge dockets are recorded.

Should asbestos be observed or suspected during the earthworks, all work shall cease and Health & Safety at Work (Asbestos) Regulations (2016) will be followed. Works can recommence once all asbestos has been removed safely. Any asbestos works (assessment, delineation, removal and verification) shall be undertaken by a specialist asbestos contractor under the supervision of a person certified under the Health & Safety at Work (Asbestos) Regulations (2016).

7.5 Dust control

From an environmental and human health perspective, dust generated during earthworks on a contaminated site has the potential to contain contaminants and, during windy conditions, may discharge offsite.

In order to control the generation of contaminated dust, the contractor shall:

- Limit the amount of contaminated soil to be excavated as much as practicable;
- Limit vehicle access onto contaminated areas;
- Utilise a water truck or portable water sprays in trafficked areas to dampen dust during dry and windy conditions;
- Cover stockpiled material awaiting laboratory testing and removal as outlined in Section 7.2 to prevent dust generation;
- Visually monitor dust emissions in the vicinity of the excavation until exposed contaminated material has been removed or covered by clean material; and
- Avoid work during windy conditions.

When utilising water to control dust, the contractor shall ensure that:

- The application does not cause surface runoff that would discharge into natural water bodies; and
- The application of water does not induce soil erosion or pugging.

7.6 Stormwater and sediment control measures

During earthworks on contaminated sites, rainwater has the potential to come into contact with contaminated material and become contaminated itself. Contaminated sediment may also become entrained in the stormwater.

The contractor shall liaise with the SQEP and ensure that the stormwater and sediment control procedures specific to and appropriate for the potential contaminants in each area, are put in place prior to any ground breaking works commencing. The procedures shall include as a minimum:

- Limiting the duration of exposure of contaminated ground as much as possible;
- Containment of any runoff during rainfall events within the excavation;
- Bunded stockpiles as set out in Section 7.2;
- Implement sediment and erosion control measures as set out in the Erosion and Sediment Control Plan, and;
- Controlled site exit points and wheel washing equipment shall be put in place to prevent contaminated soils being tracking offsite by vehicles.

7.7 Dewatering (RC8.17)

The quality of any dewatering discharges on confirmed contaminated sites (Table 3) shall be assessed as to the likelihood of the water becoming contaminated due to contact with contaminated soils. In line with consent conditions, where it is considered that the dewatering water may have become contaminated it will be tested prior to the disposal of the water to stormwater. Considerations that will be included in this assessment will be if the area of dewatering is in direct contact with a potential area of contamination, if contamination is adjacent is it a leaching risk i.e. not asbestos. Where deep dewatering is occurring, and the shallow groundwater and shallow soils are isolated from the excavation, those areas will not be considered a risk and no testing will be required.

If contaminant concentrations of the water meet the criteria set out in Table 4 below, then the water shall be allowed to discharge to stormwater or a watercourse.

Sampling of any water requiring management should be scheduled prior to works taking place to ensure no programme delays. Consultation with a SQEP may be required to inform management if samples do not meet criteria outlined in Table 4 below.

Table 4: Stormwater disposal trigger levels

Parameter	Water concentration[1] (mg/L)
Arsenic	0.14
Cadmium	0.0008
Chromium	0.04
Copper	0.0025
Nickel	0.017
Lead	0.0094
Zinc	0.031
Hydrocarbons	Not to contain separate phase liquid contaminants, including separate phase hydrocarbons or hydrocarbon sheen. If hydrocarbons are likely to be present, benzene and xylene levels to be confirmed being below 2 mg/L and 1mg/L, respectively.

Notes: All values refer to soluble or dissolved concentrations

[1] Guideline for the protection of freshwater species, 80% trigger level from Australian and New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC, 2000

In the absence of confirmatory testing, any dewatering on confirmed contamination sites shall be disposed of to tradewaste with prior approval from Watercare.

In addition, the SQEP shall be notified if any unusual/unexpected ground and groundwater conditions are encountered during the project works. The SQEP shall assess the need to test or treat the water and advise on appropriate disposal methods.

7.8 Odour control

If odorous material is uncovered during excavation works the following odour control measures shall be implemented to prevent a nuisance to neighbouring houses and to ensure the health of workers:

- All work in the immediate vicinity of odorous material shall cease and the exposed material shall be covered, for example with tarpaulin, polyethylene sheeting or a layer of clean soil to prevent further discharge of odour. The contractor shall then seek advice from the SQEP. The SQEP shall assess the

potential for volatile compounds and advise on health and safety requirements. Assessment of volatility may include use of a Photoionisation Detector and soil sampling and testing;

- Wind conditions shall be assessed and if necessary work shall cease until conditions are more favourable for minimising discharge of odour; and
- A ventilation or other mitigation system, for example odour suppression sprays, shall be established if natural dispersion is not adequate.

7.9 Monitoring programme (RC8.9)

Daily monitoring shall be undertaken by the Ghella Abergeldie JV and shall involve inspection of earthworks areas for:

- Sediment control and compliance with specific ESCP;
- Water accumulation and/or any dewatering requirements; and
- Dust generation.

The Ghella Abergeldie JV shall also notify the SQEP if any visual inspections of excavations identify significant odours, discoloration or ACM.

7.10 Potential asbestos contaminated sites (RC8.3e, RC8.10)

A number of sites have been identified as having the potential for asbestos contamination or limited sampling has identified asbestos presence. Table 3 identifies these sites as an amber or red classification.

As outlined in Table 3, several sites may require further testing. These sites will be managed as if they were Class B Licenced Asbestos Work without any delineation or further sampling being conducted. An Asbestos Management Plan has been developed to outline specific health and safety procedures associated with working on these sites.

Disposal options will also be limited to landfill for those sites with asbestos detections without any delineation or further sampling being conducted. It is therefore recommended that asbestos sampling be undertaken at these sites in advance of site mobilisation. Pre-emptive sampling will advise appropriate health and safety protocols and allow for the delineation of areas of asbestos onsite to reduce disposal costs.

Should additional asbestos sampling be undertaken and it is shown that asbestos is present but at a level which requires BRANZ ‘Asbestos related work’ procedures as opposed to Class B Licenced Asbestos Work then site specific procedures will be developed in conjunction with the Contractor and the SQEP.

In the case of changing the ‘CLSMP Status’ classification (as set out in Table 3) and the relevant type of asbestos works from ‘Class B Licensed Asbestos Work’ into ‘Asbestos Related Work’, Auckland Council’s Compliance Team will be notified prior to the commencement of the land-disturbance works.

8. Health and Safety Procedures

Ghella Abergeldie JV have and are implementing a Health and Safety Plan in compliance with the Health and Safety at Work Act, 2015, its amendments, and associated regulations, and other applicable legislation, regulations, codes and guidelines. The HSP shall address all potential hazards associated with the proposed works. General protocols related to the presence of potentially contaminated material are described in this section and shall be included in the HSP.

8.1 General safety requirements

Ghella Abergeldie JV shall, as a minimum, implement the following measures for all sites highlighted in Table 3 as yellow, amber or red :

- Entry to the site shall be restricted to authorised workers only;
- A Health and Safety Manager ('HSM') shall be appointed for the works. The role of the HSM shall be to ensure workers are wearing the correct protective equipment and respond to new hazards as they arise;
- All workers shall be inducted prior to carrying out works at the sites. The inductions shall describe the Personal Protective Equipment ('PPE') requirements and outline the potential hazards of the contamination that is likely to be encountered at that specific construction site;
- Contact with contaminated soil by workers is expected to be minimal because the potential for contamination has been identified as low in most of the sites and earthworks are proposed to be undertaken by mechanical methods. However, as a precautionary measure, any worker that is required to manually handle contaminated or potentially contaminated soil shall be required to wear disposable gloves. The resistance of the gloves to the contaminants encountered on site shall be confirmed prior to use;
- Workers shall be made aware of fibrous asbestos risk in amber and red alert sites, and appropriate dust management and H&S protocol to mitigate asbestos risk will be in place. P2 dust masks shall be made available at all other sites within the Project area at all times and shall be used by workers if visible dust clouds are present within the Project area. The use of masks does not remove the need to carry out initial dust mitigation (e.g. dampening).
- Additional requirements such as safety glasses, disposable or splash/water proof overalls, and/or half mask respirators with organic filters may be required depending on the nature of the contamination present on site and the scale and location of the works. The conditions under which the need for additional requirements will be on a site-by-site basis and determined by the SQEP, HSM and Construction Manager prior to works commencing; and
- Hand to mouth contact (including eating, drinking and smoking) within the Project area shall not be permitted except within a designated support zone(s).

8.2 Asbestos contaminated sites requirements (RC8.3e)

Sites with an identified or potential asbestos risk are highlighted amber or red in Table 3. These sites will require additional PPE above that listed in Section 8.1 should they be intended to be worked prior to any further sampling being undertaken. These requirements are based on the lack of risk assessment currently known for some sites.

Work on these sites will be required to be classified as Class B Licenced Asbestos work and will require a specific Asbestos Management Plan to be developed by an independent contractor as detailed in Section 7.10.

Additional PPE, monitoring and isolation zone requirements are detailed the Project Asbestos Management Plan.

8.3 Emergency procedures

It is the responsibility of the HSM to ascertain the availability of appropriate emergency services and equipment prior to the start of works. These will include:

- The location of the nearest telephone;
- Location of the nearest first aid kit; and
- Appropriate local medical emergency numbers.

The HSM shall be immediately notified of any injury or accident occurring at the site. If serious harm occurs, Worksafe NZ must be notified immediately. Table 5 provides a list of emergency numbers.

Please refer to the Project's Emergency Management Plan in the first instance for any construction emergency item not relating to contaminated land. Spill response is also covered in the Projects Construction Management Plan.

Table 5. Contamination emergency contacts

Contact	Phone Number
Emergency	111
Auckland Hospital	09 367 0000
Project HSM (Duane Rogers)	+64 21 626 312
Construction Manager (Stefano Vittor)	+64 21 633 030
Contaminated Land SQEP (Sean Toland)	+64 27 403 1059

9. Soil Management (RC8.14)

9.1 Sustainability Hierarchy

The sustainability hierarchy outlined in Table 6 will be used to identify remediation options. The options will be developed with consideration to the site soil classification, the type and location of construction activities to be undertaken on the site, the final site design and advice from the SQEP.

These options will then be assessed using the option evaluation scorecard. The option evaluation score card is a decision-making tool that includes environmental, social and economic indicators to provide a ranking of options. Where applicable, consideration of the effectiveness and durability of the chosen remedial option shall be taken into account along with any associated maintenance and/or monitoring.

Table 6: Sustainability hierarchy

Remediation Options	Definition
1. On-site treatment (favourable)	Soil is treated* at site under assessment, so the contaminant is destroyed, or the associated risk is reduced to an acceptable level. This includes not touching parts of site that may contain contaminants if at all possible with regard to construction methodology (may only be possible for some contaminants).
2. Off-site treatment before return to site	Soil is taken off site under assessment** and treated* so the contaminant is destroyed, or the associated risk is reduced to an acceptable level. The soil is then returned to the site from which it came.
3. Consolidation and isolation	Soil is isolated on-site from humans and damage to the environment. Soil with mobile contamination (e.g. oils, hydrocarbons, and other leaching contaminants) is moved and isolated using a properly designed barrier (e.g. concrete cell or installation of impermeable barrier). Some forms of contaminated soil (e.g. asbestos) could be reused on site and covered/identified (e.g. geotextile layer) then landscaped and planted.
4. Removal and replacement	Soil is removed from site and disposed of at an approved site or facility, before being replaced with clean material if necessary.
5. Management strategy (unfavourable)	Where assessment indicates remediation would have no net environmental benefit, or would have a net adverse environmental effect - soil remains on-site and a management plan is developed in order to manage material long-term so that environmental and human health risks are minimised.

* Treatment options must be overseen by a SQEP and could include, but are not limited to:

- Biodegradation to reduce hydrocarbons
- Changing the pH level (e.g. adding lime)
- Mixing soil with other materials
- Stabilising soil (e.g. mixing with concrete/cement/other binding material)

** Includes moving soil to another area of project (e.g. from May Road to Māngere Pump Station) or to a third-party site.

9.1.1 Soil Disposal

The preliminary classifications of material for each site is identified in Table 7. These classifications will inform the site remediation options.

The confirmation sampling of asbestos concentrations present in the soil, as outlined in Section 5, shall determine the suitable disposal location for sites that may still present an asbestos risk.

Acceptance of spoil must be confirmed by the Disposal Facility prior to disposal.

Disposal locations have specific acceptance criteria for soil chemical parameters (test results) and physical parameters (moisture, refuse, organics, etc). Material that does not meet the acceptance criteria of a particular fill site may be required to be disposed of at a licensed landfill. This criterion should be discussed with the Disposal Facilities Manager prior to transporting.

Record of the material disposed (weighbridge dockets, etc) will be kept and this information shall be provided to the SQEP on request. Note that this information will be required for site validation as outlined in Section 10.

Table 7: Site fill classification

Tranch	Site Name	Justification:	Fill Classification:	Potential Fill Classification
Link Sewer 1	~~Motions Road~~	Not required anymore		
	~~Western Springs Depot~~	Not required anymore		
Link Sewer 2	Rawalpindi Reserve	Exceedance of nickel above Auckland non-volcanic but within volcanic criteria.	Managed fill	Potential Clean fill pending acceptance from disposal facility.
	Norgrove Avenue	Exceedance of lead above non-volcanic and volcanic criteria.	Managed fill	Potential Clean fill pending acceptance from disposal facility.
Link Sewer 3	Pump Station 25	Exceedance of nickel above Auckland non-volcanic criteria, but within volcanic criteria.	Managed fill	Potential Clean fill pending acceptance from disposal facility.
	Miranda Reserve	No HAIL, no exceedances.	Clean fill	Clean fill pending acceptance from disposal facility.
	Whitney Street	Exceedance of lead above Auckland non-volcanic and volcanic criteria.	Managed fill	Clean fill pending acceptance from disposal facility.
	Dundale Avenue	Exceedance of arsenic above Auckland non-volcanic and volcanic criteria and nickel above Auckland non-volcanic criteria, but within volcanic criteria.	Managed fill	Clean fill pending acceptance from disposal facility.
	Haycock Avenue	Contaminants above the natural background concentrations for heavy metals and TPH/PAH, and is presumed to contain ACM.	Managed fill/Contaminated fill	Most of the onsite material will likely be accepted as Managed fill after the building footprints have been disposed of separately.
Main Tunnel	Western Springs Playing Field	Exceedance of chromium, copper, lead, and nickel above Auckland non-volcanic criteria. Detection of asbestos.	Managed fill/Contaminated fill	Requires further asbestos sampling to inform potential fill classification.
	May Road	Exceedances of Heavy Metals, ACM, PAH and TPH.	Managed fill/Contaminated fill	-
	Māngere Pump Station	Exceedances of Heavy Metals, ACM, PAH and TPH.	Managed fill/Contaminated fill	-
	Twin Rising Main	Exceedances of Heavy Metals, ACM, PAH and TPH.	Contaminated fill	-
	Mt Albert War Memorial/Centre	No exceedances.	Managed fill	Clean fill pending acceptance from disposal facility.
	Lyon Ave	Asbestos detection, to be sampled and reassessed. Some organics would register as managed fill.	Contaminated fill	
	Haverstock Road	Exceedance of mercury above Auckland volcanic criteria.	Managed fill	Clean fill pending acceptance from disposal facility.
	Walmsley Park	Contaminants above the natural background concentrations for heavy metals and PAH, it will not be suitable for disposal at a clean fill facility.	Managed fill	-
	Keith Hay Park	Contaminants above the natural background concentrations for heavy metals, PAH and AF.	Managed fill/Contaminated fill	Managed fill pending additional sampling to ensure no ACM in spoil.
	Pump Station 23	Exceedance of arsenic and lead above Auckland non-volcanic criteria. ACM not tested.	Managed fill/Contaminated fill	Requires further asbestos sampling to inform potential fill classification.
	~~Kiwi Esplanade + Ambury Regional~~	Not required anymore		

10. Site Validation

10.1 Validation testing (RC8.3b, RC8.22)

Validation sampling and reporting to Auckland Council is required as per resource consent condition 8.22.

As discussed in Section 7.3, validation testing of imported clean fill shall be undertaken.

In addition, should unexpected contamination conditions be encountered, the appointed SQEP shall inspect the material and provide additional advice regarding its safe handling, disposal and the requirement for any validation sampling to occur.

Validation sampling shall be undertaken by the SQEP and collected according to the Ministry for the Environment Contaminated Land Management Guidelines No.5: Site Investigation and Analysis of Soils.

10.2 Validation reporting (RC8.8, RC8.22)

Validation is the process of confirming that the objectives and goals of this CLSMP have been achieved. Excavation Summary Reports ('**ESR**s') shall be prepared by the SQEP on completion of the earthworks and upon receipt of all necessary documentation. The reports shall document:

- Variations from the strategies outlined in this plan and the reasons why variations were necessary;
- Provision of results of any testing of imported soils;
- Confirm the excavation soil disposal volume and destination;
- Results of soil validation samples (if any);
- Evidence that groundwater and surface water was disposed in an appropriate manner; and
- Requirements for further work, if any.

Any validation report prepared shall comply with the Ministry for the Environment *Guidelines for Reporting on Contaminated Sites in New Zealand* (Revised 2011).

Information required from the Contractor for inclusion in each site's ESR includes:

- Copies of disposal location weigh bridge summaries from any contaminated soil disposal;
- Documentation (e.g. weigh bridge summaries or invoices) confirming the source of any clean material imported to the site and the location of its placement;
- Records of visits by Council representatives;
- Details of any complaints related to contamination and how they were resolved; and
- Details of any health and safety incidents related to contamination and how they were resolved.

APPENDIX A - SUSTAINABILITY ASPECTS

Table A identifies the ISCA Credit Requirements relevant to this CLSMP and where they are address in the document.

Table A: ISCA Requirements

ISCA Credit	ISCA Requirement*	Relevant Sections	Other Relevant Information
Contamination and Remediation			
LAN-3 Level 1	LAN3.1.1 Site assessment follows the recommended approach	Section 3.2, 5.1, 5.2, 5.3, 5.4, 7.9	A site investigation has been completed for the Project and the following reports: - Desk study and ground contamination assessment – Main works Central Interceptor Project dated July 2012, prepared by Tonkin and Taylor Ltd; - Desk study and ground contamination assessment - Combined sewer overflows (CSO) points Central Interceptor Project dated July 2012, prepared by Tonkin and Taylor Ltd; - Central Interceptor: Main Project Work Detailed Design – Geotechnical Factual Report dated February 2017, prepared by Jacobs NZ Ltd, Aecom NZ Ltd and McMillen Jacobs Ltd; - Central Interceptor: Main Project Work Detailed Design – Geotechnical Interpretive Report dated February 2017, prepared by Jacobs NZ Ltd, Aecom NZ Ltd and McMillen Jacobs Ltd. The investigations undertaken by both Tonkin and Taylor Ltd and Jacobs have been reviewed and summarised on a site by site basis in Section 5.3. Table 3 identifies the degree of potential risk in each site. - Some of the sites will have additional sampling conducted as detailed in Section 5.4.2 and in Table 3 prior to mobilising on site. - Ongoing monitoring will continue during excavation as outlined in Sections 7.9. - Supervision by a Contaminated Land Professional will occur where required (refer to Section 7.4 and 7.7).
LAN-3 Level 1	LAN3.1.2 Remediation options are identified and selected using a sustainability hierarchy	Section 9.1	5-step hierarchy of control used to identify and select remediation options.

* Refer to ISCA Rating Tool for full details of the requirement

APPENDIX B - WATERCARE LETTER OF CONFIRMATION OF NO HAIL ACTIVITIES

APPENDIX C - TONKIN & TAYLOR CONTAMINATION ASSESSMENTS

The initial T&T contamination assessments were undertaken in 2012 during the consenting phase of the Central Interceptor project and targeted the sites being designated by Watercare for construction. A draft site management plan was also prepared in the S92 response by T&T. The T&T reports referred to in this CLSMP are:

- Tonkin and Taylor Ltd, July 2012, Desk study and ground contamination assessment – Main works Central Interceptor Project; and
- Tonkin and Taylor Ltd, December 2012, Central Interceptor Project Site Management Plan.
- Tonkin and Taylor Ltd, January 2014, Ground Contamination Investigation, 105 May Rd, Mt Roskill These reports are located on Watercare's website at:

https://www.watercare.co.nz/About-us/Central-interceptor/Central-Interceptor-consent-documents

APPENDIX D - JACOBS CONTAMINATION TEST

Following T&T's assessment and the consenting of the project in 2012, Jacobs were commissioned in 2015 to undertake sampling of all sites as required by consent conditions. Contamination testing was undertaken as part of a wider geotechnical investigation, and included in the following reports:

- Jacobs NZ Ltd, Aecom NZ Ltd and McMillen Jacobs Ltd, February 2017, Central Interceptor: Main Project Work Detailed Design – Geotechnical Factual Report; and,
- Jacobs NZ Ltd, Aecom NZ Ltd and McMillen Jacobs Ltd, February 2017, Central Interceptor: Main Project Work Detailed Design – Geotechnical Interpretive Report.

Extracts relevant to the contamination testing aspects in the reports above are included below and include:

- Contamination assessment summaries (from the Geotechnical Factual Report);
- Contamination assessment results (from the Geotechnical Factual Report); and
- Shaft site plans.

Note that the following sites are no longer applicable to this project: Motions Road, Western Springs Park Depot, Kiwi Esplanade, and Ambury Regional Park.

Full versions of these reports are available upon request.

APPENDIX E - ADDITIONAL SITE INVESTIGATIONS

Following previous investigations by T&T (2012) and Jacobs (2017), Babingtons and Soil & Rock have been involved on the Project to conduct additional detailed site investigations. The detailed investigations prior to site establishment at various sites help to inform what Health and Safety controls are required, assist with soil management considerations and help the GA-JV meet consent requirements.

- Babingtons Civil and Environmental Consultants Ltd, February 2020, Detailed Site Investigation: Shaft 5 Site 2 - 4 Haycock Avenue, Mt Roskill Central Interceptor Project February 2020 (GAJV-RPT-00081)
- Babingtons Civil and Environmental Consultants Ltd, December 2019, Environmental Site Investigation: Access Shaft 4, Walmsley Park Central Interceptor Project December 2019 (GAJV-RPT-00086)
- Babingtons Civil and Environmental Consultants Ltd, March 2020, Environmental Site Investigation: Access Shaft 5, Keith Hay Park Central Interceptor Project March 2020 (GAJV-RPT-00078)
- Babingtons Civil and Environmental Consultants Ltd, March 2020, Environmental Site Investigation: MPS - Twin Rising Main Central Interceptor Project March 2020 (GAJV-RPT-00083)
- Babingtons Civil and Environmental Consultants Ltd, February 2020, Supplementary Site Investigation: Māngere Pump Station Central Interceptor Project October 2019 (GAJV-RPT-00082)
- Soil & Rock Consultants Ltd, September 2019, Supplementary Site Investigation: May Road, Mount Roskill Environmental Site Assessment (GAJV-RPT-00084)
- Babingtons Civil and Environmental Consultants Ltd, October 2019, Memorandum: Soil and Rock Consultants Supplementary Site Investigation at May Road – Summary (GAJV-RPT-00085)
- Babingtons Civil and Environmental Consultants Ltd, February 2020, Detailed Site Investigation: 105 May Road, Mt Roskill Central Interceptor Project March 2020 (GAJV-RPT-00122)
- Babingtons Civil and Environmental Consultants Ltd, February 2020, Asbestos Demolition Survey – 2 Haycock Avenue, Mt Roskill, February 2020 (GAJV-RPT-00079)
- Babingtons Civil and Environmental Consultants Ltd, February 2020, Asbestos Demolition Survey – 4 Haycock Avenue, Mt Roskill, February 2020 (GAJV-RPT-00080)

Appendix D: Certificate of Compliance (CoC)

Certificate of Compliance

Project title and description

Basalt Rock Storage - Greenwood Road

44 and 54 Greenwood Road, Mangere Bridge

April 2020

prepared for Watercare by:

Watercare
An Auckland Council Organisation

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1. Introduction

1.1 Overview

This Certificate of Compliance report confirms that the proposal to store basalt rocks at the subject site (44 and 54 Greenwood Road, Mangere), is a permitted activity under the Auckland Unitary Plan, and can be lawfully carried out without a resource consent.

This application has been prepared in accordance with the requirements of Section 139 of the Resource Management Act 1991. This report is intended to provide the information necessary for a full understanding of the proposal and to demonstrate that it can be carried out without a resource consent.

1.2 Introduction

Watercare Services Limited (Watercare) owns and operates the Mangere Resource Recovery Facility (RRF) located at 500 Island Road, Mangere. The site extends from Greenwood Road in the east to the Manukau Harbour in the west and is designated under the Auckland Unitary Plan – Operative in Part (AUP) for Wastewater Purposes (designation reference: 9502), and Odour Buffer Area (designation reference: 9503).

The sites at 44 and 54 Greenwood Road are in 'Area 2' under designation 9503. Watercare is seeking to utilise these sites for the storage of 'Basalt' rocks. The basalt rocks have been excavated from various sites for the Central Interceptor project and will be stored at the site throughout the duration of the project.

Note: This Certificate of Compliance relates only to the use of the area for storage of basalt rocks. Works for the construction and operation of the Central Interceptor Project have been obtained.

As stated in the designation, deposition of biosolids is the only permitted activity for area 2. Therefore, any other activity for area 2 is outside the scope of this designation. This activity will be assessed against the underlying zone of the site and the Auckland Unitary Plan (AUP OiP) standards. Additionally, the proposed activity complies with the conditions outlined in designation 9503.

1.3 Requiring Authority and Property Details

Table 1.2: Requiring authority and property details

Requiring Authority	Watercare Services Limited
Owner of site	Watercare Services Limited
Site address	44 and 54 Greenwood Road, Mangere
Site area	4.0128 hectares (total area of the two sites)
Legal description	Lot 11 DP 16117 Lot 12 DP 16117
District Plan	Auckland Unitary Plan – Operative in Part
Designation reference	9503 Odour Buffer Area – Mangere Wastewater Treatment Plant
Designation purpose	Wastewater purposes - Area 1A - wastewater treatment purposes; Area 1B and 2 - odour buffer area and application of biosolids from wastewater treatment plant
Underlying zoning	Business – Light Industry Zone
Precinct	Mangere Puhinui

Controls	Controls: Macroinvertebrate Community Index - Rural Controls: Macroinvertebrate Community Index - Urban

2. Background of the Central Interceptor Project

The Central Interceptor (CI) Project involves a wastewater tunnel that will run between Western Springs and the Māngere WWTP. It includes the construction of the 13km underground wastewater tunnel, above ground facilities, and two link sewers referred to as Link Sewer B and Link Sewer C. Along the route, the Central Interceptor will connect to the existing wastewater network, which will divert flows and overflows into the tunnel. Construction of the Project will take approximately 6 years.

The Māngere Pump Station site is the southern-most of the 16 shafts sites on the main tunnel alignment and will connect the Central Interceptor to the Māngere WWTP (refer to figure 1 below).

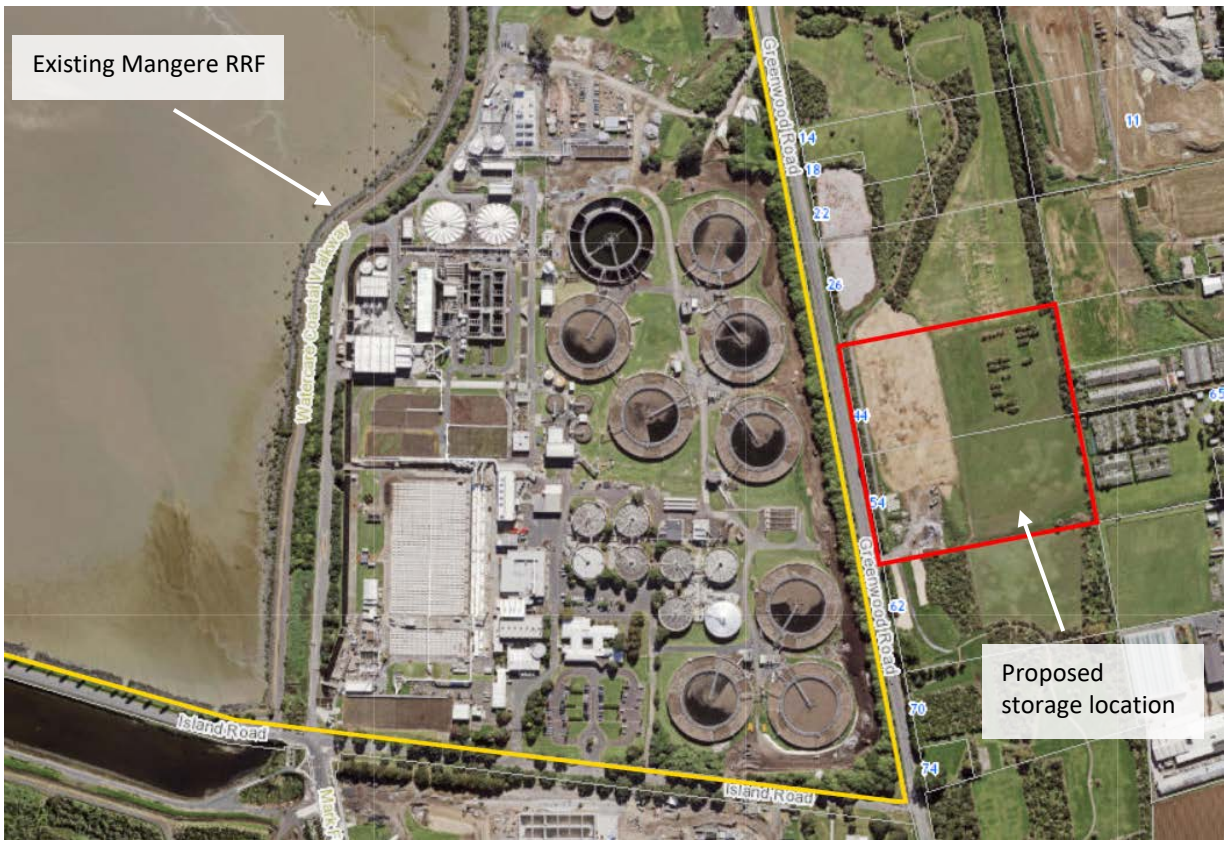
Figure 1: Central Interceptor alignment

3. Environmental Setting

3.1 Site location

The Mangere Resource Recovery Facility (RRF) is located at 500 Island Road, Mangere Bridge. It is located to the east of Puketutu Island and to the west of Mangere Town Centre. The storage area proposed as part of this application is located to the east of the Mangere RRF and is recognized as 'Area 2' under designation 9503 Odour Buffer Area – Mangere Wastewater Treatment Plant.

Figure 2: Mangere RRF Location Plan



Source: Auckland Council GeoMaps, 2020

The area subject to the proposed works (refer to Figure 2) comprises of two sites, 44 and 54 Greenwood Road, Mangere Bridge. The legal descriptions and property ownerships details are set out in Table 3.1.

Table 3.1: Site details

Property	Legal Description	CT Reference	Property Owner
44 Greenwood Road, Mangere Bridge	Lot 12 DP 16117	NA444/225	Watercare
54 Greenwood Road, Mangere Bridge	Lot 11 DP 16117	NA401/145	Watercare

3.2 Site description

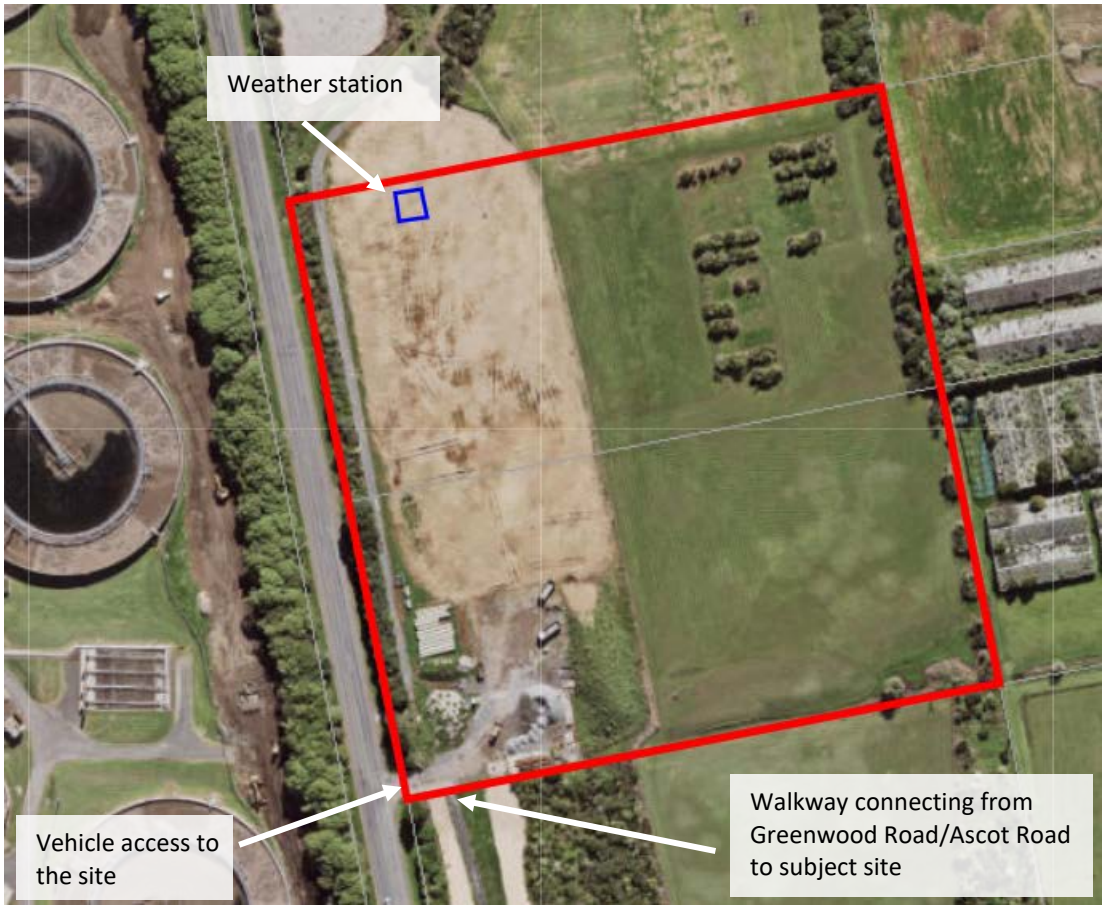
The basalt rock will be stored across the two sites; however, it is not anticipated to be placed across the full area of the two sites. The basalt rock will be stored closer to the entrance of the site and the existing walkway will be rerouted around the basalt rock storage. Sufficient area will be retained for public access and for pedestrians to walk their dogs.

The site is relatively flat, and majority of the site is covered in grass. The entrance is formed with aggregate surface. The site is also currently partially planted adjacent to Greenwood Road, screening the majority of the site from passing traffic.

Access to the storage area is via 54 Greenwood Road. The double entry is directly off Greenwood Road through the recessed double set of gates (approximately 7.8m wide). Previously this site was utilized for the BNR project for storage of pipe segments, machinery, and construction equipment.

There is currently no provision for parking on site as the area is used mainly by the public for dog walking.

Figure 3: Proposed location of basalt rock storage



Source: Auckland Council GeoMaps, 2020

Figure 4: Entrance to the site from 54 Greenwood Road

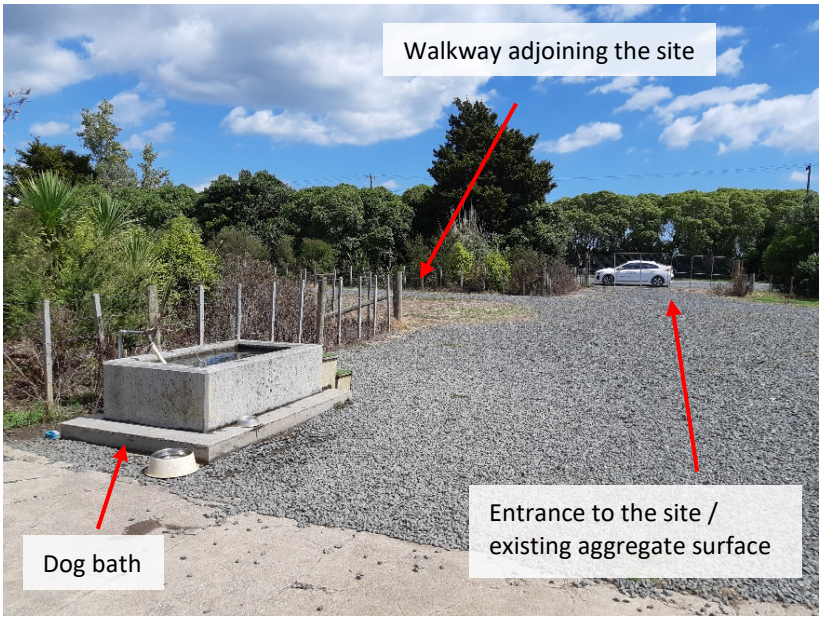


Figure 5: Walkway connecting from Greenwood Road/Ascot Road to subject site and entrance to the site

Figure 6: Site boundary and proposed location of basalt rock storage

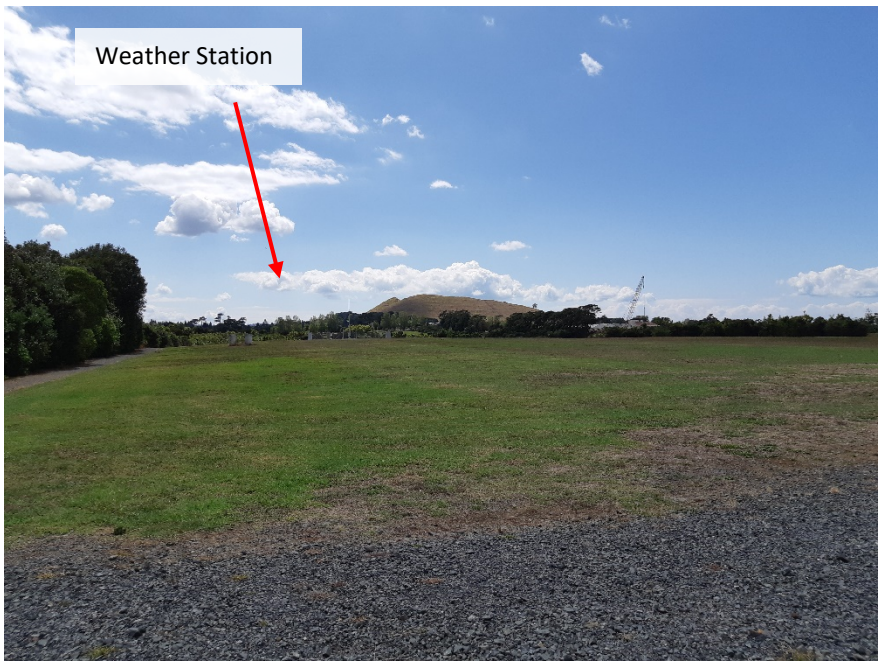


Figure 7: Proposed location of basalt rock storage and weather station location

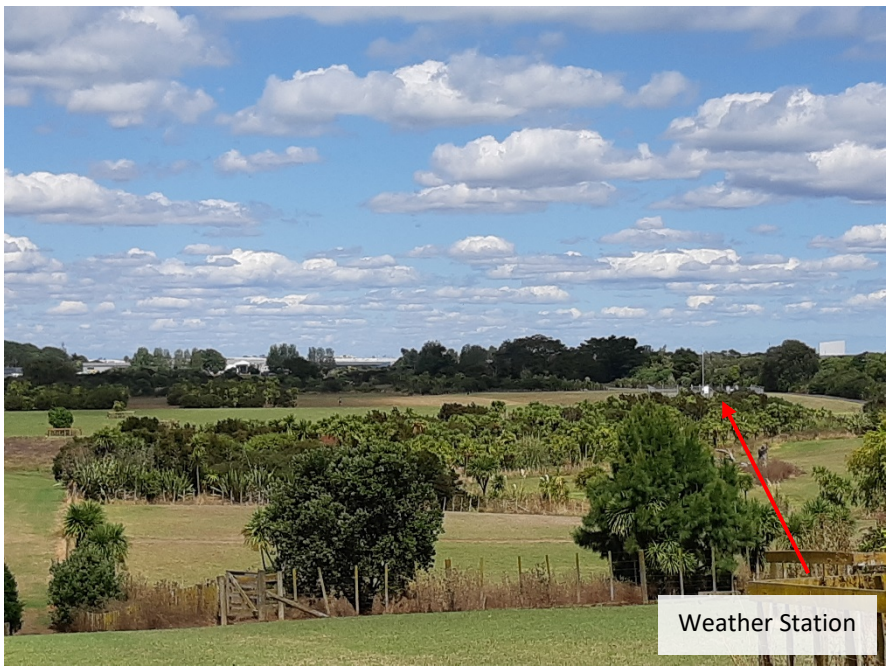


Figure 8: View of the proposed site from Creamery Road

4. Proposed Activity

Watercare is not currently utilizing the site. However, previously the site has been used to store pipes and construction material for the BNR project.

It is proposed that the area will be retained by Watercare and used for the Central Interceptor Project, to store basalt rocks excavated from various Central Interceptor sites. The basalt rocks will be stored for the duration of the CI project.

The basalt rocks will be stored across the two sites as a permitted activity. However, if any earthworks are carried out on site they will not exceed the maximum 2500m^2 permitted threshold. The earthworks will comprise of stripping the grass and laying thin aggregate (maximum 1500mm thickness) where required. The topsoil will be stockpiled, and the area will be replanted after the completion of the Central Interceptor Project. If additional earthworks are required on site WSL will seek consents in the future.

Note: the topsoil will be taken off site, however, if it is retained on site it will be located within the permitted earthworks threshold.

The basalt rock will be enclosed by a barbed wire fence. There will also be signage placed along the fence to advise the general public to not enter the storage area. The walkway entrance will also have signs to show the temporary walking track route.

There will be provision for 2-3 parking spaces on site. However, it is not anticipated that someone will be working at the site full time. Trucks will enter through the accessway, remove all the basalt rock onto the site and exit the site. Additional parking will be available 300m down the road at Central Interceptors lay down area site. Traffic management will be in place and trucks will enter the site 'right in' and exit the site 'left out', as no trucks are allowed on Creamery Road. The trucks will have sufficient space on site to carry out on site manoeuvring to exit the site in a forward motion.

Additional matters:

- Fencing – Standard deer style fencing with double barb wire on top will surround the proposed basalt rock storage area.
- Public use – There is no public access to the walkway from the subject site at 54 Greenwood Road, however, the walkway is accessed via Creamery Road, Ascot Road, and other locations off Greenwood Road opposite Island Road. None of the sites will be impacted by use of this area for basalt rock storage. A pedestrian accessway will still be retained and will be rerouted along the boundary of the subject site.
- Erosion and Sediment control measures – Silt fence will be installed where required and grass surface will be maintained throughout the area not being utilized to store basalt rock.

5. Certificate of Compliance Considerations

In order for the Certificate of Compliance to be granted under section 139 of the Act, it must be shown that the proposal is a permitted activity and can be lawfully carried out without a resource consent.

4.1 Auckland Unitary Plan

Figure 9: Unitary Plan Zones

Source: Auckland Council GeoMaps, 2020

Under the AUP, the site is located in the Business Light Industry Zone and is not subject to any overlays. Rules for activities within the Business Light Industry Zone are set out in Chapter H17.

No other special limitations apply to the site.

The table below provides a planning assessment of the proposed activity under the AUP.

Rule Reference	Provision	Assessment
Business Light Industry Zone Activity Table H17.4.1	(A33) Industrial Activities	The use of the subject area for storage of basalt rocks is classified as 'Industrial Activities' in the activity table under the Business Light Industry Zone, which is a **Permitted Activity.**
	All activity listed as permitted in Table H17.4.1 must comply with the following permitted activity standards:	
	H17.6.0 Activities within 30m of a residential zone	The subject site is not located within 30m of a residential zone; therefore, this standard does not apply.
	H17.6.1 Building Height	The storage of basalt rocks will not be higher than 5m in height from the existing ground level. Therefore, the proposed works can comply with H17.6.1.
	H17.6.2 Height in relation to boundary	The basalt rocks will maintain reasonable distance from the side boundaries and will not exceed 5m in height. The proposed activity will not infringe the HIRB standard. Therefore, the proposed works can comply with H17.6.2.
	H17.6.3 Maximum Impervious Area within the Riparian yard	The subject site is not within the riparian yard; therefore, this standard does not apply.
	H17.6.4 Yards	The basalt rocks will be stored towards the front portion of the site (Greenwood Road) and will maintain sufficient distance from the front, side and rare boundaries as specified in table H17.6.4.1. Therefore, the proposed works can comply with H17.6.4.
	H17.6.5 Storage and screening	The basalt rock storage will be screened from the public by a fence. The site is currently partially planted adjacent to Greenwood Rd, screening the majority of the site from passing traffic. Additionally, the outdoor storage does not face/ is not visible from the zones listed under the standard. Therefore, the proposed works can comply with H17.6.5.
Land Disturbance – District Activity Table E12.4.1 (A5)	General earthworks greater than 1000m² up to 2500m² is permitted in Business and City Centre Zones	Earthworks associated with removing topsoil will not exceed 2500m^2. This is therefore a **Permitted Activity.**

Noise and Vibration - Noise levels in the Business – Heavy Industry Zone or the Business – Light Industry Zone E25.6.5	The noise (rating) level arising from an activity in the Business – Light Industry Zone measured within the boundary of any other site in those zones must not exceed 65dB LAeq.	Noise producing activities associated with the basalt rock storage will be truck delivery of the rock. The basalt rock will be located approximately 80m away from the closest neighbouring property to the east. It is therefore anticipated that the proposed activity meets the noise limit and is a **Permitted Activity.**
Transport Activity Table E27.6.2.5 (T61) All other industrial activities	1 per 50m^2 GFA, or 0.7 per FTE employee (where the number of employees is known), whichever results in requiring a lower amount of onsite parking	There will be provision for 2-3 parking spaces on site. However, it is not anticipated that someone will be working at the site full time. Trucks will enter through the accessway, remove all the basalt rock onto the site and exit the site. It is anticipated that the proposed activity meets this provision and is therefore a **Permitted Activity.**
Mangere Puhinui Precinct Activity Table I423.4.1	(A1) Intensive farming (A2) Forestry within 500m of MHWS (A3) Animal breeding or boarding without dogs (A4) Animal breeding or boarding including dogs (A5) Rural industries (A6) Buildings > 300m² gross floor area	The proposed activity is to store basalt rock at the subject site and does not involve activities listed under this precinct. Therefore, this does not apply.

4.2 Summary

Accordingly, the proposed activity is considered to be a permitted activity under the AUP.

6. Conclusion

Watercare is seeking a Certificate of Compliance to store basalt rock at 44 and 54 Greenwood Road, Mangere. It is considered that the proposal is within the relevant permitted activity criteria of the AUP. To secure this position, Watercare requests that the Council issue a Certificate of Compliance under section 139 of the Act for this activity.

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