REPORT

Tonkin+Taylor

Contamination Site Management Plan

Beachlands South - Fast-Track Consent

Prepared for
Beachlands South Limited Partnership c/- Russell Property Group

Prepared by
Tonkin & Taylor Ltd

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Statement of qualifications and experience

My name is Natalie Linda O'Rourke. I am a Senior Contaminated Land Consultant at Tonkin & Taylor Ltd (T+T). I have worked at T+T since 2019. I have 17 years' experience in the assessment and management of contaminated land and groundwater. I am a Certified Environmental Practitioner Site Contamination Specialist (CEnvP SC), awarded in 2021.

Recent relevant projects and services that I have been involved with include:

- Expert witness relating to contaminated land for the plan change for the Beachlands South project.
- Technical review and expert witness for hydrogeology relating to a discharge consent application for a construction and demolition landfill in Greymouth.
- Contamination lead and technical reviewer for consent inputs for Watercare's South Auckland (Hingaia) wastewater servicing scheme.

I confirm that, in my capacity as author of this report, I have read and abided by the Environment Court of New Zealand's Code of Conduct for Expert Witnesses contained in the Practice Note 2023.

1 Introduction

1.1 General

This report has been prepared in support of a substantive application submitted by Beachlands South Limited Partnership ('BSLP') under the Fast-track Approvals Act ('FTAA'). The Project name is 'Beachlands South' and is included in Schedule 2 of the FTAA as a Listed Project with significant regional or national benefits. The Project location or Site is located across approximately 159.58 hectares of live zoned land and approximately 108.6 hectares Future Urban zoned land at 110 Jack Lachlan Drive, and 620, 712, 758 and 770 Whitford-Maraetai Road, Beachlands. The Site layout is presented in Figure 1.1.

In summary, the Project will provide for the development of live zoned land at Beachlands into a comprehensively planned and public transport focussed community to achieve a well-functioning urban environment comprising residential dwellings, a hotel and conference venue, community and commercial activities, protected ecological restoration areas, walking and cycling networks, and community facilities, and enable the potential development of two schools, as well as all associated earthworks and all associated infrastructure including transport facilities, intersection upgrades and roading, telecommunications, power, and water supply, stormwater, and wastewater infrastructure (including any treatment or storage facilities, drainage, pipes, pump stations, outfalls and discharges).

Key elements of the Project include:

- Residential activities comprising approximately 2,200 dwellings in a variety of housing types, densities and vacant sites for future residential development;
- Establishment of a commercial local centre supported by employment opportunities within and around the periphery of the local centre and on the Whitford-Maraetai Road frontage comprising approximately 27,000 m^2 of commercial ground floor area (GFA) and 30,000 m^2 of light industrial GFA;
- Education facilities comprising the development of both primary and secondary schools;
- Establishment of an Ecological Protected Area Network (EPAN) comprising approximately 75 hectares of land being replanted, restored, maintained and enhanced including preservation of streams and their margins;
- A series of open spaces including a suburban park, neighbourhood parks, the Fairway Reserve, golf course, esplanade reserve and riparian margins;
- Provision of public access to and along the coastal marine area and the creation of a quality coastal pathway;
- Public transport enhancements and integrations including expanded ferry passenger capacity;
- Staged road upgrades including the provision of pedestrian and cycling facilities along Jack Lachlan Drive, the upgrade of Whitford roundabout, a series of intersection upgrades; and
- Establishment of infrastructure to service the project including wastewater, water supply, stormwater, telecommunications and power.

The properties at 620, 712, 758 and 770 Whitford-Maraetai Road are zoned Future Urban Zone (FUZ). Limited works are currently proposed within the FUZ:

1 620 Whitford-Maraetai Road will contain some of the wastewater discharge via drip feed irrigation.

2 712 Whitford-Maraetai Road will have an access road located on it to serve the development.

3 770 and 758 Whitford-Maraetai Road are proposed to be used for potential additional golf holes and an access way to the light industrial / work live units on the land fronting Whitford-Maraetai Road.

Tonkin & Taylor Ltd (T+T) has been engaged by the Beachlands South Limited Partnership (hereafter referred to as 'BSLP') to prepare this Contamination Site Management Plan (CSMP). This CSMP outlines procedures to follow during ground disturbance works proposed to be undertaken for the development of the Site. T+T has also completed a Geotechnical Investigation Report (GIR)[1] for the project.

This CSMP has been prepared in accordance with our proposal dated 2 December 2025 and our variations approved on 22 April 2026 and 9 June 2026.

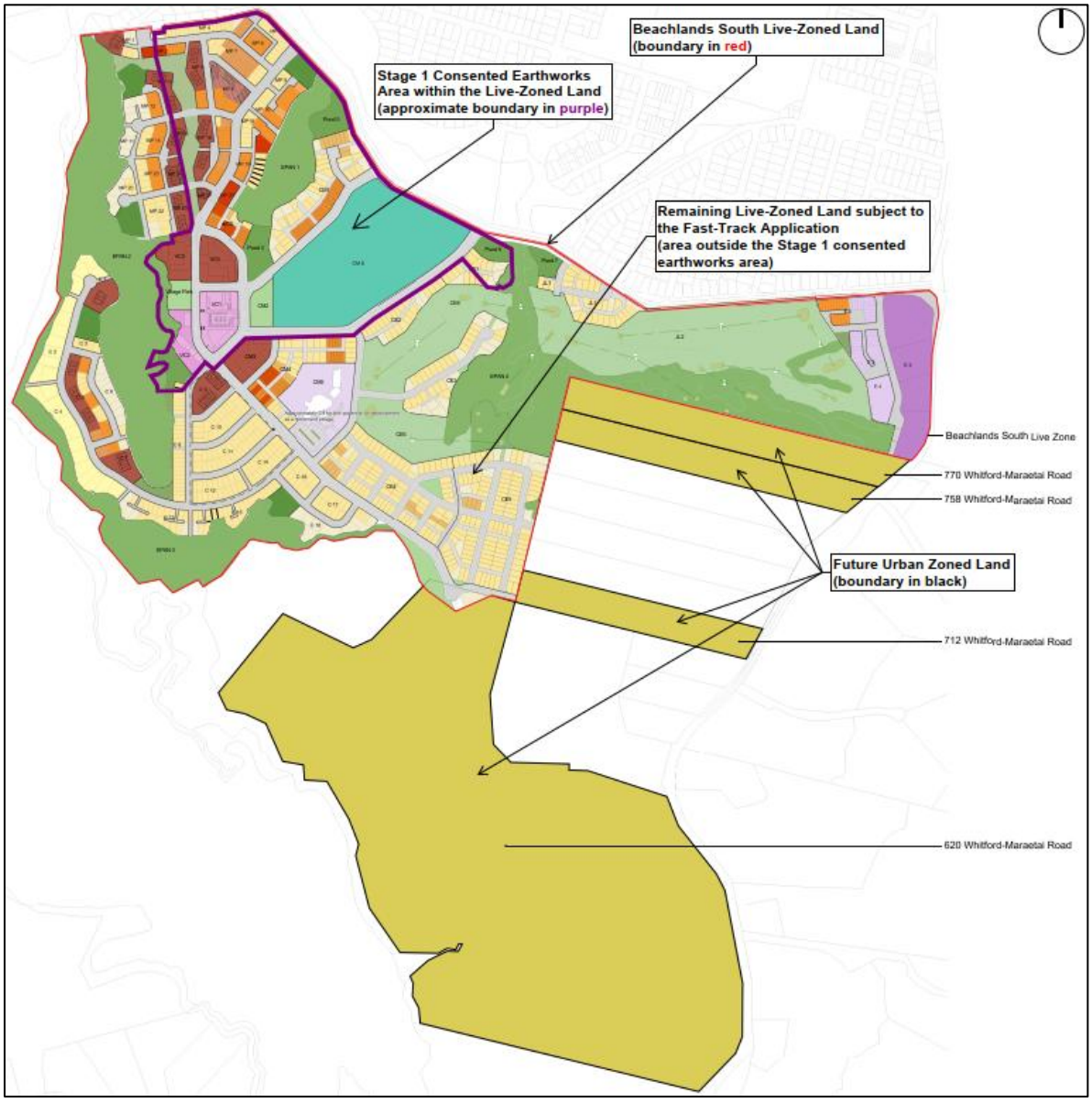


Figure 1.1: Site layout showing Stage 1 consented earthworks area, remaining live zone and Future Urban Zone land.

[1] T+T, June 2026. Beachlands South Fast-Track Application, Geotechnical Report,. Prepared for Beachlands South Limited Partnership. T+T ref: 1014358.3200 v2.

1.2 Existing contamination reports

In addition to this CSMP, the following contamination reports support the substantive application:

- T+T, November 2022. Detailed Site Investigation[2] (the DSI)
  - This report was prepared to support the private plan change and was used in support of the resource consent application for Stage 1 earthworks[3] within 110 Jack Lachlan Drive (consented separately to the substantive application).
  - This report presents preliminary site investigation (PSI) information for 110 Jack Lachlan Drive, 620 Whitford-Maraetai Road and 712 Whitford-Maraetai Road.
  - This report presents a detailed site investigation (DSI), i.e. intrusive site investigation, for 110 Jack Lachlan Drive and 620 Whitford-Maraetai Road.
- T+T, June 2026. Desktop Ground Contamination Investigation, 758 and 770 Whitford-Maraetai Road[4].
  - This report presents an initial desktop assessment for 758 and 770 Whitford-Maraetai Road comprising review of historical aerial imagery and a high-level implications assessment.
- T+T, June 2026. Beachlands South Fast-Track Application, Contamination Consent Considerations[5].
  - This letter report outlines the approach for contamination-related consents on the basis of the available site investigation information and the understanding of proposed soil disturbance.

A summary of the contamination conditions is provided in Section 3.

1.3 Proposed soil disturbance and consent requirements

The Infrastructure Report[6] describes six stages of bulk earthworks across the site, with secondary earthworks for superlot and multi-storey development areas to be undertaken at a later stage by future development partners.

T+T has been supplied with a draft cut/fill plan dated 25 May 2026[7] which indicates cut and fill contours on 110 Jack Lachlan Drive and for the new access road on 712 Whitford-Maraetai Road with a new road intersection on 620 Whitford-Maraetai Road. Further to the draft cut/fill plan, T+T understand that earthworks will also be undertaken on:

- 620 Whitford-Maraetai Road for the development of the new wastewater drip irrigation fields; and
- 758 and 770 Whitford-Maraetai Road as part of Stage 6 of the staged development framework, with works relating to golf course reconfiguration and an access way.

Contamination-related consents are required for the development on the basis that:

- Soil disturbance of an identified HAIL area (the existing WWTP on 110 Jack Lachlan Drive) is planned; and

[2] T+T, November 2022. Detailed Site Investigation - 110 Jack Lachlan Drive and 620 Whitford-Maraetai Road, 1014358.v5
[3] Resource consent was granted for earthworks in this area by Auckland Council in 2025 (LUC60453761 and LUS60459682).
[4] T+T, June 2026. Desktop Ground Contamination Investigation, 758 and 770 Whitford-Maraetai Road
[5] T+T, June 2026. Beachlands South, Fast-Track Application, Contamination Consent Considerations. Ref: 1014358.3200-LTR-CN-001 v3.
[6] Harrison Grierson, June 2026. Beachlands South Fast Track, Infrastructure Report.
[7] Harrison Grierson, 25 May 2026. Beachlands Fast Track Consent Package, Beachlands South, Cut/Fill Volume. DRAFT. Drawing No. A2515591.00-HG-S1-SK-C-037.

- Soil disturbance of potential HAIL areas on 758 and 770 Whitford-Maraetai Road may occur (earthwork plans are not currently available).

The proposed subdivision and change of use of the identified and potential HAIL areas are permitted activities under the NESCS, refer to the Contamination Consent Considerations letter report[5] for further discussion.

The DSI includes 110 Jack Lachlan Drive, but not 758 and 770 Whitford-Maraetai Road. From the work to date it has not been confirmed that the NESCS and AUP would apply to proposed soil disturbance on 758 and 770 Whitford-Maraetai Road. In the absence of confirmation, it is **assumed** that the NESCS and AUP will apply to soil disturbance on 758 and 770 Whitford-Maraetai Road.

As a DSI has not been undertaken for 758 and 770 Whitford-Maraetai Road, soil disturbance for the Site will be a **discretionary activity** under the NESCS (per Regulation 11). Discharges from the soil disturbance will require consent as a **discretionary activity** under Chapter E30 of the AUP (Table E30.4.1 A7).

The potential human health and environmental effects from the soil disturbance will be negligible if appropriate controls are implemented during soil disturbance and impacted soil is removed off-site to an appropriate facility or capped on site. This CSMP outlines procedures for the management of potential ground contamination effects during the proposed works and includes protocols for the management of unexpected contamination. Implementation of the CSMP, including pre-works investigations, will be a condition of the consent.

1.4 Objectives of the CSMP

The objectives of this CSMP are to:

- Provide procedures to manage potential ground contamination effects on human health and the environment during ground disturbance activities associated with the proposed development.
- Support resource consent application for soil disturbance under the NESCS and Chapter E30 of the AUP.

This CSMP has been prepared for the Site as described in Section 1. A separate CSMP[8] is already in place for the Stage 1 earthworks (northern portion of 110 Jack Lachlan Drive) pertaining to consents LUC60453761 and LUS60459682 dated 4 December 2025.

1.5 Regulatory compliance

This CSMP has been prepared in general accordance with Ministry for the Environment (MfE) *Contaminated Land Management Guidelines No.1 - Reporting on Contaminated Sites in New Zealand (Updated 2021)*. Sampling procedures provided in this plan generally comply with the MfE's *Contaminated Land Management Guidelines No.5 – Site Investigation and Analysis of Soils (Updated 2021)*.

In case of unexpected discoveries, this plan considers the requirements of the Health and Safety at Work (Asbestos) Regulations (2016), the WorkSafe NZ *Approved Code of Practice (ACOP): Management and Removal of Asbestos* (September 2016) and the *New Zealand Guidelines for Assessing and Managing Asbestos in Soil* (BRANZ, November 2017, updated 2024).

[8] T+T, July 2025. Contamination Site Management Plan, Stage 1 – 110 Jack Lachlan Drive. Prepared for Beachlands South Limited Partnership c/l Russell Property Group. T+T ref: 1014358.5100 v1.2.

The persons preparing and certifying this CSMP are suitably qualified and experienced practitioners (SQEP) as required by the NESCS and defined in the NESCS Users' Guide.[9]

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

2 Roles and responsibilities

2.1 General

The requirements of this CSMP are mandatory for all persons (employees, contractors and sub-contractors) involved in undertaking any of the proposed ground disturbance works. Implementation of the CSMP shall be the responsibility of the appointed Contractor. The developer of the Site shall be responsible for ensuring that the Contractor is provided with the most up to date version of the CSMP and shall oversee the Contractor to ensure that the procedures set out in the CSMP are followed. An appropriate contaminated land specialist (CLS) will be appointed to liaise with the Contractor during the course of the works. The CLS shall be sufficiently experienced to comply with the SQEP definitions as described in and required by the NESCS Users' Guide and will be responsible for the provision of advice relating to ground contamination.

At the time of this draft CSMP the specific organisations undertaking the ground disturbance have not been confirmed. The roles and responsibilities for organisations involved in implementing the CSMP will be summarised in a future update.

2.2 Distribution

A copy of the CSMP shall always be kept onsite. It is the responsibility of the developer to distribute the plan to the Contractor appointed to carry out the work. It is the responsibility of the developer's nominated Contractor to distribute the CSMP to any other sub-contractors or parties carrying out earthworks.

2.3 Review and update

Statutory requirements, operating procedures or Site conditions may vary and may require that this plan be amended or updated. Any variations to the CSMP proposed by the Contractor must be approved by the CLS prior to works relating to the variation commencing. If the changes are substantive, they may also need to be approved by Council prior to implementation.

It is the responsibility of the appointed Contractor to distribute any changes to the CSMP to the relevant parties involved in the construction works.

3 Contamination conditions

3.1 Site history and investigation results

For simplicity, the investigation results are grouped by property.

Soil sampling locations and analytical results from the DSI are presented in Appendix B.

3.1.1 110 Jack Lachlan Drive

110 Jack Lachlan Drive was used as a golf resort from approximately 1996. Prior to this it was used as pastoral land with a residential dwelling and associated farm sheds. Cut to fill earthworks were undertaken as part of the construction of the golf course to either create level playing fields or constructed gullies. These areas of cut to fill were identified as "borrow disposal areas" in the DSI.

Potential HAIL[10] activities were identified relating to:

- Filling during development with fill of unknown origin (Activity I).
- Application or storage of persistent pesticides at the golf course (Activity A10).
- Buildings built or demolished during time when asbestos containing material and lead based paints in use (Activity I).
- On-site wastewater treatment plant and effluent disposal (Activity G6), relating to the existing on-site wastewater treatment plant (and associated neighbouring disposal areas), hereafter collectively referred to as the 'WWTP'.

As part of the DSI soil was investigated at 18 locations within portion of 110 Jack Lachlan Drive that is part of the Site (refer to locations shown in Appendix B). The following potential land use/activity sources were targeted:

- Potential filling during Site development (including borrow disposal areas) was targeted by HA13 to HA17, HA20, HA21.
- Potential application of and storage of persistent pesticides was targeted by SS01 to SS06 and SS10.
- Buildings built or demolished during this time that may have contained asbestos containing material (ACM) and lead based paints were targeted by HA22 to HA25.

Investigation of the WWTP was not undertaken for the DSI as it was (and remains) operational.

All sample results for the Site were within the published background range concentrations for non-volcanic soils in Auckland and did not exceed the NESCS soil contaminant standard (SCS) for residential 10% produce or the AUP discharge criteria.

Further to the DSI findings noted above, T+T note that unexpected contamination has been encountered during Stage 1 earthworks on 110 Jack Lachlan Drive in 2026 (under the separate consent). On that basis, even if there is not a specific contamination consent trigger for earthworks on the remainder of 110 Jack Lachlan Drive, given the size of the property, there is the potential for unexpected contamination.

3.1.2 620 Whitford-Maraetai Road

620 Whitford-Maraetai Road has been used for farming activities since the early 1900s. Potential HAIL activities identified on this property included:

- Filling of gullies with fill of unknown origin (Activity I).

[10] Ministry for the Environment, October 2011. Hazardous Activities and Industries List (HAIL).

- Livestock drip or spray race operations associated with sheep and beef farming (Activity A8).
- Storage of fuel for farm equipment in drums or mobile tankers (Activity A17).

As discussed in the DSI, Fraser Thomas[11] had previously investigated soil in an infilled gully and in the location of a former spray race:

- Concentrations of dieldrin, an insecticide, in surface soil in the location of the former spray race exceeded Auckland background concentrations, but did not exceed the residential NESCS SCS or the AUP discharge criteria.
- During the site investigations in 2011 Fraser Thomas observed some refuse (farm and building waste) in the gully area including small pieces of potential asbestos-containing material (ACM). Soil samples were collected in this area. Arsenic concentrations in four samples of fill from the gully exceeded the NESCS SCS of 20 mg/kg. Zinc concentrations exceeded the AUP discharge criteria in three of the samples. In addition to arsenic and zinc, cadmium, chromium and copper concentrations exceeded background ranges.

For the DSI, in 2021 T+T inspected the gully area and did not observe surface or buried refuse that had been previously identified by Fraser Thomas. Soil samples were collected from five additional locations (HA01 to HA05) and were tested for asbestos by the semi-quantitative method. Asbestos was not detected.

While the Fraser Thomas investigation confirmed HAIL activities have been undertaken on 620 Whitford-Maraetai Road, T+T understand that the location of these (see Appendix B) does not intersect with the proposed development works for this consent application.

3.1.3 712 Whitford-Maraetai Road

A PSI was undertaken for this property as part of the DSI. This property has been used for grazing purposes since circa 1955. In the 1980s a residence was constructed in the eastern portion of the property. In 2021 The Turning Point New Zealand Limited was running a detoxification and rehabilitation facility at the property.

Potential HAIL activities were identified relating to:

- Buildings built or demolished during time when asbestos containing material and lead based paints in use (Activity I).
- Potential filling of gully and filling during residential dwelling development with fill of unknown origin (Activity I).

A DSI has not been undertaken to assess the soil condition in the potential HAIL areas. Based on the description of work provided to T+T, earthworks are not anticipated to intersect with the potential HAIL activities on 712 Whitford-Maraetai Road.

3.1.4 758 Whitford-Maraetai Road

The property was pastoral land following which it was developed for rural residential land use sometime between the 1950s and 1975. The desktop assessment has identified a potential HAIL activity relating to buildings built or demolished during time when asbestos containing material and lead based paints in use (Activity I).

[11] Fraser Thomas Consultants, December 2012. Proposed Ahuareka rural subdivision at 650 Whitford-Maraetai Road Environmental assessment, #31883

A DSI has not been undertaken to assess the soil condition in the potential HAIL area. Based on the description of work, earthworks may intersect with the potential HAIL area on 758 Whitford-Maraetai Road.

3.1.5 770 Whitford-Maraetai Road

The property was pastoral land following which it was developed for rural residential land use sometime between the 1950s and 1975. The desktop assessment has identified a potential HAIL activity relating to buildings built or demolished during time when asbestos containing material and lead based paints in use (Activity I).

A DSI has not been undertaken to assess the soil condition in the potential HAIL area. Based on the description of work, earthworks may intersect with the potential HAIL area on 770 Whitford-Maraetai Road.

3.2 Contamination risks

At this stage there is no confirmed land contamination present where ground disturbance is proposed on the Site and the risk to workers is likely to be low. However, sampling has not been undertaken in the vicinity of the existing WWTP or in the potential HAIL areas on 758 and 770 Whitford-Maraetai Road. Pre-works investigations as set out in Section 4 will be carried out prior to earthworks in these areas to assist in characterising the potential impact. Noting the findings from the Stage 1 earthworks, there is potential for unexpected contamination (e.g. farm dumps) to be encountered during the earthworks on the Site.

The likely principal risks posed by on-site soil contamination (if present) are summarised below:

- Potential risk to the health of on-site workers from inhalation of contaminants in dust, and dermal contact with, and ingestion of, contaminants from excavated soil during breaking of ground, excavation, trenching or other intrusive works.
- Potential risk to the health of future occupiers and general public if uncapped contaminated soils remain onsite following development works.

Exposure to ground contamination hazards during ground disturbance will be controlled by a combination of requirements including dust control, erosion and stormwater control, good hygiene practices, decontamination procedures, and wearing appropriate personal protective equipment (PPE). These control measures are detailed in Section 5.

4 Pre-works investigations

4.1 Existing WWTP

At the time of preparing this draft CSMP, the programme for the bulk earthworks has not been confirmed. T+T understand that the existing WWTP on 110 Jack Lachlan Drive is intended to remain in use for some years before decommissioning and redevelopment.

Following demolition of the WWTP (including all structures and drip irrigator lines), a pre-works investigation is proposed to assess contamination levels before undertaking earthworks. The purpose of the sampling is to confirm the controls for this CSMP as well as soil disposal and re-use options.

The consent under which the WWTP is operating (DIS60353629) may require periodic wastewater testing and/or soil testing in the disposal fields for contaminants. If this dataset is made available, and covers up to the time that the WWTP ceases operating, the pre-works investigation outlined in this section may be further refined. Similarly, if there are changes to the development plans indicating changes to the extent of proposed soil disturbance, the pre-works investigation outlined in this section may need to be revised.

On the basis of the estimated size of the WWTP, the following number of sampling locations are recommended:

- Plant area covering approximately 600 m^2: 6 locations targeting former infrastructure (i.e. allowance of roughly 1 sampling location per 100 m^2).
- Disposal fields covering approximately 16,800 m^2: 17 grid-based locations (i.e. allowance of roughly 1 sampling location per 1,000 m^2).

At this stage it is not clear if soil disturbance will be proposed across the entire area of the WWTP. The sampling location numbers may be adjusted for the area of proposed earthworks based on the densities for the plant area and disposal fields noted above.

We anticipate the sampling will comprise hand auger or test pit locations (depending on the availability of an excavator), to a depth of 0.5 m below ground level (m bgl) or natural soil, whichever comes first.

Sampling will be carried out by a SQEP, and the sampling and analysis will be conducted in general accordance with the MfE Contaminated Land Management Guidelines[12] and NZ Asbestos in Soil Guidelines.[13] Visual observations of subsurface conditions will be recorded and soil samples collected for laboratory analysis. The analytical suite will need to be confirmed based on the provision of any WWTP consent monitoring data, but will likely comprise:

- Plant area: heavy metals, polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), per- and poly-fluoroalkyl substances (PFAS), asbestos by NZ semi-quantitative method.
- Disposal fields: heavy metals, nitrogen species and PFAS.

This CSMP shall be updated with the results of the investigation. The procedures outlined in Sections 5 and 6 are proposed on a precautionary basis given the current Site data, and may change as a result of the pre-works investigations.

[12] Ministry for the Environment. Contaminated Land Management Guidelines No. 5: Site Investigation and Analysis of Soil (Revised 2021).
[13] BRANZ Ltd, 2017, updated 2024. New Zealand Guidelines for Assessing and Managing Asbestos in Soil.

4.2 758 and 770 Whitford-Maraetai Road

The potential HAIL areas on 758 and 770 Whitford-Maraetai Road relate to buildings built at the time when ACM and lead-based paints were in use. Due to the potential presence of asbestos in the buildings, under the Asbestos Regulations, an asbestos demolition survey will be required to be undertaken prior to demolition/removal. Removal of asbestos greater than 10 m^2 in area will need to occur under the supervision of an appropriately licensed removalist. The removalist may also address localised contamination around and beneath buildings at the time of demolition.

Prior to ground disturbance within potential HAIL areas of 758 and 770 Whitford-Maraetai Road, soil sampling is proposed to confirm the controls for this CSMP as well as soil disposal and re-use options. Sampling may comprise testing of curtilage areas prior to building demolition, or across the building footprints following demolition. The SQEP will develop the sampling plan taking into account asbestos removal works and the available earthworks plans.

Sampling will be carried out by a SQEP, and the sampling and analysis will be conducted in general accordance with the MfE Contaminated Land Management Guidelines and NZ Asbestos in Soil Guidelines. Visual observations of subsurface conditions will be recorded and soil samples collected for laboratory analysis. The analytical suite will comprise metals and asbestos (by the NZ semi-quantitative method).

This CSMP shall be updated with the results of the investigation. The procedures outlined in Sections 5 and 6 are proposed on a precautionary basis given the current Site data, and may change as a result of the pre-works investigations.

5 Ground disturbance procedures

The Contractor shall prepare and implement a risk assessment in compliance with the Health and Safety at Work Act 2015 and other applicable legislation, regulations, codes, and guidelines. This is likely to comprise a Job Safety Analysis (JSA) or similar document. The Contractor's assessment shall also cover measures related to the presence of potentially contaminated material.

As described in Section 3.1, the available information indicates that the potential for on-site human health risks during ground disturbance is likely to be low. The procedures within this section are therefore proposed on a precautionary basis and reflect good practice for reducing exposure risks to the extent practicable. As noted, these procedures will be further updated upon completion of the pre-works investigation.

5.1 Identification of new hazards

The Contractor is responsible for reviewing any new work element and assessing whether there are any new associated hazards, and whether these can be eliminated, isolated or minimised. The Contractor shall seek review by the developer, or its project manager, who will seek CLS input if necessary. The Contractor shall then instruct all staff on the health and safety procedures associated with the new hazard.

5.2 Emergency procedures

Emergency procedures appropriate to the proposed works shall be established prior to the start of works. The only additional emergency requirement relating to working on a contaminated site is that provision should be made to notify any responding emergency personnel of the presence of contamination. A copy of the CSMP should be available at the work site so it can be referred to by emergency personnel, if necessary.

5.3 Summary of procedures and controls

Ground disturbance procedures and controls for the Site are summarised in Table 5.1. As noted above, these will be updated as needed upon completion of pre-works investigations.

Reference should also be made to the following sections:

- Contingency procedures in Section 6. These should be followed in the event of unexpected contamination discovery.
- Validation procedures in Section 7.

A checklist is included in Appendix C to support the Contractor with CSMP implementation. An example agreement and acknowledgement sheet is attached in Appendix D.

All procedures employed by the Contractor shall comply with the relevant Council bylaws and conditions of any resource/building consent(s), including *Guidance Document 05: Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region (June 2016)*.

Table 5.1: Ground disturbance procedures/controls

Activity	Contamination-specific management/controls
Council notification	• Council must be notified in writing prior to works commencing.
Observations	• Contractor(s) will be on Site. CLS will be on Site as required if unexpected contamination encountered.
Site induction	• All personnel involved in undertaking ground disturbance activities shall be required to undergo a Site safety induction before commencing work. Specific training must be given on risks associated with potentially contaminated materials, minimum requirements for PPE and its use, and on good hygiene practices to minimise risks. The purpose of the safety induction is to make the worker aware of the hazards, safe working procedures, safety equipment and requirements and the action plan in case of an emergency. • It is recommended that all personnel undertaking ground disturbance activities confirm that they understand and agree to abide by the requirements of the CSMP (refer Appendix C).
Risk Assessment	• The Contractor shall prepare and implement a risk assessment in compliance with the Health and Safety at Work Act 2015 and other applicable legislation, regulations, codes, and guidelines. This is likely to comprise a Job Safety Analysis (JSA) or similar document. The Contractor's assessment shall also cover measures related to the presence of potentially contaminated material.
Emergency procedures	• Emergency procedures appropriate to the proposed works shall be established prior to the start of works. The only additional emergency requirement relating to working on a contaminated site is that provision should be made to notify any responding emergency personnel of the presence of contamination. A copy of the CSMP should be available at the work Site so it can be referred to by emergency personnel, if necessary.
Contamination-specific PPE (in addition to standard earthworks PPE)	• Full length clothing and standard steel toe gumboots or other appropriate safety footwear for personnel involved in soil disturbance. • No additional contamination specific PPE required.
Site establishment	• All staff undertaking disturbance work shall be inducted so they are aware of contamination risks. • Hazard board shall state that there is a risk from soil contamination. • Fencing or barriers shall be placed to exclude entry by persons who have not been inducted.
Dust control	• Standard earthwork controls apply.
Sediment discharges	• No debris or spoil generated by the works is allowed to be discharged to the stormwater system. Erosion and sediment control shall be managed in accordance with the Council's guidelines and other applicable legislation, including where necessary the use of silt fences and runoff diversion bunds (as appropriate).

Activity	Contamination-specific management/controls
Excavation, transport, and stockpiling	• Trucks shall be loaded directly, with soil stockpiles avoided where possible. • If to be placed on clean soil, stockpiles shall be placed on paved surfaces or an impermeable membrane to prevent contamination of underlying soils. Alternatively, the stockpile areas need to be validated following removal of stockpiles. • As a minimum, trucks transporting soil are to be covered when transporting soil off the Site. The Contractor shall confirm transportation requirements with the disposal facility prior to soil excavation. • Soil disposal records (summaries) shall be kept for later validation reporting for all soil going offsite. • Where stockpiling of soil is necessary, stockpiles shall be kept damp during works.
Soil reuse	• If geotechnically suitable, natural/topsoil material can be reused onsite from a contamination point of view.
Soil disposal	• Disposal requirements for the existing WWTP and potential HAIL area on 758 and 770 Whitford-Maraetai Road are to be confirmed via pre-works investigations. • Outside of those areas, based on the DSI, if offsite disposal of topsoil material is required, it should be able to be disposed of at a cleanfill facility. Further contamination testing may be required by the receiving disposal sites. • Deeper soil (the underlying natural soil) will likely be suitable for disposal as cleanfill; however, this may be subject to further contamination testing. This should be taken into consideration when engaging with disposal sites. • The disposal site operator must provide prior approval of its acceptance of the material before it is carted offsite. • Records (disposal dockets) to be kept as proof of disposal location(s). • All surplus soil must be disposed to a facility consented to receive the level of contamination.
Water discharges	• Follow standard earthworks controls.
Imported material	All soils imported to Site must either be hardfill direct from a quarry or the following: • If recycled hardfill or crushed concrete sourced from offsite is proposed to be used this must be specifically authorised by the conditions of consent granted for the works; • Be derived from a source, which is previously verified in accordance with the methods described in the NESCS, as being a piece of land to which the NESCS do not apply; or • Have been adequately investigated in accordance with MfE Contamination Land Management Guidelines No.5 – Site Investigation and Analysis of Soils (Revised 2021) by the CLS to meet the 'cleanfill' definition and comply with the published background concentrations for Auckland volcanic soils. Testing will depend on the potential contamination sources and may include metals, PAH, OCPs and asbestos content. It is preferable that the material is tested at its source prior to its importation. However, if this is not possible, then the Contractor shall stockpile the material in a clean area of the Site until test results are available.
Decontamination	• Personnel should follow good hygiene practices such as washing hands prior to eating, drinking, smoking, driving or leaving Site.

Activity	Contamination-specific management/controls
	• Standard machinery and equipment cleaning are appropriate for the Site.
General monitoring	• Daily monitoring shall be undertaken to note use of personal protective equipment and presence of unexpected contamination. Action shall be taken as required to notify the relevant parties and rectify any controls if monitoring identifies that it is needed. • Erosion and sediment controls should be monitored on a regular basis, including after periods of heavy rain. • Visual monitoring for dust shall be carried out on a continuous basis. • The agents of the Auckland Council shall be permitted access to the relevant parts of the Site, records, monitoring and test results at all reasonable times. • The Contractor is responsible for reviewing any new work element and assessing whether there are any new associated hazards, and whether these can be eliminated, isolated or minimised. The Contractor shall seek review by the developer, or its project manager, who will seek CLS input if necessary. The Contractor shall then instruct all staff on the health and safety procedures associated with the new hazard.
Capping	• Capping may be required based on the findings of the pre-works investigations or unexpected discoveries. Based on the DSI, no specific capping is required.
Validation	• No specific requirements unless unexpected contamination is discovered or the findings of the pre-works investigations indicate specific validation requirements are needed.
Ongoing management	• No specific requirements unless unexpected contamination is discovered or the findings of the pre-works investigations indicate ongoing management is needed.

6 Contingency procedures

6.1 General

The following actions are proposed in the event that unexpected conditions are encountered, discharges occur and/or complaints are received in relation to the works. Mitigation measures should be applied in accordance with the hierarchy of control described in the Health and Safety at Work Act 2015 – eliminate or minimise.

As described in Section 2, the Contractor shall be responsible for implementation of all aspects of this CSMP, including contingency procedures. The Contractor's Site supervisor shall be authorised to enact contingency and emergency measures without delay.

6.2 Unexpected contamination conditions

The onus is on the Contractor to note where visual and olfactory indicators of contamination exist and liaise with the CLS to ensure the controls in place remain appropriate to the type and level of contamination encountered. Typical visual and olfactory indicators of contamination could include the following:

- Odour (petroleum hydrocarbons, oil).
- Black staining coupled with an odour may indicate heavy oil/hydrocarbon contamination.
- Green/yellow discoloured soil may indicate high levels of copper and chromium.
- Suspected or confirmed ACM including asbestos cement pipework.
- Black gravel/sand may be boiler ash materials that could be high in metals and PAHs.
- Refuse or waste materials in soil.
- Underground structures containing contaminants such as tanks or pipework.

Table 6.1 provides a "first response" checklist for the Contractor to follow should visual or olfactory evidence of contamination be encountered during the works onsite.

The presence of other contaminants in high levels may dictate further controls be implemented and additional or different containment disposal be required.

The first response procedures are to ensure contamination is appropriately contained while decisions about its management are being undertaken.

6.3 Emergency response procedures

Should an incident occur on Site which may result in any unauthorised discharges (vapour, odour, water, soil, separate phase hydrocarbon etc.), the Contractor will take control of the situation and coordinate the efforts of all on site to minimise the impact.

In the event that sustained and uncontrollable discharges occur from the Site, emergency response and evacuation procedures, including provisions for notifying and managing neighbouring site users, shall be implemented. The emergency response and evacuation procedures shall be specified in the Contractors JSA.

Table 6.1: First response checklist

First Response Checklist:	
Stop work in the immediate vicinity of the contamination discovery and isolate the area by taping, coning or fencing off.	☐
Advise the developer (or the designated project manager).	☐
Update Site Hazard Board and prevent access to the area by unnecessary personnel.	☐
Ensure appropriate personal protective equipment is available to all staff entering the isolated area.	☐
If water discharges/runoff are being generated the area in which unexpected contamination conditions have been encountered, these shall be isolated so that runoff from this area can be separated from that generated across the wider site.	☐
If odours are present cover the material over with non-odorous soil or hay/straw and lime to prevent nuisance odour.	☐
The developer must advise the CLS to inspect and advise of specific controls if appropriate. No materials shall be removed from the affected area until approval has been provided by the CLS.	☐

6.4 Contact with contaminated materials

In the event of direct contact with unexpected soil or groundwater contamination, exposed body parts should immediately be washed with soap and water.

All personnel shall undergo personal decontamination comprising the following when leaving the work area where unexpected contamination was discovered:

- Rinsing and / or scrubbing of boots, gloves and other PPE to remove dirt and dust residues;
- Removal of all PPE with disposable items such as gloves and dust mask (if worn) placed in a plastic bag or drum for waste collection; and
- Thorough washing of hands with soap and water.

Records shall be kept of any uncontrolled contact with potentially contaminated materials, including:

- Name(s) and contact details of all persons exposed.
- The nature of the contact (time, duration etc.).
- Decontamination undertaken; and any other treatment given etc.

Medical advice shall be sought immediately if any adverse health effects develop at the time of or following exposure.

6.5 Complaints procedure

A written record of all complaints received will be maintained for inclusion in the completion report (refer to Section 7). The Contractor will advise the developer (or its designated project manager) and initiate an investigation as soon as practicable on receipt of a complaint. The Contractor will provide appropriate feedback to the complainant, such as the response made, and any corrective actions taken in response to the complaint.

7 Validation and completion reporting

7.1 Validation

Validation procedures for the WWTP and potential HAIL areas on 758 and 770 Whitford-Maraetai Road will be confirmed following the pre-works investigations. If contaminated soil is capped or removed, the validation process is likely to comprise visual confirmation. Validation shall be carried out by the CLS. For the remainder of the earthworks on the Site, it is proposed that soil validation samples will not be required to be collected except where unexpected contamination conditions are encountered and remediated (refer to Section 6.2 and Appendix C). As described in those sections, in these instances the appointed CLS shall inspect the material and provide additional advice on the collection of any validation samples. If undertaken, validation sampling shall be undertaken by a suitably qualified CLS.

7.2 Information required from the Contractor

The following information is required from the Contractor for inclusion in project reporting:

- Confirmation that the works were undertaken in accordance with the CSMP or where variations were required details of those variations (note these are to be agreed as per Section 2.3).
- Copies of weigh bridge summaries for the disposal destination for all soil materials disposed offsite.
- Clearance certificates from any licensed asbestos works (if applicable in case of unexpected finds).
- Summaries for the disposal destination (volume or tonnage and receiving site) for all excavated materials.
- Documentation confirming the source, and where necessary testing (refer to Section 4 and 7.1), of any fill or soils imported during works.
- Records of visits by council representatives.
- Details of any complaints.
- Details of any health and safety incident related to the contamination and how they were resolved.
- Details of unexpected ground contamination encounters/events and the action taken.

The Contractor shall provide the required information to the developer and CLS within one month of completion of the works to which the information relates.

7.3 Reporting

On completion of the soil disturbance works, an SVR shall be prepared by the CLS and provided to the developer incorporating the following:

- A summary of the works completed, and an accompanying site plan.
- Confirmation that soil disturbance works were completed according to this CSMP and documenting any variations during the works.
- Confirmation that there were no environmental or human health incidents during the works. If there were any incidents, then the report shall detail the nature of the incident and the measures taken to mitigate effects.
- Confirmation that there was no unexpected contamination encountered during the works. If unexpected contamination was encountered then the report shall record the location and

dimensions of the impacted area(s), validation sampling locations and analytical results compared against relevant regulatory criteria.

- Validation sampling results.
- Documentation confirming the source, and where necessary testing (refer Table 5.1), of any fill or soils imported during works.
- Scaled plans showing the locations and containment details (if any) of any contaminated materials remaining on Site.
- Confirmation of the disposal destination(s) of all spoil and the verification test results undertaken (where required) for disposal permitting.

The report shall comply with the Ministry for the Environment *Contaminated Land Management Guideline No. 1: Guidelines for Reporting on Contaminated Sites in New Zealand*.

If the asbestos management procedures are required to be implemented during the works additional clearance reporting to WorkSafe maybe necessary to comply with the Asbestos Regulations. Clearance reporting requirements shall be determined by the CLS, in consultation with an Independent Competent Person where necessary.

7.4 Ongoing monitoring and management

Potential ongoing management requirements related to the WWTP, or potential HAIL areas on 758 and 770 Whitford-Maraetai Road, will be incorporated in this section following the pre-works investigation.

If unexpected contamination conditions are encountered during the works, the requirement for ongoing monitoring or management with respect to ground contamination will be assessed on completion of the earthworks.

8 Applicability

We understand and agree that our client will submit this report as part of an application under the Fast-track Approvals Act 2024 and that an Expert Panel will use this report for the purpose of assessing that application. We understand and agree that this report will be used by the Expert Panel in undertaking its regulatory functions.

The requirements of this CSMP are mandatory for all persons (employees, contractor and sub-contractors) who will be involved in undertaking ground disturbance works on the Site.

This CSMP provides a framework for managing contamination hazards on Site by identifying potential hazards and suggesting mitigation measures relevant to Site conditions and works proposed at the time of writing. This CSMP provides information and recommendations to augment this process but is not intended to relieve the person conducting a business or undertaking (PCBU, previously referred to as the controller of the place of work) of either their responsibility for the health and safety of their workers, contractors and the public, or their responsibility for protection of the environment.

Any persons undertaking ground disturbance works on the Site should develop a Site-specific risk assessment (such as a job safety analysis (JSA), or similar) to complement this CSMP and to address other health and safety requirements that may be applicable to their particular works. The Site-specific risk assessment should also be modified to address any specific health, safety or environmental issues that may arise during the works.

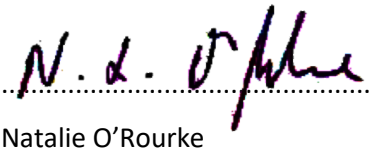
From time to time, statutory requirements, Site ownership or occupation, operating procedures or Site conditions may vary requiring that this plan be amended or updated.

The plan has been prepared on the basis of information available at the date of preparation nature and continuity of subsoil away from sample locations are inferred and it must be appreciated that actual conditions could vary from the assumed model.

This report has been prepared for the benefit of BSLP with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:



.....

Natalie O'Rourke
Senior Contaminated Land Consultant

Authorised for Tonkin & Taylor Ltd by:

.....

Mark Thomas
Project Director

Report reviewed by: Sarah Schiess – Technical Director

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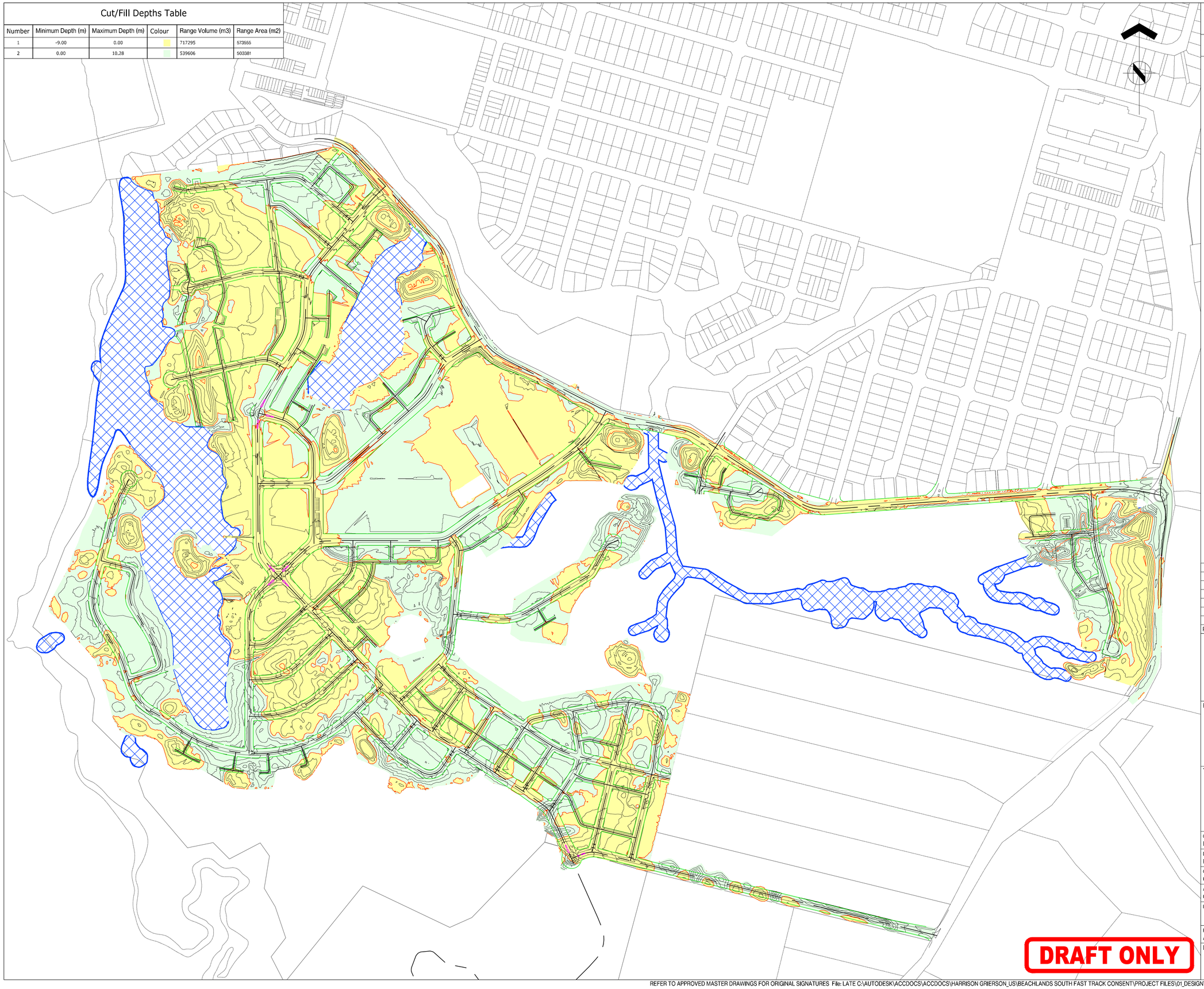
Appendix A Draft cut/fill and site plans

Cut/Fill Depths Table

Number	Minimum Depth (m)	Maximum Depth (m)	Colour	Range Volume (m3)	Range Area (m2)
1	-9.00	0.00		717295	573555
2	0.00	10.28		539606	503381



DRAFT ONLY

ACENZ ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND

ISO 9001 QUALITY ASSURED

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NOTES:

1. EARTHWORKS VOLUMES (EXISTING SUBGRADE VS PROPOSED SUBGRADE):
   CUT VOLUME = 717,000m^3
   FILL VOLUME = 540,000m^3

   STRIPPED TOPSOIL VOLUME = 215,400m^3
   RESPREAD TOPSOIL VOLUME = 107,700m^3

2. EARTHWORKS AREA :
   TOTAL AREA = 1,077,000m^2

   NOTE: TOPSOIL STRIP ASSUMED 200mm ACCORDING TO THE GEOTECH REPORT RECEIVED FROM TONKIN AND TAYLOR ON 12.06.2025.

3. VOLUMES INDICATED ABOVE ARE A COMPARISON BETWEEN EXISTING GROUND AFTER TOPSOIL/UNSUITABLE REMOVAL (200mm DEPTH), AND THE SUBGRADE DESIGN LEVELS (100mm LOWERED FROM FINISHED GROUND DESIGN LEVELS FOR ALL AREAS). THIS EXCLUDES VOLUMES FOR ROAD GULLETS, SERVICE TRENCHING, TEMPORARY BATTER SLOPES AND ANY OTHER GEOTECHNICAL FINIDINGS ON SITE. ACTUAL VOLUMES ARE SUBJECT TO CHANGE BASED ON THE GROUND CONDITIONS ENCOUNTERED DURING EARTHWORKS OPERATIONS.

4. VOLUMES PRESENTED ARE IN SOLID MEASURE WHICH IS THE MATHEMATICAL DIFFERENCE BETWEEN TWO SHAPES. VOLUMES DO NOT ACCOUNT FOR COMPACTION OR BULKING.

LEGEND:

CUT CONTOURS SHOWN AT 1m INVERVALS

FILL CONTOURS SHOWN AT 1m INVERVALS

REF	REVISIONS	BY	DATE
A	FOR INFORMATION	PZS	24.05.26

HARRISON GRIERSON

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PROJECT:

BEACHLANDS
FAST TRACK CONSENT PACKAGE
BEACHLANDS SOUTH, AUCKLAND

TITLE:

CUT/FILL VOLUME

ORIGINATOR: PZS	DATE: 05.2026	SIGNED:	PLOT BY: PZS
DRAWN: PZS	DATE: 05.2026	SIGNED:	PLOT DATE: 25.05.26
CHECKED: CJM	DATE: 05.2026	SIGNED:	SURVEY BY:
APPROVED: CJM	DATE: 05.2026	SIGNED:	SURVEY DATE:

ISSUE STATUS: FOR INFORMATION

PROJECT No:	SCALES:	
A2515591.00	A1 1:3500 A3 1:7000	A1

DRAWING No: A2515591.00-HG-S1-SK-C-037 REV A

REFER TO APPROVED MASTER DRAWINGS FOR ORIGINAL SIGNATURES File: LATE C:\AUTODESK\ACCDOCS\ACCDOCS\HARRISON GRIERSON_US\BEACHLANDS SOUTH FAST TRACK CONSENT\PROJECT FILES\01_DESIGN\02_CIVIL\05_SKETCHES\SK037-CUT FILL VOLUME (PROPOSED VS EXISTING).DWG

COPYRIGHT ON THIS FIGURE IS RESERVED DO NOT SCALE FROM THIS FIGURE - IF IN DOUBT, ASK.

\\ttgroup.local\corporate\Auckland\Projects\1014358\1014358.5000\WorkingMaterial\GIS\Maps_Documents\UPDATED 210720.RUKO.Sampling locations map\210720.RUKO.1014358.5000.aprx Layout: Formosa golf course 2026-Jun-18 10:29 am Drawn by JORB

LEGEND

- Surface Sample, Investigation
- Hand Auger, Investigation
- Formosa Property Boundary
- Future Urban Zone
- Sub-precinct Boundaries
- Live Zoning Boundary
- Sewer Line

Inferred Potential Contamination Sources

- Engineered fill (No HH + Env exceedences)
- Potential hazardous storage area (HAIL activity I)
- Borrow disposal area (No HH + Env exceedences)
- Additional shed present ~ 1972 - 1996 (No HH + Env exceedences)
- Residential dwelling present 1955 - 1996 (No HH + Env exceedences)
- Residential dwelling present 1950 - 1996
- Several smaller buildings/sheds present ~ 1995 - 1996 (No HH + Env exceedences)
- Shed structure present ~ 1961 - 1996 (No HH + Env exceedences)
- Smaller building/shed present 1950 - 1996
- Sewage plant (Potential HAIL G6)
- Potential historical filling (not investigated)

Constructed Wetland

- Constructed freshwater vegetated wetland: mixed native and exotic
- Constructed freshwater vegetated wetland: exotic
- Constructed freshwater wetland: open water (pond)

HA103a HA103b HA103 HA103c HA06 SS09 Marina Point SS08 SS07

HA25 HA22 Golf HA24 HA23

HA13 SS10 HA12 HA26 Marina Point HA11 HA10 HA14 Village Centre Community HA18 HA09 HA07 HA15 HA16 HA17 Coastal SS03 HA21 SS04 HA20 Golf SS02 SS05 SS06 SS01 Live Zone FUZ Whitford Marae

HA18 Community HA09 HA08 Golf

A3 SCALE 1:8,700

0 100 200 300 400 500 m

Tonkin+Taylor

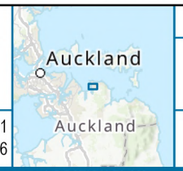
Exceptional thinking together www.tonkintaylor.co.nz

NOTES:

HH - NESCS Human Health, Env - Environmental Health. Potential contamination sources listed in report. Basemap LINZ NZ Primary Parcels: . Aotearoa New Zealand Hillshade - Alpha: Eagle Technology, Land Information New Zealand. TTCL Lab Test Sample (Unclassified): . NZ Topographic Relief (Vector): Eagle Technology, LINZ, StatsNZ, NIWA, Natural Earth, © OpenStreetMap contributors.. NZ Imagery: Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors

REV	DESCRIPTION	GIS	CHK	DATE
0	First version	RUKO	JORB	05/08/21
1	Second version	JORB	DSMI	18/05/26

LOCATION PLAN



PROJECT No.	1014358.5000		
DESIGNED	RUKO	JUN.26	
DRAWN	JORB	JUN.26	
CHECKED	DSMI	JUN.26	
APPROVED		DATE	

CLIENT **BEACHLANDS SOUTH LIMITED PARTNERSHIP**

PROJECT **CONTAMINATION SAMPLING**

TITLE BEACHLANDS - SAMPLE LOCATION MAP - 110 JACK LACHLAN DRIVE

SCALE (A3) 1:8,700 FIG No. FIGURE 1 REV 1

Appendix B Summary soil result tables

Analytical Results from 2022 DSI

Sample ID										PT-BL_HA01_0.00m-0.15m	PT-BL_HA02_0.00m-0.10m	PT-BL_HA03_0.40m-0.65m	PT-BL_HA04_0.00m-0.10m	PT-BL_HA05_0.00m-0.15m	PT-BL_HA06_0.00m-0.10m	PT-BL_HA06_0.50m-0.60m	PT-BL_HA07_0.00m-0.10m	PT-BL_HA08_0.50m-0.60m	PT-BL_HA09_0.00m-0.10m	PT-BL_HA10_0.00m-0.10m
Sample Name / Guideline Values	NES Commercial / Industrial[1a]	NES Recreational[1b]	NES High Density Residential[1c]	NES Residential (10 % produce)[1d]	NES Rural Residential / lifestyle block (25% produce)[1e]	AUP Permitted Activity Criteria[2]	Published Auckland Background Levels (non-volcanic)[3b]	Typical Managed Fill Criteria*	Maximum	HA01	HA02	HA03	HA04	HA05	HA06	HA06	HA07	HA08	HA09	HA10
Depth										0.00	0.00	0.40	0.00	0.00	0.00	0.50	0.00	0.50	0.00	0.00
Strata										Topsoil	Topsoil	Fill	Topsoil	Topsoil	Topsoil	Fill	Topsoil	Fill	Topsoil	Topsoil
Area										620 W-M Rd	620 W-M Rd	620 W-M Rd	620 W-M Rd	620 W-M Rd	Stage 1	Stage 1	Stage 1	Stage 1	Stage 1	Stage 1
Date										06/07/2021	06/07/2021	06/07/2021	06/07/2021	06/07/2021	06/07/2021	06/07/2021	06/07/2021	06/07/2021	06/07/2021	06/07/2021
Asbestos (Semi-Quantitative)																				
Asbestos type	-		-	-	-	-	ND	At operator discretion	-	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	-	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Asbestos form	-		-	-	-	-	ND	At operator discretion	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos as ACM (w/w%)	0.05%[4]	0.02%[4]	0.04%[4]	0.01%[4]	0.01%[4]	-	ND	At operator discretion		-	-	-	-	-	-	-	-	-	-	-
Asbestos Fibres/Fine (w/w %)	0.001%[4]	0.001%[4]	0.001%[4]	0.001%[4]	0.001%[4]	-	ND	At operator discretion		-	-	-	-	-	-	-	-	-	-	-
Metals																				
Arsenic	70	80	45	20	17	100	12	70	35	-	-	-	-	-	-	5	6	4	< 2	2
Cadmium	1300	400	230	3	0.8	7.5	0.65	7.5	0.23	-	-	-	-	-	-	< 0.10	0.14	0.12	0.11	< 0.10
Chromium	6300	2700	1500	460	290	400	55	400	34	-	-	-	-	-	-	15	12	12	9	13
Copper	>10000	>10000	>10000	>10000	>10000	325	45	325	31	-	-	-	-	-	-	10	22	15	4	5
Lead	3300	880	500	210	160	250	65	250	17.1	-	-	-	-	-	-	7.1	15.4	13.9	6.4	6.7
Nickel	6000[5]	1200[5]	1200[5]	400[5]	-	105	35	320	19	-	-	-	-	-	-	14	14	9	3	4
Zinc	400000[7]	30000[7]	60000[7]	7400[7]	-	400	180	400	77	-	-	-	-	-	-	30	71	76	11	8
Organochlorine Pesticides																				
2,4'-DDD	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
2,4'DDE	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
2,4'-DDT	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
4,4'-DDD	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
4,4'-DDE	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
4,4'-DDT	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
Aldrin	160	70	45	2.6	1.1	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
Alpha-BHC	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
Beta-BHC	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
cis-Chlordane	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
Delta-BHC	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
Dieldrin	160	70	45	2.6	1.1	2.7[10]	<LoR	0.2	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
Endosulfan I	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
Endosulfan II	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
Endosulfan sulphate	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
Endrin	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
Endrin aldehyde	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
Endrin ketone	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
Gamma-BHC (Lindane)	14000[10]	1400[10]	700[10]	139[10]	33[10]	140[10]	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
Heptachlor	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
Heptachlor epoxide	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
Hexachlorobenzene	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
Methoxychlor	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
Total DDT Isomers	1000	400	240	70	45	12	<LoR	12	<LoR	-	-	-	-	-	< 0.08	< 0.08	< 0.08	-	-	-
trans-Chlordane	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	< 0.013	< 0.013	< 0.013	-	-	-
Polycyclic Aromatic Hydrocarbons																				
1-Methylnaphthalene	-[6]	-[6]	-[6]	-[6]	-[6]	-	<LoR	-	<LoR	-	-	-	-	-	-	< 0.013	< 0.013	< 0.012	< 0.014	< 0.013
2-Methylnaphthalene	-[6]	-[6]	-[6]	-[6]	-[6]	-	<LoR	-	<LoR	-	-	-	-	-	-	< 0.013	< 0.013	< 0.012	< 0.014	< 0.013
Acenaphthene	-[6]	-[6]	-[6]	-[6]	-[6]	-	<LoR	-	<LoR	-	-	-	-	-	-	< 0.013	< 0.013	< 0.012	< 0.014	< 0.013
Acenaphthylene	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	-	< 0.013	< 0.013	< 0.012	< 0.014	< 0.013
Anthracene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	<LoR	-	-	-	-	-	-	< 0.013	< 0.013	< 0.012	< 0.014	< 0.013
BaP equivalent	35	40	24	10	6	20	<LoR	20	0.03	-	-	-	-	-	-	< 0.03	< 0.03	< 0.03	< 0.04	< 0.04
Benzo (e) pyrene	-	-	-	-	-	-	<LoR	-	0.016	-	-	-	-	-	-	< 0.013	< 0.013	< 0.012	< 0.014	< 0.013
Benzo[a]anthracene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.025	-	-	-	-	-	-	< 0.013	< 0.013	< 0.012	< 0.014	< 0.013
Benzo[a]pyrene (BAP)	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.017	-	-	-	-	-	-	< 0.013	< 0.013	< 0.012	< 0.014	< 0.013
Benzo[b]fluoranthene + Benzo[j]fluoranthene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.029	-	-	-	-	-	-	< 0.013	< 0.013	< 0.012	< 0.014	< 0.013
Benzo[g,h,i]perylene	-	-	-	-	-	-	<LoR	-	0.012	-	-	-	-	-	-	< 0.013	< 0.013	< 0.012	< 0.014	< 0.013
Benzo[k]fluoranthene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.011	-	-	-	-	-	-	< 0.013	< 0.013	< 0.012	< 0.014	< 0.013
Chrysene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.018	-	-	-	-	-	-	< 0.013	< 0.013	< 0.012	< 0.014	< 0.013
Dibenzo[a,h]anthracene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	<LoR	-	-	-	-	-	-	< 0.013	< 0.013	< 0.012	< 0.014	< 0.013
Fluoranthene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.031	-	-	-	-	-	-	< 0.013	< 0.013	< 0.012	< 0.014	< 0.013
Fluorene	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	-	< 0.013	< 0.013	< 0.012	< 0.014	< 0.013
Indeno(1,2,3-c,d)pyrene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.012	-	-	-	-	-	-	< 0.013	< 0.013	< 0.012	< 0.014	< 0.013
Naphthalene	210[7]	63[7]	63[7]	63[7]	7.2[7]	0.28[8]	<LoR	-	<LoR	-	-	-	-	-	-	< 0.07	< 0.07	< 0.06	< 0.07	< 0.07
Perylene	-	-	-	-	-	-	<LoR	-	0.017	-	-	-	-	-	-	0.017	< 0.013	< 0.012	< 0.014	< 0.013
Phenanthrene	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	-	-	-	< 0.013	< 0.013	< 0.012	< 0.014	< 0.013
Pyrene	NL[1]	1600[1]	1600[1]	1600[1]	160[1]	7.9[1]	<LoR	-	0.027	-	-	-	-	-	-	< 0.013	< 0.013	< 0.012	< 0.014	< 0.013

Notes:

All values in mg/kg unless otherwise indicated (i.e. asbestos).

'-' indicates not analysed or no relevant acceptance criteria

<LOR = less than laboratory limit of reporting

Grey font indicates values <LOR

'ND or Asbestos NOT detected' = asbestos not identified to be present by the laboratory method.

NL = Not limiting (i.e. >10,000 mg/kg)

Red values indicate that the results exceed NES Soil criteria: commercial / industrial criteria

▲ values indicate results exceed NES recreational criteria

Dashed outlined values indicate that the results exceed NES Soil criteria: High density residential criteria

Grey Shaded values indicate that the results exceed NES Soil criteria: Residential 10% produce criteria

Underlined values indicates that results exceed the AUP Permitted Activity Criteria

Bold values indicate that results exceed the published background concentrations for non-volcanic soils in the Auckland Region

● values indicate that results exceed typical managed fill criteria

1a - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health: Commercial/Industrial use (and adopted conservative preliminary screening standard for construction works), unless otherwise stated.

1b - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health: Recreational use, unless otherwise stated.

1c - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health: High density residential use, unless otherwise stated.

1d - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health: Residential 10% produce, unless otherwise stated.

2 - Auckland Unitary Plan: Operative in Part Version (AUP). Permitted Activity Soil Criteria Table E30.6.1.4.1 (unless otherwise stated).

3b - Auckland Regional Council, Technical Publication 153, October 2001. Background Concentrations of inorganic elements in soils from the Auckland Region: non-volcanic soils

5 - Assessment of Site Contamination National Environment Protection Measures (ASC NEPM) Toolbox – http://www.nepc.gov.au/nepms/assessment-site-contamination/toolbox.

6 - USPEA Regional Screening Levels - https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

7 - MfE 1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, Revised 2011. Tier 1 Soil acceptance criteria for applicable pathway.

* Ridge Road acceptance criteria based on the published maximum truckload concentrations for deep fill (>2.0m).

Analytical Results from 2022 DSI

Sample ID										PT-BL_HA11_0.00m-0.10m	PT-BL_HA11_0.50m-0.60m	PT-BL_HA12_0.00m-0.10m	PT-BL_HA13_0.00m-0.10m	PT-BL_HA14_0.00m-0.20m	PT-BL_HA14_0.20m-0.60m	PT-BL_HA15_0.00m-0.05m	PT-BL_HA16_0.00m-0.10m	PT-BL_HA16_0.20m-0.60m	PT-BL_HA17_0.00m-0.10m
Sample Name / Guideline Values	NES Commercial / Industrial[1a]	NES Recreational[1b]	NES High Density Residential[1c]	NES Residential (10 % produce)[1d]	NES Rural Residential / lifestyle block (25% produce)[1e]	AUP Permitted Activity Criteria[2]	Published Auckland Background Levels (non-volcanic)[3b]	Typical Managed Fill Criteria*	Maximum	HA11	HA11	HA12	HA13	HA14	HA14	HA15	HA16	HA16	HA17
Depth										0.00	0.50	0.00	0.00	0.00	0.20	0.00	0.00	0.20	0.00
Strata										Topsoil	Natural	Topsoil	Topsoil	Topsoil	Natural	Topsoil	Topsoil	Natural	Topsoil
Area										Stage 1	Stage 1	Stage 1	Balance Live-Zone	Balance Live-Zone	Balance Live-Zone	Balance Live-Zone	Balance Live-Zone	Balance Live-Zone	Balance Live-Zone
Date										06/07/2021	06/07/2021	06/07/2021	06/07/2021	06/07/2021	06/07/2021	06/07/2021	06/07/2021	06/07/2021	06/07/2021
Asbestos (Semi-Quantitative)																			
Asbestos type	-		-	-	-	-	ND	At operator discretion	-	Asbestos NOT detected.	-	Asbestos NOT detected.	-	Asbestos NOT detected.	-	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Asbestos form	-		-	-	-	-	ND	At operator discretion	-	-	-	-	-	-	-	-	-	-	-
Asbestos as ACM (w/w%)	0.05%[4]	0.02%[4]	0.04%[4]	0.01%[4]	0.01%[4]	-	ND	At operator discretion		-	-	-	-	-	-	-	-	-	-
Asbestos Fibres/Fine (w/w %)	0.001%[4]	0.001%[4]	0.001%[4]	0.001%[4]	0.001%[4]	-	ND	At operator discretion		-	-	-	-	-	-	-	-	-	-
Metals																			
Arsenic	70	80	45	20	17	100	12	70	35	4	2	2	5	3	2	3	< 2	< 2	3
Cadmium	1300	400	230	3	0.8	7.5	0.65	7.5	0.23	0.23	< 0.10	< 0.10	0.22	0.19	< 0.10	< 0.10	0.17	< 0.10	0.13
Chromium	6300	2700	1500	460	290	400	55	400	34	12	10	12	16	22	34	30	11	10	10
Copper	>10000	>10000	>10000	>10000	>10000	325	45	325	31	5	7	5	8	6	10	7	4	< 2	23
Lead	3300	880	500	210	160	250	65	250	17.1	8.9	6.7	9.1	9.8	8.3	9.3	9.3	7.9	5	17.1
Nickel	6000[5]	1200[5]	1200[5]	400[5]	-	105	35	320	19	14	6	4	7	4	5	3	3	3	9
Zinc	400000[7]	30000[7]	60000[7]	7400[7]	-	400	180	400	77	30	14	13	20	16	22	14	10	6	51
Organochlorine Pesticides																			
2,4'-DDD	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
2,4'DDE	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
2,4'-DDT	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
4,4'-DDD	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
4,4'-DDE	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
4,4'-DDT	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
Aldrin	160	70	45	2.6	1.1	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
Alpha-BHC	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
Beta-BHC	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
cis-Chlordane	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
Delta-BHC	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
Dieldrin	160	70	45	2.6	1.1	2.7[10]	<LoR	0.2	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
Endosulfan I	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
Endosulfan II	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
Endosulfan sulphate	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
Endrin	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
Endrin aldehyde	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
Endrin ketone	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
Gamma-BHC (Lindane)	14000[10]	1400[10]	700[10]	139[10]	33[10]	140[10]	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
Heptachlor	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
Heptachlor epoxide	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
Hexachlorobenzene	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
Methoxychlor	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
Total DDT Isomers	1000	400	240	70	45	12	<LoR	12	<LoR	-	-	-	< 0.08	-	-	< 0.08	-	-	-
trans-Chlordane	-	-	-	-	-	-	<LoR	-	<LoR	-	-	-	< 0.013	-	-	< 0.013	-	-	-
Polycyclic Aromatic Hydrocarbons																			
1-Methylnaphthalene	-[6]	-[6]	-[6]	-[6]	-[6]	-	<LoR	-	<LoR	< 0.013	< 0.012	< 0.012	< 0.013	< 0.013	< 0.015	< 0.013	< 0.013	< 0.012	< 0.012
2-Methylnaphthalene	-[6]	-[6]	-[6]	-[6]	-[6]	-	<LoR	-	<LoR	< 0.013	< 0.012	< 0.012	< 0.013	< 0.013	< 0.015	< 0.013	< 0.013	< 0.012	< 0.012
Acenaphthene	-[6]	-[6]	-[6]	-[6]	-[6]	-	<LoR	-	<LoR	< 0.013	< 0.012	< 0.012	< 0.013	< 0.013	< 0.015	< 0.013	< 0.013	< 0.012	< 0.012
Acenaphthylene	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.012	< 0.012	< 0.013	< 0.013	< 0.015	< 0.013	< 0.013	< 0.012	< 0.012
Anthracene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	<LoR	< 0.013	< 0.012	< 0.012	< 0.013	< 0.013	< 0.015	< 0.013	< 0.013	< 0.012	< 0.012
BaP equivalent	35	40	24	10	6	20	<LoR	20	0.03	< 0.04	< 0.03	< 0.03	< 0.04	< 0.03	< 0.04	< 0.03	< 0.04	< 0.03	< 0.03
Benzo (e) pyrene	-	-	-	-	-	-	<LoR	-	0.016	< 0.013	< 0.012	< 0.012	< 0.013	< 0.013	< 0.015	< 0.013	< 0.013	< 0.012	< 0.012
Benzo[a]anthracene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.025	< 0.013	< 0.012	< 0.012	< 0.013	< 0.013	< 0.015	< 0.013	< 0.013	< 0.012	< 0.012
Benzo[a]pyrene (BAP)	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.017	< 0.013	< 0.012	< 0.012	< 0.013	< 0.013	< 0.015	< 0.013	< 0.013	< 0.012	< 0.012
Benzo[b]fluoranthene + Benzo[j]fluoranthene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.029	< 0.013	< 0.012	< 0.012	< 0.013	< 0.013	< 0.015	< 0.013	< 0.013	< 0.012	< 0.012
Benzo[g,h,i]perylene	-	-	-	-	-	-	<LoR	-	0.012	< 0.013	< 0.012	< 0.012	< 0.013	< 0.013	< 0.015	< 0.013	< 0.013	< 0.012	< 0.012
Benzo[k]fluoranthene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.011	< 0.013	< 0.012	< 0.012	< 0.013	< 0.013	< 0.015	< 0.013	< 0.013	< 0.012	< 0.012
Chrysene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.018	< 0.013	< 0.012	< 0.012	< 0.013	< 0.013	< 0.015	< 0.013	< 0.013	< 0.012	< 0.012
Dibenzo[a,h]anthracene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	<LoR	< 0.013	< 0.012	< 0.012	< 0.013	< 0.013	< 0.015	< 0.013	< 0.013	< 0.012	< 0.012
Fluoranthene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.031	< 0.013	< 0.012	< 0.012	< 0.013	< 0.013	< 0.015	< 0.013	< 0.013	< 0.012	< 0.012
Fluorene	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.012	< 0.012	< 0.013	< 0.013	< 0.015	< 0.013	< 0.013	< 0.012	< 0.012
Indeno(1,2,3-c,d)pyrene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.012	< 0.013	< 0.012	< 0.012	< 0.013	< 0.013	< 0.015	< 0.013	< 0.013	< 0.012	< 0.012
Naphthalene	210[7]	63[7]	63[7]	63[7]	7.2[7]	0.28[8]	<LoR	-	<LoR	< 0.07	< 0.06	< 0.06	< 0.07	< 0.07	< 0.08	< 0.07	< 0.07	< 0.06	< 0.06
Perylene	-	-	-	-	-	-	<LoR	-	0.017	< 0.013	< 0.012	< 0.012	< 0.013	< 0.013	< 0.015	< 0.013	< 0.013	< 0.012	< 0.012
Phenanthrene	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.012	< 0.012	< 0.013	< 0.013	< 0.015	< 0.013	< 0.013	< 0.012	< 0.012
Pyrene	NL[7]	1600[7]	1600[7]	1600[7]	160[7]	7.9[7]	<LoR	-	0.027	< 0.013	< 0.012	< 0.012	< 0.013	< 0.013	< 0.015	< 0.013	< 0.013	< 0.012	< 0.012

Notes:

All values in mg/kg unless otherwise indicated (i.e. asbestos).

'-' indicates not analysed or no relevant acceptance criteria

<LOR = less than laboratory limit of reporting

Grey font indicates values <LOR

'ND or Asbestos NOT detected' = asbestos not identified to be present by the laboratory method.

NL = Not limiting (i.e. >10,000 mg/kg)

Red values indicate that the results exceed NES Soil criteria: commercial / industrial criteria

▲ values indicate results exceed NES recreational criteria

Dashed outlined values indicate that the results exceed NES Soil criteria: High density residential criteria

Grey Shaded values indicate that the results exceed NES Soil criteria: Residential 10% produce criteria

Underlined values indicates that results exceed the AUP Permitted Activity Criteria

Bold values indicate that results exceed the published background concentrations for non-volcanic soils in the Auckland Region

● values indicate that results exceed typical managed fill criteria

1a - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health: Commercial/Industrial use (and adopted conservative preliminary screening standard for construction works), unless otherwise stated.

1b - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health: Recreational use, unless otherwise stated.

1c - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health: High density residential use, unless otherwise stated.

1d - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health: Residential 10% produce, unless otherwise stated.

2 - Auckland Unitary Plan: Operative in Part Version (AUP). Permitted Activity Soil Criteria Table E30.6.1.4.1 (unless otherwise stated).

3b - Auckland Regional Council, Technical Publication 153, October 2001. Background Concentrations of inorganic elements in soils from the Auckland Region: non-volcanic soils

5 - Assessment of Site Contamination National Environment Protection Measures (ASC NEPM) Toolbox – http://www.nepc.gov.au/nepms/assessment-site-contamination/toolbox.

6 - USPEA Regional Screening Levels - https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

7 - MfE 1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, Revised 2011. Tier 1 Soil acceptance criteria for applicable pathway.

* Ridge Road acceptance criteria based on the published maximum truckload concentrations for deep fill (>2.0m).

Analytical Results from 2022 DSI

Sample ID										PT-BL_HA18_0.00m-0.10m	PT-BL_HA19_0.00m-0.30m	PT-BL_HA20_0.00m-0.30m	PT-BL_HA21_0.20m-0.60m	Beachlands (NE samples)_HA22_0.00m-0.10m	Beachlands (NE samples)_HA23_0.35m-0.60m	Beachlands (NE samples)_HA24_0.35m-0.60m
Sample Name / Guideline Values	NES Commercial / Industrial[1a]	NES Recreational[1b]	NES High Density Residential[1c]	NES Residential (10 % produce)[1d]	NES Rural Residential / lifestyle block (25% produce)[1e]	AUP Permitted Activity Criteria[2]	Published Auckland Background Levels (non-volcanic)[3b]	Typical Managed Fill Criteria*	Maximum	HA18	HA19	HA20	HA21	HA22	HA23	HA24
Depth										0.00	0.00	0.00	0.20	0.00	0.35	0.35
Strata										Topsoil	Topsoil	Topsoil	Topsoil	Topsoil	Fill	Fill
Area										Stage 1	Stage 1	Balance Live-Zone	Balance Live-Zone	Balance Live-Zone	Balance Live-Zone	Balance Live-Zone
Date										06/07/2021	06/07/2021	06/07/2021	06/07/2021	09/07/2021	09/07/2021	09/07/2021
Asbestos (Semi-Quantitative)																
Asbestos type	-		-	-	-	-	ND	At operator discretion	-	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Asbestos form	-		-	-	-	-	ND	At operator discretion	-	-	-	-	-	-	-	-
Asbestos as ACM (w/w%)	0.05%[4]	0.02%[4]	0.04%[4]	0.01%[4]	0.01%[4]	-	ND	At operator discretion		-	-	-	-	-	-	-
Asbestos Fibres/Fine (w/w %)	0.001%[4]	0.001%[4]	0.001%[4]	0.001%[4]	0.001%[4]	-	ND	At operator discretion		-	-	-	-	-	-	-
Metals																
Arsenic	70	80	45	20	17	100	12	70	35	3	2	< 2	< 2	5	2	2
Cadmium	1300	400	230	3	0.8	7.5	0.65	7.5	0.23	0.16	0.18	0.17	0.15	< 0.10	< 0.10	< 0.10
Chromium	6300	2700	1500	460	290	400	55	400	34	13	10	7	9	9	11	12
Copper	>10000	>10000	>10000	>10000	>10000	325	45	325	31	5	6	3	3	9	6	5
Lead	3300	880	500	210	160	250	65	250	17.1	11.4	10.3	6.1	6.5	7.4	6.8	5.7
Nickel	6000[5]	1200[5]	1200[5]	400[5]	-	105	35	320	19	3	3	2	3	6	8	5
Zinc	400000[7]	30000[7]	60000[7]	7400[7]	-	400	180	400	77	13	17	8	9	32	24	11
Organochlorine Pesticides																
2,4'-DDD	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
2,4'DDE	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
2,4'-DDT	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
4,4'-DDD	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
4,4'-DDE	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
4,4'-DDT	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
Aldrin	160	70	45	2.6	1.1	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
Alpha-BHC	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
Beta-BHC	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
cis-Chlordane	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
Delta-BHC	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
Dieldrin	160	70	45	2.6	1.1	2.7[10]	<LoR	0.2	<LoR	-	-	< 0.013	< 0.012	-	-	-
Endosulfan I	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
Endosulfan II	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
Endosulfan sulphate	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
Endrin	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
Endrin aldehyde	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
Endrin ketone	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
Gamma-BHC (Lindane)	14000[10]	1400[10]	700[10]	139[10]	33[10]	140[10]	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
Heptachlor	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
Heptachlor epoxide	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
Hexachlorobenzene	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
Methoxychlor	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
Total DDT Isomers	1000	400	240	70	45	12	<LoR	12	<LoR	-	-	< 0.08	< 0.08	-	-	-
trans-Chlordane	-	-	-	-	-	-	<LoR	-	<LoR	-	-	< 0.013	< 0.012	-	-	-
Polycyclic Aromatic Hydrocarbons																
1-Methylnaphthalene	-[6]	-[6]	-[6]	-[6]	-[6]	-	<LoR	-	<LoR	< 0.013	-	< 0.013	< 0.012	-	< 0.013	< 0.013
2-Methylnaphthalene	-[6]	-[6]	-[6]	-[6]	-[6]	-	<LoR	-	<LoR	< 0.013	-	< 0.013	< 0.012	-	< 0.013	< 0.013
Acenaphthene	-[6]	-[6]	-[6]	-[6]	-[6]	-	<LoR	-	<LoR	< 0.013	-	< 0.013	< 0.012	-	< 0.013	< 0.013
Acenaphthylene	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	-	< 0.013	< 0.012	-	< 0.013	< 0.013
Anthracene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	<LoR	< 0.013	-	< 0.013	< 0.012	-	< 0.013	< 0.013
BaP equivalent	35	40	24	10	6	20	<LoR	20	0.03	< 0.04	-	< 0.04	< 0.03	-	< 0.04	< 0.04
Benzo (e) pyrene	-	-	-	-	-	-	<LoR	-	0.016	< 0.013	-	< 0.013	< 0.012	-	< 0.013	< 0.013
Benzo[a]anthracene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.025	< 0.013	-	< 0.013	< 0.012	-	< 0.013	< 0.013
Benzo[a]pyrene (BAP)	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.017	< 0.013	-	< 0.013	< 0.012	-	< 0.013	< 0.013
Benzo[b]fluoranthene + Benzo[j]fluoranthene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.029	< 0.013	-	< 0.013	< 0.012	-	< 0.013	< 0.013
Benzo[g,h,i]perylene	-	-	-	-	-	-	<LoR	-	0.012	< 0.013	-	< 0.013	< 0.012	-	< 0.013	< 0.013
Benzo[k]fluoranthene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.011	< 0.013	-	< 0.013	< 0.012	-	< 0.013	< 0.013
Chrysene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.018	< 0.013	-	< 0.013	< 0.012	-	< 0.013	< 0.013
Dibenzo[a,h]anthracene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	<LoR	< 0.013	-	< 0.013	< 0.012	-	< 0.013	< 0.013
Fluoranthene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.031	< 0.013	-	< 0.013	< 0.012	-	< 0.013	< 0.013
Fluorene	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	-	< 0.013	< 0.012	-	< 0.013	< 0.013
Indeno(1,2,3-c,d)pyrene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.012	< 0.013	-	< 0.013	< 0.012	-	< 0.013	< 0.013
Naphthalene	210[7]	63[7]	63[7]	63[7]	7.2[7]	0.28[8]	<LoR	-	<LoR	< 0.07	-	< 0.07	< 0.06	-	< 0.07	< 0.07
Perylene	-	-	-	-	-	-	<LoR	-	0.017	< 0.013	-	< 0.013	< 0.012	-	< 0.013	< 0.013
Phenanthrene	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	-	< 0.013	< 0.012	-	< 0.013	< 0.013
Pyrene	NL[7]	1600[7]	1600[7]	1600[7]	160[7]	7.9[7]	<LoR	-	0.027	< 0.013	-	< 0.013	< 0.012	-	< 0.013	< 0.013

Notes:

All values in mg/kg unless otherwise indicated (i.e. asbestos).

'-' indicates not analysed or no relevant acceptance criteria

<LOR = less than laboratory limit of reporting

Grey font indicates values <LOR

'ND or Asbestos NOT detected' = asbestos not identified to be present by the laboratory method.

NL = Not limiting (i.e. >10,000 mg/kg)

Red values indicate that the results exceed NES Soil criteria: commercial / industrial criteria

▲ values indicate results exceed NES recreational criteria

Dashed outlined values indicate that the results exceed NES Soil criteria: High density residential criteria

Grey Shaded values indicate that the results exceed NES Soil criteria: Residential 10% produce criteria

Underlined values indicates that results exceed the AUP Permitted Activity Criteria

Bold values indicate that results exceed the published background concentrations for non-volcanic soils in the Auckland Region

● values indicate that results exceed typical managed fill criteria

1a - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health: Commercial/Industrial use (and adopted conservative preliminary screening standard for construction works), unless otherwise stated.

1b - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health: Recreational use, unless otherwise stated.

1c - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health: High density residential use, unless otherwise stated.

1d - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health: Residential 10% produce, unless otherwise stated.

2 - Auckland Unitary Plan: Operative in Part Version (AUP). Permitted Activity Soil Criteria Table E30.6.1.4.1 (unless otherwise stated).

3b - Auckland Regional Council, Technical Publication 153, October 2001. Background Concentrations of inorganic elements in soils from the Auckland Region: non-volcanic soils

5 - Assessment of Site Contamination National Environment Protection Measures (ASC NEPM) Toolbox – http://www.nepc.gov.au/nepms/assessment-site-contamination/toolbox.

6 - USPEA Regional Screening Levels - https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

7 - MfE 1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, Revised 2011. Tier 1 Soil acceptance criteria for applicable pathway.

* Ridge Road acceptance criteria based on the published maximum truckload concentrations for deep fill (>2.0m).

Analytical Results from 2022 DSI

Sample ID										Beachlands (NE samples)_HA25_0.30m-0.55m	PT-BL_HA26_0.00m-0.30m	PT-BL_SS01_0.00m-0.10m	PT-BL_SS02_0.00m-0.10m	PT-BL_SS03_0.00m-0.10m	PT-BL_SS04_0.00m-0.10m	PT-BL_SS05_0.00m-0.10m	PT-BL_SS06_0.00m-0.10m	PT-BL_SS07_0.00m-0.10m
Sample Name / Guideline Values	NES Commercial / Industrial[1a]	NES Recreational[1b]	NES High Density Residential[1c]	NES Residential (10 % produce)[1d]	NES Rural Residential / lifestyle block (25% produce)[1e]	AUP Permitted Activity Criteria[2]	Published Auckland Background Levels (non-volcanic)[3b]	Typical Managed Fill Criteria*	Maximum	HA25	HA26	SS01	SS02	SS03	SS04	SS05	SS06	SS07
Depth										0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Strata										Fill	Topsoil	Topsoil	Topsoil	Topsoil	Topsoil	Topsoil	Topsoil	Topsoil
Area										Balance Live-Zone	Stage 1	Balance Live-Zone	Balance Live-Zone	Balance Live-Zone	Balance Live-Zone	Balance Live-Zone	Balance Live-Zone	Stage 1
Date										09/07/2021	06/07/2021	06/07/2021	06/07/2021	06/07/2021	06/07/2021	06/07/2021	06/07/2021	06/07/2021
Asbestos (Semi-Quantitative)																		
Asbestos type	-		-	-	-	-	ND	At operator discretion	-	Asbestos NOT detected.	-	-	-	-	-	-	-	-
Asbestos form	-		-	-	-	-	ND	At operator discretion	-	-	-	-	-	-	-	-	-	-
Asbestos as ACM (w/w%)	0.05%[4]	0.02%[4]	0.04%[4]	0.01%[4]	0.01%[4]	-	ND	At operator discretion		-	-	-	-	-	-	-	-	-
Asbestos Fibres/Fine (w/w %)	0.001%[4]	0.001%[4]	0.001%[4]	0.001%[4]	0.001%[4]	-	ND	At operator discretion		-	-	-	-	-	-	-	-	-
Metals																		
Arsenic	70	80	45	20	17	100	12	70	35	< 2	3	3	2	2	3	4	2	4
Cadmium	1300	400	230	3	0.8	7.5	0.65	7.5	0.23	< 0.10	< 0.10	0.21	0.14	0.2	< 0.10	0.12	0.15	< 0.10
Chromium	6300	2700	1500	460	290	400	55	400	34	12	14	13	13	13	14	10	11	14
Copper	>10000	>10000	>10000	>10000	>10000	325	45	325	31	5	6	6	6	6	6	4	5	11
Lead	3300	880	500	210	160	250	65	250	17.1	5	7.3	9.9	9.6	9.1	10.1	8.4	8.5	8.3
Nickel	6000[5]	1200[5]	1200[5]	400[5]	-	105	35	320	19	6	5	3	5	6	5	4	4	16
Zinc	400000[7]	30000[7]	60000[7]	7400[7]	-	400	180	400	77	13	15	17	20	21	15	15	16	34
Organochlorine Pesticides																		
2,4'-DDD	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
2,4'DDE	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
2,4'-DDT	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
4,4'-DDD	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
4,4'-DDE	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
4,4'-DDT	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
Aldrin	160	70	45	2.6	1.1	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
Alpha-BHC	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
Beta-BHC	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
cis-Chlordane	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
Delta-BHC	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
Dieldrin	160	70	45	2.6	1.1	2.7[10]	<LoR	0.2	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
Endosulfan I	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
Endosulfan II	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
Endosulfan sulphate	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
Endrin	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
Endrin aldehyde	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
Endrin ketone	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
Gamma-BHC (Lindane)	14000[10]	1400[10]	700[10]	139[10]	33[10]	140[10]	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
Heptachlor	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
Heptachlor epoxide	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
Hexachlorobenzene	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
Methoxychlor	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
Total DDT Isomers	1000	400	240	70	45	12	<LoR	12	<LoR	-	< 0.09	< 0.08	< 0.08	< 0.09	< 0.08	< 0.08	< 0.08	< 0.08
trans-Chlordane	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	< 0.014	< 0.013	< 0.014	< 0.014	< 0.013	< 0.014	< 0.013
Polycyclic Aromatic Hydrocarbons																		
1-Methylnaphthalene	-[6]	-[6]	-[6]	-[6]	-[6]	-	<LoR	-	<LoR	-	< 0.015	-	-	-	-	-	-	< 0.013
2-Methylnaphthalene	-[6]	-[6]	-[6]	-[6]	-[6]	-	<LoR	-	<LoR	-	< 0.015	-	-	-	-	-	-	< 0.013
Acenaphthene	-[6]	-[6]	-[6]	-[6]	-[6]	-	<LoR	-	<LoR	-	< 0.015	-	-	-	-	-	-	< 0.013
Acenaphthylene	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	-	-	-	-	-	-	< 0.013
Anthracene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	<LoR	-	< 0.015	-	-	-	-	-	-	< 0.013
BaP equivalent	35	40	24	10	6	20	<LoR	20	0.03	-	< 0.04	-	-	-	-	-	-	< 0.04
Benzo (e) pyrene	-	-	-	-	-	-	<LoR	-	0.016	-	< 0.015	-	-	-	-	-	-	< 0.013
Benzo[a]anthracene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.025	-	< 0.015	-	-	-	-	-	-	< 0.013
Benzo[a]pyrene (BAP)	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.017	-	< 0.015	-	-	-	-	-	-	< 0.013
Benzo[b]fluoranthene + Benzo[j]fluoranthene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.029	-	< 0.015	-	-	-	-	-	-	< 0.013
Benzo[g,h,i]perylene	-	-	-	-	-	-	<LoR	-	0.012	-	< 0.015	-	-	-	-	-	-	< 0.013
Benzo[k]fluoranthene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.011	-	< 0.015	-	-	-	-	-	-	< 0.013
Chrysene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.018	-	< 0.015	-	-	-	-	-	-	< 0.013
Dibenzo[a,h]anthracene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	<LoR	-	< 0.015	-	-	-	-	-	-	< 0.013
Fluoranthene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.031	-	< 0.015	-	-	-	-	-	-	< 0.013
Fluorene	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	-	-	-	-	-	-	< 0.013
Indeno(1,2,3-c,d)pyrene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.012	-	< 0.015	-	-	-	-	-	-	< 0.013
Naphthalene	210[7]	63[7]	63[7]	63[7]	7.2[7]	0.28[8]	<LoR	-	<LoR	-	< 0.08	-	-	-	-	-	-	< 0.07
Perylene	-	-	-	-	-	-	<LoR	-	0.017	-	< 0.015	-	-	-	-	-	-	< 0.013
Phenanthrene	-	-	-	-	-	-	<LoR	-	<LoR	-	< 0.015	-	-	-	-	-	-	< 0.013
Pyrene	NL[1]	1600[7]	1600[7]	1600[7]	160[7]	7.9[7]	<LoR	-	0.027	-	< 0.015	-	-	-	-	-	-	< 0.013

Notes:

All values in mg/kg unless otherwise indicated (i.e. asbestos).

'-' indicates not analysed or no relevant acceptance criteria

<LOR = less than laboratory limit of reporting

Grey font indicates values <LOR

'ND or Asbestos NOT detected' = asbestos not identified to be present by the laboratory method.

NL = Not limiting (i.e. >10,000 mg/kg)

Red values indicate that the results exceed NES Soil criteria: commercial / industrial criteria

▲ values indicate results exceed NES recreational criteria

Dashed outlined values indicate that the results exceed NES Soil criteria: High density residential criteria

Grey Shaded values indicate that the results exceed NES Soil criteria: Residential 10% produce criteria

Underlined values indicates that results exceed the AUP Permitted Activity Criteria

Bold values indicate that results exceed the published background concentrations for non-volcanic soils in the Auckland Region

● values indicate that results exceed typical managed fill criteria

1a - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health: Commercial/Industrial use (and adopted conservative preliminary screening standard for construction works), unless otherwise stated.

1b - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health: Recreational use, unless otherwise stated.

1c - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health: High density residential use, unless otherwise stated.

1d - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health: Residential 10% produce, unless otherwise stated.

2 - Auckland Unitary Plan: Operative in Part Version (AUP). Permitted Activity Soil Criteria Table E30.6.1.4.1 (unless otherwise stated).

3b - Auckland Regional Council, Technical Publication 153, October 2001. Background Concentrations of inorganic elements in soils from the Auckland Region: non-volcanic soils

5 - Assessment of Site Contamination National Environment Protection Measures (ASC NEPM) Toolbox – http://www.nepc.gov.au/nepms/assessment-site-contamination/toolbox.

6 - USPEA Regional Screening Levels - https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

7 - MfE 1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, Revised 2011. Tier 1 Soil acceptance criteria for applicable pathway.

* Ridge Road acceptance criteria based on the published maximum truckload concentrations for deep fill (>2.0m).

Analytical Results from 2022 DSI

Sample ID										PT-BL_SS08_0.00m-0.10m	PT-BL_SS09_0.00m-0.10m	PT-BL_SS10_0.00m-0.10m	HA103 - 0.5	HA103A - 0.0	HA103A - 0.5	HA103B - 0.5	HA103C - 0.0	HA103C - 0.5
Sample Name / Guideline Values	NES Commercial / Industrial[1a]	NES Recreational[1b]	NES High Density Residential[1c]	NES Residential (10 % produce)[1d]	NES Rural Residential / lifestyle block (25% produce)[1e]	AUP Permitted Activity Criteria[2]	Published Auckland Background Levels (non-volcanic)[3b]	Typical Managed Fill Criteria*	Maximum	SS08	SS09	SS10	HA103 - 0.5	HA103A	HA103A	HA103B	HA103C	HA103C
Depth										0.00	0.00	0.00	0.5	0.0	0.5	0.5	0.0	0.5
Strata										Topsoil	Fill	Topsoil	Clayey SILT	Clayey SILT	Clayey SILT	Clayey SILT	Clayey SILT	Clayey SILT
Area										Stage 1	Stage 1	Balance Live-Zone	Stage 1	Stage 1	Stage 1	Stage 1	Stage 1	Stage 1
Date										06/07/2021	06/07/2021	06/07/2021	23-Nov-21	23-Nov-21	23-Nov-21	23-Nov-21	23-Nov-21	23-Nov-21
Asbestos (Semi-Quantitative)																		
Asbestos type	-		-	-	-	-	ND	At operator discretion	-	-	-	-	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Asbestos form	-	-	-	-	-	-	ND	At operator discretion	-	-	-	-	-	-	-	-	-	-
Asbestos as ACM (w/w%)	0.05%[4]	0.02%[4]	0.04%[4]	0.01%[4]	0.01%[4]	-	ND	At operator discretion		-	-	-	-	-	-	-	-	-
Asbestos Fibres/Fine (w/w %)	0.001%[4]	0.001%[4]	0.001%[4]	0.001%[4]	0.001%[4]	-	ND	At operator discretion		-	-	-	-	-	-	-	-	-
Metals																		
Arsenic	70	80	45	20	17	100	12	70	35	4	35	3	5	-	4	9	-	5
Cadmium	1300	400	230	3	0.8	7.5	0.65	7.5	0.23	0.13	0.13	< 0.10	< 0.10	-	< 0.10	< 0.10	-	< 0.10
Chromium	6300	2700	1500	460	290	400	55	400	34	11	19	12	13	-	20	12	-	12
Copper	>10000	>10000	>10000	>10000	>10000	325	45	325	31	9	31	5	9	-	12	7	-	8
Lead	3300	880	500	210	160	250	65	250	17.1	8.8	11.9	11.4	6.4	-	6.9	6.5	-	6.2
Nickel	6000[5]	1200[5]	1200[5]	400[5]	-	105	35	320	19	8	19	4	10	-	17	8	-	10
Zinc	400000[7]	30000[7]	60000[7]	7400[7]	-	400	180	400	77	36	77	13	24	-	37	22	-	23
Organochlorine Pesticides																		
2,4'-DDD	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
2,4'DDE	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
2,4'-DDT	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
4,4'-DDD	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
4,4'-DDE	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
4,4'-DDT	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
Aldrin	160	70	45	2.6	1.1	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
Alpha-BHC	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
Beta-BHC	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
cis-Chlordane	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
Delta-BHC	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
Dieldrin	160	70	45	2.6	1.1	2.7[10]	<LoR	0.2	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
Endosulfan I	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
Endosulfan II	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
Endosulfan sulphate	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
Endrin	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
Endrin aldehyde	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
Endrin ketone	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
Gamma-BHC (Lindane)	14000[10]	1400[10]	700[10]	139[10]	33[10]	140[10]	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
Heptachlor	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
Heptachlor epoxide	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
Hexachlorobenzene	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
Methoxychlor	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
Total DDT Isomers	1000	400	240	70	45	12	<LoR	12	<LoR	< 0.08	< 0.07	< 0.08	< 0.08	< 0.08	-	< 0.08	< 0.08	-
trans-Chlordane	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	< 0.012	< 0.013	< 0.012	-	< 0.013	< 0.013	-
Polycyclic Aromatic Hydrocarbons																		
1-Methylnaphthalene	-[6]	-[6]	-[6]	-[6]	-[6]	-	<LoR	-	<LoR	< 0.013	< 0.011	-	< 0.3	-	< 0.3	< 0.3	-	< 0.3
2-Methylnaphthalene	-[6]	-[6]	-[6]	-[6]	-[6]	-	<LoR	-	<LoR	< 0.013	< 0.011	-	< 0.013	-	< 0.013	< 0.013	-	< 0.013
Acenaphthene	-[6]	-[6]	-[6]	-[6]	-[6]	-	<LoR	-	<LoR	< 0.013	< 0.011	-	< 0.013	-	< 0.013	< 0.013	-	< 0.013
Acenaphthylene	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	-	< 0.013	-	< 0.013	< 0.013	-	< 0.013
Anthracene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	<LoR	< 0.013	< 0.011	-	< 0.013	-	< 0.013	< 0.013	-	< 0.013
BaP equivalent	35	40	24	10	6	20	<LoR	20	0.03	< 0.04	0.03	-						
Benzo (e) pyrene	-	-	-	-	-	-	<LoR	-	0.016	< 0.013	0.016	-	< 0.013	-	< 0.013	< 0.013	-	< 0.013
Benzo[a]anthracene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.025	< 0.013	0.025	-	< 0.013	-	< 0.013	< 0.013	-	< 0.013
Benzo[a]pyrene (BAP)	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.017	< 0.013	0.017	-	< 0.013	-	< 0.013	< 0.013	-	< 0.013
Benzo[b]fluoranthene + Benzo[j]fluoranthene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.029	< 0.013	0.029	-	< 0.013	-	< 0.013	< 0.013	-	< 0.013
Benzo[g,h,i]perylene	-	-	-	-	-	-	<LoR	-	0.012	< 0.013	0.012	-	< 0.013	-	< 0.013	< 0.013	-	< 0.013
Benzo[k]fluoranthene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.011	< 0.013	0.011	-	< 0.013	-	< 0.013	< 0.013	-	< 0.013
Chrysene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.018	< 0.013	0.018	-	< 0.013	-	< 0.013	< 0.013	-	< 0.013
Dibenzo[a,h]anthracene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	<LoR	< 0.013	< 0.011	-	< 0.013	-	< 0.013	< 0.013	-	< 0.013
Fluoranthene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.031	< 0.013	0.031	-	< 0.013	-	< 0.013	< 0.013	-	< 0.013
Fluorene	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	-	< 0.013	-	< 0.013	< 0.013	-	< 0.013
Indeno(1,2,3-c,d)pyrene	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	<LoR	-	0.012	< 0.013	0.012	-	< 0.013	-	< 0.013	< 0.013	-	< 0.013
Naphthalene	210[7]	63[7]	63[7]	63[7]	7.2[7]	0.28[8]	<LoR	-	<LoR	< 0.07	< 0.06	-	< 0.07	-	< 0.07	< 0.07	-	< 0.07
Perylene	-	-	-	-	-	-	<LoR	-	0.017	< 0.013	< 0.011	-	< 0.013	-	< 0.013	< 0.013	-	< 0.013
Phenanthrene	-	-	-	-	-	-	<LoR	-	<LoR	< 0.013	< 0.011	-	< 0.013	-	< 0.013	< 0.013	-	< 0.013
Pyrene	NL[7]	1600[7]	1600[7]	1600[7]	160[7]	7.9[9]	<LoR	-	0.027	< 0.013	0.027	-	< 0.013	-	< 0.013	< 0.013	-	< 0.013

Notes:

All values in mg/kg unless otherwise indicated (i.e. asbestos).

'-' indicates not analysed or no relevant acceptance criteria

<LOR = less than laboratory limit of reporting

Grey font indicates values <LOR

'ND or Asbestos NOT detected' = asbestos not identified to be present by the laboratory method.

NL = Not limiting (i.e. >10,000 mg/kg)

Red values indicate that the results exceed NES Soil criteria: commercial / industrial criteria

▲ values indicate results exceed NES recreational criteria

Dashed outlined values indicate that the results exceed NES Soil criteria: High density residential criteria

Grey Shaded values indicate that the results exceed NES Soil criteria: Residential 10% produce criteria

Underlined values indicates that results exceed the AUP Permitted Activity Criteria

Bold values indicate that results exceed the published background concentrations for non-volcanic soils in the Auckland Region

● values indicate that results exceed typical managed fill criteria

1a - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health: Commercial/Industrial use (and adopted conservative preliminary screening standard for construction works), unless otherwise stated.

1b - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health: Recreational use, unless otherwise stated.

1c - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health: High density residential use, unless otherwise stated.

1d - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health: Residential 10% produce, unless otherwise stated.

2 - Auckland Unitary Plan: Operative in Part Version (AUP). Permitted Activity Soil Criteria Table E30.6.1.4.1 (unless otherwise stated).

3b - Auckland Regional Council, Technical Publication 153, October 2001. Background Concentrations of inorganic elements in soils from the Auckland Region: non-volcanic soils

5 - Assessment of Site Contamination National Environment Protection Measures (ASC NEPM) Toolbox – http://www.nepc.gov.au/nepms/assessment-site-contamination/toolbox.

6 - USPEA Regional Screening Levels - https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

7 - MfE 1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, Revised 2011. Tier 1 Soil acceptance criteria for applicable pathway.

* Ridge Road acceptance criteria based on the published maximum truckload concentrations for deep fill (>2.0m).

Appendix C Contractor checklist

Contractor checklist

Summary of key CSMP requirements

Timing	Key task	Details	Completed
Prior to ground works commencing	Site set up	a Developer to advise Auckland Council of works commencing.	
		b Appoint a Contaminated Land Specialist (CLS): Name: Contact:	
		c Prior to works in the WWTP or potential HAIL areas on 758 and 770 Whitford-Maraetai Road, CLS to undertake pre-works testing and update CSMP.	
		d Establish earthworks controls (dust, erosion, sediment, stormwater, odour).	
		e Hazard board to state contaminated soil may be present and indicating health and safety requirements for workers.	
		f Obtain PPE: Have on hand disposable gloves and P2 masks (in the event of an accidental discovery).	
During the works	General CSMP Compliance	g Maintain earthworks controls (dust, erosion, sediment, stormwater, odour).	
		h Retain all weighbridge and disposal dockets provided to the Contractor.	
		i Ensure imported material meets requirements in Table 5.1**.**	
		j Ensure compliance with any other procedures outlined by the CLS.	
	Alert Developer and/or the site appointed Project Manager and CLS	If any of the following situations arise: k Contaminated soil is encountered that includes: - Odours (petroleum / oil) - Discolouration (green/blue staining most common). - Refuse or inclusions of non-cleanfill allowable deleterious materials (i.e. plastic, rubber, metal). - Suspected asbestos containing materials (ACM).	
		l Groundwater with an oil sheen, odour or discolouration is encountered.	
		m If soil is to be disposed offsite, soil samples may need to be collected and tested.	
Within one month of completion of the relevant works	Provide contaminated land-related information to CLS	n Details of any contaminated land complaints made during works i.e. odour, dust etc.	
		o Details of accidental discoveries/events and the actions taken.	
		p Details of visits made by Auckland Council representatives.	
		q Summary of weighbridge information for disposal verification (if required)	

Appendix D Example Agreement and Acknowledgement Sheet

Agreement and Acknowledgment Sheet

All persons involved in undertaking ground-breaking activities must sign this Agreement and Acknowledgment Sheet prior to conducting activities at this site

I sign to acknowledge that I have been informed of the site hazards detailed in this Contamination Site Management Plan (CSMP) and will abide by its provisions and aid in the implementation of effective site safety, health and environmental practices (Note: this CSMP does not preclude any persons from taking any other steps they consider necessary to comply with relevant health and safety legislation).	
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
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