Central Interceptor

Main Project Works Detailed Design

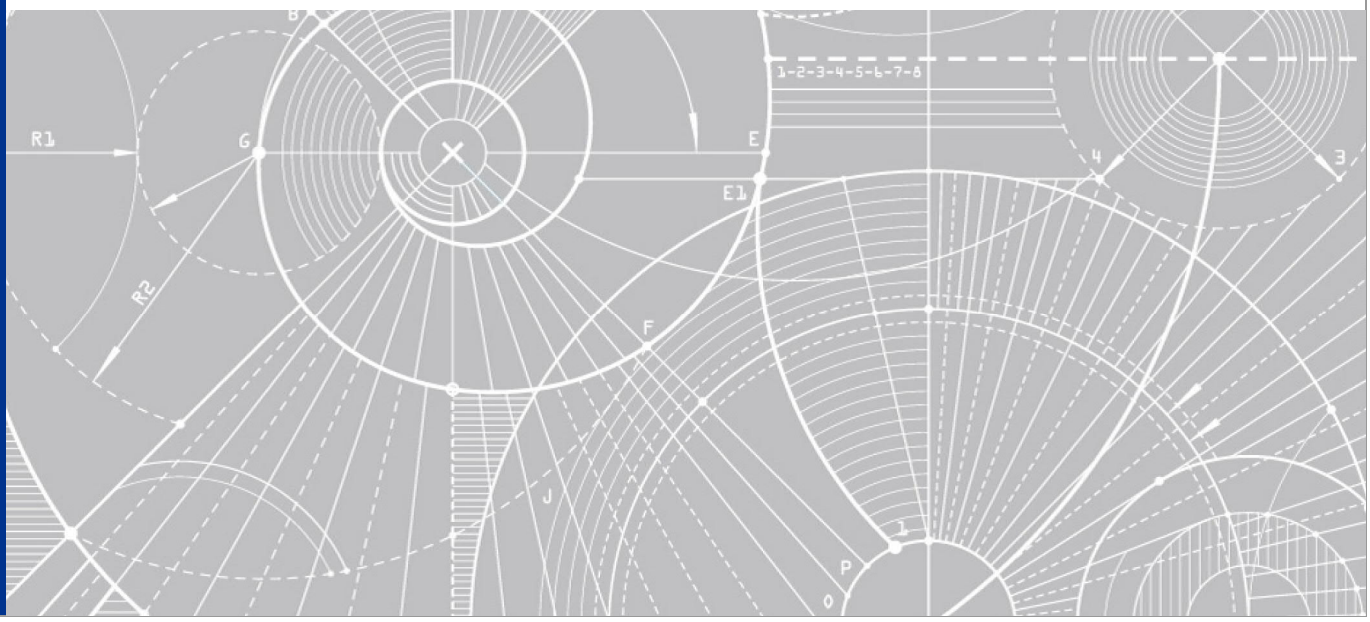
WATERCARE SERVICES LIMITED

Western Springs Accessway Resource Consent Application and Assessment of Effects on the Environment

JNZ-WSL-CIP-RT-0000010 | 2

Watercare Ref: 5747

March 2021



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Document title:	Western Springs Accessway Resource Consent Application and Assessment of Effects on the Environment
Document no:	JNZ-WSL-CIP-RT-0000010
Revision:	2
Date:	17 March 2021
Client name:	Watercare Services Ltd
Client no:	5747
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Document history and status

Revision	Date	Description	By	Checked	Review	Approved
2	17/03/2021	Re-issued for Review	T Malcon	T Hegarty	L Laurenson	L Laurenson
1	08/03/2021	Issued for Review	T Malcon	T Hegarty	A Henderson	A Henderson

Contents

Executive Summary

Watercare Services Limited (Watercare) is an Auckland Council Controlled Organisation (CCO) tasked with the planning, construction and operation of Auckland's water and wastewater infrastructure[1]. Watercare proposes to construct a new accessway at the Western Springs Stadium, within the outer playing fields of this complex. The accessway will support the construction of the Central Interceptor (CI) project. In the long-term, it may be used for foot, vehicle and/or bicycle traffic or for any other purpose ancillary to Regional Facilities Auckland (RFA) who manage Western Springs Stadium.

This Assessment of Effects on the Environment (AEE) supports the application for resource consent for construction of an accessway and its ongoing use to support the operation of Western Springs Stadium. Construction works associated with the CI project are underway along the project's alignment, with works due to commence at Western Springs Stadium within the next five years. The contamination, construction traffic, noise and sediment control measures required to support the works proposed in this application will be addressed through the existing environmental management plans approved as part of the wider CI project.

Watercare is seeking resource consent for a discretionary activity under the Resource Management Act 1991 (RMA). A regional resource consent is required for the discharge of contaminants to land, air or water and the discharge and diversion of stormwater (section 15) as a discretionary activity. A district resource consent is required as per the provisions of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health as a discretionary activity under Regulation 11 (section 9(3)).

The AEE includes a statutory assessment which confirms that the proposal is consistent with the relevant objectives and policies of the Auckland Unitary Plan: Operative in Part (AUP(OP)) and meets the relevant statutory requirements of the RMA.

Overall, the project will have positive effects on the environment. These are associated from the creation of a temporary accessway which will also provide for future use by RFA. The adverse effects generated are considered to be less than minor and can be adequately avoided, remedied or mitigated.

[1] Auckland's public stormwater networks and infrastructure is the responsibility of Auckland Council.

Part A: Resource Consent Application

To: Auckland Council

Address: Auckland Council
Private Bag 92300
Auckland 1142

Consent application form

Application by Watercare:

Watercare is seeking resource consent to construct and operate a new accessway at Western Springs Stadium, 731 Great North Road, Grey Lynn. The proposed works requires regional consent for the discharge of contaminants to air, water or land that does not comply with the standards and diversion and discharge of stormwater runoff from impervious areas onto or into land or into water pursuant to section 15 and land disturbance on a HAIL site pursuant to section 9(3) of the Resource Management Act 1991 (RMA).

These resource consents are required pursuant (but not limited) to the following:

Auckland Unitary Plan (Operative in Part) 2016

- E8.4.1(A9): Diversion and discharge of stormwater runoff from impervious areas greater than 1,000m^2 and up to 5,000m^2 within an urban area, that complies with Standard E8.6.1 and Standard E8.6.3.1 – **controlled**
    - The proposed accessway will be 214 m long and 4.5m wide, which gives a total impermeable area of 936m^2. To provide flexibility for the detailed design phase and contingency during construction, consent will be sought for a total impermeable area of 1,500m^2.
- E30.4.1(A7): Discharges of contaminants into air, or into water, or onto or into land not meeting controlled activity Standard E30.6.2.1 – **discretionary**
    - The volume of contaminated soil disturbed exceeds 200m^3 and a Detailed Site Investigation (DSI) has not been prepared for the site. Therefore, the works do not comply with permitted and controlled activity standards E30.6.1.2 and E30.6.2.1.

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

- Regulation 11 – Soil disturbance at a HAIL site without the preparation of a Detailed Site Investigation – **discretionary**
    - The site is a considered a HAIL site. The proposed soil disturbance does not meet the permitted activity thresholds in regulations 8(3)(c), (d)(ii) and (f) as the earthworks exceed 25m^3 per 500m^2, more than 5m^3 per 500m^2 will be taken off site and the duration of works is anticipated to be no more than two months (although it may exceed this duration). The works do not meet the controlled or restricted discretionary activity thresholds as a Detailed Site Investigation (DSI) has not been prepared for these works and therefore the works do not meet Regulation 10(2).

Overall, resource consent is sought for a **discretionary** activity.

Site location

The legal descriptions of the sites affected by the proposed works are presented in Table 0-1 and the Records of Title are provided at Appendix A

Table 0-1: Legal descriptions

Address	Legal Description	Record of Title	Owner
731 Great North Road	Lot 12 DP 168863	NA103A/1	Auckland Unlimited

Assessment of Effects on the Environment

Attached is an AEE which has been prepared in accordance with the requirements of the RMA, in particular the Fourth Schedule, in such detail as corresponds with the scale and significance of the effects the proposal may have on the environment.

Part B: Assessment of Effects on the Environment

1. Introduction

Watercare Services Limited (Watercare) is an Auckland Council Controlled Organisation (CCO) tasked with the planning, construction and operation of Auckland's water and wastewater infrastructure. Watercare proposes to construct a new accessway within the outer playing fields of Western Springs Stadium, Grey Lynn. The accessway will provide an alternative access to the consented route along Stadium Road. In the long-term, it may be used for foot, vehicle and/or bicycle traffic or for any other purpose ancillary to Regional Facilities Auckland (RFA) who manage Western Springs Stadium. In addition, it may provide ongoing maintenance access for Watercare. The CI is a regionally significant wastewater project.

The accessway will be located entirely within the site and runs parallel to Stadium Road before terminating near to the Stadium Road/Great North Road intersection. The accessway will enable the movement of vehicles between the Western Springs shaft site and the public road network. The accessway will be operated in compliance with the controls and restrictions associated with the approved resource consents and designation conditions. Following the completion of the CI, the accessway will become ancillary to Western Springs Stadium and will be operated by RFA.

This Assessment of Effects on the Environment (AEE) supports the application for resource consent for construction and operation of the accessway. Resource consents are required for discharge of contaminants to land, air or water and soil disturbance resulting in material being removed from the site that exceeds the standards in the NESCS, as well as the generated of stormwater runoff. Construction works for the CI project is due to commence at Western Springs within the next five years and most of the activities proposed in this application are addressed through the approved environmental management plans for the site[2].

The following components of the project are provided for as a permitted activity under the AUP(OP):

- An accessway (i.e. an accessory activity) serving Western Springs Stadium located within the Western Springs sub-precinct;
- Parking, loading and access as per the standards for an accessory activity; and
- Earthworks up to 2,500m^2 and 2,500m^3 for the construction of the accessway[3].

The AEE has been prepared in accordance with the requirements of the RMA, in particular the Fourth Schedule, in such detail that corresponds with the scale and significance that the effects of the proposed works may have on the environment.

[2] This includes the management plans associated with construction traffic, erosion and sediment control, and noise.
[3] It is expected that approximately 482m^3 of earthworks across and area of approximately 950m^2 will be required for the construction of the accessway. It should be noted that these volumes and areas are estimates and will be confirmed during detailed design but will not exceed the permitted activity thresholds listed.

2. Project Background and Works Description

2.1 Background and Introduction to the Central Interceptor Project

The CI is the largest wastewater project in Watercare's history and is a key part of Watercare's region-wide wastewater strategy which focuses on supporting population growth while protecting the environment. Construction of the CI project commenced in 2019, has a budget of $1.2 billion, and is an integral part in reducing overflows in the area by 80 per cent.

The CI will help improve the quality of Auckland's waterways by upgrading the wastewater network to collect increased volumes of combined stormwater and wastewater and convey this to the Māngere Wastewater Treatment Plant[4]. Once completed, the CI will run underground from Grey Lynn to the Māngere Wastewater Treatment Plant and will include several link sewer pipes and shafts along the route. The tunnel will be 14.7 kilometres in length and 4.5 metres wide, making it the longest wastewater tunnel in New Zealand (see Figure 2-1).

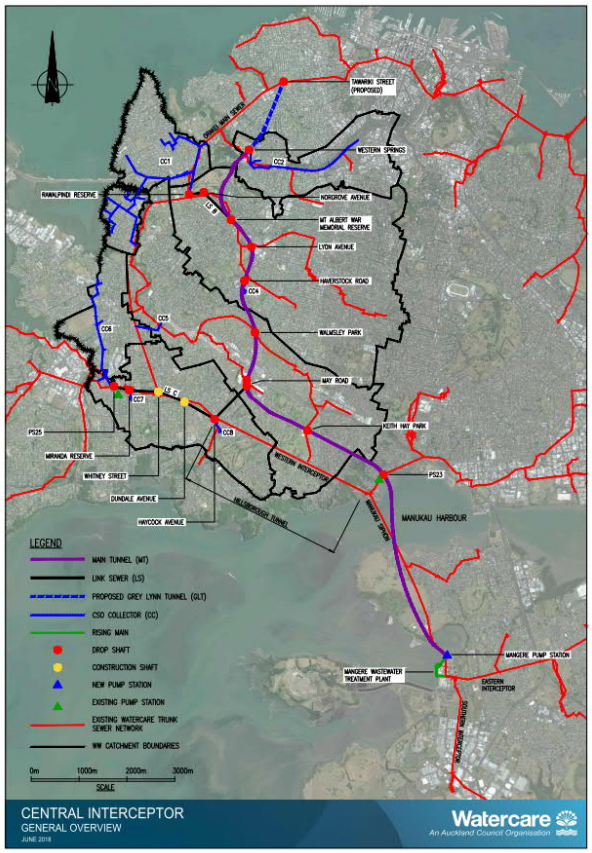


Figure 2-1: Alignment of CI

In 2008, Watercare completed the Three Waters Strategic Plan which identified that Auckland's most immediate wastewater need was upgrading the network across Auckland's isthmus. The Plan highlighted that the wastewater network needed to:

- Provide additional network capacity for growth and development across Auckland's isthmus;

[4] A prime driver for the growth of wastewater volumes is population growth.

- Duplicate the lower section of the regionally critical Western Interceptor, particularly the Hillsborough Tunnel and Manukau Siphon which are at risk of failure due to their age; and,

- Reduce existing wastewater overflows from the combined system into urban streams and the Waitemata Harbour, improving public health and the environment[5].

The CI scheme has been developed by Watercare as the Best Practicable Option (BPO) for addressing these requirements, with an analysis of options confirming that the CI represents the most cost-effective solution to deliver the required wastewater network improvements.

The original concept of the CI was a gravity sewer tunnel with additional tunnels extending from the main trunk in a westward direction. The concept also included a series of connections to the existing trunk network that would pick up wastewater flow and the development of a new pump station at Mangere WWTP (the "main project works"). In addition to these works, the CI involves a series of smaller sewers that extend into the local network and connect to network overflow locations (the "Combined Sewer Overflow (CSO) Collector Sewers").

The project was approved at a concept design stage and has been subject to several design changes resulting from further environmental investigations, stakeholder engagement and design innovations. A number of resource consents were approved and Notices of Requirements confirmed during the 2010s for the CI. These were followed by additional resource consents for minor changes (e.g. slight alterations to tunnel alignments), outline plans and other related approvals. Additional works were approved in 2019 for a tunnel between Western Springs and Tawariki Street (Grey Lynn) that provides for population growth and reduces wet weather overflows into Cox's Creek.

While the construction of the CI tunnels is occurring largely below ground, sites are required at the surface along the tunnel alignment to construct the tunnels, to provide permanent facilities associated with connections to the network and for ongoing operations and maintenance. One of these sites is at Western Springs Stadium, and includes a shaft, control chambers and a construction yard.

2.2 Central Interceptor Project Benefits

The CI will result in the following benefits:

- Provide additional sewer network capacity for growth and development;

- Provide asset security by duplicating the lower section of the ageing Western Interceptor;

- Significantly reduce the major wastewater overflows into the Meola Creek catchment; and,

- Provide the opportunity to further reduce existing wastewater overflows from the combined sewer system into urban streams and the Waitemata Harbour.

The figures below graphically indicate the level of wastewater overflow reduction achieved by the CI. Figure 2-2 depicts the frequency of overflows in the year 2030 both without (left hand figure) and with (right hand figure) the CI scheme, where the red dots indicate overflow frequency at overflow locations in an average year of rainfall.

[5] The combined network carries both stormwater and wastewater, with subsequent discharges from outfalls into freshwater and marine bodies of water.

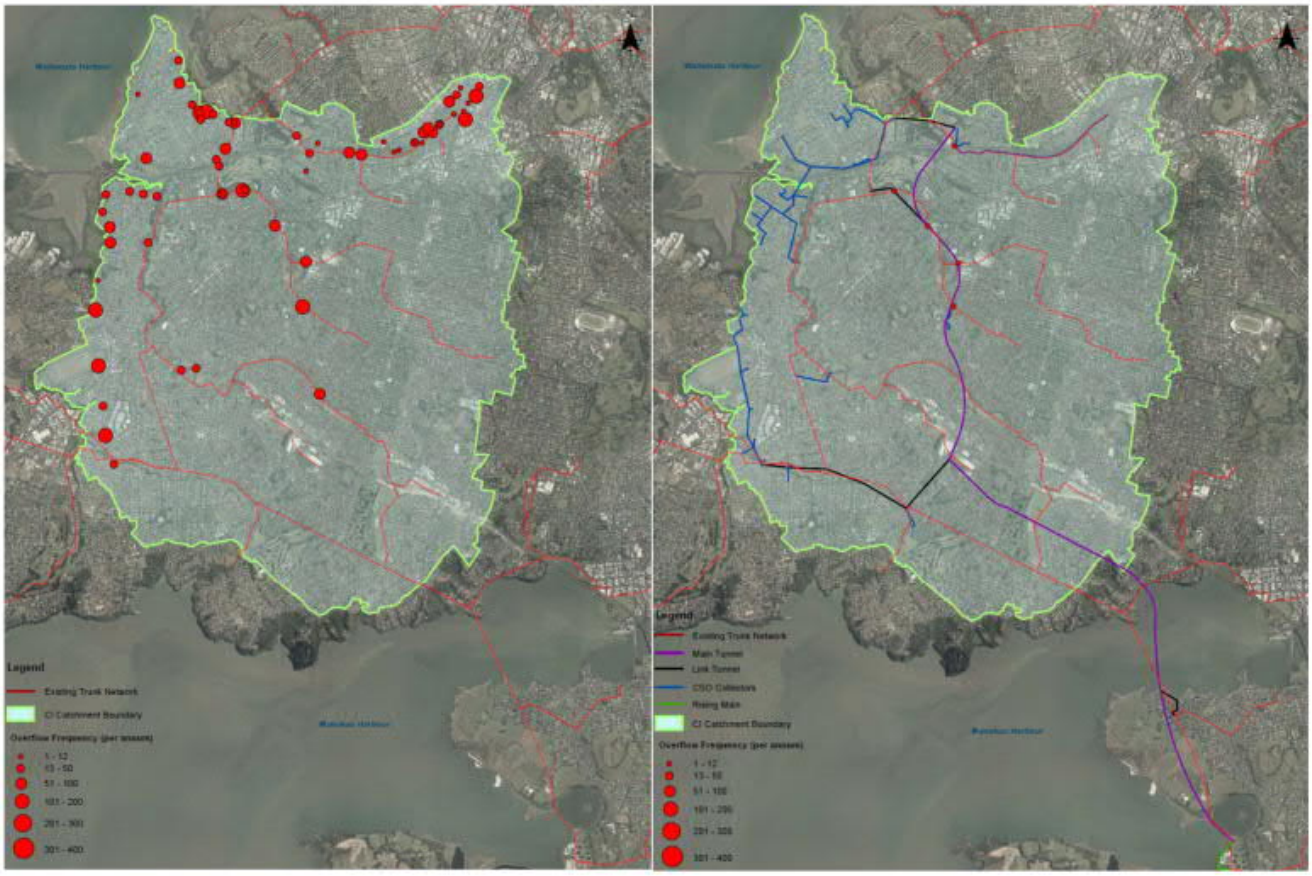


Figure 2-2: Overview of Overflow Reductions

2.3 Original Accessway Proposal

2.3.1 Background and the Original Accessway Proposal

One of the main CI shafts will be located within Western Springs Stadium. This site is consented as one of three primary construction areas for the tunnelling activities. Spoil from the tunnelling work can be removed from these sites via the construction shaft. The construction shaft will provide access to the tunnel, serves to launch/retrieve the tunnel boring machine and provides access for the supply of construction materials and services.

As shown in Figure 2-3, the original access arrangements at the Western Springs site featured an accessway which ran between Bullock Track and the terminus of Stadium Road. This arrangement provided for one-way vehicle traffic through the construction site, with vehicles entering via Bullock Track and exiting via an existing maintenance road onto Stadium Road.

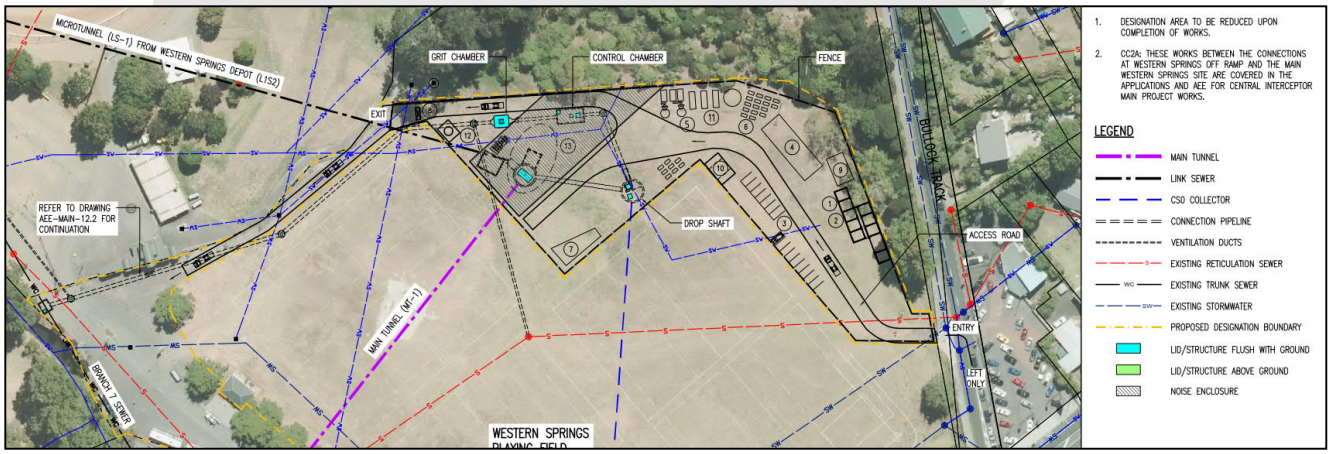


Figure 2-3: Construction Arrangement as Approved

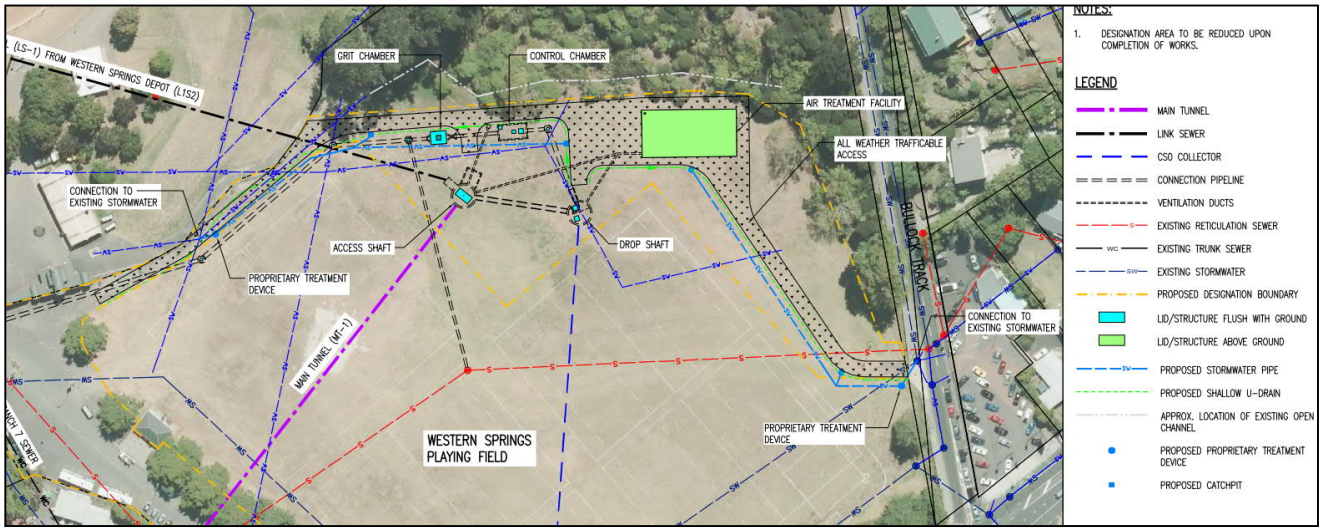


Figure 2-4: Permanent Arrangement as Approved

The estimated peak and total construction traffic movements for the consented works at Western Springs Stadium are shown in Table 2-1[6]. Most of the construction traffic generated will result from trucks and trailers transporting spoil away from the site. It is noted that this detail was developed based on the Western Springs construction site being a primary construction site. However, the May Road site has become the main construction area, reducing the construction traffic flows to Western Springs to less than previously approved.

[6] These figures are taken from the approved Construction Traffic Management Plan (CTMP).

Table 2-1: Traffic Volumes (Source: Council Certified CTMP)

Activity	Estimated peak movements per day	Total estimated movements	Comments
Topsoil	10	165	There are less than 50 vehicle movements in total required for the construction of the MH12A bifurcation chamber on Stadium Road
Chambers and pipeline spoil	10	370	
Shaft excavation	12	350	
Site establishment and reinstatement	TBC	TBC	

2.4 Updated Access Proposal

Following the RMA approval process for CI, Watercare further engaged with RFA (i.e. the landowner) who asked that the accessway arrangements be amended so that construction traffic was (primarily) diverted from Stadium Road and onto a new accessway to be constructed parallel to Stadium Road. The accessway would be used by Watercare for the construction of CI and then used for RFA purposes once construction was completed.

2.4.1 Construction

The construction of the accessway may be completed prior to site establishment or as part of works on site. However, any effects arising from its construction will be addressed, in part, by the following approved CI management plans:

- Construction Noise and Vibration Management (CNVMP);
- Construction Traffic Management Plan (CTMP);
- Erosion and Sediment Control Plan (ESCP); and
- Site Management Plan (SMP) (updated to address the potential soil contamination risks in the construction area).

The current proposal is to fence the accessway along its length for the duration of works onsite with controlled pedestrian gates at selected locations. However, detailed arrangements will be finalised in consultation with the landowner.

2.4.2 Proposed Layout

The proposed accessway will be 4.5 m wide and approximately 214 m long (as shown in Figure 2-5). It will run parallel with Stadium Road, before terminating more than 10 m from the intersection of Stadium Road and Great North Road. Design drawings are provided at Appendix B.

The accessway will comply with the access and manoeuvring standards of the AUP(OP). Although not a consenting matter, for information purposes this may include the following (and is subject to change but will be approved through a CTMP as noted above):

- Access will be controlled by locked gates (i.e. padlocked chains), one on Bullock Track (provided for by the CI designation and resource consents) and an additional gate on Stadium Road.
- The accessway is likely to be fenced during construction with this being removed at completion of construction.
- Vehicle traffic on the accessway will be limited to 10 km/h with speed limit signs located at both vehicle crossings (i.e. Bullock Track and Stadium Road).

Vehicles exiting the proposed accessway will need to give-way to southbound traffic on Stadium Road.

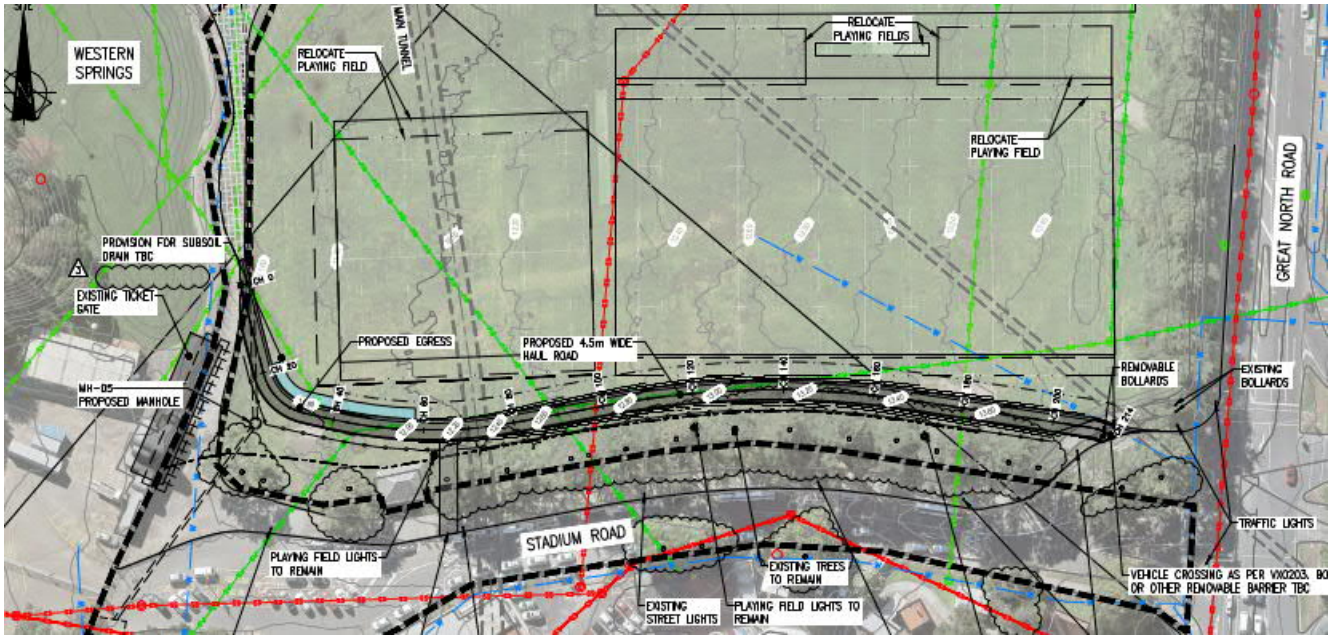


Figure 2-5: Proposed Alignment

2.4.3 Long-Term Use of the Accessway

The long-term operational use of the accessway will be managed by RFA. Its use as accessory to Western Springs Stadium is a permitted activity under the Special Purpose – Major Recreation Facility Zone of the AUP(OP).

Watercare's operational traffic use will involve approximately one light vehicle per week; although this will vary depending on servicing and emergency requirements. Any Watercare maintenance or emergency related traffic requiring heavy vehicles will engage with RFA to avoid any clashes between activities at the site. Stadium Road may also be used for operational purposes in accordance with the CI designation 9466.

2.4.4 Stormwater Design

The proposed accessway is located within a sub-catchment that forms part of the wider Motions Creek catchment. The area is currently a grassed surface and the works will result in an increase in impervious surface of approximately 1% of the total area of the catchment. This results in a slight change in overall site permeability and increased runoff. The proposed accessway will be 214 m long and 4.5m wide, which gives a total impermeable area of 936 m^2. To provide flexibility for the detailed design phase and contingency during construction, consent will be sought for at total impermeable area of 1,500 m^2. No more than 5,000 m^2 of impervious surface will be installed. As the proposed impervious area is currently greater than 1,000 m^2 water quality treatment is required, and it is proposed to install a half dish channel and a rain garden.

3. Site Description

The proposed activities will be located within the outer playing fields, between Western Springs Stadium and Great North Road. The site is owned by RFA (now Auckland Unlimited) and legally identified as Lot 12 DP 168863.

3.1 Existing Land Uses

The site is currently used for a variety of recreational activities and forms part of the wider complex of community and regional recreational facilities at Western Springs (see Figure 3-1). The primary use of the site is playing fields, with the Ponsonby Rugby Club's clubrooms located beside Stadium Road. It is used for hospitality tents and other structures during events held at Western Springs Stadium, as well as car parking to support these events. It is noted that the northern third of the site is covered in dense vegetation and is undeveloped.

Figure 3-1: Aerial Photo of Western Springs (Source: Auckland Council GeoMaps)

The surrounding area includes residential development to the east and southeast and Western Springs Stadium to the north. To the west is Western Springs Lake, while to the southwest is MOTAT. To the northwest is Motions Creek, a degraded urban waterway, which drains into the Upper Waitemata Harbour at Westmere.

The playing fields are separated from MOTAT by Stadium Road. Stadium Road is a private dual carriageway providing access into Western Springs from Great North Road via a controlled traffic signal. Limited on-street parking is available, and a dedicated footpath is present along the eastern side of the carriageway.

3.2 AUP(OP) Overlays, Controls, Designations and Precincts

As shown in Figure 3-2, the site (including Stadium Road[7]) is zoned Special Purpose – Major Recreation Facility. Other facilities provided for by this zone include Auckland Zoo and MOTAT. The surrounding zones include Open Space – Informal Recreation, Residential – Single House and Residential Mixed Housing Urban.

Figure 3-2: AUP(OP) zoning (Source: Auckland Council GeoMaps)

The site is subject to the following overlay and controls:

- Natural Resources: Quality-Sensitive Aquifer Management Areas Overlay [rp] - Western Springs Volcanic Aquifer. The proposed works will not affect the purpose of this overlay; and,
- Controls: Macroinvertebrate Community Index – Exotic and Urban.

The site is subject to two designations (Figure 3-3):

- 518 – The purpose of this designation is for a carpark and the requiring authority is Auckland Council; and,
- 9466 – The purpose of this designation is for the construction, operation and maintenance of wastewater infrastructure and the requiring authority is Watercare Services Ltd.

[7] Given its location in the Special Purpose Zone, the tree controls of Chapter E16/17 and E26 do not apply.

The site is located within the Western Springs Stadium sub-precinct, which the AUP(OP) describes as providing *"specific planning controls for the use and development of Western Springs Stadium as a multi-functional recreation, sporting and events venue within a natural amphitheatre that has a crowd capacity upwards of 50,000 people"*.

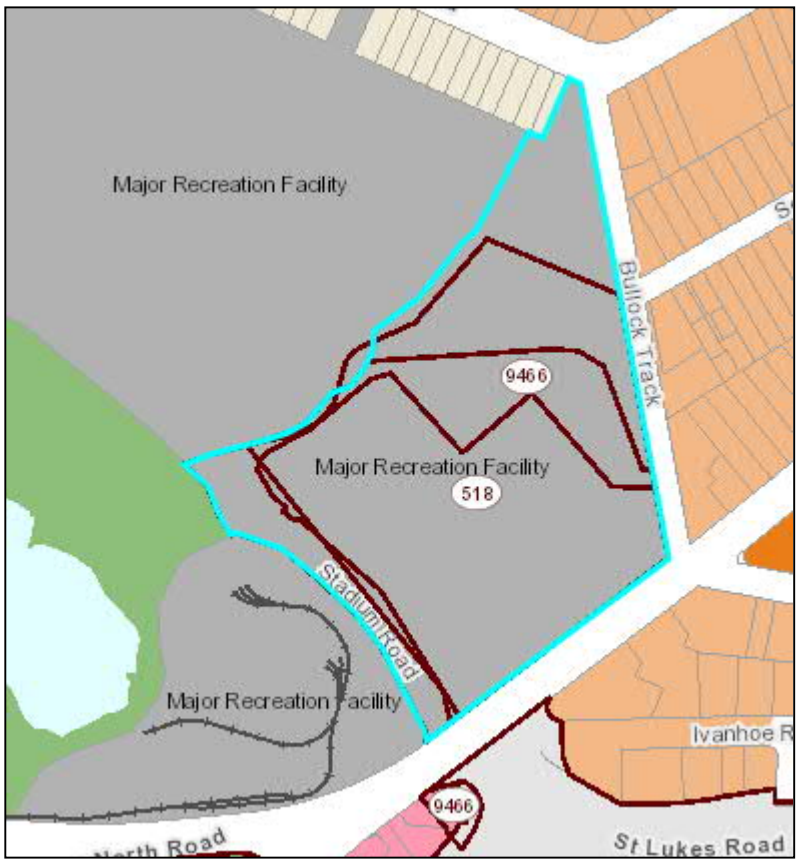


Figure 3-3: AUP(OP) designations (Source: Auckland Council GeoMaps)

3.3 Topography

The site is largely flat, with approximately two thirds of the site levelled for playing fields. The northern third of the site rises steeply to the northeast, from 12 m above sea level to 50 m above sea level, although no works are proposed in this area of the site.

3.4 Hydrological Features

The site is not located in a 1 in 100 AEP floodplain or a Stormwater Management – Flow overlay. Several overland flow paths (OLFPs) traverse the site and flow in the direction of Motions Creek (Figure 3-4) with one OLFP intersecting with the proposed alignment of the accessway at the southern boundary. As noted in the stormwater assessment, the updated flood model for Motions Creek Catchment produced by Tonkin and Taylor (T&T) in 2017 shows that the existing OLFP does not interfere with the proposed accessway (Figure 3-5).

The site is located within the Motions Creek surface catchment which has an area of 7.5km. Motions Creek is largely spring fed by groundwater discharge from adjacent basalt lava flows and rises close to Western Springs Lake, an artificial reservoir constructed by Auckland City Council on the adjacent site. Motions Creek discharges

to the Waitemata Harbour at Westmere, approximately 1.5km northwest of the site. Based on geotechnical bore logs, groundwater was generally encountered at approximately 2.5m below ground level.

The headwaters of Motions Creek are located approximately 60m (at its closest) from the accessway. As an urban waterway, it has experienced historical degradation in water quality, due in part to contaminants leaching to groundwater, wastewater overflows and stormwater discharges.

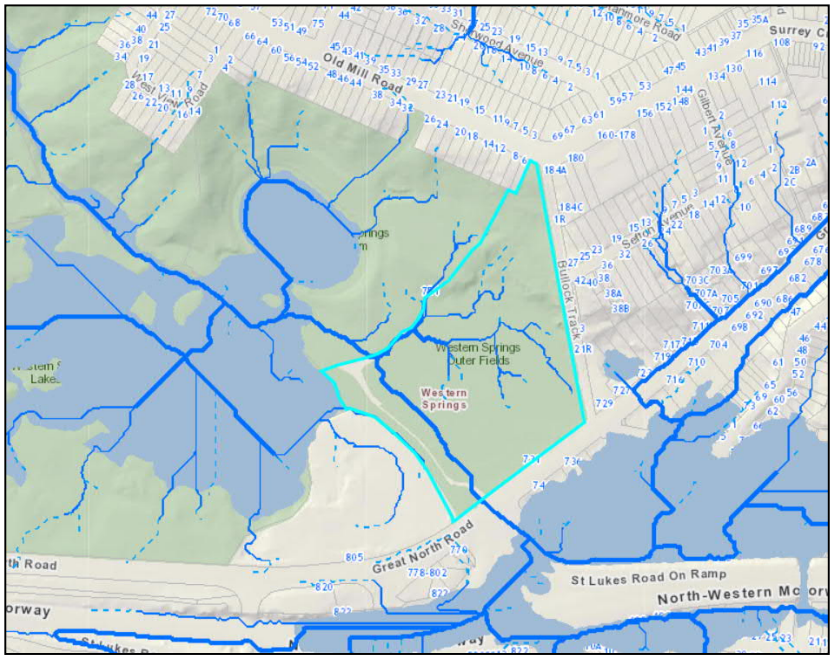


Figure 3-4: Local hydrological features (Source: Auckland Council GeoMaps)

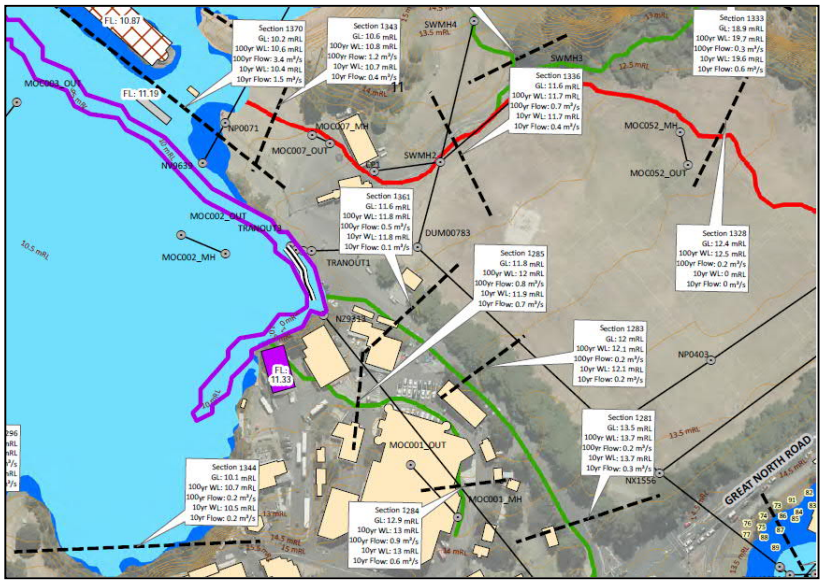


Figure 3-5: Local Hydrological Features in the Updated Flood Model for Motions Creek Catchment (Source: T&T)

3.5 Vegetation

Most of the site consists of regularly maintained grass fields, the exception being the northern third of the site which is covered by a mixture of mature native and exotic trees. A row of mature pine trees planted in a regular spaced pattern runs along the north west boundary of the site. It is noted that none of the trees on the site are subject to protection under the AUP(OP), either as scheduled trees or as vegetation within a significant ecological area. It is not proposed to remove any trees.

3.6 Historic and Cultural Heritage

No historic or cultural heritage features are identified as being located within the site. It is noted that Western Springs Lake is a site of significance to Mana Whenua however, no works are proposed within its vicinity[8].

[8] AUP(OP) reference: 008.

4. Reasons for Application

4.1 Auckland Unitary Plan – Operative in Part 2016 (AUP(OP))

Land use consent under section 9(3) and regional consent under section 15 of the RMA is required under the following provisions of the AUP(OP):

Table 4.1: Relevant AUP(OP) provisions and assessment.

Activity	Reference	Rule	Activity Status	Comment
Contaminated land	E30.4.1(A7)	Discharges of contaminants into air, or into water, or onto or into land not meeting controlled activity Standard E30.6.2.1	**Discretionary**	The volume of contaminated soil proposed to be disturbed exceeds 200m^3 and a DSI has not been prepared for the site. Therefore, the works do not comply with the permitted or controlled activity standards (i.e. E30.6.1.2 and E30.6.2.1).
Operational discharge of stormwater	E8.4.1 (A9)	Diversion and discharge of stormwater runoff from impervious areas greater than 1,000 m^2 and up to 5,000 m^2 within an urban area, that complies with Standard E8.6.1 and Standard E8.6.3.1	**Controlled**	The proposed accessway will be 214 m long and 4.5m wide, which gives a total impermeable area of 936m^2. To provide flexibility for the detailed design phase and contingency during construction, consent will be sought for at total impermeable area of 1,500m^2. No more than 5,000m^2 of impervious surface will be installed

Overall, the construction of the accessway requires consent under the AUP(OP) as a **discretionary** activity.

4.1.1 Permitted activities

Activity	Reference	Rule	Activity Status	Comment
Accessory Activities within a Precinct	I335.6.2 (A10)	Accessory Activities	Permitted	The accessway will be an accessory activity to the operation of Western Springs Road and may provide access for ongoing maintenance of Watercare CI assets. Its purpose is to support these lawfully established activities and does not serve any other

				purpose or act as any other form of land use.
Vehicle Access	E27.4.1(A1)	Parking, loading and access which is an accessory activity and complies with the standards for parking, loading and access	**Permitted**	The proposed accessway complies with all the standards required for access. No loading and no parking are required for this development.
Vegetation alteration or removal	E15.4.1 (A22A)	Vegetation alteration or removal	**Permitted**	No tree removal is expected. However, trees at the site are not protected given their location in the Special Purpose – Major Recreational Facility Zone, and the lack of a riparian margin, wetland, significant ecology area or any other related overlay so can be removed as a permitted activity if required.
Earthworks [dp]	E26.5.3.1 (A95/96)	Earthworks up to 2500m^2/2500m^3 other than for maintenance, repair, renewal, minor infrastructure upgrading	**Permitted**	The proposed accessway will require at least 482m^3 of earthworks across an area of at least 950m^2.
Earthworks [rp]	E26.5.3.2 (A101)	Up to 10,000m^2 where land has a slope less than 10 degrees outside the Sediment Control Protection Area other than for maintenance, repair, renewal, minor infrastructure upgrading	**Permitted**	The proposed accessway will require earthworks across an area of at least 950m^2.

4.2 Designations

Under section 177 of the RMA where a designation is included in a district plan, and the land that is the subject of the designation is already the subject of an earlier designation or heritage order. –

(a) the requiring authority responsible for the later designation may do anything that is in accordance with that designation only if that authority has first obtained the written consent of the authority responsible for the earlier designation or order; and

(b) the authority responsibly for the earlier designation or order, not withstanding section 176(1)(b) and without obtaining the prior written consent of the later requiring authority, do anything that is in accordance with the earlier designation or order.

RFA's designation (518) was in place prior to Watercare's designation (9466). Therefore Section 177(1)(a) of the RMA requires the requiring authority of the later designation to obtain written consent from the requiring authority for the earlier designation prior to doing anything in relation to the designated land that will prevent or hinder the purpose of the designation. Watercare are seeking written consent from RFA and this will be provided to Council.

4.3 National Environmental Standard for Contaminated Soil (NES-CS)

The NES-CS came into effect on 1 January 2012. This legislation sets out nationally consistent planning controls appropriate to district and regional councils for assessing contaminants in soil with regard to human health. The NES-CS applies to specific activities on land where a HAIL activity has or is more likely than not to have occurred. Activities covered under the NES-CS include soil disturbance, soil sampling, fuel systems removal, subdivision and land use change.

The current use of the site is considered in the HAIL list under:

> *A. Chemical infrastructure, application and bulk storage (10) persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds*.

As the site is currently used as sports fields and is likely to include regular use of pesticides on the HAIL list it is a category A10 site, the piece of land is assessed as an area of approximately 30,000m^2. Following the preparation of a PSI, the following consents under the NES-CS are required:

- Regulation 11 applies to an activity described in any of regulation 5(2) to (6) on a piece of land described in regulation 5(7) or (8) that is not a permitted activity, controlled activity or restricted discretionary activity. The activity is a discretionary activity.
    - The site is a considered a HAIL site. The proposed soil disturbance does not meet the permitted activity thresholds in regulations 8(3)(c), (d)(ii) and (f) as soil disturbance will exceed 25m^3 per 500m^2 and greater than 5m^3 per 500m^2 will be taken off site. While the duration of works is anticipated to be no more than two months, it may exceed this duration. The works do not meet the controlled or restricted discretionary activity threshold as a Detailed Site Investigation (DSI) has not been prepared for these works and the work therefore does not meet Regulation 10(2).

A district resource consent is required for a **discretionary** activity under Regulation 11 of the NES-CS.

4.4 Summary

Overall, the proposed works require consent as a discretionary activity and will require the following regional and land use consents (i.e. s9(3)) under the provisions of the AUP(OP) and NES-CS:

- E30.4.1(A7): Discharges of contaminants into air, or into water, or onto or into land not meeting controlled activity Standard E30.6.2.1 are a **discretionary** activity;
- E8.4.1(A9): Diversion and discharge of stormwater runoff from impervious areas greater than 1,000 m^2 and up to 5,000 m^2 within an urban area, that complies with Standard E8.6.1 and Standard E8.6.3.1 is a **controlled** activity; and
- Disturbing soil is a **discretionary** activity pursuant to regulation 11 of the NES-CS.

A five-year lapse period is sought for the proposed works under section 125 of the RMA. A 35-year term of consent is sought for the stormwater discharge and diversion under section 123 of the RMA.

5. Assessment of Effects on The Environment

Pursuant to the Fourth Schedule of the Resource Management Act 1991, the following assessment is provided on the actual and potential effects that can be reasonably expected from the works.

5.1 Permitted Baseline

The assessment of effects has considered the permitted baseline, including:

- An accessory activity (i.e. an accessway) associated with Western Springs Stadium located within the Western Springs sub-precinct;
- The accessway complies with all parking, loading and access standards for an accessory activity;
- Any vegetation alteration or removal required would be permitted; and
- Earthworks will not exceed 2,500m^2 or 2,500m^3.

In addition, it is noted that most of the potential effects are associated with the construction of the accessway and are addressed through the Council approved Central Interceptor management plans, including those associated with erosion and sediment control, construction traffic and noise.

5.2 Positive Effects

The positive effects of the proposed works include the creation of a permanent accessway which will be used to support activities at Western Springs Stadium. In the temporary case, construction traffic will be redirected (in the main) from Stadium Road which will separate recreational vehicle and foot traffic from construction activities.

5.3 Discharge of Contaminants

A Preliminary Site Investigation (PSI) was prepared by Jacobs and a copy of the report is included at Appendix C. The PSI report discusses the contamination history of the parcel and includes a review of contaminated land assessments that have been undertaken for the parcel and other publicly available information.

The original access arrangements at the Western Springs site featured an accessway which ran between Bullock Track and the terminus of Stadium Road (as noted above in Section 2.3. The consent for this accessway was supported by a PSI and subsequent Detailed Site Investigation (DSI) prepared by T&T in 2012. The 2012 investigations confirmed that the site has been in use as a recreational space since at least 1940. The current land use remains as sports fields.

The T&T report identified the likely presence of unclassified fill within the site potentially impacted by the presence of low concentrations of metals, petroleum hydrocarbons and possibly asbestos containing material (ACM). The review identified the presence of a landfill within the former vegetated area to the northwest of the site. The southern boundary of the landfill lies approximately 50m north of the site at its closest point and the landfill does not extend below the site.

The soil test completed by T&T and the PSI undertaken by Jacobs identified the following:

- The fill encountered generally low-level contamination that is unlikely to pose a risk to workers or future users of the site.

- The topsoil and fill from the site are not suitable for disposal to a general cleanfill site and would require disposal to either a managed fill site or a licensed landfill.

- The natural soils underlying the fill should be suitable for disposal to a general cleanfill site, subject to further testing; and

- It is recommended that to minimise the potential and actual effects of contaminated soil discharged during the proposed works that the site is managed accordingly.

Based on the recommendations in the earlier T&T report, and the subsequent PSI, the existing SMP will be updated to identify the management procedures that will be implemented during the works to minimise any potential adverse effects resulting from the disturbance of contaminated land. These works will be incorporated into the existing SMP and if off-site disposal is required, spoil will be trucked to a licenced facility following appropriate procedures. In addition, erosion and sediment controls will be implemented throughout the construction period.

Overall, with appropriate management procedures as proposed, any adverse effects of discharges from contaminated land will be less than minor.

5.4 Stormwater Discharge Effects

A stormwater assessment has been prepared by Jacobs and its findings incorporated into the assessment below. Although consent is sought overall for a discretionary activity it should be noted that the stormwater discharge aspects are a controlled activity.

The proposed accessway will be 214 m long and 4.5m wide, which gives a total impermeable area of 936m^2. To provide flexibility for the detailed design phase and contingency during construction, consent will be sought for at total impermeable area of 1,500m^2. However, no more than 5,000m^2 of impervious surface will be installed.

The proposed accessway is to be located on the existing grassed surface. The accessway will provide an approximate 2% increase in hard surface of the total area of the site. This result is a slight reduction in overall site permeability and therefore some increased runoff.

No buildings and/or properties will be adversely affected by the stormwater discharge and diversion.

Stormwater runoff was calculated by using TP108. This modelling showed an increase in site runoff volume across design events of approximately 1.7-2.8%. The same modelling provides very little to no change in the peak flowrate for each event. Given the proposed accessway is located at the very bottom of a large contributing catchment (approximately 1057 hectares), and is approximately 60 m from the headwater of Motions Creek (the receiving body), any effects arising from these peak flowrates are therefore less than minor.

With regard to water quality treatment, it is proposed to capture and discharge the stormwater runoff via a proposed half dish channel and a raingarden. The raingarden is designed in accordance with Auckland Council Guidance Document 01 *"Stormwater Management Devices in the Auckland Region"* (GD01). The raingarden will provide stormwater runoff treatment, as well as retention and detention prior to discharge to Motions Creek. The raingarden is considered appropriate for a public reserve and is considered the best practicable option.

Overall, it is considered that the stormwater discharge effects will be less than minor.

5.5 Summary

The proposed works will have positive effects associated with the creation of a permanent accessway to support Western Springs Stadium activities. The actual and potential adverse effects of the proposed works will be less than minor given the existing environment, the design of the accessway and the mitigation provided by Watercare.

6. Engagement and Consultation

6.1 Consultation with Mana Whenua

Watercare have consulted with mana whenua the proposed works through its iwi liaison group. No matters of interest were raised by this group. The application has been provided to iwi entities that have expressed interest in the project and feedback will be provided to Council either directly or at their request.

6.2 Consultation with Regional Facilities Auckland

The site is owned and managed by RFA (now Auckland Unlimited). Engagement with RFA in relation to Central Interceptor commenced during 2009 and 2010 is ongoing.

7. Notification assessment

7.1 Public notification assessment (section 95A)

The test that must be considered by the consent authority when deciding whether or not to publicly notify an application are set out in section 95A of the RMA.

Step 1: Mandatory public notification in certain circumstances

No mandatory notification is required as:

) the applicant has not requested that the application is publicly notified (s95A(3)(a));

a) there are no outstanding or refused requests for further information (s95C and s95A(3)(b)); and

b) the application does not involve any exchange of recreation reserve land under s15AA of the Reserves Act 1977 (s95A(3)(c)).

Step 2: If not required by step 1, public notification precluded in certain circumstances

The application is not precluded from public notification as:

c) the activities are not subject to a rule or national environmental standard (NES) which precludes public notification (s95A(5)(a)); and,

d) the application for resource consent is for a discretionary activity and therefore not precluded from public notification (s95A(5)(b)).

Step 3: If not precluded by Step 2, public notification in certain circumstances

The application is precluded from public notification as:

e) the activities are not subject to a rule or national environmental standard (NES) which require public notification (s95A(5)(a)), and,

f) The activity will not have adverse effects on the environment that are more than minor (s95A(8)(b)).

Step 4: Special circumstances

Section 95(4) of the Act states that an application may be publicly notified if 'special circumstances' exist, notwithstanding the satisfaction of the statutory tests that would allow for non-notification. 'Special circumstances' are not defined in the Act. Case law has identified 'special circumstances' as something outside the common run of things which is exceptional, abnormal or unusual but less than extraordinary or unique. A 'special circumstance' would be one which makes notification desirable despite the general provisions excluding the need for notification. The local authority should be satisfied that public notification may elicit additional information on the aspects of the proposal requiring resource consent.

Public notification conclusion

There are no 'special circumstances' that exist to justify the public notification of this application.

It is considered that public notification of the application under s95A - 95C-D is not required.

7.2 Limited notification assessment (section 95B)

Step 1: Certain affected protected customary rights groups must be notified

There are no protected customary rights groups or customary marine title groups affected by the proposed activity (s95B(2)).

Step 2: If not required by step 1, limited notification precluded in certain circumstances

The application is not precluded from limited notification as:

g) the activities are not subject to a rule or national environmental standard (NES) which precludes limited notification (s95B(6)(a)); and,

h) the application for resource consent is for a discretionary activity and is therefore not precluded from limited notification (s95B(6)(b)).

Step 3: If not precluded by Step 2, certain other affected person must be notified.

The application is not precluded from limited notification as:

i) the activity is not a boundary activity and there are no prescribed persons (s95B(7)(a) and (b)),

j) no person is considered affected in accordance with s95E.

Step 4: Further notification in special circumstances

The application does not warrant notification to any other persons not already determined to be eligible for limited notification under this section.

Limited notification conclusion

It is considered that limited notification of the application under s95B is not required and the application can be processed on a non-notified basis.

8. Statutory considerations

The following assessment is provided in accordance with the relevant sections under the Resource Management Act (RMA) applicable to this proposal.

8.1 Part 2 (Purposes and Principles) – Sections 5, 6, 7, and 8

8.1.1 Section 5 assessment

The RMA has a single overarching purpose: to promote the sustainable management of natural and physical resources. Sustainable management is defined in Section 5 as:

> *...managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while –*
>
> *(a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
>
> *(b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
>
> *(c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment.*

Assessment

The proposal is consistent with Section 5 of the RMA given that the proposed works promotes the sustainable management of natural and physical resources. This is due to the use of existing management plans, as well as the provision of stormwater attenuation and treatment. It will also enable the safe and efficient construction of a regionally significant infrastructure project that will deliver significant environmental benefits.

8.1.2 Section 6 Assessment

In achieving the purpose of the RMA, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for the matters of national importance as set out in Section 6 of the Act.

Matters of national importance relevant to this application include:

> *(a) The preservation of natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development.*
>
> *(b) The relationship of Maori and their culture and traditions with their ancestral lands, water, sites, wāhi tapu, and other taonga.*

Assessment

The proposal is consistent with Section 6 of the RMA. In particular, the use of existing management plans will limit the effects associated with earthworks and the disturbance of contaminated material. In the longer-term, the natural character of Motions Creek will be protected via the use of stormwater treatment and attenuation. Lastly, Watercare has been regularly engaging with mana whenua as part of the wider CI project, with mana

whenua not raising any concerns with these works. The application has been provided to iwi entities that have expressed interest in the project and feedback will be provided to Council either directly or at their request.

8.1.3 Section 7 Assessment

Other matters that shall have particular regard to when managing the use, development and protection of natural and physical resources include;

(a) the efficient use and development of natural and physical resources;

(b) the maintenance and enhancement of amenity values;

(c) maintenance and enhancement of the quality of the environment;

Assessment

The proposal is consistent with Section 7 of the RMA as the proposed works will the enable the use of Western Springs Stadium as a crucial part of a regionally significant wastewater project. Safe and efficient construction access is required, with the proposed accessway providing such access. In addition, and as detailed in Section 2, the CI is a critical infrastructure project for the wellbeing of Auckland's environment and will allow for greater urban intensification, and improvements to Auckland's waterways and harbours. Lastly, the use of the accessway post-construction will support the efficient operation of Western Springs Stadium and improve the amenity values at the playing fields.

8.1.4 Section 8 Assessment

The principles of the Treaty of Waitangi shall be taken into account when managing the use, development, and protection of natural and physical resources.

Assessment

The proposal is consistent with Section 8 of the RMA and the principles of the Treaty of Waitangi. Watercare continues to engage with mana whenua and recognises the values they place on freshwater values. The application has been provided to iwi entities that have expressed interest in the project and feedback will be provided to Council either directly or at their request.

8.2 Section 104(1)(a)

This section of the Act requires that regard is given to any actual and potential effects on the environment of allowing the activity.

Assessment

An assessment of the actual and potential environmental effects on the environment resulting from the proposed works is provided in Section 5. Overall, the proposed works will have positive effects on the environment that are associated with creating a permanent accessway to support the functions of Western Springs Stadium. The actual and potential adverse effects of the proposed works including effects of discharges from contaminated land and stormwater discharge will be less than minor.

8.3 Section 104(1)(b)(i)

This section of the Act requires that regard is given to any relevant provisions of a national environmental standard.

Assessment

The site is currently used as sports fields and is likely to include regular use of pesticides on the HAIL list. It is considered a Category A10 site. As soil disturbance is required to undertake the proposed works, the NES:CS applies.

As described in Section 5, The T&T report identified the likely presence of unclassified fill within the site potentially impacted by the presence of low concentrations of metals, petroleum hydrocarbons and possibly asbestos containing material (ACM). The review identified the presence of a landfill within the former vegetated area to the northwest of the parcel. The southern boundary of the landfill lies approximately 50m north of the proposed accessway at its closest point and the landfill does not extend below the site.

Based on the recommendations in the earlier T&T report, and the subsequent PSI prepared by Jacobs, the existing project SMP will be updated to identify the management procedures that will be implemented during the works. These procedures will minimise any potential adverse effects resulting from the disturbance of contaminated land. If off-site disposal is required, spoil will be trucked to a licenced facility following appropriate procedures. In addition, erosion and sediment control in accordance with GD05 will be implemented throughout the construction period.

No other NES is considered relevant to this proposal.

8.4 Section 104(1)(b)(ii)

This section of the Act requires that regard is given to any relevant provisions of any other regulations.

Assessment

No other regulations are relevant to the proposed works.

8.5 Section 104(1)(b)(iii)

This section of the Act requires that regard is given to any relevant provisions of a National Policy Statement (NPS).

The National Policy Statement for Freshwater Management (Freshwater NPS) 2020 came into effect on 3 September 2020. It replaced the National Policy Statement for Freshwater Management 2014 (amended 2017). It provides local authorities with direction on how to manage freshwater under the RMA.

2.1 Objective

(1) *The objective of this National Policy Statement is to ensure that natural and physical resources are managed in a way that prioritises:*

- *(a) first, the health and well-being of water bodies and freshwater ecosystems*
- *(b) second, the health needs of people (such as drinking water)*
- *(c) third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.*

2.2 Policies

(1) *Freshwater is managed in a way that gives effect to Te Mana o te Wai.*
(2) *Tangata whenua are actively involved in freshwater management (including decision making processes), and Māori freshwater values are identified and provided for.*
(9) *The habitats of indigenous freshwater species are protected.*

Assessment

The Freshwater NPS is considered relevant to the works as the proposal includes stormwater discharge and has the potential to affect water quality. As previously noted, Motions Creeks is an urban waterway that has experienced historical degradation in water quality, due in part to contaminants leaching to groundwater, wastewater overflows and stormwater discharges. As part of this project it is proposed to install a raingarden to provide on-site water quality treatment which will mitigate any proposed effects associated with stormwater discharge. Overall, it is considered that the works are consistent with the Freshwater NPS.

No other NPS is considered relevant to the proposed works.

8.6 Section 104(1)(b)(iv)

This section of the Act requires that regard is given to any relevant provisions of the New Zealand Coastal Policy Statement.

Assessment

Given the nature of the proposed activity and its distance from the coast, the NZCPS is not considered relevant.

8.7 Section 104(1)(b)(vi)

This section of the Act requires that regard is given to any relevant provisions of a plan or proposed plan.

Assessment

An assessment of the proposal against the Unitary Plan Objectives and Policies has been provided in Appendix E. The proposal is consistent with these objectives and policies.

8.8 Section 104(1)(c)

This section of the Act requires the consent authority to consider any other matter relevant and reasonably necessary to determine the application.

Assessment

No other matters are considered relevant to the current application.

9. Conclusion

The proposed accessway will be located within 731 Great North Road and run parallel to Stadium Road before terminating near to the Stadium Road/Great North Road intersection. The accessway will be used for construction traffic and later function as an accessory activity for the Western Springs Stadium.

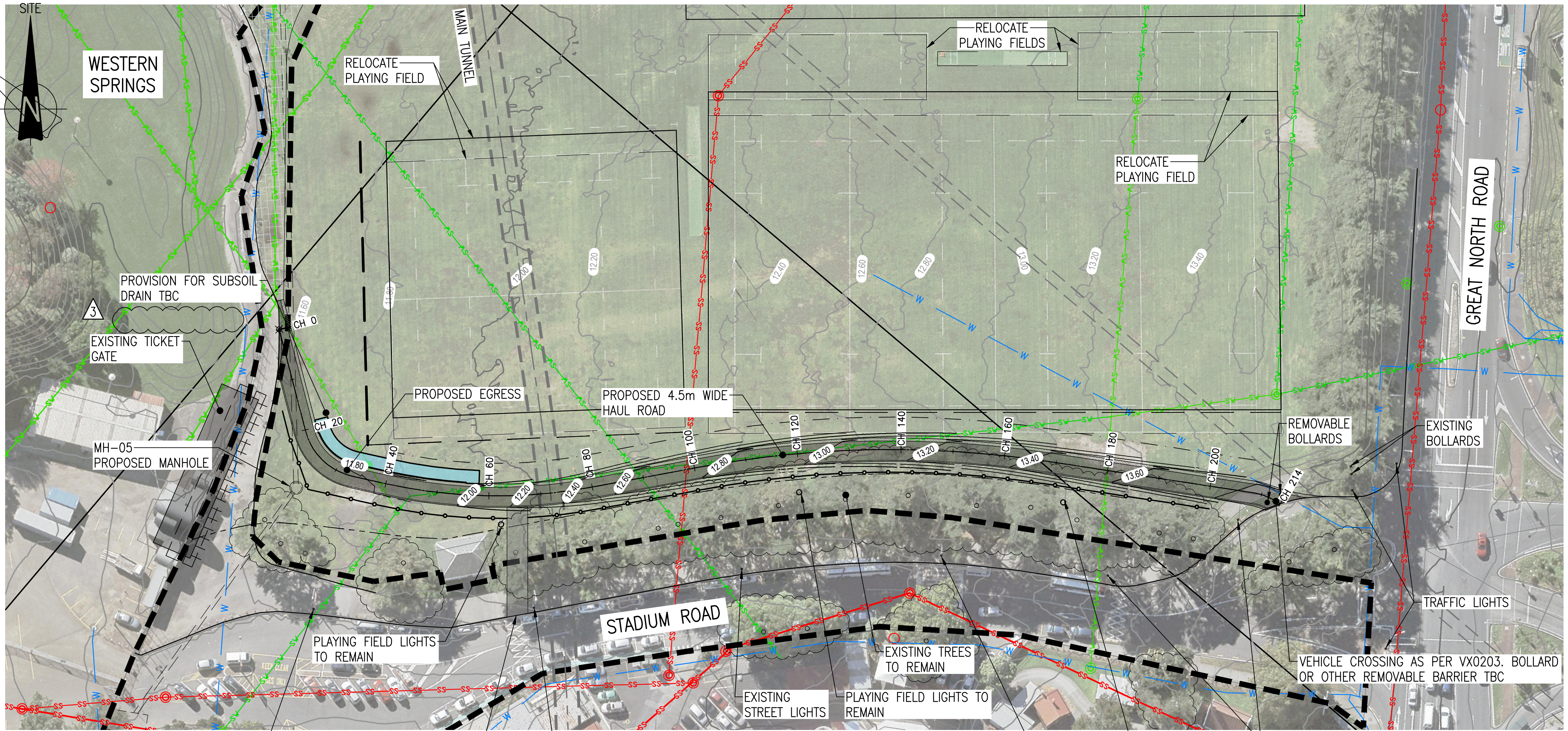
The project will result in the provision of an accessway serving both Watercare's immediate need to obtain access to the CI construction site, as well as providing long-term use for RFA.

Watercare is seeking a resource consent for a discretionary activity under the Resource Management Act 1991 (RMA). A regional resource consent is required for the discharge of contaminants to land, air or water and stormwater discharge and diversion (section 15) as a discretionary activity. A district resource consent is required as per the provisions of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health as a discretionary activity under Regulation 11.

Overall, the works will result in positive effects on the environment resulting from the collaboration of Watercare and RFA to secure a sustainable use of land, via the sharing of infrastructure. Any potential adverse effects resulting from the works are associated with temporary construction activities, which will be appropriately managed through the use of the existing SMP. Any operational effects will be addressed through stormwater attenuation and treatment infrastructure. The works will benefit the community's recreational use of Western Springs Stadium and the project meets the strategic objectives associated with zoning of the site. As such, resource consents can be granted on a non-notified basis.

Appendix A. Record of Title

Appendix B. Site Plan



STORMWATER MANAGEMENT CONCEPT DESIGN

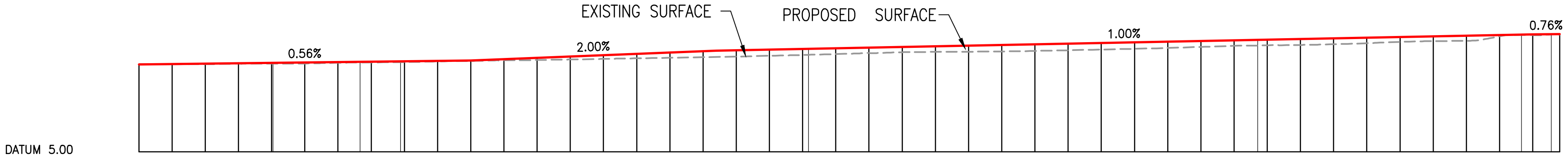
SCALE. 1:500

NOTES:

1. CO-ORDINATES ARE IN NZTM AND LEVELS ARE TO AUCKLAND L&S 1946 DATUM.
2. LOCATION OF EXISTING SERVICES HAVE BEEN EXTRACTED FROM AUCKLAND COUNCIL GIS AND UTILITIES PLANS AND ARE INDICATIVE. PHYSICAL LOCATION OF AFFECTED SERVICES WILL BE REQUIRED PRIOR TO CONSTRUCTION.
3. PLAYING FIELD LIGHTS AND EXISTING TREE DRIP LINE LOCATIONS ARE APPROXIMATE. LOCATIONS TO BE CONFIRMED ON SITE PRIOR TO CONSTRUCTION.

LEGEND

- PROPOSED MAIN TUNNEL
- PROPOSED LINK SEWER
- PROPOSED SEWERAGE
- DESIGNATION BOUNDARY
- ALL WEATHER TRAFFICABLE ACCESS (SEPARATE CONTRACT)
- 3 PROPOSED ALL WEATHER TRAFFICABLE SURFACE
- PROPOSED KERB: ATCOP TYP13 FLAT EDGE BEAM
- PROPOSED KERB: ATCOP STANDARD CONCRETE ROUND DISH CHANNEL
- PROPOSED FENCE FOR CONSTRUCTION ONLY (CONTRACTOR TO CONFIRM)
- 5m PLAYING FIELD OFFSET
- 17m OFFSET FROM STADIUM ROAD KERB
- 4m PEDESTRIAN PATH
- EXISTING PLAYING FIELD TO BE RELOCATED
- APPROXIMATE TREE DRIP LINE
- 13.60 PROPOSED CONTOURS (MAJOR)
- 13.40 PROPOSED CONTOURS (MINOR)
- 12.00 EXISTING CONTOURS (MAJOR)
- EXISTING CONTOURS (MINOR)
- PROPOSED STORMWATER
- SW EXISTING STORMWATER
- EXISTING STORMWATER STREAM
- SS EXISTING NETWORK WASTEWATER
- SS SS SS EXISTING TRANSMISSION WASTEWATER
- W EXISTING WATERMAIN
- REMOVABLE BOLLARDS
- RAINGARDEN LOCATION



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CUT/FILL	0.00	-0.01	-0.05	-0.04	-0.05	-0.08	-0.05	-0.06	-0.05	-0.03	-0.03
PROPOSED LEVEL	11.60	11.62	11.65	11.68	11.71	11.74	11.76	11.79	11.82	11.85	11.88
EXISTING LEVEL	11.60	11.61	11.60	11.64	11.65	11.66	11.71	11.74	11.77	11.81	11.85

CHAINAGE	55.00	60.00	65.00	70.00	75.00	80.00	85.00	90.00	95.00	100.00	105.00
CUT/FILL	-0.08	-0.16	-0.22	-0.27	-0.33	-0.38	-0.44	-0.46	-0.46	-0.44	-0.43
PROPOSED LEVEL	11.98	12.08	12.18	12.28	12.38	12.48	12.58	12.65	12.70	12.75	12.80
EXISTING LEVEL	11.90	11.92	11.96	12.01	12.05	12.09	12.14	12.18	12.24	12.30	12.37

CHAINAGE	110.00	115.00	120.00	125.00	130.00	135.00	140.00	145.00	150.00	155.00	160.00
CUT/FILL	-0.40	-0.39	-0.41	-0.45	-0.48	-0.49	-0.49	-0.49	-0.48	-0.47	-0.44
PROPOSED LEVEL	12.85	12.90	12.95	13.00	13.05	13.10	13.15	13.20	13.25	13.30	13.35
EXISTING LEVEL	12.45	12.51	12.54	12.55	12.57	12.61	12.66	12.71	12.76	12.83	12.91

CHAINAGE	165.00	170.00	175.00	180.00	185.00	190.00	195.00	200.00	205.00	210.00	214.04
CUT/FILL	-0.41	-0.41	-0.44	-0.44	-0.41	-0.36	-0.36	-0.38	-0.09	-0.05	-0.05
PROPOSED LEVEL	13.40	13.45	13.50	13.55	13.60	13.65	13.70	13.75	13.80	13.85	13.88
EXISTING LEVEL	12.99	13.03	13.05	13.11	13.19	13.29	13.34	13.37	13.71	13.80	13.83

VERTICAL GEOMETRY: 0.6% (1:178.6) | 2.0% (1:50.0) | 1.0% (1:100.0) | 0.8% (1:131.5)

HORIZONTAL GEOMETRY: L 20.21 B 215° 08' 05" | 20.21 | L 13.1 R 12.00 | 33.34 | B 152° 24' 53" L 6.08 | 39.42 | L 40.6 R 100.00 | 79.99 | L 20.89 B 129° 10' 12" | 100.88 | L 67.7 R 202.00 | 168.57 | L 39.74 B 148° 22' 11" | L 4.5 R 12.00 208.31 212.77 | B 169° 41' 52" | L 1.27

LONGITUDINAL SECTION

SCALE. 1:500

SCALE 1:500 (A1) 108 6 4 2 0 10 20 30 40 50m

CONSENT ISSUE

JACOBS AECOM McMILLEN JACOBS ASSOCIATES

ISSUE	DATE	AMENDMENT	BY	APPD.
3	25.03.21	CONSENT ISSUE - FENCING REVISED AND REVISED AS INDICATED	PMF	DJK
2	08.03.21	CONSENT ISSUE	SS	DJK
1	22.01.21	CLIENT REVIEW ISSUE	SS	DJK

	BY	DATE
DESIGNED	BH	06.20
DES. CHECKED	CW	01.21
DRAWN	AT	07.20
DWG. CHECKED	PMF	01.21
PROJECT LEADER		
INFRAST'R APP'D		

OPERATIONS

INFRASTRUCTURE

Watercare

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WESTERN SPRINGS - CENTRAL INTERCEPTOR (DSCIN)

11 STORMWATER

STORMWATER MANAGEMENT CONCEPT

CAD FILE 2011811.043 DATE 25.03.21
ORIGINAL SCALE A1 1:500
CONTRACT No. 6661
REF. No. CI-CIVIL
DWG. No. 2011811.043 ISSUE 3

Plot Date: Mar 25, 2021 - 8:59am C:\users\pfar\appdata\local\projectwise\watercare_ltd_projects\dms52245\ 2011811.043.dwg

Appendix C. Preliminary Site Investigation

Central Interceptor & Associated Works

Western Springs Access Way Preliminary Site Investigation

JNZ-RPT-00006 | 1

02 March 2021

Watercare Services Ltd

5747

Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
A	21 May 2020	First draft for internal review	GH		KT	
1	8 June 2020	Final draft for release	KT	GH	TH	KT
2	18 February	Final for lodgement	KT	GH	TH	KT

Distribution of copies

Revision	Issue approved	Date issued	Issued to	Comments

Central Interceptor & Associated Works

Project No:	IZ027501
Document Title:	Western Springs Access Way Preliminary Site Investigation
Document No.:	JNZ-RPT-00006
Revision:	1
Document Status:	FINAL
Date:	02 March 2021
Client Name:	Watercare Services Ltd
Client No:	5747
Project Manager:	Paul McClean
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Contents

Executive Summary

This report presents a Preliminary Site Investigation (PSI) to support resource consent applications by Watercare for the construction of a new access way at the Western Springs Stadium main construction site WS1 (the site), associated with the Central Interceptor (CI) Project. In the original RMA approvals for the CI Project, construction traffic entered the site from Bullock Track with the exit to northern end of Stadium Road. The current proposal is to construct a new section of access way parallel to Stadium Road with the exit closer to Great North Road. The site is currently used as sport fields, which is an activity listed under the Ministry for the Environment (MfE) Hazardous Activities and Industries List (HAIL) as category A10 site - Persistent pesticide bulk storage or use. The approval for the original construction works was therefore supported by a PSI and subsequent Detailed Site Investigation (DSI) reported in 2012 by Tonkin &Taylor.

The 2012 investigations confirmed that the site had been in use as recreational space since at least 1940, with no material change of use identified to the date of the report. A former landfill was also identified to the northwest of the site that did not extend into the site. Ground investigations identified fill to a maximum depth of 3.1 m overlying natural silt. Elevated (greater than Auckland background) concentrations of contaminants, including metals, total petroleum hydrocarbon (TPH) and polycyclic aromatic hydrocarbon (PAH), were detected in soils within the site. Concentrations were below the Air, Land and Water (ALW) Plan permitted activity soil criteria (discharges), the soil contaminant standards (SCS) for recreational and commercial/industrial land use under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protected Human Health Regulations (NESCS), and the adopted assessment criterion for asbestos. The generally low-level contamination found indicated that the construction works could be appropriately managed to mitigate adverse effects to the environment, subject to the appropriate management of contaminated soils using the procedures set out in a Site Management Plan/Remedial Action Plan (SMP/RAP).

The new access way proposal has triggered the requirement for new resource consent application. Reassessment of the activity status under Chapter E30 (Contaminated Land) of the Auckland Unitary Plan Operative in Part (AUP) and the NESCS has therefore been undertaken by Jacobs, based mainly on information presented in the previous 2012 investigation report, augmented by publicly available information to provide an update on land use.

The information reviewed for this PSI has established that the proposed access way lies within a site used as sports fields since at least 1940 and the site is therefore HAIL (category A10). Topsoil and shallow fill material within the site contain contaminant concentrations exceeding background levels for Auckland soils but that are compliant with the AUP permitted activity criteria, and the SCS in relation to both recreational and commercial industrial land uses. These soils are likely to be disturbed during the access way forming works and will need to be disposed to either a managed fill site or a licenced landfill if not reused on site. Soil disturbance works are relatively shallow and no significant effects on groundwater are expected.

The activity will not meet AUP permitted or controlled activity standards based on the volume of soil disturbance (greater 200 m^3) and the absence of a site specific Detailed Site Investigation (DSI). Discretionary activity status under the AUP will therefore apply. The activity will also not meet permitted activity and/or controlled status under the NESCS based on the volume of soil disturbance and soil disposal (25 m^3 and 5 m^3 per 500 m^2 of area of the piece of land, respectively) and the absence of a site specific DSI. Discretionary activity status under the NESCS will therefore apply.

The soil disturbance works for the access way can be an incorporated into the current SMP/RAP for site works at WS1.

Important note about your report

The sole purpose of this report prepared by Jacobs New Zealand Limited (Jacobs) is to document the findings of a preliminary site investigation in relation to the contamination potential along the proposed alignment of a access road at the Western Springs Central Interceptor site. The contents of the report are in accordance with the scope of services detailed in the terms of engagement between Jacobs and Watercare Services Limited (the Client)

In assessing available information and preparing this report, Jacobs has relied upon and presumed accurate, all information provided by the Client and any third party. Unless otherwise stated in this report, Jacobs has not attempted to verify the accuracy or completeness of any such information and Jacobs accepts no liability to the client and/or any third party for any loss and/or damage incurred as a result of any inaccurate or incomplete information.

The information in this report is derived from data provided by the client, and a number of public domains, including Auckland Council.

It is imperative to note that the Report only considers the site conditions current at the time of investigation, and to be aware that conditions may have changed due to natural forces and/or operations on or near the site. Any decisions based on the findings of the Report must take into account any subsequent changes in site conditions and/or developments in legislative and regulatory requirements. Jacobs accepts no liability to the Client or any third party for any loss and/or damage incurred as a result of a change in the site conditions and/or regulatory/legislative framework since the date of the Report.

Jacobs has prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law. Opinions and judgements expressed in the report are based on Jacobs' understanding and interpretation of current regulatory standards and should not be construed as legal opinions.

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1. Introduction

1.1 Terms of Reference

This report has been prepared for Watercare Services Limited (Watercare) by Jacobs New Zealand Limited (Jacobs). It presents a Preliminary Site Investigation (PSI) to support resource consent applications by Watercare for the construction of a new access way at the Western Springs Stadium main construction site WS1 (the site), associated with the Central Interceptor (CI) Project. The access way will provide access to a CI related shaft site and long-term access for Regional Facilities Auckland (RFA) related vehicles at the stadium (as well as Watercare maintenance vehicles). Resource consents required - include land use consent under section 9 of the Resource Management Act 1991 (RMA) for the disturbance of potentially contaminated soil, and specifically, consent under the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESCS). Additionally, a discharge consent under section 15 of the RMA is required. This is due to the volume of contaminated soil being disturbed exceeding 200m^3 without a site specific DSI being prepared.

The background to and overview of the CI project are presented in Appendix A.

1.2 Background to the PSI

In the original RMA approvals for the CI Project, construction traffic entered the site from Bullock Track with exit to northern end of Stadium Road. The current proposal is to construct a new section of road parallel to Stadium Road with the exit closer to Great North Road.

The site currently comprises sports fields, which is an activity listed under the Ministry for the Environment (MfE) Hazardous Activities and Industries List (HAIL) as category A10 site - Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds (MfE 2011)[1]. The approval for the originally proposed works at the site was therefore supported by a PSI and subsequent Detailed Site Investigation (DSI), reported in 2012 by Tonkin &Taylor (T+T, 2012)[2].

As described above, it is now proposed to construct a new section of access road to run along the south-western boundary of the sports fields to within about 10 m of the intersection of Stadium Road and Great North Road. In addition, a raingarden will be constructed to address stormwater flows coming from the access road. These works have triggered the requirement for resource consent, as well as confirmation of their activity status under Chapter E30 (Contaminated land) of the Auckland Unitary Plan Operative in Part (AUP) and the NESCS.

1.3 Objective of the PSI

The objective of this PSI is to provide information on ground contamination in relation to the proposed new access way, to support the resource consent application.

1.4 Scope of Work

This PSI has comprised a desk top review of existing information describing the contamination status of the site sourced primarily from T+T (2012) and the CI Assessment of Effects on the Environment (AEE) report[3]. These documents present a comprehensive description of the environmental setting and contamination status of the site as of 2012. This information has been augmented by the review of publicly available information, including

[1] Ministry for the Environment 2011. Hazardous Activities and Industries List (HAIL), October 2011. https://www.mfe.govt.nz/land/hazardous-activities-and-industries-list-hail

[2] T+T 2012. Desk Study and Ground Contamination Assessment – Main Works, Central Interceptor Project. Report prepared for Watercare Services Ltd by Tonkin & Taylor Ltd, July 2012, ref T&T: 26145.400

[3] Central Interceptor Main Project Works. Assessment of Effects on the Environment Part B – Site Specific Assessments. Watercare Services limited August 2012.

aerial photographs from Auckland Council Geomaps[4] to assess material changes in land use within the site and environs between 2012 and 2020.

Key supporting information is appended.

1.5 Report Status

This PSI report has been prepared by Kevin Tearney, CEnvP SC, a Suitably Qualified and Experienced Practitioner (SQEP) as described under the NESCS, in general accordance with MfE Contaminated Land Management Guideline (CLMG) No 1 Reporting on Contaminated Sites in New Zealand.

[4] https://geomapspublic.aucklandcouncil.govt.nz/viewer/index.html

2. Site Description

2.1 Location and land Use

The site is located at Western Springs Stadium, Outer Playing Fields, 731 Great North Road, Grey Lynn, as shown in Figure 2.1.

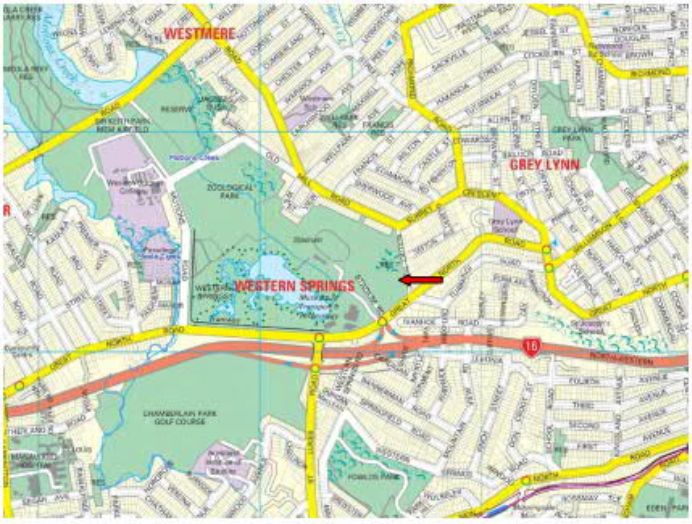

Figure 2.1: Site Location (from AEE 2012)

A site description is summarised in Table 2.1.

Table 2.1: Site Description.

Site Description	
Address	731 Great North Road Grey Lynn
Legal Description	Lot 12 DP 168863
Title	NA103A/1
Owner	Regional Facilities Auckland Ltd
Main Construction site area	~approx. 1,000 m^2
Zoning	Special Purpose – Major Recreation Facility
Site Description	Grassed flat land adjacent to the sports fields at Western Springs and the entrance to Western Springs Stadium.
Surrounding land use	
North	Steep vegetated slope which rises to Old Mill Road at the top of the ridge leading to residential housing
East	Bullock Track connecting Great North Road to the south to Mill Road to the north, leading to residential housing to the east and car yard located on the corner of Great North Road and Bullock Track.
South	Sports fields leading to Great North Road and State Highway (SH 16)

Site Description	
West	Western Springs Stadium and Stadium Road, leading to Western Springs Park and the Museum of Transport and Technology (MOTAT)

2.2 Geology, Hydrogeology and Surface Water

The surface geology of the site is described by Kermode (1992)[5] and is presented in Appendix B. It comprises Tauranga Group alluvial deposits at the base of the ridge rising to the north of the site formed by sandstones and mudstones of the Waitemata Group. Basaltic lava flows with variable cover of tuff and ash are present to the south and west of the site.

T&T (2012) describes geotechnical borehole logs within and in proximity of the site recording up to approximately 2 m of fill underlain by alluvial sediments inferred to be estuarine muds. The fill comprised clays and silt intermixed with occasional gravel and bricks. Groundwater was generally encountered at approximately 2.5 m below ground level. Geological logs are presented in Appendix C.

The site lies within the Motion Creek surface catchment which has an area of some 7.5 km^2. Motions Creek is largely spring fed by groundwater discharge from adjacent basalt lava flows. It rises close to Western Springs Lake which is an artificial reservoir constructed by the Auckland City Council in 1875 to contain the water from the basalt aquifer (Russell and Rodgers, 1977)[6]. Motions Creek discharges to the Waitemata Harbour at Westmere, approximately 1.5 km northwest of the site (Figure 2.2).

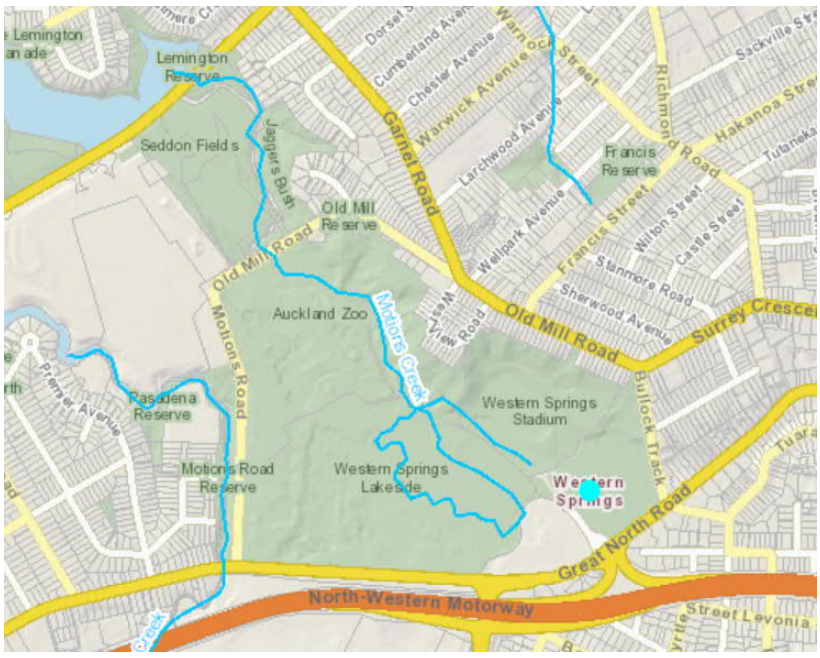

Figure 2.2: Location of Motions Creek (from Auckland Council Geomaps)

[5] Kermode, L.O. 1992. Geology of the Auckland urban area: sheet R11. Scale 1:50 000. Institute of Geological & Nuclear Sciences geological map 2. Institute of Geological & Nuclear Sciences, Lower Hutt. 1 map + 63 p

[6] W. J. Russell & K. A. Rodgers (1977) Waters of the western spring catchment, Auckland, New Zealand Journal of Marine and Freshwater Research, 11:4, 713-728, https://doi.org/10.1080/00288330.1977.9515708

2.3 Site History

2.3.1 Data Sources

The historical development of the site is described in T+T (2012), based on a desk top review of inhouse and publicly available information, including aerial photographs and the following records and information held by Auckland Council (AC):

- special land feature map
- property file
- contaminated land enquiry information regarding land use and pollution incidents.
- certificates of title to determine property ownership details.

The information as presented by T+T (2012) is provided in Appendix D.

2.3.2 Assessment

The aerial photograph review showed the site was a level grassed area, possibly sports fields, from at least 1940. The Western Springs Stadium structure was also present at that time. Land to the north of the site leading to Mill Road was covered in vegetation, inferred to be trees. Residential land use was well established to the north and east of the site. Subsequent aerial photographs reviewed by T+T (2012) showed no material change in land use at the site up to 2008.

No evidence of material change has been identified by Jacobs from review of available aerial photographs between 2008 and 2020. Current land use is sports fields.

The T+T (2012) review identified the likely presence of unclassified fill within the site potentially impacted by the presence of low concentrations of metals, petroleum hydrocarbons and possibly asbestos containing material (ACM). No pollution incidents affecting the site were identified. The review also identified the presence of a landfill within the former vegetated area to the northwest of the site. The lateral extent of the landfill is shown in Figure G1 in Appendix C. The southern boundary of the landfill as shown lies approximately 150 m north of the proposed access way at its closest point and landfill does not extend below the site.

Jacobs notes that the aerial photograph from 1959 shows evidence of ground disturbance within two of the vegetated areas to the north and northwest of the site. It is unclear whether the soil disturbance is related to vegetation removal/harvesting of timber only, or to landfill activities, as the area to the northwest of the site appears to overlap part of the landfill identified from Council records by T+T (2012). The aerial photograph is shown as Figure 2.3.

Figure 2.3: Aerial Photograph 1959; blue dot marks general site location (from Auckland Council Geomaps)

2.4 Site Investigations

2.4.1 Description

Site investigation works were undertaken between 21 October and 11 November 2011 to assess the contamination status of soils that would be disturbed during development works. The investigation works comprised one hand augered hole (HA2) to a depth of 1 m below ground level (m bgl) and nine machine excavated test pits (TP01-TP09) to depths between 2.2 m and 3.2 m bgl, distributed across the site. TP2 was located at the proposed shaft location. The investigation locations on the main construction site were spaced about 25 m apart to give a 15 m radius hotspot detection to 95% confidence.

The investigation locations are shown on Figure G1 in Appendix C. As they are located approximately 120 m northeast of the proposed access way, the results are considered to be indicative only of the ground conditions. The geological logs for each investigation location are attached in Appendix C.

It is reported that soil samples were collected from the surface of the test pits or hand augers, from 0.25 m bgl and a selection of depths thereafter, using a stainless-steel trowel and/or freshly gloved hand. All samples were placed immediately into 300 ml glass jars in accordance with MfE sampling protocols. The trowel was decontaminated between each sample location using clean potable water and Decon 90 (a phosphate-free detergent).

A Photo-Ionisation Detector (PID) was also used to monitor concentrations of volatile organic compounds (VOC) in the headspace of selected soil samples. Landfill gas monitoring was also undertaken using a portable landfill gas meter.

Twelve primary samples and one duplicate sample representative of topsoil, fill and natural ground were shipped in chilled containers under chain of custody documentation to Watercare Laboratories Ltd, Māngere. Two samples were also sent to Dowdell & Associates, Penrose. The sample and analysis schedule is presented in Table 2.2.

Table 2.2: Sample and Analysis Schedule

Location	Depth (m bgl)	Soil Type	Analytical Suite
TP01	0	Topsoil	Metals, PAH, TPH
TP02	2	Natural Ground	Metals, PAH, TPH
TP03	0.5	Fill	Asbestos bulk fibre analysis
TP03	1	Fill	Metals, PAH, TPH
TP04	0	Topsoil	Metals, PAH, TPH
TP04	2	Natural Ground	Metals, PAH, TPH
TP05	0.25	Natural Ground	Metals, PAH, TPH
TP06	0.5	Fill	Metals, PAH, TPH
TP07	0	Topsoil	Metals, PAH, TPH
TP08	0.25	Fill	Asbestos bulk fibre analysis
TP08	0.5	Fill	Metals, PAH, TPH
TP09	0.25	Topsoil	Metals, PAH, TPH
HA2	0	Topsoil	Metals, PAH, TPH

PAH-Polycyclic aromatic hydrocarbon

TPH-Total petroleum hydrocarbons

Laboratory reports and tabulated data are presented in Appendix C.

2.4.2 Investigation Results

2.4.2.1 Soils Encountered

Fill material was encountered at three locations (HA1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9 and TP10) between 0.3 m and 3.1m depth. The fill material was variable and consisted of silt with ceramic tile fragments, silt with sand and scoria gravel and large fragments of wood, and large scoria gravels in a silt matrix. Natural ground comprising silt inferred to be East Coast Bay Formation of the Waitemata Group was encountered at all the investigation locations except at test pit TP6 where the fill extended to the base of the test pit (3.1 m bgl).

No evidence of any soil discolouration or odour were reported in the fill and natural materials. Headspace VOC concentrations measurements were generally less than 10 ppm, with a maximum of 35 ppm within fill at test pit TP6. Landfill gas readings recorded ‘normal ambient’ levels.

ACM was not observed in any of the fill material encountered during the investigations.

2.4.2.2 Groundwater

Groundwater was not encountered in the test pits or hand augers although the soils near the base of the test pits were saturated. Groundwater depth was inferred likely to be less than 5 m bgl.

2.4.2.3 Soil Analyses Results

The soil analytical results are summarised in the results tables presented in Appendix C and were assessed against the assessment criteria presented in Appendix E. The assessment criteria included:

1) Soil Contaminant Standards (SCS) from the NESCS in relation to commercial/industrial outdoor worker (unpaved) land use scenario (post works) and for recreational/parkland for continued use of the site as a reserve,

2) Permitted Activity (PA) Soil Criteria from the Auckland Council Air, and Water (ALW) Plan,

3) Background Concentrations in Inorganic Elements in Soils from the Auckland Region

4) Auckland Council generic cleanfill and managed fill criteria, and

5) Manukau City Council agreed guideline for asbestos fibre in residential soil in New Zealand of 0.001%, adopted in the absence of New Zealand specific guideline values.

Key findings are summarised below;

- All metals, TPH and PAH results were below the ALW Plan PA soil criteria (discharges) and the NESCS SCS for commercial/industrial and recreational/parkland scenario.
- Contaminant concentrations for arsenic exceeded the defined background concentrations for Auckland soils in two samples.
- Trace to low levels of PAH and TPH were present in topsoil and some fill samples, indicating some anthropogenic contamination and exceedance of expected background concentrations.
- All the samples contained metals, TPH and/or PAH concentrations that exceeded the Auckland Council default cleanfill criteria.
- The natural soil sample at the proposed shaft location at TP2 showed metals and TPH concentrations below the Auckland Council default cleanfill criteria but detected low concentrations of PAH. The low PAH concentrations were close to the laboratory detection limit and within the analytical testing variation.
- Of the two samples tested for asbestos fibres, one sample from TP3 at 0.5 m depth detected Chrysotile as one loose fibre group (0.00001%), below the assessment criterion of 0.001%.

2.4.2.4 Conclusions and development implications

The key conclusions of the site investigation works were as follows:

- The landfill identified to the northwest of the site did not extend onto the site.
- Fill encountered generally contained low level contamination unlikely to pose a risk to workers or future users.
- Topsoil and fill from the site were not suitable for disposal to a general cleanfill site and would require disposal to either a managed fill site or a licensed landfill.
- The natural soils underlying the fill should be suitable for disposal to a general cleanfill site, subject to further testing.
- The construction works will need to be managed to minimise the potential and actual effects of contaminated soil discharges during the proposed works.

Strategies, precautionary mitigation measures and health and safety requirements were provided in a draft Site Management Plan/Remedial Action Plan (SMP/RAP).

3. Reassessment of Guideline Criteria under the AUP and NESCS

3.1 AUP

The AUP has replaced the ALW plan. Chapter E3O of the AUP addresses the effects of discharges of contaminants from contaminated land or land containing elevated levels of contaminants into air, water or onto land. Table E30.4.1 Activity Table lists the status of activities undertaken on contaminated land as Permitted (A1 to A5), Controlled (A6) or Discretionary (A7).

Permitted activity Standard (E30.6.1) requirements include:

- E30.6.1.2. Discharges of contaminants into air, or into water, or onto or into land from disturbing soil on land containing elevated levels of contaminants;
  - limitations on the volume of soil disturbance (e.g., maximum 200 m3 per site) and
  - duration of works (not to exceed two months).
- E30.6.1.4. Discharges of contaminants into air, or into water, or onto or into land from land not used for rural production activities;
  - soil contaminant maximum concentration limits comprising

    Tier 1 acceptance criteria from Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, Ministry for the Environment (Revised 2011)

    Table E30.6.1.4.1 Permitted activity soil acceptance criteria

Elevated levels of contaminants relate to the exceedance of soil concentrations provided in AUP Table E30.6.1.4.2 Background ranges of trace elements in Auckland soils sources from Table 3 of TP153:20001 Background Concentrations of Inorganic Elements in Soils from the Auckland Region. However, a precautionary approach has been employed as the site, while noting that no elevated levels of these contaminants have yet been found within the access way works area.

Controlled activity Standard (E30.6.2) relates to discharges of contaminants into air, or into water, or onto or into land not meeting permitted activity standards E30.6.1.1; E30.6.1.2; E30.6.1.3; E30.6.1.4; or E30.6.1.5. Requirements include:

- E30.6.2.1. (1) A detailed site investigation (contaminated land) prepared and submitted to Council for consideration

Discretionary status applies to activities not meeting controlled activity Standard E.30.6.2.1.

Chapter E30 is attached as Appendix F.

3.1.1 Activity Status Assessment

The information obtained to date indicates that the activity will not meet permitted activity status based on the volume of soil disturbance.

The criteria used in T+T (2012) to assess the significance of contaminants in soil in relation to the ALW Plan are the same criteria required under the AUP. The assessment criteria are therefore appropriate for the purposes of this PSI in relation to the AUP. However, as the sampling locations were placed approximately 120 m northeast of the proposed access way, the T+T (2012) investigation, a precautionary approach has ben taken. As such, the previous T+T (2012) investigation is not considered to be a DSI in relation to the new works. The activity is therefore a discretionary activity under the AUP.

3.2 NESCS

The NESCS is intended to provide a nationally consistent approach to the assessment and management of contaminants in soil in relation to human health. It applies to HAIL sites and activities on associated pieces of land. Activities include soil disturbance and offsite disposal for which permitted activity thresholds of 25 m^3 and 5 m^3 per 500 m^2 of area of the piece of land, respectively have been established.

SCS for metals, TPH and PAH from the NESCS were used in T+T (2012) to assess the significance of contaminants in soil in relation to human health. These SCS criteria have not changed since 2012. The results of the assessment are therefore appropriate for the purposes of this PSI in relation to the NESCS.

Notes on the application of the NESCS are presented in Appendix G.

3.2.1 Asbestos

Nationally agreed assessment criteria for asbestos in soil were not available in 2012. T+T (2012) used an adopted value of 0.001% asbestos fibres.

Guidelines for assessing and managing asbestos in soil in New Zealand were published in 2017 (BRANZ, 2017)[7]. The guidelines include description of appropriate sampling and analysis methods and provide risk-based guideline criteria for asbestos in soil. These criteria are relevant for use in New Zealand as environmental guideline values under the NESCS. Table 5 from the guidelines is presented as Table 3.1 below.

Two soil samples were analysed by T+T (2012) for asbestos by an accredited laboratory using Low Powered Stereomicroscopy followed by Polarised Light Microscopy. One loose fibre group was detected in the >2 mm fraction of the total sample, weighing 0.00001g calculated as 0.00001% of the total sample. No ACM was observed.

This result appears to comply with the guideline value for both recreational and commercial industrial land use. It is also expected that remaining fill will be capped by pavement subsequent to the works. It is noted that the asbestos detection method used is different to the methodologies described in BRANZ (2017).

[7] BRANZ 2017 New Zealand Guidelines for assessing and managing asbestos in soil

Table 3.1: Table 5 Guideline Values (from BRANZ, 2017)

Form of asbestos		Soil guideline values for asbestos (w/w)			
		Residential[1]	High-density residential[2]	Recreational[3]	Commercial and industrial[4]
ACM (bonded)		0.01%	0.04%	0.02%	0.05%
FA and/or AF[5]		0.001%			
All forms of asbestos – surface		No visible asbestos on surface soil[6]			
Capping requirements for residual contamination above selected soil guideline value					
Depth[7]	Hard cap	No depth limitation; no controls – except for long-term management			
	Soft cap	≥0.5 m			≥0.2 m

Notes:

1. **Residential**: Single dwelling site with garden and/or accessible soil. Also includes daycare centres, preschools, primary and secondary schools and rural residential.
2. **High-density residential**: Urban residential site with limited exposed soil/soil contact, including small gardens. Applicable to urban townhouses, flats and ground-floor apartments with small ornamental gardens but not high-rise apartments (with very low opportunity for soil contact).
3. **Recreational**: Public and private green areas and sports and recreation reserves. Includes playing fields, suburban reserves where children play frequently and school playing fields.
4. **Commercial and industrial:** Includes accessible soils within retail, office, factory and industrial sites. Many commercial and industrial properties are well paved with concrete pavement and buildings that will adequately cover/cap any contaminated soils.
5. **FA and/or AF:** Where free fibre is present at concentrations at or below 0.001% w/w, a proportion of these samples should be analysed using the laboratory analysis method described in section 5.4.4 (≈10% of samples). This is due to limitations in the AS 4964-2004 and WA Guidelines 500 ml sample method for free fibre (see section 5.4 for more information).
6. **Surface:** Effective options include raking/tilling the top 100 mm of asbestos-contaminated soil (or to clean soil/fill if shallower to avoid contaminating clean material at depth) and hand picking to remove visible asbestos and ACM fragments or covering with a soft cap of virgin natural material (VNM) 100 mm thick delineated by a permeable geotextile marker layer or hard cap. Near-surface fragments of ACM can become exposed in soft soils such as sandy pumiceous soils after periods of rain.
7. **Depth:** Capping is used where contamination levels exceed soil guideline values. Considerations of depth need to incorporate the type and likelihood of future disturbance activities at the site and site capping requirements (see section 6.1). Ideally, any capping layer should be delineated by a permeable geotextile marker layer between the cap and underlying asbestos/contaminated material. Institutional controls must be used to manage long-term risks, particularly where the cap may be disturbed (see section 7). Two forms of capping are typically used:
   a. Hard cap comprises surfaces that are difficult to penetrate and isolate the asbestos contamination, such as tar seal or concrete driveway cover. This would typically not include pavers or decking due to maintenance and coverage factors.
   b. Soft cap consists of a layer(s) of material which either comprise virgin natural material or soils that meet the asbestos residential soil guideline value from an on-site source. Use of on-site soils may require resource consent.

Table 5: Soil guideline values for asbestos in New Zealand

3.2.2 Activity Status

The information obtained to date indicates that the activity may not meet permitted activity status based on the volume of soil disturbance and soil disposal. In addition, as the previous investigation is not considered to constitute a DSI, the activity will be subject to Regulation 11, and will be a discretionary activity under the NESCS.

4. Conclusions and Recommendations

The information reviewed for this PSI has established the following:

1) The proposed access way lies within a site used as sports fields since at least 1940.
2) The site is therefore HAIL (category A10).
3) Topsoil and fill material within the site and by inference, below the proposed access way, contain contaminant concentrations exceeding background levels for Auckland soils but that are compliant with SCS from the NESCS in relation to both recreational and commercial industrial land uses. These soils are likely to be disturbed during the road forming works.
4) Disturbed topsoil and fill not reused on site will need to be disposed to either a managed fill site or a licenced landfill.
5) Shallow groundwater is present at 2.5 m bgl or greater within inferred estuarine silts. No significant impact on groundwater is expected.
6) Using a precautionary approach (given the limited contamination reporting for this area of Western Springs), it is assessed that the activity will not meet AUP permitted or controlled activity status based on the volume of soil disturbance (greater 200 m^3) and duration of the works (two months); and the absence of a site specific DSI, respectively. Discretionary activity status under the AUP will therefore apply.
7) The activity may also not meet permitted activity or controlled status under the NESCS based on the volume of soil disturbance and soil disposal (25 m^3 and 5 m^3 per 500 m^2 of area of the piece of land, respectively) and the absence of a site specific DSI. Discretionary activity status under the NESCS will therefore apply.
8) The soil disturbance works for the access way can be an incorporated into the current SMP/RAP for site works at WS1.

Appendix A. Geological Map

Motions Road
Western Springs Depot
Western Springs
Norgrove Avenue
Rawalpindi Reserve
Mt Albert War Memorial Reserve
Lyon Avenue
Haverstock Road
Walmsley Park
May Road
PS25
Whitney Street
Miranda Reserve
Dundale Avenue
Haycock Avenue
Keith Hay Park
PS23
Kiwi Esplanade
Pump Station
Mangere WWTP

Waitemata Harbour
Manukau Harbour

LEGEND

Main Tunnel

Link Tunnel

Construction Sites:

Large >5000m^2

Intermediate 1000 & 5000m^2

Small ≤ 1000m^2

avl Basalt & basanite lava

avs Basalt & basanite scoria

avt Lithic tuff

ta Undifferentiated alluvium

tp Puketoka Formation

re East Coast Bays Formation

SCALE 1: 35,000

0 350 700 1050 1400 1750 (m)

Aerial photo sourced from Terralink International
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L:\26145\26145.400\WorkingMate

Tonkin & Taylor
Environmental and Engineering Consultants
105 Carlton Gore Road, Newmarket, Auckland
www.tonkin.co.nz

DRAWN	RBS	Jan.12
DRAFTING CHECKED		
APPROVED		
CADFILE : 26145.400–Geology.dwg		
SCALES (AT A3 SIZE) 1: 35000		
PROJECT No. 26145.400		

waterCare services limited

CENTRAL INTERCEPTOR

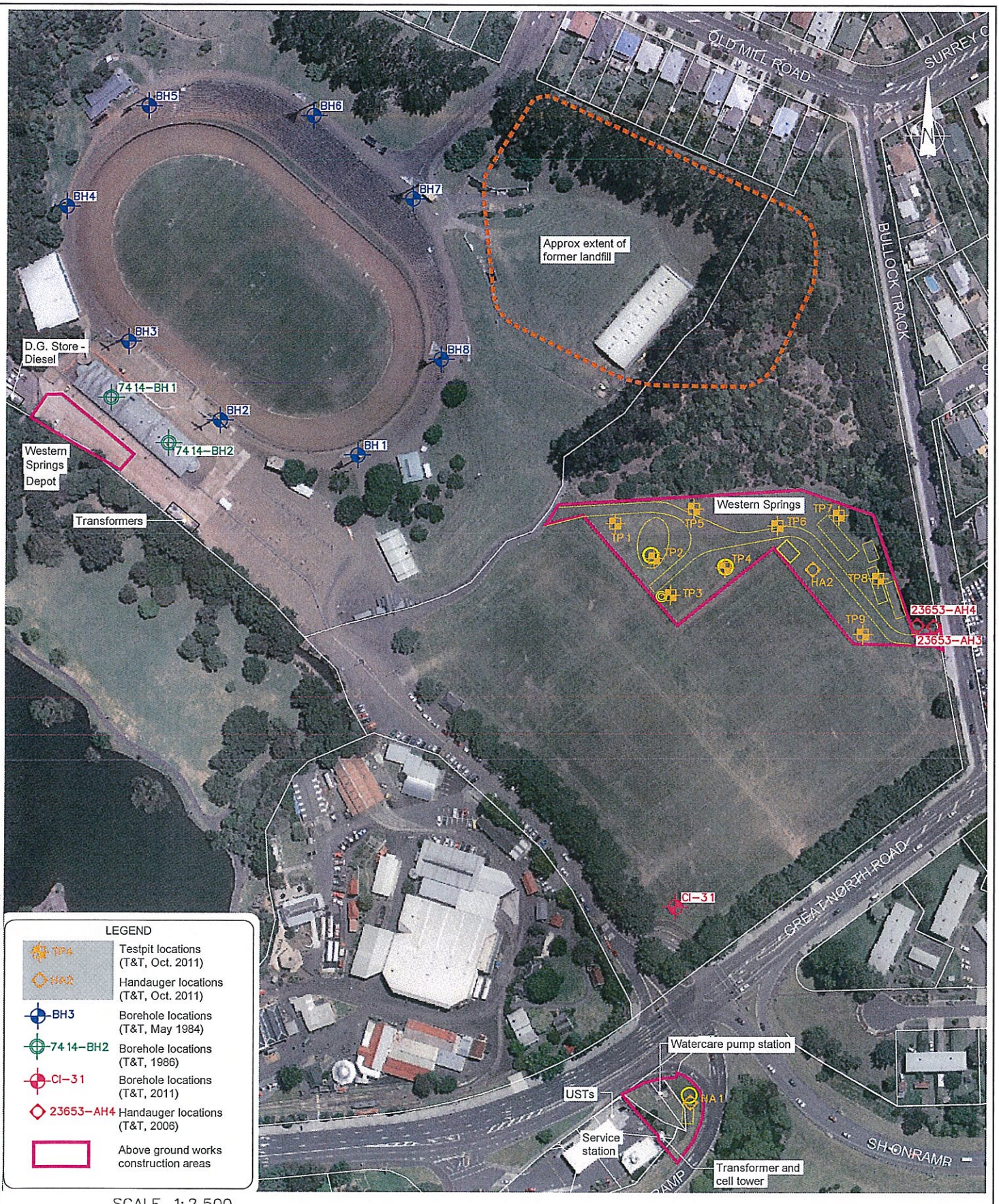
Geology Plan

FIG. No. Figure 2

REV. 0

Appendix B. DSI Report Appendix G (T+T, 2012)

Appendix G: Western Springs Outer Fields Site Investigation Information



L:\26 145\26 145.400\WorkingMaterial\CAD\26 145.400–FG–1.dwg F–WS 16/12/2011 2:33:20 p.m.

Aerial photo sourced from Terralink International Copyright 2002-2005 Terralink International Limited and its licensors).
Property boundaries sourced from Land Information New Zealand data as at 8-Aug-2011 (Crown Copyright Reserved).
Extent of former landfill source from drawing "Location of All Known Refuse Landfills in Auckland City", produced by Tonkin & Taylor, January 1993.

Tonkin & Taylor Environmental and Engineering Consultants 105 Carlton Gore Road, Newmarket, Auckland www.tonkin.co.nz	DRAWN: RBS Dec. 11 DRAFTING CHECKED: APPROVED: CADFILE : 26 145.400–FG– 1.dwg SCALES (AT A4 SIZE): 1: 2500 PROJECT No. 26 145.400	Water Care services limited CENTRAL INTERCEPTOR Western Springs Outer Field – Testpit Location Plan FIG. No. Figure G– 1 REV. 0

TONKIN & TAYLOR LTD

BOREHOLE LOG

BOREHOLE No: HA1
Hole Location:

SHEET 1 OF 1

PROJECT: Western Springs | LOCATION: Auckland | JOB No: 26145.400

CO-ORDINATES | DRILL TYPE: Handauger | HOLE STARTED: 10/11/11

HOLE FINISHED: 10/11/11

R.L. m | DRILL METHOD: 50mm diameter Auger | DRILLED BY: City Parks

DATUM | DRILL FLUID: | LOGGED BY: CF | CHECKED: LP

GEOLOGICAL | ENGINEERING DESCRIPTION

GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION.	FLUID LOSS	WATER	CORE RECOVERY (%)	METHOD	CASING	TESTS	SAMPLES	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION / WEATHERING	STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa)	COMPRESSIVE STRENGTH (MPa)	DEFECT SPACING (mm)	SOIL DESCRIPTION / ROCK DESCRIPTION
TOPSOIL				Hand Auger		PID=1.8											TOPSOIL: SILT, with gravels, dark brown, reddish brown inclusions of SILT and abundant organics
FILL									0.5			M	F				Clayey SILT, dark brown mottled orange brown and light grey in places, firm, moist, contains peat inclusions [REWORKED FILL] 0.5
						PID=1.3			1.0								**END OF BOREHOLE AT 0.8m.** Hit brick - abandoned hole. 1.0
									1.5								1.5
									2								

Soil description: Soil type, minor components, plasticity or particle size, colour.

Rock description: Substance: Rock type, particle size, colour, minor components. Defects: Type, inclination, thickness, roughness, filling.

T+T DATATEMPLATE.GDT cf

BORELOG 26145.400.GPJ 16/2/12

TONKIN & TAYLOR LTD

BOREHOLE LOG

BOREHOLE No: HA2
Hole Location:

SHEET 1 OF 1

PROJECT: Western Springs | LOCATION: Auckland | JOB No: 26145.400

CO-ORDINATES | DRILL TYPE: Handauger | HOLE STARTED: 10/11/11

HOLE FINISHED: 10/11/11

R.L. m | DRILL METHOD: 50mm diameter Auger | DRILLED BY: City Parks

DATUM | DRILL FLUID: | LOGGED BY: CF | CHECKED: LP

GEOLOGICAL | ENGINEERING DESCRIPTION

GEOLOGICAL UNIT, GENERIC NAME, ORIGIN, MINERAL COMPOSITION.	FLUID LOSS	WATER	CORE RECOVERY (%)	METHOD	CASING	TESTS	SAMPLES	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MOISTURE CONDITION / WEATHERING	STRENGTH/DENSITY CLASSIFICATION	SHEAR STRENGTH (kPa) 10 25 50 100 200	COMPRESSIVE STRENGTH (MPa) 5 20 50 100 250	DEFECT SPACING (mm) 60 200 600 2000	SOIL DESCRIPTION: Soil type, minor components, plasticity or particle size, colour. ROCK DESCRIPTION: Substance: Rock type, particle size, colour, minor components. Defects: Type, inclination, thickness, roughness, filling.
TOPSOIL																	TOPSOIL: SILT, with gravels, dark brown, reddish brown inclusions of SILT and abundant organics
NATURAL						21ppm			0.5								SILT, orange brown
																	Sandy SILT, light purplish grey
						31ppm			1.0								END OF BOREHOLE AT 1m.
									1.5								
									2								

T+T DATATEMPLATE.GDT cf

TONKIN & TAYLOR LTD

EXCAVATION LOG

EXCAVATION No: TP1
Location: Refer site plan.

SHEET 1 OF 1

PROJECT: Watercare Wastewater Treatment Plant	LOCATION:	JOB No: 26145.400
CO-ORDINATES:	EXPOSURE TYPE:	EXCAV. STARTED: 21/10/11
	EQUIPMENT: 5 1/2 Tonne Digger	EXCAV FINISHED: 21/10/11
R.L. m	OPERATOR: City Parks	LOGGED BY: CF
DATUM	DIMENSIONS:	CHECKED BY: LP

EXCAVATION TESTS | ENGINEERING DESCRIPTION | GEOLOGICAL

PENETRATION 1 2 3	SUPPORT	WATER	SAMPLES, TESTS	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL NAME, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION / WEATHERING	STRENGTH / DENSITY CLASSIFICATION	ESTIMATED SHEAR STRENGTH (kPa) 10 25 50 100 200	ORIGIN TYPE, MINERAL COMPOSITION, DEFECTS, STRUCTURE	UNIT
					0			TOPSOIL: SILT, with gravels, dark brown, moist	M			TOPSOIL	
								HARDFILL: Greywacke gravels in a dark brown silt matrix, greenish blue, loose		L		FILL	
					0.5			Clayey SILT, dark brown, with inclusions of white and blue clay throughout, contains gravels and brick fragments, stained green in places, firm, moist, strong organics odour		F			
			PID 18.6ppm		1.0								
					1.5								
			20.8ppm		2.0			GRAVELS, in an orange brown silt matrix, loose, wet	W	L			
								END OF TEST PIT AT 2.4m.					
					2.5								
					3.0								
					3.5								

T+T DATATEMPLATE.GDT cf

TONKIN & TAYLOR LTD

EXCAVATION LOG

EXCAVATION No: TP2
Location: Refer site plan.

SHEET 1 OF 1

PROJECT: Watercare Wastewater Treatment Plant	LOCATION:	JOB No: 26145.400
CO-ORDINATES:	EXPOSURE TYPE:	EXCAV. STARTED: 21/10/11
	EQUIPMENT: 5 1/2 Tonne Digger	EXCAV FINISHED: 21/10/11
R.L. m	OPERATOR: City Parks	LOGGED BY: CF
DATUM	DIMENSIONS:	CHECKED BY: LP

EXCAVATION TESTS | ENGINEERING DESCRIPTION | GEOLOGICAL

PENETRATION 1 2 3	SUPPORT	WATER	SAMPLES, TESTS	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL NAME, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION / WEATHERING	STRENGTH / DENSITY CLASSIFICATION	ESTIMATED SHEAR STRENGTH (kPa) 10 25 50 100 200	ORIGIN TYPE, MINERAL COMPOSITION, DEFECTS, STRUCTURE	UNIT
					0			TOPSOIL: SILT, dark brown, with gravels and plastic remnants, soft, moist	M	S		TOPSOIL	
					0.5			SILT, dark brown with lenses of grey/blue clay, contains gravels and inclusions of clay, firm, moist				FILL	
			PID 0ppm		1.0			SAND, orange brown, loose, wet	W	L			
			0ppm		2.0			SILT, with trace sand, dark brown mottled blue, soft, wet		S		ESTUARINE MUDS	
					2.5			**END OF TEST PIT AT 2.5m.** Maximum digger reach.					
					3.0								
					3.5								

T+T DATATEMPLATE.GDT cf

TONKIN & TAYLOR LTD

EXCAVATION LOG

EXCAVATION No: TP3
Location: Refer site plan.

SHEET 1 OF 1

PROJECT: Watercare Wastewater Treatment Plant	LOCATION:	JOB No: 26145.400
CO-ORDINATES:	EXPOSURE TYPE:	EXCAV. STARTED: 21/10/11
	EQUIPMENT: 5 1/2 Tonne Digger	EXCAV FINISHED: 21/10/11
R.L. m	OPERATOR: City Parks	LOGGED BY: CF
DATUM	DIMENSIONS:	CHECKED BY: LP

EXCAVATION TESTS				ENGINEERING DESCRIPTION							GEOLOGICAL	
PENETRATION 1 2 3	SUPPORT	WATER	SAMPLES, TESTS	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL NAME, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION / WEATHERING	STRENGTH / DENSITY CLASSIFICATION	ESTIMATED SHEAR STRENGTH (kPa) 12 25 50 100 200	ORIGIN TYPE, MINERAL COMPOSITION, DEFECTS, STRUCTURE	UNIT
								SILT, with gravels, dark brown, loose, moist	M	L		FILL	
					0.5			SILT, yellow brown, soft, moist		S			
								SILT, dark reddish brown with lenses of grey/blue clay throughout, firm, moist, no obvious odour		F			
			PID 0ppm		1.0								
					1.5			Clayey SILT, dark purplish grey, with peat inclusions, contains lenses of white clay and greenish blue silt throughout, abundance of organic material, firm, moist					
			10ppm		2.0								
								Clayey SILT, greenish grey (Estuarine Muds), firm, wet, friable	W			ESTUARINE MUDS	
					2.5								
			5ppm		3.0			**END OF TEST PIT AT 3m.**					
					3.5								

T+T DATATEMPLATE.GDT cf

TONKIN & TAYLOR LTD

EXCAVATION LOG

EXCAVATION No: TP4
Location: Refer site plan.

SHEET 1 OF 1

PROJECT: Watercare Wastewater Treatment Plant | LOCATION: | JOB No: 26145.400

CO-ORDINATES:
R.L. m
DATUM

EXPOSURE TYPE:
EQUIPMENT: 5 1/2 Tonne Digger
OPERATOR: City Parks
DIMENSIONS:

EXCAV. STARTED: 21/10/11
EXCAV FINISHED: 21/10/11
LOGGED BY: CF
CHECKED BY: LP

EXCAVATION TESTS | ENGINEERING DESCRIPTION | GEOLOGICAL

PENETRATION 1 2 3	SUPPORT	WATER	SAMPLES, TESTS	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL NAME, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION / WEATHERING	STRENGTH / DENSITY CLASSIFICATION	ESTIMATED SHEAR STRENGTH (kPa) 10 50 100 200	ORIGIN TYPE, MINERAL COMPOSITION, DEFECTS, STRUCTURE	UNIT
					0.5			SILT, dark brown, with gravels and large boulders of greywacke throughout, loose, moist, with plastic	M	L		FILL	
								Clayey SILT, orange brown, with lenses of greenish grey silt and white clay throughout, firm, moist		F			
			PID 0ppm		1.0			SILT, creamy grey, with inclusions of grey and purplish brown clayey silt throughout, firm, moist					
								SILT, dark brown mottled red, with inclusions of whitish grey and green grey silt, firm, moist					
			0ppm		1.5								
					2.0								
								END OF TEST PIT AT 2.2m.					
					2.5								
					3.0								
					3.5								

T+T DATATEMPLATE.GDT cf

TONKIN & TAYLOR LTD

EXCAVATION LOG

EXCAVATION No: TP5
Location: Refer site plan.

SHEET 1 OF 1

PROJECT: Watercare Wastewater Treatment Plant	LOCATION:	JOB No: 26145.400
CO-ORDINATES:	EXPOSURE TYPE:	EXCAV. STARTED:21/10/11
	EQUIPMENT: 5 1/2 Tonne Digger	EXCAV FINISHED: 21/10/11
R.L. m	OPERATOR: City Parks	LOGGED BY: CF
DATUM	DIMENSIONS:	CHECKED BY: LP

EXCAVATION TESTS				ENGINEERING DESCRIPTION							GEOLOGICAL	
PENETRATION 1 2 3	SUPPORT	WATER	SAMPLES, TESTS	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL NAME, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION / WEATHERING	STRENGTH / DENSITY CLASSIFICATION	ESTIMATED SHEAR STRENGTH (kPa) 12 25 50 100 200	ORIGIN TYPE, MINERAL COMPOSITION, DEFECTS, STRUCTURE	UNIT
								TOPSOIL				TOPSOIL	
								SILT, with gravels and organics, dark brown, loose, moist	M	L		FILL	
								SILT, reddish brown with lenses of grey and orange CLAY as above					
					0.5								
			PID 0ppm		1.0								
								CLAY, orange brown mottled grey with lenses of reddish brown silt and dark brwon silt, stiff, moist		St			
					1.5								
								1.9 (approx.)-2.2m (approx.): SILT, yellow brown, firm, wet					
			0ppm		2.0								
								2.2-2.9m (approx.): SILT, orange brown/reddish brown, with inclusions of white clay, soft, wet	W	S			
					2.5								
								SILT, greenish grey mottled blue, with trace sand, soft, wet				ESTUARINE MUDS	
			0ppm		3.0								
								END OF TEST PIT AT 3.2m.					
								Hole filled with water from approx. 1.2m - made logging extremely difficult and depths are approximates.					
					3.5								

TONKIN & TAYLOR LTD

EXCAVATION LOG

EXCAVATION No: TP6
Location: Refer site plan.

SHEET 1 OF 1

PROJECT: Watercare Wastewater Treatment Plant | LOCATION: | JOB No: 26145.400

CO-ORDINATES:
R.L. m
DATUM

EXPOSURE TYPE:
EQUIPMENT: 5 1/2 Tonne Digger
OPERATOR: City Parks
DIMENSIONS:

EXCAV. STARTED: 21/10/11
EXCAV FINISHED: 21/10/11
LOGGED BY: CF
CHECKED BY: LP

EXCAVATION TESTS | ENGINEERING DESCRIPTION | GEOLOGICAL

PENETRATION 1 2 3	SUPPORT	WATER	SAMPLES, TESTS	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL NAME, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION / WEATHERING	STRENGTH / DENSITY CLASSIFICATION	ESTIMATED SHEAR STRENGTH (kPa) 10 25 50 100 200	ORIGIN TYPE, MINERAL COMPOSITION, DEFECTS, STRUCTURE	UNIT
					0			TOPSOIL, abundant organics, soft, moist	M	S		TOPSOIL	
								SILT, dark brown, with plastic and gravels, soft, moist	W			FILL	
					0.5								
			PID 29ppm	x2	1.0			SILT, dark brown mottled reddish orange, contains inclusions and lenses of light brown and greyish white and grey clay throughout, contains medium to large sized gravels of greywacke, firm, moist [FILL]					
					1.5								
			19ppm		2.0								
					2.5			SILT, medium yellow brown, with trace sand, with gravels, soft, wet, water in - hole collapsing from 2.5m					
			35ppm		3.0								
								END OF TEST PIT AT 3.1m.					
					3.5								

T+T DATATEMPLATE.GDT cf

TONKIN & TAYLOR LTD

EXCAVATION LOG

EXCAVATION No: TP7
Location: Refer site plan.

SHEET 1 OF 1

PROJECT: Watercare Wastewater Treatment Plant	LOCATION:	JOB No: 26145.400
CO-ORDINATES:	EXPOSURE TYPE:	EXCAV. STARTED: 21/10/11
	EQUIPMENT: 5 1/2 Tonne Digger	EXCAV FINISHED: 21/10/11
R.L. m	OPERATOR: City Parks	LOGGED BY: CF
DATUM	DIMENSIONS:	CHECKED BY: LP

EXCAVATION TESTS				ENGINEERING DESCRIPTION						GEOLOGICAL	
PENETRATION 1 2 3	SUPPORT	WATER	SAMPLES, TESTS	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL NAME, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION / WEATHERING	STRENGTH / DENSITY CLASSIFICATION	ESTIMATED SHEAR STRENGTH (kPa) 12 25 50 100 200	ORIGIN TYPE, MINERAL COMPOSITION, DEFECTS, STRUCTURE	UNIT
								TOPSOIL: SILT, with fine gravels, dark brown, soft, moist	M	S		TOPSOIL	
					0.5			SILT, dark brown, with plastic and gravels, soft, moist				FILL	
			PID 7.5ppm		1.0			SILT, dark brown mottled reddish orange, contains inclusions and lenses of light brown and greyish white and grey clay throughout, contains medium to large sized gravels of greywacke, firm, moist		F			
					1.5								
					2.0								
					2.5								
								SILT, greenish grey mottled blue, with trace sand, soft, wet [NATURAL]	W	S		ESTUARINE MUDS	
					3.0								
								END OF TEST PIT AT 3.2m.					
					3.5								

T+T DATATEMPLATE.GDT cf

TONKIN & TAYLOR LTD

EXCAVATION LOG

EXCAVATION No: TP8
Location: Refer site plan.

SHEET 1 OF 1

PROJECT: Watercare Wastewater Treatment Plant	LOCATION:	JOB No: 26145.400
CO-ORDINATES:	EXPOSURE TYPE:	EXCAV. STARTED: 21/10/11
	EQUIPMENT: 5 1/2 Tonne Digger	EXCAV FINISHED: 21/10/11
R.L. m	OPERATOR: City Parks	LOGGED BY: CF
DATUM	DIMENSIONS:	CHECKED BY: LP

EXCAVATION TESTS					ENGINEERING DESCRIPTION							GEOLOGICAL	
PENETRATION 1 2 3	SUPPORT	WATER	SAMPLES, TESTS	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL NAME, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION / WEATHERING	STRENGTH / DENSITY CLASSIFICATION	ESTIMATED SHEAR STRENGTH (kPa) 12 25 50 100 200	ORIGIN TYPE, MINERAL COMPOSITION, DEFECTS, STRUCTURE	UNIT
					0			TOPSOIL, abundant organics, soft, moist	M	S		TOPSOIL	
								SILT, with organics and gravels throughout, medium brown, contains inclusions and lenses of whitish grey clay and reddish brown silt, soft, moist				FILL	
			PID 12ppm		1.0								
			4ppm		2.0			Sandy SILT, brownish grey, with inclusions of hard whitish grey silt, soft, wet - hole collapsing from 2.3m, contains limonite staining [NATURAL?]	W			ESTUARINE MUDS	
					2.5			**END OF TEST PIT AT 2.6m.**					
					3.0								
					3.5								

T+T DATATEMPLATE.GDT cf

TONKIN & TAYLOR LTD

EXCAVATION LOG

EXCAVATION No: TP9
Location: Refer site plan.

SHEET 1 OF 1

PROJECT: Watercare Wastewater Treatment Plant	LOCATION:	JOB No: 26145.400
CO-ORDINATES:	EXPOSURE TYPE:	EXCAV. STARTED: 21/10/11
	EQUIPMENT: 5 1/2 Tonne Digger	EXCAV FINISHED: 21/10/11
R.L. m	OPERATOR: City Parks	LOGGED BY: CF
DATUM	DIMENSIONS:	CHECKED BY: LP

EXCAVATION TESTS					ENGINEERING DESCRIPTION						GEOLOGICAL	
PENETRATION 1 2 3	SUPPORT	WATER	SAMPLES, TESTS	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL NAME, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION / WEATHERING	STRENGTH / DENSITY CLASSIFICATION	ESTIMATED SHEAR STRENGTH (kPa) 50 100 200	ORIGIN TYPE, MINERAL COMPOSITION, DEFECTS, STRUCTURE	UNIT
								TOPSOIL: SILT, dark brown, with gravels, loose, dry 0.2m: Geotextile	D	L		TOPSOIL	
					0.5			SILT, medium brown, with gravel inclusions and lenses of peat?, white silt, grey clay and organic materials, firm, moist	M	F		FILL	
			PID 0ppm		1.0								
					1.5			CLAY, orange brown mottled reddish brown, with light grey lenses throughout, stiff, moist		St			
			7ppm		2.0			SILT, greenish grey, fine shelly, partially cemented, wet Waterin around 2.2m	W			ESTUARINE MUDS	
			0ppm		2.5			**END OF TEST PIT AT 2.5m.**					
					3.0								
					3.5								

TONKIN & TAYLOR LTD

EXCAVATION LOG

EXCAVATION No: TP10
Location: Refer site plan.

SHEET 1 OF 1

PROJECT: Watercare Wastewater Treatment Plant	LOCATION:	JOB No: 26145.400
CO-ORDINATES:	EXPOSURE TYPE:	EXCAV. STARTED:21/10/11
	EQUIPMENT: 5 1/2 Tonne Digger	EXCAV FINISHED: 21/10/11
R.L. m	OPERATOR: City Parks	LOGGED BY: CF
DATUM	DIMENSIONS:	CHECKED BY: LP

EXCAVATION TESTS				ENGINEERING DESCRIPTION						GEOLOGICAL	
PENETRATION 1 2 3	SUPPORT	WATER	SAMPLES, TESTS	R.L. (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL NAME, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, SECONDARY AND MINOR COMPONENTS	MOISTURE CONDITION / WEATHERING	STRENGTH / DENSITY CLASSIFICATION	ESTIMATED SHEAR STRENGTH (kPa) 10 50 100 200	ORIGIN TYPE, MINERAL COMPOSITION, DEFECTS, STRUCTURE	UNIT
								TOPSOIL: SILT, dark brown, with gravels, loose, dry 0.2m: Geotextile	D	L		TOPSOIL	
					0.5			SILT, with organics and gravels throughout, medium brown, contains inclusions and lenses of whitish grey clay and reddish brown silt, soft, moist	M	S		FILL	
		▼	PID 0ppm		1.0			SILT, grey, with timber, concrete, plastic, gravels etc, soft, wet Pit filled with water to 0.9m	W				
					1.5								
			0ppm		2.0			CLAY, grey mottled reddish brown and medium brown, stiff, wet [REWORKED NATURAL?]		St			
								SILT, greenish grey, fine shelly, partially cemented, wet Waterin around 2.2m				ESTUARINE MUDS	
					2.5								
			0ppm		3.0			END OF TEST PIT AT 3m.					
					3.5								

T+T DATATEMPLATE.GDT cf

Table 1: Western Springs Reserve Soil Test Results - Metals

Test Description	NES Soil Contaminant Standards (Recreational)[1]	NES Soil Contaminant Standards (Commercial/Industrial)[1]	PARP:ALW Permitted Activity Soil Criteria (Discharges	Unit	TP1 - 0	TP2 - 2	TP3 - 1	TP4 - 0	TP4 - 2	TP5 - 0.25
					Topsoil	Natural	Fill	Topsoil	Natural	Natural
Arsenic	80	70	100	mg/kg	4.2	0.87	2.5	6.7	0.96	2
Cadmium	400	1,300	7.5	mg/kg	0.17	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chromium	NL	NL	400	mg/kg	14	2.6	14	4.9	9.2	9.2
Copper	NL	NL	325	mg/kg	19	5.5	6.9	4.5	7.5	7.1
Lead	880	3,300	250	mg/kg	40	3.9	10	11	4.5	6.7
Mercury	3,300	4,200	0.75	mg/kg	0.071	< 0.05	0.07	< 0.051	< 0.051	< 0.05
Nickel	600[4]	3,000[4]	105	mg/kg	13	2.1	5.3	3.4	2.4	10
Zinc	14,000[4]	35,500[4]	400	mg/kg	74	23	11	16	9.9	30

Test Description	NES Soil Contaminant Standards (Recreational)[1]	NES Soil Contaminant Standards (Commercial/Industrial)[1]	PARP:ALW Permitted Activity Soil Criteria (Discharges	Unit	TP6 - 0.5	TP7 - 0	TP8 - 0.5	TP9 - 0.25	HA1 - 0.5	HA2 - 0
					Fill	Topsoil	Fill	Topsoil	Fill	Topsoil
Arsenic	80	70	100	mg/kg	2.6	19	2.9	5.6	3.9	15
Cadmium	400	1,300	7.5	mg/kg	< 0.1	0.14	< 0.1	< 0.1	< 0.099	0.11
Chromium	NL	NL	400	mg/kg	11	18	12	11	8.8	19
Copper	NL	NL	325	mg/kg	10	20	13	9.2	9	17
Lead	880	3,300	250	mg/kg	9	51	3.2	35	21	64
Mercury	3,300	4,200	0.75	mg/kg	0.051	0.072	< 0.051	0.094	0.087	0.15
Nickel	600[4]	3,000[4]	105	mg/kg	6.7	27	2.2	4.8	12	10
Zinc	14,000[4]	35,500[4]	400	mg/kg	26	69	13	23	39	55

Notes:

Shaded values exceed the PARP:ALW Permitted Activity Soil Criteria (Discharges)

Bold values exceed the NES Soil Contaminant Standards for recreational/commercial use

1 - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health (unless otherwise stated).

2 - PARP:ALW Permitted Activity Soil Criteria - discharges (unless otherwise stated).

3 - ARC, October 2001. TP153 - Background Concentrations of Inorganic Elements in Soils from the Auckland Region.

4 - NEPC, 1999. Guideline on the Investigation Levels for Soil and Groundwater (Recreational/Commercial).

Table 2: Western Springs Reserve Soil Test Results - PAH

	NES Soil Contaminant Standards (Recreational)[2]	NES Soil Contaminant Standards (Commercial/Industrial)[1]	PARP:ALW Permitted Activity Soil Criteria	TP1 - 0	TP2 - 2	TP3 - 1	TP4 - 0	TP4 - 2	TP5 - 0.25	TP6 - 0.5	TP7 - 0	TP8 - 0.5	TP9 - 0.25	HA1 - 0.5	HA2 - 0
				Topsoil	Natural	Fill	Topsoil	Natural	Natural	Fill	Topsoil	Fill	Topsoil	Fill	Topsoil
PAH															
Acenaphthylene	-	-	-	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	0.15	< 0.0100
Acenaphthene	-	-	-	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Anthracene	-	-	-	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	0.26	< 0.0100
Benzo(a)anthracene	-	-	-	0.22	< 0.0100	0.03	0.14	< 0.0100	0.02	< 0.0100	0.07	< 0.0100	0.14	1.73	0.06
Benzo(a)pyrene	-	-	-	0.24	0.07	0.04	0.15	0.01	0.03	< 0.0100	0.05	< 0.0100	0.14	1.09	0.08
Benzo(b)fluoroanthene	-	-	-	0.22	< 0.0100	< 0.0100	0.12	< 0.0100	< 0.0100	< 0.0100	0.1	< 0.0100	0.14	0.98	0.09
Benzo(ghi)perylene	-	-	-	0.11	< 0.0100	0.03	0.07	< 0.0100	0.02	< 0.0100	0.06	< 0.0100	0.07	0.5	0.05
Benzo(k)fluoranthene	-	-	-	0.28	< 0.0100	0.07	0.14	< 0.0100	0.02	< 0.0100	0.07	< 0.0100	0.2	1.16	0.06
Chrysene	-	-	-	0.06	< 0.0100	< 0.0100	0.04	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	0.05	0.88	< 0.0100
Dibenzo(ah)anthracene	-	-	-	< 0.0100	< 0.0100	< 0.0100	0.02	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	0.02	1.94	0.02
Fluoranthene	-	-	-	0.28	< 0.0100	0.06	0.24	< 0.0100	0.04	< 0.0100	0.1	< 0.0100	0.25	3.03	0.12
Fluorene	-	-	-	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Indeno(1,2,3,c,d)pyrene	-	-	-	0.1	< 0.0100	0.02	0.05	< 0.0100	< 0.0100	< 0.0100	0.03	< 0.0100	0.05	0.37	0.03
Naphthalene	230[3]	230[3]	230[3]	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Phenanthrene	-	-	-	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	0.82	< 0.0100
Pyrene	NA[3]	NA[3]	NA[3]	0.4	0.01	0.11	0.32	< 0.0100	0.08	0.01	0.16	< 0.0100	0.32	2.96	0.17
Benzo(a)pyrene equivalent	40	35	2.15	0.33	0.08	0.06	0.22	0.02	0.04	0.01	0.08	0.01	0.21	3.46	0.12
TPH															
C7-C9	8800[3]	8800[3]	8800[3]	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00	-	< 20.00	< 20.00	< 20.00
C10-C14	1900[3]	1900[3]	1900[3]	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00	-	< 20.00	< 20.00	< 20.00
C15-C36	NA[3]	NA[3]	NA[3]	173	< 20.00	< 20.00	79	< 20.00	< 20.00	< 20.00	387	< 20.00	34	39	342

Notes:

Shaded values exceed the PARP:ALW Permitted Activity Soil Criteria (Discharges)

Bold values exceed the NES Soil Contaminant Standards for Recreational/Commercial use

NA - indicates contaminant not limiting as estimated health-based criterion is significantly higher than that likely to be encountered on site.

1 - MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health (unless otherwise stated).

2 - PARP:ALW Permitted Activity Soil Criteria- discharges (unless otherwise stated).

3 - MfE 1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand. Silty Clay, All Pathways, Commercial/Industrial use.

Table 3: Western Springs Reserve Soil Disposal - Metals

Test Description	Auckland Council Generic Cleanfill Criteria	Example Managed Fill Criteria[1]	Unit	TP1 - 0	TP2 - 2	TP3 - 1	TP4 - 0	TP4 - 2	TP5 - 0.25
				Topsoil	Natural	Fill	Topsoil	Natural	Natural
Arsenic	12	30	mg/kg	4.2	0.87	2.5	6.7	0.96	2
Cadmium	0.65	20	mg/kg	0.17	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chromium	55	400	mg/kg	14	2.6	14	4.9	9.2	9.2
Copper	45	325	mg/kg	19	5.5	6.9	4.5	7.5	7.1
Lead	65	250	mg/kg	40	3.9	10	11	4.5	6.7
Mercury	0.45	-	mg/kg	0.071	< 0.05	0.07	< 0.051	< 0.051	< 0.05
Nickel	35	250	mg/kg	13	2.1	5.3	3.4	2.4	10
Zinc	180	1160	mg/kg	74	23	11	16	9.9	30

Test Description	Auckland Council Generic Cleanfill Criteria	Example Managed Fill Criteria[1]	Unit	TP6 - 0.5	TP7 - 0	TP8 - 0.5	TP9 - 0.25	HA1 - 0.5	HA2 - 0
				Fill	Topsoil	Fill	Topsoil	Fill	Topsoil
Arsenic	12	30	mg/kg	2.6	**19**	2.9	5.6	3.9	**15**
Cadmium	0.65	20	mg/kg	< 0.1	0.14	< 0.1	< 0.1	< 0.099	0.11
Chromium	55	400	mg/kg	11	18	12	11	8.8	19
Copper	45	325	mg/kg	10	20	13	9.2	9	17
Lead	65	250	mg/kg	9	51	3.2	35	21	64
Mercury	0.45	-	mg/kg	0.051	0.072	< 0.051	0.094	0.087	0.15
Nickel	35	250	mg/kg	6.7	27	2.2	4.8	12	10
Zinc	180	1160	mg/kg	26	69	13	23	39	55

Notes:

Shaded values exceed the cleanfill criteria

Bold values exceed the example managed fill criteria

1 - Greenmount Fill Acceptance Criteria - Managed Fill

Table 4: Western Springs Reserve Soil Disposal - PAH

	Auckland Council Generic Cleanfill Criteria	Example Managed Fill Criteria[1]	TP1 - 0	TP2 - 2	TP3 - 1	TP4 - 0	TP4 - 2	TP5 - 0.25	TP6 - 0.5	TP7 - 0	TP8 - 0.5	TP9 - 0.25	HA1 - 0.5	HA2 - 0
			Topsoil	Natural	Fill	Topsoil	Natural	Natural	Fill	Topsoil	Fill	Topsoil	Fill	Topsoil
PAH														
Acenaphthylene	<LD	-	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	0.15	< 0.0100
Acenaphthene	<LD	-	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Anthracene	<LD	-	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	0.26	< 0.0100
Benzo(a)anthracene	<LD	-	0.22	< 0.0100	0.03	0.14	< 0.0100	0.02	< 0.0100	0.07	< 0.0100	0.14	1.73	0.06
Benzo(a)pyrene	<LD	-	0.24	0.07	0.04	0.15	0.01	0.03	< 0.0100	0.05	< 0.0100	0.14	1.09	0.08
Benzo(b)fluoroanthene	<LD	-	0.22	< 0.0100	< 0.0100	0.12	< 0.0100	< 0.0100	< 0.0100	0.1	< 0.0100	0.14	0.98	0.09
Benzo(ghi)perylene	<LD	-	0.11	< 0.0100	0.03	0.07	< 0.0100	0.02	< 0.0100	0.06	< 0.0100	0.07	0.5	0.05
Benzo(k)fluoranthene	<LD	-	0.28	< 0.0100	0.07	0.14	< 0.0100	0.02	< 0.0100	0.07	< 0.0100	0.2	1.16	0.06
Chrysene	<LD	-	0.06	< 0.0100	< 0.0100	0.04	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	0.05	0.88	< 0.0100
Dibenzo(ah)anthracene	<LD	-	< 0.0100	< 0.0100	< 0.0100	0.02	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	0.02	1.94	0.02
Fluoranthene	<LD	-	0.28	< 0.0100	0.06	0.24	< 0.0100	0.04	< 0.0100	0.1	< 0.0100	0.25	3.03	0.12
Fluorene	<LD	-	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Indeno(1,2,3,c,d)pyrene	<LD	-	0.1	< 0.0100	0.02	0.05	< 0.0100	< 0.0100	< 0.0100	0.03	< 0.0100	0.05	0.37	0.03
Naphthalene	<LD	-	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Phenanthrene	<LD	-	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	0.82	< 0.0100
Pyrene	<LD	-	0.4	0.01	0.11	0.32	< 0.0100	0.08	0.01	0.16	< 0.0100	0.32	2.96	0.17
Benzo(a)pyrene equivalent	<LD	25	0.33	0.08	0.06	0.22	0.02	0.04	0.01	0.08	NC	0.21	3.46	0.12
TPH														
C7-C9	<LD	120	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00	-	< 20.00	< 20.00	< 20.00
C10-C14	<LD	500	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00	-	< 20.00	< 20.00	< 20.00
C15-C36	<LD	10,000	173	< 20.00	< 20.00	79	< 20.00	< 20.00	< 20.00	387	< 20.00	84	39	342

Notes:

Shaded values exceed the cleanfill criteria

Bold values exceed the example managed fill criteria

<LD - cleanfill criteria is taken as being below the laboratory limit of detection

1 - Greenmount Fill Acceptance Criteria - Managed Fill

water Care Laboratory Services

Certificate of Analysis

TONKIN & TAYLOR NZ LTD
105 CARLTON GORE ROAD
NEWMARKET
AUCKLAND

Copy To 1: Rachel Pickett
2: Leon Pemberton
3: Courtney Fagan

Attention: Rachel Pickett

Job Description: 11/26145.400 Tonkin & Taylor 10-Day TAT R Pickett
Batch Number: 11/41650

Sample Descriptions

Sample No.	Date Sampled	Sample Description
01	10/11/2011	TP1 0m
02	10/11/2011	TP2 2m
03	10/11/2011	TP3 1m
04	10/11/2011	TP4 0m
05	10/11/2011	TP4 2m
06	10/11/2011	TP5 0.25m
07	10/11/2011	TP6 0.5m
08	10/11/2011	TP7 0m
09	02/11/2011	TP8 0.5m
10	10/11/2011	TP9 0.25m
11	11/11/2011	HA1 0.5m
12	11/11/2011	HA2 0m
13	11/11/2011	Dup 2

Results

Test Description	Units	Sample Number/Result					
		01	02	03	04	05	06
Arsenic: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	4.2	0.87	2.5	6.7	0.96	2.
Cadmium: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	0.17	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chromium: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	14.	2.6	14.	4.9	9.2	9.2
Copper: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	19.	5.5	6.9	4.5	7.5	7.1
Acid Digestion: Recoverable Metals in Solids		1	1	1	1	1	1
Mercury: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	0.071	< 0.05	0.07	< 0.051	< 0.051	< 0.05
Preparation of solid samples for digestion		Yes	Yes	Yes	Yes	Yes	Yes
Nickel: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	13.	2.1	5.3	3.4	2.4	10.
Lead: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	40.	3.9	10.	11.	4.5	6.7
Zinc: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	74.	23.	11.	16.	9.9	30.
TPH Band C10-C14 as dry wt basis	mg/kg	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00
TPH Band C15-C36 (as dry wt basis)	mg/kg	173.00	< 20.00	< 20.00	79.00	< 20.00	< 20.00
TPH Band C7-C9 (as dry wt basis)	mg/kg	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00
Acenaphthylene (as dry wt	mg/kg	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100

Test Description	Units	Sample Number/Result					
basis)							
Acenaphthene (as dry wt basis)	mg/kg	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Anthracene (as dry wt basis)	mg/kg	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Benzo(a)anthracene (as dry wt basis)	mg/kg	0.2200	< 0.0100	0.0300	0.1400	< 0.0100	0.0200
Benzo(a)pyrene (as dry wt basis)	mg/kg	0.2400	0.0700	0.0400	0.1500	0.0100	0.0300
Benzo(b)fluoroanthene (as dry wt basis)	mg/kg	0.2200	< 0.0100	< 0.0100	0.1200	< 0.0100	< 0.0100
Benzo(ghi)perylene (as dry wt basis)	mg/kg	0.1100	< 0.0100	0.0300	0.0700	< 0.0100	0.0200
Benzo(k)fluoranthene (as dry wt basis)	mg/kg	0.2800	< 0.0100	0.0700	0.1400	< 0.0100	0.0200
Chrysene (as dry wt basis)	mg/kg	0.0600	< 0.0100	< 0.0100	0.0400	< 0.0100	< 0.0100
Dibenzo(ah)anthracene (as dry wt basis)	mg/kg	< 0.0100	< 0.0100	< 0.0100	0.0200	< 0.0100	< 0.0100
Fluoranthene (as dry wt basis)	mg/kg	0.2800	< 0.0100	0.0600	0.2400	< 0.0100	0.0400
Fluorene (as dry wt basis)	mg/kg	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Indeno(1,2,3,c,d)pyrene (as dry wt basis)	mg/kg	0.1000	< 0.0100	0.0200	0.0500	< 0.0100	< 0.0100
Naphthalene (as dry wt basis)	mg/kg	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Phenanthrene (as dry wt basis)	mg/kg	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Pyrene (as dry wt basis)	mg/kg	0.4000	0.0100	0.1100	0.3200	< 0.0100	0.0800
Total petroleum hydrocarbons profile (C7-C36 as drywt basis)	mg/kg	173.00	< 30.00	< 30.00	79.00	< 30.00	< 30.00
Dry wt % Sludge	%w/w	60.3	79.7	73.9	70.8	71.2	74.1
		07	**08**	**09**	**10**	**11**	**12**
Arsenic: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	2.6	19.	2.9	5.6	3.9	15.
Cadmium: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	< 0.1	0.14	< 0.1	< 0.1	< 0.099	0.11
Chromium: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	11.	18.	12.	11.	8.8	19.
Copper: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	10.	20.	13.	9.2	9.	17.
Acid Digestion: Recoverable Metals in Solids		1	1	1	1	1	1
Mercury: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	0.051	0.072	< 0.051	0.094	0.087	0.15
Preparation of solid samples for digestion		Yes	Yes	Yes	Yes	Yes	Yes
Nickel: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	6.7	27.	2.2	4.8	12.	10.
Lead: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	9.	51.	3.2	35.	21.	64.
Zinc: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	26.	69.	13.	23.	39.	55.
TPH Band C10-C14 as dry wt basis	mg/kg	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00
TPH Band C15-C36 (as dry wt basis)	mg/kg	< 20.00	387.00	< 20.00	34.00	39.00	342.00
TPH Band C7-C9 (as dry wt basis)	mg/kg	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00	< 20.00
Acenaphthylene (as dry wt basis)	mg/kg	< 0.0100	< 0.0100	< 0.0100	< 0.0100	0.1500	< 0.0100
Acenaphthene (as dry wt	mg/kg	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100

Test Description	Units	Sample Number/Result					
basis)							
Anthracene (as dry wt basis)	mg/kg	< 0.0100	< 0.0100	< 0.0100	< 0.0100	0.2600	< 0.0100
Benzo(a)anthracene (as dry wt basis)	mg/kg	< 0.0100	0.0700	< 0.0100	0.1400	1.7300	0.0600
Benzo(a)pyrene (as dry wt basis)	mg/kg	< 0.0100	0.0500	< 0.0100	0.1400	1.0900	0.0800
Benzo(b)fluoroanthene (as dry wt basis)	mg/kg	< 0.0100	0.1000	< 0.0100	0.1400	0.9800	0.0900
Benzo(ghi)perylene (as dry wt basis)	mg/kg	< 0.0100	0.0600	< 0.0100	0.0700	0.5000	0.0500
Benzo(k)fluoranthene (as dry wt basis)	mg/kg	< 0.0100	0.0700	< 0.0100	0.2000	1.1600	0.0600
Chrysene (as dry wt basis)	mg/kg	< 0.0100	< 0.0100	< 0.0100	0.0500	0.8800	< 0.0100
Dibenzo(ah)anthracene (as dry wt basis)	mg/kg	< 0.0100	< 0.0100	< 0.0100	0.0200	1.9400	0.0200
Fluoranthene (as dry wt basis)	mg/kg	< 0.0100	0.1000	< 0.0100	0.2500	3.0300	0.1200
Fluorene (as dry wt basis)	mg/kg	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Indeno(1,2,3,c,d)pyrene (as dry wt basis)	mg/kg	< 0.0100	0.0300	< 0.0100	0.0500	0.3700	0.0300
Naphthalene (as dry wt basis)	mg/kg	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100
Phenanthrene (as dry wt basis)	mg/kg	< 0.0100	< 0.0100	< 0.0100	< 0.0100	0.8200	< 0.0100
Pyrene (as dry wt basis)	mg/kg	0.0100	0.1600	< 0.0100	0.3200	2.9600	0.1700
Total petroleum hydrocarbons profile (C7-C36 as drywt basis)	mg/kg	< 30.00	387.00	< 30.00	34.00	< 20.00	342.00
Dry wt % Sludge	%w/w	71.7	46.6	73.9	76.5	73.2	45.9
		13					
Arsenic: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	7.7					
Cadmium: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	< 0.099					
Chromium: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	5.2					
Copper: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	4.7					
Acid Digestion: Recoverable Metals in Solids		1					
Mercury: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	< 0.049					
Preparation of solid samples for digestion		Yes					
Nickel: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	4.9					
Lead: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	9.2					
Zinc: Recoverable (dry wt. basis) by ICPMS-Screen	mg/kg	18.					

Test Descriptions

Test Description	Method	Accredited
Acenaphthene (as dry wt basis)	USEPA 8270	IANZ
Acenaphthylene (as dry wt basis)	USEPA 8270	IANZ
Acid Digestion: Recoverable Metals in Solids	USEPA 200.8	
Anthracene (as dry wt basis)	USEPA 8270	IANZ
Arsenic: Recoverable (dry wt. basis) by ICPMS-Screen	USEPA 200.8, modified	IANZ
Benzo(a)anthracene (as dry wt basis)	USEPA 8270	IANZ
Benzo(a)pyrene (as dry wt basis)	USEPA 8270	IANZ

Test Description	Method	Accredited
Benzo(b)fluoroanthene (as dry wt basis)	USEPA 8270	IANZ
Benzo(ghi)perylene (as dry wt basis)	USEPA 8270	IANZ
Benzo(k)fluoranthene (as dry wt basis)	USEPA 8270	IANZ
Cadmium: Recoverable (dry wt. basis) by ICPMS-Screen	USEPA 200.8, modified	IANZ
Chromium: Recoverable (dry wt. basis) by ICPMS-Screen	USEPA 200.8, modified	IANZ
Chrysene (as dry wt basis)	USEPA 8270	IANZ
Copper: Recoverable (dry wt. basis) by ICPMS-Screen	USEPA 200.8, modified	IANZ
Dibenzo(ah)anthracene (as dry wt basis)	USEPA 8270	IANZ
Dry wt % Sludge	APHA (2005) 2540 G	IANZ
Fluoranthene (as dry wt basis)	USEPA 8270	IANZ
Fluorene (as dry wt basis)	USEPA 8270	IANZ
Indeno(1,2,3,c,d)pyrene (as dry wt basis)	USEPA 8270	IANZ
Lead: Recoverable (dry wt. basis) by ICPMS-Screen	USEPA 200.8, modified	IANZ
Mercury: Recoverable (dry wt. basis) by ICPMS-Screen	USEPA 200.8, modified	IANZ
Naphthalene (as dry wt basis)	USEPA 8270	IANZ
Nickel: Recoverable (dry wt. basis) by ICPMS-Screen	USEPA 200.8, modified	IANZ
Phenanthrene (as dry wt basis)	USEPA 8270	IANZ
Preparation of solid samples for digestion	USEPA 200.8, modified	
Pyrene (as dry wt basis)	USEPA 8270	IANZ
Total petroleum hydrocarbons profile (C7-C36 as drywt basis)	Extraction GC-FID	IANZ
TPH Band C10-C14 as dry wt basis	Extraction DCM, GC-FID	IANZ
TPH Band C15-C36 (as dry wt basis)	Extraction DCM, GC-FID	IANZ
TPH Band C7-C9 (as dry wt basis)	Extraction DCM, GC-FID	IANZ
Zinc: Recoverable (dry wt. basis) by ICPMS-Screen	USEPA 200.8, modified	IANZ

Comments: This report replaces 11/41650-1.

Results are reported on an as received basis.

Samples, with suitable preservation and stability of analytes, will be held by the laboratory for a period of two weeks after results have been reported, unless otherwise advised by the submitter.

This report may not be reproduced except in full.

Dr You-Sing Yong
Operations Manager
28 November 2011
yyong@water.co.nz

DOWDELL & ASSOCIATES LTD

OCCUPATIONAL HEALTH ANALYSTS & CONSULTANTS

4 Cain Rd, Penrose, PO Box 112-017 Auckland 1642, Phone (09) 5260-246, Fax (09) 5795-389.

Western Springs

16th November 2011

Tonkin & Taylor Ltd
PO Box 5271
Newmarket
Auckland

Attn Courtney Fagan

Dear Courtney,

Re: Bulk Fibre Analysis -

Sampled by	: Client
Date Samples Received	: 14th November 2011
Laboratory No.	: 26287.1
Location/Description	: 2 x soil samples for asbestos ID (Job 26415.400)
Method	: AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.

The following samples were examined using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including Dispersion Staining Techniques.
The following results apply to the samples as received.

Reg No: 91035 **Description:** Soil TP3 0.5
Sample Size: 104.34 wet weight / 78.11
Result: **Chrysotile** ***(White Asbestos)*** detected*
** 1x loose fibre group detected in >2mm sieve faction weighing 0.00001g*

Reg No: 91036 **Description:** Soil TP 8 0.25
Sample Size: 100.70 wet weight / 80.62g dry
Result: Asbestos **NOT** detected

Yours Faithfully
DOWDELL & ASSOCIATES LTD

I.B. Murgatroyd BSc.
Consultant

R.Nicholson
Analyst/Consultant

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NOTES:

- This report must not be altered, or reproduced except in full.

- Sample weights are defined as;

a) (Wet Weight) – Weight of Sample that has been Analysed. NOTE: Samples were sub-sampled. As received weights were 200g+

b) (Dry Basis) - The combusted dry weight of the Analysed Sample.

- New Zealand has no specific guidelines with regard to asbestos content in soils. However, we recommend that the Australian Government's enHealth Council's Document 'Management of Asbestos in the Non-Occupational Environment' – 2005 and the (DOH) WA's 'Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia – May 2009 be consulted.

Appendix C. Desk Study Data Summary (T+T, 2012)

Table B2 - Summary of Certificates of title

Plan Ref	Site Name	Address	Legal Description	Ct - Issued	Current Owner	Historical	Transfers
WS1	Western Springs	731 Great North Road 770 Great North Road	Lot 12 DP 168863; Pt Lot 3 DP 10276, Allot 76 Sec 7 Suburbs of Auckland; Pt Lot 3 DP10276	NA103A/1 Issued 13/06/1996	Regional Facilities Auckland Limited	NA20B/492 and NZ932/171	N/A

Table B1 - Summary of Property Information

Plan Ref	Site Name	Address	Legal Description	Special Land features	T&T Jobs	Contamination Enquiry	Notes:
WS1	Western Springs	731 Great North Road, 770 Great North Road, Western Springs	Lot 12 DP 168863; Pt Lot 3 DP 10276, Allot 76 Sec 7 Suburbs of Auckland; Pt Lot 3 DP10276	Flood Risk Area, Unstable/suspect ground	61394 - EC, 23653 - GT	**One pollution files within 200m of the property:** - Washing forecourt to stormwater (Challenge - 778-802 Great North Road) **Consents within 200m of the property:** - Four borehole consents.	- Nil from 770 GN Rd

Table B3 - Aerial Photographs Review

Site ID	Location	1940	1959	1972	1975	1980/81	1987/88	1996	2006-2008	Summary of aerial photographs
WS1	Western Springs	Fields, bordered by bush to north.	Playing fields. Bush clearance/ area of disturbed ground visible to north.	-	-	Playing fields with bush bordering to north.	No significant change from 1996.	Bush extends over part of works area. Remaining area fields.	Area of parkland/playing fields, with bush bordering northern edge	No significant change over time. Playing fields, bordered by bush to the north, which extended into the works area in the 80's & 90's.
WS1	Western Springs (adjacent service station)	Fewer properties line the road than in 1959. Similar to 1959, lot appears to be grassed area adjacent to property.	Aerial shows works area prior to current road infrastructure. No on-off access roads to motorway visible. Road lined with properties; work area apears to be undeveloped grassed area adjacent to a building .	-	-	Parts of site are developed, with visible structures and hard surfacing (watercare facility). Rest is grassed over.	No significant change.	No significant change.	No significant change.	Site to south of Western Springs (adjacent service station): Main change to works area occurred with development of access roads for the motorway. Prior to this the works area appears to be an undeveloped lot within a residential area. No significant change visible since the 1980's, when building visible on site (watercare facility).

Auckland Council
Te Kaunihera o Tāmaki Makaurau

10 October 2011

Tonkin & Taylor Limited
PO Box 5271
Wellesley Street
Auckland 1141

Attention: Rachel Pickett

Dear Rachel Pickett

Site Contamination Enquiry – 770 Great North Road and 778-802 Great North Road, Western Springs

This letter is in response to your enquiry requesting available site contamination information for the above sites. The following details are based on information available from the former Auckland Regional Council records system and information currently held by the Auckland Council Natural Resources and Specialist Input Unit. The details provided below exclude any property information held by the former district/city councils.

The table below outlines the reference for the site files and pollution incident files available for the subject site:

File Reference	5-44-1673		
File Name	778-802 Great North Road, Western Springs		
Site Occupier Name	Challenge – Western Springs		
Pollution Date	7/11/02	Comment	Washing forecourt to stormwater
Site Visit Date	7/11/02	Comment	Site Audit

The general catchment file and site visit file for the catchment (5-44 and 5-44-SV respectively) were not searched. These files contain pollution incidents where the source of pollution was not traced to a particular site, site visits where no follow-up correspondence was required and some information from archived files.

If the above sites is coastal or beside a river, it is possible that historic, unconsented reclamation may have occurred. The Auckland Council, Natural Resources and Specialist Input, Coastal Team may be able to provide further information.

The records reviewed as part of this Site Contamination Enquiry search do not identify individual horticultural sites in the region. However, there is a possibility that horticultural activities may have occurred at the sites. The local Auckland Council customer service centre, specific to the area of the site may be able to provide relevant information where former horticultural sites have been mapped.

If you are concerned that a historic land use (such as filling) may have caused the underlying soils to become contaminated, it is recommended that you obtain an independent environmental assessment of the sites. Staff from the Auckland Council Earthworks and Contaminated Land Team can provide advice on the results of any evaluation in terms of site remediation and/or potential consent requirements.

The former Auckland Regional Council and current Natural Resources and Specialist Input Unit databases were searched for records of landfill, bore, air discharge, industrial and trade process consents, contaminated site discharge consents, and environmental assessments within approximately 200 metres of the site. Relevant details of the identified consents are appended to this letter (Attachment A).

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

In addition, it is recommended that you contact the local customer service centre of the Auckland Council, specific to the sites being investigated: 35 Graham Street, Auckland Central as they also may hold files with relevant information.

I trust that this answers your query. If you wish to discuss the matter further, please contact Andrew Kalbarczyk on 301 0101. Should you wish to request any of the files listed above for viewing, please contact the Auckland Council Call Centre on 301 0101 and note you are requesting former Auckland Regional Council records (the records department requires three working days' notice to ensure files will be available).

Please note: the Auckland Council cost recovers officer's time for all site enquiries. A basic enquiry takes approximately 0.5-1.5 hours to search the files and databases in which information is held. As such an invoice for the time involved in this enquiry will follow shortly.

Yours sincerely

PP

Michael Parsonson
Acting Team Leader - Earthworks and Contaminated Land
Natural Resources and Specialist Input

Attachment A

ACTIVITY DESCRIPTION:	Null
ACTIVITY ID:	5205
ACTIVITY STATUS:	Drilled
ACTIVITY TYPE:	Bore
CONSENT HOLDER:	Auckland City Council
CONSENT NUMBER:	14906
CONSENT STATUS:	Expired
DATE CREATE:	25/08/2011 7:16:18 p.m.
EXPIRY DATE:	19970222
FILE REFERENCE:	C512-12-1724*
GRANTED DATE:	19960222
LOC TYPE:	Point
PROCESSING OFFICER:	_Marian Jenner
PROPERTY ADDRESS:	
PURPOSE:	Authorize the construction of a bore for the extraction of groundwater for stock and domestic supply
REVIEW DATE:	Null
SITE DESCRIPTION:	Roadside berm, Cnr Leone Terrace & Martin Terrace, Western Springs
SITE NAME:	Null
WORKS DESCRIPTION:	Construction of a 100mm dia. bore to approx 17m depth. Installation of PVC casing and PVC screen if required.

ACTIVITY DESCRIPTION:	Null
ACTIVITY ID:	5208
ACTIVITY STATUS:	Drilled
ACTIVITY TYPE:	Bore
CONSENT HOLDER:	Auckland City Council
CONSENT NUMBER:	14909
CONSENT STATUS:	Expired
DATE CREATE:	25/08/2011 7:16:18 p.m.
EXPIRY DATE:	19970222
FILE REFERENCE:	C512-12-1727*
GRANTED DATE:	19960222
LOC TYPE:	Point
PROCESSING OFFICER:	_Marian Jenner
PROPERTY ADDRESS:	
PURPOSE:	Authorize the construction of a bore for groundwater level and/or Chemistry investigations
REVIEW DATE:	Null
SITE DESCRIPTION:	Western Springs Park, (southwestern cnr, adjacent to MOTAT), Western Springs
SITE NAME:	Null
WORKS DESCRIPTION:	Construction of a 100mm dia. bore to approx

	12m depth. Installation of PVC casing and PVC screen if required.
ACTIVITY DESCRIPTION:	Null
ACTIVITY ID:	20027
ACTIVITY STATUS:	NeverOccurred
ACTIVITY TYPE:	Discharge Other
CONSENT HOLDER:	NEW ZEALAND WATER MANAGEMENT LTD
CONSENT NUMBER:	22549
CONSENT STATUS:	Expired
DATE CREATE:	25/08/2011 7:16:18 p.m.
EXPIRY DATE:	20010531
FILE REFERENCE:	14074
GRANTED DATE:	19990422
LOC TYPE:	Area
PROCESSING OFFICER:	_Brent Evans
PROPERTY ADDRESS:	Great North Road Western Springs Auckland City
PURPOSE:	To discharge Prentox PrenfishTM pesticide to water (Western Springs Lake) as a trial for the purpose of controlling grass carp.
REVIEW DATE:	Null
SITE DESCRIPTION:	Null
SITE NAME:	Western Springs Reserve
WORKS DESCRIPTION:	Null

ACTIVITY DESCRIPTION:	
ACTIVITY ID:	27791
ACTIVITY STATUS:	Assessment Completed
ACTIVITY TYPE:	Bore
PERMITTED ACTIVITY HOLDER:	Chevron
PERMITTED ACTIVITY NUMBER:	52524
PERMITTED ACTIVITY STATUS:	
FILE REFERENCE:	C512-12-4746
LOC TYPE:	
PROCESSING OFFICER:	Reginald Samuel
PROPERTY ADDRESS:	778 Great North Road Grey Lynn Auckland City
PURPOSE:	To authorise the construction of a bore to conduct a contaminated site investigation.
REVIEW DATE:	30-NOV-2010
SITE DESCRIPTION:	
SITE NAME:	Chevron EMC
WORKS DESCRIPTION:	The construction of a 50mm diameter bore to a maximum depth of 6m. Installation of a PVC casing material to an approximate depth of 6m.

Appendix D. Assessment Criteria (T+T, 2012)

11 Regulatory Framework and Assessment Criteria

The rules and associated assessment criteria relating to the control of contaminated sites in the Auckland region are specified in the Regional Plan and also regulations introduced by the new National Environmental Standards (NES) for contaminated sites that came into effect on 01 January 2012.

The regulatory framework and criteria used to assess the site investigation results are set out below.

11.1 Auckland Council Regional Plan: Air, Land and Water

The Auckland Council Regional Plan: Air, Land and Water (ALW Plan) includes a series of rules related to contaminated sites. The contaminated land rules are now operative.

The relevant Permitted Activity (PA) rules can be briefly summarised as follows:

- Small scale earthworks on land containing contaminants are a PA (Rule 5.5.40) providing the volume of earthworks open at any one time is less than 200 m^3 and works are completed within one month (this rule is principally to allow the installation of services, or similar minor works, without the need for consent). There are a number of other requirements relating to notification and appropriate stormwater and erosion controls along with appropriate off-site soil disposal; and
- Rule 5.5.41 states that if soil concentrations or the 95% upper confidence limit (UCL) of the mean of soil concentrations are below the relevant guidelines for the current (or proposed, if change is planned) land use and the land does not contain separate phase hydrocarbons, then a resource consent is not required for the site. If soil contaminant concentrations exceed these relevant guidelines or separate phase is present, then consent will be required under the ALW Plan.

In assessing if the presence of soil contamination is a PA under Rule 5.5.41, the following requirements are specified in the Operative Contaminated Land Rules within the ALW Plan:

a Discharge criteria set out in Schedule 10 apply where the effects of land use on human health are expressly authorised through District Plan rules or a consent granted by the territorial authority. The 'discharge' criteria have been used in our assessment rather than the human health criteria in Schedule 10 because human health is already considered by the NES.

b For contaminants not included in Schedule 10, analytical results should be assessed against Tier 1 soil acceptance criteria for the current land use or, if the land use is to change, the proposed land use. The soil acceptance criteria shall protect both human health and sensitive groundwater, as specified in the following documents:

- 'Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand', Ministry for the Environment (MfE) 1999;
- 'Canadian Environmental Quality Guidelines', (Canadian Council of Ministers of the Environment, CCME 1991 (update 2002);
- 'Identifying, Investigating and Managing Risks Associated with Former Sheep-Dip Sites: A guide for local authorities', MfE 2006 (dieldrin and lindane only).

c If background levels of contaminants at the site are greater than the criteria in (a) or (b) above then the soil contamination concentrations shall be assessed against the background levels instead, derived from either:

- The natural background levels for that soil at the site; or

- ARC Technical Publication 'Background Concentrations in Inorganic Elements in Soils from the Auckland Region', TP 153, October 2001.

The ALW Plan criteria are shown together with the analytical results on the tables provided in Appendices E to I of this report.

11.2 National Environmental Standards

The National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) under the Resource Management Act (1991) came into effect on 01 January 2012. The main objectives of the NES are to set out nationally consistent planning controls appropriate to district and city councils for assessing contaminants in soil and to provide a set of chemical specific soil contaminant thresholds (or soil contaminant standards) that define an adequate level of protection for human health for a range of differing land-uses in New Zealand. All territorial authorities were required to implement the NES from 01 January 2012.

NES soil contaminant standards (SCS) for 13 priority contaminants were derived and published in the MfE, April 2012 Users' Guide. The NES requires that the *Contaminated Land Management Guideline No.2 – Hierarchy and Application in New Zealand of Environmental Guideline Values* be used where an NES contaminant standard is not provided. However, the NES do not consider environmental receptors, accordingly guidelines relevant to environmental receptors are implemented according to the MfE *Contaminated Land Management Guideline No.2* and any relevant rules in Regional Plans.

The NES also includes a series of requirements related to soil disturbance, fuel systems removal, subdivision and land use change. The Users' Guide sets out a number of methods to assess if the NES apply to a site. Depending on this assessment, an activity on a site will be classed as permitted, controlled, restricted discretionary or discretionary.

For this project, the soil disturbance rules are applicable, as summarised below:

- Disturbance of small volumes of soil is a permitted activity subject to the following conditions, as set out in Regulation 8(3):
  - Installation of controls to minimise exposure of humans to mobilised contaminants.
  - The soil must be reinstated to an erosion free state within one month of completing the land disturbance.
  - The volume of the disturbance must be no more than 25 m^3 per 500 m^2.
  - Soil must not be taken away unless it is for laboratory testing or, for all other purposes combined, a maximum of 5 m^3 per 500 m^2 of soil may be taken away per year.
  - Soil taken away must be disposed of at an appropriately licensed facility.
  - The duration of land disturbance must be no longer than two months.
- Disturbance or removal of greater volumes of soil requires a consent
  - if a detailed site investigation states that contamination levels are:
    - below the standards detailed in the NES – controlled activity.
    - above the standards detailed in the NES – restricted discretionary activity.
  - if a detailed site investigation is not available, the activity would be considered a discretionary activity.

In addition to the soil disturbance regulations described above, Regulation 5(9) indicates the NES does not apply to a site already identified on the HAIL – Hazardous Activities and Industries List

(refer sub-clause (7) or (8)) if a detailed site investigation demonstrates contaminants in or on the land are at, or below, background concentrations.

The NES standards and local background concentrations are shown together with the analytical results on the Tables in Appendix E to I and conclusions are drawn for each site in Section 13.

11.3 Soil disposal

Auckland Council also controls the management of fill moved to other sites. To be disposed of at a cleanfill site, soil must meet local background concentrations of metals at the disposal site and have no organic contamination (e.g. petroleum hydrocarbons). To make an assessment of soil disposal options the soil test results have been evaluated against the generic cleanfill criteria used for the Auckland Region.

Slightly contaminated fill may be disposed of at a managed fill site, with acceptance criteria defined by the site's resource consent. Fill not acceptable at a cleanfill or managed fill site must be disposed of at a licensed landfill.

The acceptance criteria for managed and licensed landfills are typically defined by the consent conditions issued for the individual landfill sites and have therefore not been assessed in detail here. However, **an example** of current managed fill requirements in the region is provided. It is recommended that disposal sites are contacted by the appointed contractor to confirm acceptance (and associated rates) prior to commencement of works.

11.4 Asbestos-containing material

T&T is not aware of a defined guideline value for asbestos fibres in soil in New Zealand. Various regulatory authorities around the world have considered the subject and provided some guidance. Most of that consideration has been focused on what particular concentration in soil might result in an unacceptable concentration of asbestos fibres in air.

In the Flat Bush area of Manukau City (Auckland) asbestos-containing waste had been used to infill gullies and to form farm tracks/driveways etc. during a period when the land was rural and predominantly used for farming. Areas of asbestos-contaminated land became an issue with increasing residential development in the area. In 1999 Manukau City Council (MCC) engaged a consultant to review information available for asbestos contaminant levels and propose a risk management strategy for various site categories[3]. The consultant concluded that on residential lots where there were typically up to 20 asbestos-containing chips/500 m^2 (estimated to be less than 0.01% by mass of the soil), there could be in the order of up to 0.001% free fibre in the soil.

A semi-quantitative estimate of 0.001% asbestos content was accepted by MCC as a guideline, based on the mass of fibres in hand-picked samples and the mass of soil examined. A value of 0.01% by weight of asbestos-cement chips (approximately 20/500 m^2) is currently referenced in a number of consultancy reports. Asbestos in soil assessment is generally on the basis of visible contamination (chips and/or fibre bundles) with laboratory confirmation of the presence of asbestos fibres.

In Australia, EnHealth has published[4] guidance on the management of asbestos in the non-occupational environment, but without setting any soil guidelines. The report notes that the Australian Contaminated Land Consultants Association Inc (NSW) (2001) proposed a health

[3] Flat Bush Investigation, Phase 3 – Examination and Recommendations, Risk Categorisation Framework, Alan Rogers OH&S Pty Ltd, December 1999.

[4] Management of asbestos in the non-occupational environment, Australian Government, 2005 – Publication approval number 3663 (JN9050).

investigation level for asbestos of 0.01% fibres in soil and that a level of < 0.001% in soil was suggested by Imray and Neville[5] to classify a site as uncontaminated or unrestricted and suitable for all land uses.

Some guidance is available in the UK from the Interdepartmental Committee on the Redevelopment of Contaminated Land (Asbestos on contaminated sites, ICRCL Guidance Note 64/85, second edition, October 1990). This is based on historical work by the Institute of Occupational Medicine[6] which identified a threshold of 0.001% weight as an action level. Laboratory testing under controlled conditions had shown that the asbestos concentration in air is unlikely to occur above 0.1 fibre/mL where 5 mg/m^3 of respirable dust is generated from dry soil containing 0.001% asbestos. The study recommended a level of 0.001%, below which no action would be required to decontaminate further or to protect workers specifically from asbestos dust.

The Netherlands has an agreed level of 100 mg/kg (0.01%) on contamination levels in soils as a remedial target or for re-use of soils[7]. The 100 mg/kg criterion has involved a weighting calculation based on the type of asbestos present with amphibole asbestos rated 10 times more hazardous than serpentine (e.g., chrysotile) asbestos. It also assumes that activities such as digging, tipping and sifting of soil material are not systematically involved and the top layer of the soil is damp for a large part of the year. Site specific lower criteria are required where these conditions cannot be met.

As discussed above, guidance on acceptable levels of asbestos in soils is variable. In principle, most regulatory regimes consider that there should not be any asbestos present, especially in a residential setting, but acknowledge that this is unrealistic. Therefore, guidance values have been set that generally range from 0.001% to 0.01% asbestos in soil, although the higher value has a qualification associated with site characteristics. The guideline value set by Manukau City Council for asbestos fibre in residential soil in New Zealand is 0.001%. This is consistent with the value used in the UK and Australia and we consider it appropriate for the purposes of this project.

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[5] Imray P and Neville G "Approaches to the Assessment and Management of Asbestos Contaminated Soil", in A Langley & M Van Alplen, *The Health Risk Assessment and Management of Contaminated Sites*, Contaminated Sites Monograph Series No 2, 1993.

[6] Addison J, Davies LST, Robertson A, Wiley RJ, *The release of dispersed asbestos fibres from soil*, Report No. TM/88/14, Institute of Occupational Medicine, Edinburgh, 1988

[7] *Assessing risks of soil contamination with asbestos*, FA Swartjes, PC Tromp, JM Weezenbeck, RIVM report 711701034/2003.

Appendix E. AUP OP E30 Contaminated land

E30. Contaminated land

E30.1. Background

This section addresses the effects of the discharge of contaminants from contaminated land or land containing elevated levels of contaminants into air, or into water, or onto or into land pursuant to section 15 of the Resource Management Act 1991. This is separate from and different to the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health 2011.

The National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health 2011 provides a national environmental standard for activities on pieces of land where soil may be contaminated in such a way as to be a risk to human health. The activities are removing or replacing a fuel storage system, sampling the soil, disturbing the soil, subdividing land, and changing the use of the piece of land. The activities are classed as permitted activities, controlled activities, restricted discretionary activities, or discretionary activities.

Consent required for activities under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health 2011 is separate from and different to the resource consent required for the discharge of contaminants under this section of the Plan.

This section contains thresholds beyond which a risk assessment process is required to assess whether the discharge will result in significant adverse effects, or whether it can be remediated or managed. All assessments and related reports are to be carried out in in accordance with the Ministry for the Environment's Contaminated Land Management Guidelines.

This section focuses on all of the following:

- the direct discharges arising from investigation activities on land containing elevated levels of contaminants;
- discharges associated with soil disturbance that may liberate contaminants;
- longer term discharges occurring as a result of residual contaminants, often known as passive discharges;
- legacy discharges associated with past incidents; and
- the assessment of risk around ongoing discharges.

This section does not address initial discharges. These are addressed by E31 Hazardous substances and E33 Industrial and trade activities.

E30.2. Objective [rp]

(1) The discharge of contaminants from contaminated land into air, or into water, or onto or into land are managed to protect the environment and human health and to enable land to be used for suitable activities now and in the future.

E30.3. Policies [rp]

(1) Identify and record the details of land containing elevated levels of contaminants in a public register.

(2) Require any use or development of land containing elevated levels of contaminants resulting in discharges to air, land or water to manage or remediate the contamination to a level that:

(a) allows contaminants to remain in the ground/groundwater, where it can be demonstrated that the level of residual contamination is not reasonably likely to pose a significant adverse effect on human health or the environment; and

(b) avoids adverse effects on potable water supplies; and

(c) avoids, remedies or mitigates significant adverse effects on ecological values, water quality, human health and amenity values; while

taking into account all of the following:

(d) the physical constraints of the site and operational practicalities;

(e) the financial implications of the investigation, remediation, management and monitoring options;

(f) the use of best practice contaminated land management, including the preparation and consideration of preliminary and detailed site investigations, remedial action plans, site validation reports and site management plans for the identification, monitoring and remediation of contaminated land; and

(g) whether adequate measures are in place for the transport, disposal and tracking of contaminated soil and other contaminated material removed from a site to prevent adverse effects on the environment.

E30.4. Activity table

Table E30.4.1 Activity table specifies the activity status for the discharge of contaminants from contaminated land into air, or into water, or onto or into land pursuant to section 15 of the Resource Management Act 1991.

Rules for the accidental discovery of contaminated land are contained in the following sections:

- E11 Land disturbance – Regional – Standard E11.6.1 Accidental discovery rule; and
- E12 Land disturbance – District - Standard E12.6.1 Accidental discovery rule.

Table E30.4.1 Activity table

Activity		Activity status
(A1)	Discharges of contaminants into air, or into water, or onto or into land from intrusive investigations, including sampling	P

	soil, that involve either chemical testing or monitoring, excluding soil fertility testing	
(A2)	Discharges of contaminants into air, or into water, or onto or into land from disturbing soil on land containing elevated levels of contaminants	P
(A3)	Discharges of contaminants into air, or into water, or onto or into land from land currently used for rural production activities	P
(A4)	Discharges of contaminants into air, or into water, or onto or into land from land not used for rural production activities	P
(A5)	Discharges of contaminants into air, or into water, or onto or into land from a fuel storage system	P
(A6)	Discharges of contaminants into air, or into water, or onto or into land not meeting permitted activity Standard E30.6.1.1; E30.6.1.2; E30.6.1.3; E30.6.1.4; or E30.6.1.5	C
(A7)	Discharges of contaminants into air, or into water, or onto or into land not meeting controlled activity Standard E30.6.2.1	D

E30.5. Notification

(1) An application for resource consent for a controlled activity listed in Table E30.4.1 Activity table will be considered without public or limited notification or the need to obtain written approval from affected parties unless the Council decides that special circumstances exist under section 95A(4) of the Resource Management Act 1991.

(2) Any application for resource consent for an activity listed in Table E30.4.1 Activity table and which is not listed in Rule E30.5(1) above will be subject to the normal tests for notification under the relevant sections of the Resource Management Act 1991.

(3) When deciding who is an affected person in relation to any activity for the purposes of section 95E of the Resource Management Act 1991 the Council will give specific consideration to those persons listed in Rule C1.13(4).

E30.6. Standards

E30.6.1. Permitted activity standards

All activities listed as a permitted activity in Table E30.4.1 Activity table must comply with the following permitted activity standards.

E30.6.1.1. Discharges of contaminants into air, or into water, or onto or into land from intrusive investigations, including sampling soil, that involve either chemical testing or monitoring, excluding soil fertility testing

(1) Prior to the activity commencing the Council must be advised of the activity in writing, including details of the measures or controls to be implemented to minimise discharges of contaminants to the environment,

and such controls are to be effective for duration of the activity and until the soil is reinstated to an erosion-resistant state.

E30.6.1.2. Discharges of contaminants into air, or into water, or onto or into land from disturbing soil on land containing elevated levels of contaminants

(1) The volume of soil disturbed must not exceed:

(a) $200m^3$ per site; or

(b) $200m^3$ per project for sites or roads with multiple concurrent land disturbance projects, where the cumulative total volume of soil disturbance associated with each given project will be used when determining activity status; or

(c) an average depth and width of 1m for linear trenching by network utilities in the road or rail corridor. For the purpose of this rule the railway corridor does not include land more than 10m from the rail tracks.

(2) Prior to the activity commencing:

(a) the Council must be advised of the activity in writing if the volume of soil disturbed on land containing elevated levels of contaminants exceeds $25m^3$, including details of the measures and controls to be implemented to minimise discharges of contaminants to the environment, and such controls are to be effective for duration of the activity and until the soil is reinstated to an erosion-resistant state; and

(b) controls on linear trenching must be implemented to manage discharges to the environment from trenches acting as migration pathways for contaminants.

(3) Any discharge from land containing elevated levels of contaminants must not contain separate phase liquid contaminants including separate phase hydrocarbons.

(4) The duration of soil disturbance on a site must not exceed two months.

(5) Any contaminated material removed from the site must be disposed of at a facility or site authorised to accept such materials.

E30.6.1.3. Discharges of contaminants into air, or into water, or onto or into land from land currently used for rural production activities

(1) The land must have been previously used only for rural production activities.

(2) The land must not be redeveloped or used for non-rural production activities.

(3) The discharge must not have adverse effects on potable water supplies.

E30.6.1.4. Discharges of contaminants into air, or into water, or onto or into land from land not used for rural production activities

(1) For in-situ soil and fill material, the concentrations of contaminants (relevant to the site's history) in soil or fill material, or the 95 per cent upper confidence limit of the mean, determined in accordance with the Ministry for the Environment Contaminated Land Management Guidelines No.5 – Site Investigation and Analysis of Soils (Revised 2011), must not exceed:

(a) the criteria specified in Table E30.6.1.4.1 Permitted activity soil acceptance criteria; or

(b) for contaminants not included in Table E30.6.1.4.1:

(i) the tier 1 soil acceptance criteria for the protection of groundwater quality in sensitive aquifers specified in Table 4.20 Soil acceptance criteria for protection of groundwater quality in the Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, Ministry for the Environment (Revised 2011); or

(ii) for contaminants not included in Table 4.20 Soil acceptance criteria for protection of groundwater quality in the Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand by the Ministry for the Environment (Revised 2011):

- the soil quality guidelines for the current land use; or
- in the case of a proposed change in land use, the proposed land use in the Canadian Environmental Quality Guidelines, Canadian Council of Ministers of the Environment (2013); or
- for dieldrin and lindane only, the soil guideline values in Table A.5 Summary of soil guideline values (mg/kg) for individual pathways in Identifying, Investigating and Managing Risks Associated with Former Sheep Dip Sites: A Guide for Local Authorities, by the Ministry for the Environment November 2006; or

(c) the natural background levels for that soil or fill material or the relevant background levels specified in Table E30.6.1.4.2 Background ranges of trace elements in Auckland soils sources from Table 3 of TP153:

2001 Background Concentrations of Inorganic Elements in Soils from the Auckland Region.

(2) Any discharge from land containing elevated levels of contaminants must not contain separate phase liquid contaminants including separate phase hydrocarbons.

Table E30.6.1.4.1 Permitted activity soil acceptance criteria

Contaminant	Permitted activity criteria (mg/kg)
Arsenic	100.0
Benzo (a) pyrene (equivalent)	20
Cadmium	7.5
Chromium (total)	400.0
Copper	325.0
Total DDT	12.0
Lead	250.0
Mercury	0.75
Nickel	105.0
Zinc	400.0

Note 1
Total DDT includes the sum of DDT (dichlorodiphenyltrichloroethane), DDD (dichlorodiphenyldichloroethane) and DDE (dichlorodiphenyldichloroethylene).

Table E30.6.1.4.2 Background ranges of trace elements in Auckland soils sources from Table 3 of TP153:2001 Background Concentrations of Inorganic Elements in Soils from the Auckland Region

Element (total recoverable)	Non-volcanic range mg/kg	Volcanic range mg/kg
Arsenic (As)	0.4 – 12	
Boron (B)	2 – 45	<2 - 260
Cadmium (Cd)	<0.1 – 0.65	
Chromium (Cr)	2 – 55	3 – 125*
Copper (Cu)	1 – 45	20 – 90
Lead (Pb)	<5 – 65*	
Mercury (Hg)	<0.03 – 0.45	
Nickel (Ni)	0.9 – 35	4 – 320
Zinc (Zn)	9 – 180	54 – 1160

* Work suggests special cases have been found to apply for Ti Point Basalts (Cr), Mt Smart Volcanics (Pb) and as such these lithologies need to be considered individually.

E30.6.1.5. Discharges of contaminants into air, or into water, or onto or into land from a fuel storage system

(1) For discharges of contaminants into air, or into water, or onto or into land from a fuel storage system:

(a) the concentration of soluble contaminants in any of the following:

(i) overland stormwater at the site boundary;

(ii) surface water within the site; or

(iii) groundwater at the site boundary;

must not exceed Table 3.4.1 Trigger values for toxicants at alternative levels of protection in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000 Guidelines) for marine or freshwater, where relevant, at the level of protection of 80 per cent of species, except for benzene where 95 per cent of species shall apply; and

(b) the discharge must not contain separate phase hydrocarbons.

(2) For discharges of contaminants into air, or into water, or onto or into land during and following the removal or replacement of a fuel storage system:

(a) the concentration of soluble contaminants in any of the following:

(i) overland stormwater at the site boundary;

(ii) surface water within the site, and

(iii) groundwater at the site boundary

must not exceed the Table 3.4.1 Trigger values for toxicants at alternative levels of protection in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000 Guidelines) for marine or freshwater, where relevant, at the level of protection 80 per cent of species, except for benzene where 95 per cent of species shall apply;

(b) the concentrations of contaminants remaining in the soil on the site following the removal or replacement of a fuel storage system must not exceed the tier 1 soil acceptance criteria for the protection of groundwater quality in sensitive aquifers specified in Table 4.20 Soil acceptance criteria for protection of groundwater quality in the Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand by the Ministry for the Environment (Revised 2011);

(c) the discharge must not contain separate phase hydrocarbons;

(d) any contaminated materials removed from the site must be disposed of to a facility or site authorised to accept such materials;

(e) the fuel storage system removal, investigation, remediation, validation and management processes must be carried out in accordance with the Ministry for the Environment Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, (Revised 2011).

E30.6.2. Controlled activity standards

All activities listed as a controlled activity in Table E30.4.1 Activity table must comply with the following controlled activity standards.

E30.6.2.1. Discharges of contaminants into air, or into water, or onto or into land not meeting permitted activity standards E30.6.1.1; E30.6.1.2; E30.6.1.3; E30.6.1.4; or E30.6.1.5

(1) A detailed site investigation (contaminated land) must be prepared and submitted to Council for consideration.

(2) A site management plan (contaminated land) must be prepared and submitted to Council for consideration.

(3) A remedial action plan (contaminated land), relevant to the site and the proposed disturbance or remediation must be prepared and submitted to Council for consideration.

(4) The report on the detailed site investigation (contaminated land) must state either that:

(a) the concentrations of soluble contaminants in any of the following:

(i) overland stormwater at the site boundary,

(ii) surface water within the site, or

(iii) groundwater at the site boundary

must not exceed the guideline values specified in Table 3.4.1 Trigger values for toxicants at alternative levels of protection in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000 Guidelines) for marine or freshwater, where relevant, at the level of protection for 80 per cent of species, except for benzene where 95 per cent of species shall apply; or

(b) discharges from the land are highly unlikely to cause significant adverse effects on the environment; or

(c) the contamination associated with the land must be contained beneath a continuous impervious layer and must be located above the highest seasonal groundwater level beneath the site.

E30.7. Assessment – controlled activities

E30.7.1. Matters of control

The Council will reserve its control to all of the following matters when assessing a controlled activity resource consent application:

(1) the adequacy of the detailed site investigation report including:

(a) site sampling;

(b) laboratory analysis; and

(c) risk assessment.

(2) the need for and adequacy of a site management plan (contaminated land);

(3) the need for and adequacy of a remedial action plan (contaminated land);

(4) how the discharge is to be:

(a) managed;

(b) monitored, including frequency and location of monitoring; and

(c) reported on.

(5) the physical constraints of the site and operational practicalities;

(6) the transport, disposal and tracking of soil and other materials taken away in the course of the activity;

(7) the effect on potable water supplies;

(8) methods to identify contaminant risks prior to works commencing such as qualitative assessments of risk;

(9) protocols around notifying the Council of contaminant risks;

(10) how stormwater is to be managed;

(11) soil management during work and at the completion of the works;

(12) odour control;

(13) vapour control;

(14) groundwater management;

(15) contingency plans;

(16) remediation or ongoing management of the site, its timing and standard;

(17) the nature and type of close out criteria if proposed;

(18) the need for a financial bond;

(19) the need for any review conditions in the event that standards to be achieved are not achieved;

(20) the timing and nature of the review conditions; and

(21) the duration of resource consent.

E30.7.2. Assessment criteria

The Council will consider the relevant assessment criteria for controlled activities from the list below:

(1) whether the reports and information provided adequately address the effects of discharges into air, or into water, or onto or into water from contaminated land.

E30.8. Assessment – Restricted discretionary activities

There are no restricted discretionary activities in this section.

E30.9. Special information requirements

There are no special information requirements in this section.

Appendix F. National Environmental Standard for Assessing & Managing Contaminants in Soil to Protect Human Health

Regulation 3 - Interpretation

HAIL means the current edition of the MfE Hazardous Industries and Activities List, Wellington, Ministry for the Environment.

It is noted that the HAIL currently comprises 53 activities and industries that are considered to have a potential to result in contamination to land due to the hazardous substance use, storage or disposal.

Preliminary site investigation means an investigation that—

(a) is done by a suitably qualified and experienced practitioner; and

(b) is reported on in accordance with the current edition of Contaminated Land Management Guidelines No. 1–Reporting on Contaminated Sites in New Zealand, Wellington, Ministry for the Environment; and

(c) results in a report that is certified by the practitioner.

Regulation 5 – Application

(1) These regulations—

(a) apply when a person wants to do an activity described in any of subclauses (2) to (6) on a piece of land described in subclause (7) or (8):

(b) do not apply when a person wants to do an activity described in any of subclauses (2) to (6) on a piece of land described in subclause (9).

Activities

(2) An activity is removing a fuel storage system from the piece of land or replacing a fuel storage system in or on the piece of land, which means—

(a) doing any of the following:

(i) removing or replacing the whole system:

(ii) removing or replacing an underground part of the system:

(iii) taking away or putting back soil associated with the removal or replacement of the system or the part:

(b) doing any of the following for purposes associated with removing or replacing the whole system or part of the system:

(i) sampling the soil of the piece of land:

(ii) investigating the piece of land:

(iii) remediating the piece of land:

(iv) validating the piece of land:

(v) managing the piece of land.

(3) An activity is sampling the soil of the piece of land, which means sampling it to determine whether or not it is contaminated and, if it is, the amount and kind of contamination.

(4) An activity is disturbing the soil of the piece of land, which—

(a) means disturbing the soil of the piece of land for a particular purpose:

(b) does not include disturbing the soil of the piece of land, whatever the purpose, if the land is land to which regulation 33(9) or 36 of the Resource Management (National Environmental Standard for Electricity Transmission Activities) Regulations 2009 applies.

(5) An activity is subdividing land, which means subdividing land—

(a) that has boundaries that are identical with the boundaries of the piece of land; or

(b) that has all the piece of land within its boundaries; or

(c) that has part of the piece of land within its boundaries.

(6) An activity is changing the use of the piece of land, which means changing it to a use that, because the land is as described in subclause (7), is reasonably likely to harm human health.

Land covered

(7) The piece of land is a piece of land that is described by 1 of the following:

(a) an activity or industry described in the HAIL is being undertaken on it:

(b) an activity or industry described in the HAIL has been undertaken on it:

(c) it is more likely than not that an activity or industry described in the HAIL is being or has been undertaken on it.

(8) If a piece of land described in subclause (7) is production land, these regulations apply if the person wants to—

(a) remove a fuel storage system from the piece of land or replace a fuel storage system in or on the piece of land:

(b) sample or disturb—

(i) soil under existing residential buildings on the piece of land:

(ii) soil used for the farmhouse garden or other residential purposes in the immediate vicinity of existing residential buildings:

(iii) soil that would be under proposed residential buildings on the piece of land:

(iv) soil that would be used for the farmhouse garden or other residential purposes in the immediate vicinity of proposed residential buildings:

(c) subdivide land in a way that causes the piece of land to stop being production land:

(d) change the use of the piece of land in a way that causes the piece of land to stop being production land.

Land not covered

(9) These regulations do not apply to a piece of land described in subclause (7) or (8) about which a detailed site investigation exists that demonstrates that any contaminants in or on the piece of land are at, or below, background concentrations.

Regulation 6 – Methods

(1) Subclauses (2) and (3) prescribe the only 2 methods that the person may use for establishing whether or not a piece of land is as described in regulation 5(7).

(2) One method is by using information that is the most up-to-date information about the area where the piece of land is located that the territorial authority—

(a) holds on its dangerous goods files, property files, or resource consent database or relevant registers; or

(b) has available to it from the regional council.

(3) The other method is by relying on the report of a preliminary site investigation—

(a) stating that an activity or industry described in the HAIL is, or is not, being undertaken on the piece of land; or

(b) stating that an activity or industry described in the HAIL has, or has not, been undertaken on the piece of land; or

(c) stating the likelihood of an activity or industry described in the HAIL being undertaken, or having been undertaken, on the piece of land.

(4) The person must—

(a) choose which of the 2 methods to use; and

(b) meet all the costs involved in using the method that the person has chosen.

Regulation 7(1) – Land Use

(1) In this regulation,—

land use means—

(a) the current use, if the activity the person wants to do is—

(i) to remove a fuel storage system from the piece of land or replace a fuel storage system in or on the piece of land:

(ii) to sample the soil of the piece of land:

(iii) to disturb the soil of the piece of land:

(b) the intended use, if the activity the person wants to do is—

(i) to subdivide land:

(ii) to change the use of the piece of land

Regulation 8 – Permitted Activities

Regulation 8 describes a number of permitted activities associated with the NESCS. Regulation 8(3) and 8(4) are relevant to this PSI report.

Disturbing soil

(3) Disturbing the soil of the piece of land is a permitted activity while the following requirements are met:

(a) controls to minimise the exposure of humans to mobilised contaminants must—

(i) be in place when the activity begins:

(ii) be effective while the activity is done:

(iii) be effective until the soil is reinstated to an erosion-resistant state:

(b) the soil must be reinstated to an erosion-resistant state within 1 month after the serving of the purpose for which the activity was done:

(c) the volume of the disturbance of the soil of the piece of land must be no more than 25 m^3 per 500 m^2:

(d) soil must not be taken away in the course of the activity, except that,—

(i) for the purpose of laboratory analysis, any amount of soil may be taken away as samples:

(ii) for all other purposes combined, a maximum of 5 m^3 per 500 m^2 of soil may be taken away per year:

(e) soil taken away in the course of the activity must be disposed of at a facility authorised to receive soil of that kind:

(f) the duration of the activity must be no longer than 2 months:

(g) the integrity of a structure designed to contain contaminated soil or other contaminated materials must not be compromised."

Regulation 8(4)

Regulation 8(4) is a permitted activity for subdividing or changing the use of the land as follows:

Subdividing or changing use

(4) Subdividing land or changing the use of the piece of land is a permitted activity while the following requirements are met

(a) a preliminary site investigation of the land or piece of land must exist:

(b) the report on the preliminary site investigation must state that it is highly unlikely that there will be a risk to human health if the activity is done to the piece of land:

(c) the report must be accompanied by a relevant site plan to which the report is referenced:

(d) the consent authority must have the report and the plan

Regulation 9 – Controlled Activities

Regulation 9 describes a number of controlled activities associated with the NESCS. Regulation 9(1) and 9(2) are relevant to this PSI report.

Removing or replacing fuel storage system, sampling soil, or disturbing soil

(1) If a requirement described in any of regulation 8(1) to (3) is not met, the activity is a controlled activity while the following requirements are met:

(a) a detailed site investigation of the piece of land must exist:

(b) the report on the detailed site investigation must state that the soil contamination does not exceed the applicable standard in regulation 7:

(c) the consent authority must have the report:

(d) conditions arising from the application of subclause (2), if there are any, must be complied with.

(2) The matters over which control is reserved are as follows:

(a) the adequacy of the detailed site investigation, including—

(i) site sampling:

(ii) laboratory analysis:

(iii) risk assessment:

(b) how the activity must be—

(i) managed, which may include the requirement of a site management plan:

(ii) monitored:

(iii) reported on:

(c) the transport, disposal, and tracking of soil and other materials taken away in the course of the activity:

(d) the timing and nature of the review of the conditions in the resource consent:

(e) the duration of the resource consent.

Regulation 10

Regulation 10 describes the restricted discretionary activities associated with the NESCS. Regulation 10(2) and 10(3) are relevant to this PSI report.

(2) The activity is a restricted discretionary activity while the following requirements are met:

(a) a detailed site investigation of the piece of land must exist:

(b) the report on the detailed site investigation must state that the soil contamination exceeds the applicable standard in regulation 7:

(c) the consent authority must have the report:

(d) conditions arising from the application of subclause (3), if there are any, must be complied with.

(3) The matters over which discretion is restricted are as follows:

(a) the adequacy of the detailed site investigation, including—

(i) site sampling:

(ii) laboratory analysis:

(iii) risk assessment:

(b) the suitability of the piece of land for the proposed activity, given the amount and kind of soil contamination:

(c) the approach to the remediation or ongoing management of the piece of land, including—

(i) the remediation or management methods to address the risk posed by the contaminants to human health:

(ii) the timing of the remediation:

(iii) the standard of the remediation on completion:

(iv) the mitigation methods to address the risk posed by the contaminants to human health:

(v) the mitigation measures for the piece of land, including the frequency and location of monitoring of specified contaminants:

(d) the adequacy of the site management plan or the site validation report or both, as applicable:

(e) the transport, disposal, and tracking of soil and other materials taken away in the course of the activity:

(f) the requirement for and conditions of a financial bond:

(g) the timing and nature of the review of the conditions in the resource consent:

(h) the duration of the resource consent.

Regulation 11

Regulation 11 describes the discretionary activities associated with the NESCS.

(1) This regulation applies to an activity described in any of regulation 5(2) to (6) on a piece of land described in regulation 5(7) or (8) that is not a permitted activity, controlled activity, or restricted discretionary activity.

(2) The activity is a discretionary activity.

Appendix D. Stormwater Memorandum

Memorandum

To: Xenia Meier

From: Brendon Henshaw / Eugene Salmin
Reviewed: Tess Gillham / Tim Hegarty

CC:

Subject: Western Springs Accessway Stormwater Assessment

Doc. Ref: JNZ-WSL-CIP-TM0000049 Rev. 2

Date: 12 March 2021

Introduction

This memo provides background calculations and concept design for stormwater management associated with a new permanent accessway at Western Springs Stadium, Auckland. Construction of the accessway is to provide access to the Central Interceptor (CI) related shaft site and long-term access for vehicles to Western Springs Stadium (via a route over the existing Western Springs Outer Fields). Appendix 1 of this memo provides a background to the CI, including details of the previously approved design of the accessway at Western Springs and the reasons for the design change addresses by the current resource consent application.

The accessway will be 214 m long and 4.5 m wide, which gives a total impermeable area of 963 m^2. At Watercare's request (to provide some contingency during construction) this assessment has been carried out assuming the accessway will have a total impermeable area of 1,500 m^2.

A review of the Auckland Unitary Plan (Operative in Part) (AUP(OP)) confirms this works to be a **controlled activity** as per Table 1.1 below:

Table 0-1: AUP(OP) Stormwater Consent Review

Reference	Rule	Activity status	Assessment
E8.4.1 (A9)	Diversion and discharge of stormwater runoff from impervious areas greater than 1,000 m^2 and up to 5,000 m^2 within an urban area, that complies with Standard E8.6.1 and Standard E8.6.3.1	**Controlled**	As stated above, this assessment assumes that the accessway will have 1,500 m^2 of new impervious surface

The following assessment criteria associated with Rule E8.4.1 (A9) have been employed for the following stormwater design assessment:

"E8.6.1. General standards

All permitted activities, controlled activities and restricted discretionary activities listed in Table E8.4.1 Activity table must meet the following standards, except for activity E8.4.1(A1) Stormwater runoff from lawfully established impervious areas directed into an authorised stormwater network or a combined sewer network.

(1) The design of the proposed stormwater management device(s) must be consistent with any relevant precinct plan that addresses or addressed stormwater matters.

(2) The diversion and discharge must not cause or increase scouring or erosion at the point of discharge or downstream.

(3) The diversion and discharge must not result in or increase the following:

(a) flooding of other properties in rainfall events up to the 10 per cent annual exceedance probability (AEP); or

(b) inundation of buildings on other properties in events up to the 1 per cent annual exceedance probability (AEP).

(4) The diversion and discharge must not cause or increase nuisance or damage to other properties.

(5) The diversion and discharge of stormwater runoff must not give rise to the following in any surface water or coastal water:

(a) the production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials;

(b) any conspicuous change in the colour or visual clarity;

(c) any emission of objectionable odour;

(d) the rendering of fresh water unsuitable for consumption by farm animals; or

(e) any significant adverse effects on aquatic life.

(6) Where the diversion and discharge is to ground soakage, groundwater recharge or peat soil areas any existing requirements for ground soakage, including devices to manage discharges or soakage, must be complied with.

Note 1 – For the purposes of these standards "'the total impervious area" includes any additional impervious areas plus existing impervious areas on the site"

E8.6.3.1. Diversion and discharge of stormwater runoff from impervious areas greater than 1000m^2 and up to 5000m^2 within an urban area

(1) Where stormwater runoff from an impervious area is discharged into a stream receiving environment, it must be managed by a stormwater management device and meet the following hydrology mitigation requirements:

(a) provide retention (volume reduction) of a minimum of 5mm runoff depth for all impervious areas; and

(b) provide detention (temporary storage) with a drain down period of 24 hours for the difference between the pre-development and post-development runoff volumes from the 95th percentile, 24-hour rainfall event minus the retention volume for all impervious areas.

(2) Stormwater management devices must be provided to reduce or remove contaminants from the impervious area to the maximum extent applying best practicable options.

Local Environmental Considerations

General Hydrology

As noted in the AEE, there are several hydrological features in the immediate area of the accessway. The AC GeoMaps show that the accessway crosses an overland flow path (OLFP), but is located outside any flood plains[1] (Figure 2-1 below).

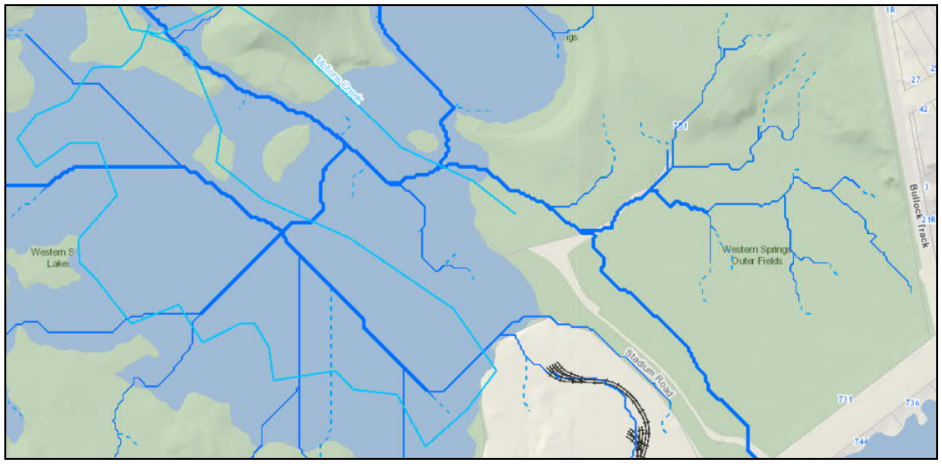


Figure 0-1: Local Hydrological Features (GeoMaps)

[1] The flood plains shown are for 1 in 100-year ARI events. This is the standard flooding frequency detailed under the AUP(OP).

However, the updated flood model for Motions Creek Catchment produced by Tonkin and Taylor in 2017 shows that the existing OLFP does not interfere with the accessway (Figure 2-2 below, where the major OLFP is shown as the red line and the minor OLFP's are shown as the green lines).

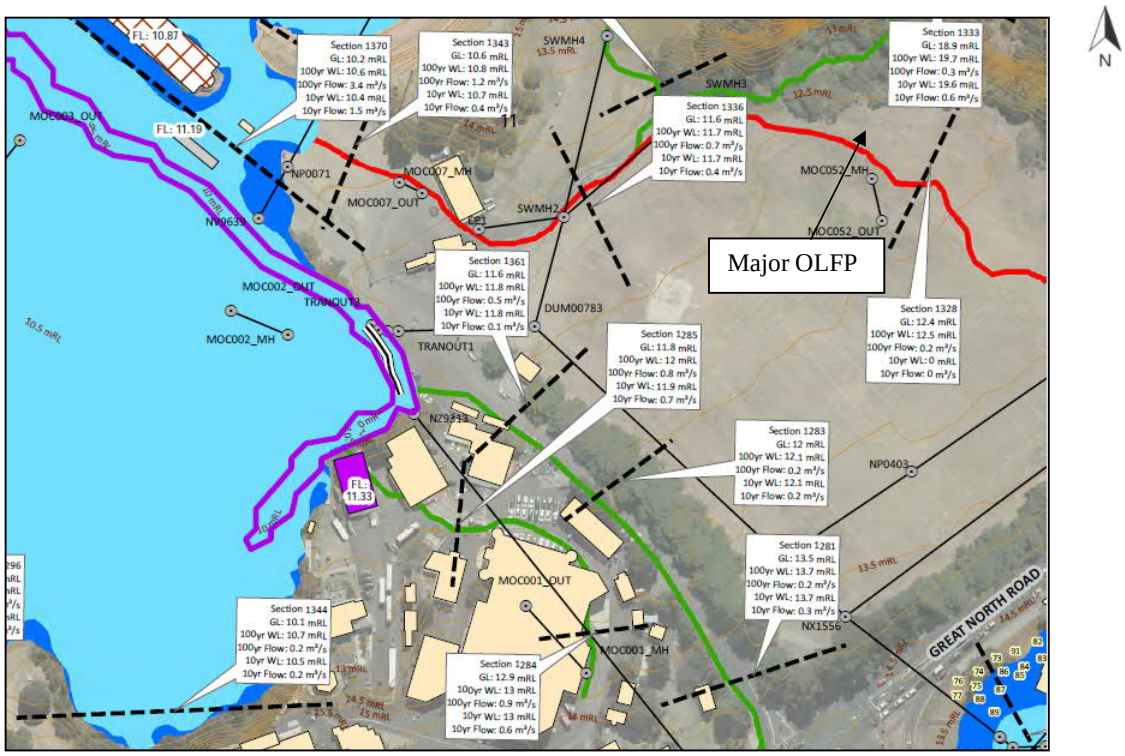


Figure 2-2: Local Hydrological Features in the Updated Flood Model for Motions Creek Catchment (by Tonkin and Taylor)

Existing Stormwater Characteristics

The affected local sub-catchment (which forms part of the wider Motions Creek catchment) consists of three distinct areas of varying permeability; a steep bush section to the north, the central and flat grassed sports fields, and hard surfaces (largely the existing access road and parking) to the south-west of the site. Individually these areas represent approximately 23%, 65% and 12% respectively of this sub-catchment (which itself forms the Western Springs outer playing fields). The existing road and carpark areas within this catchment is believed to have its surface runoff intercepted via kerb and channel and a pipe discharge separate to the remainder of the site.

The proposed accessway is to be located on the existing grassed surface adjacent to the sport fields to the south-west of the site. Refer Plan One provided at the end of this memo.

The accessway will provide an increase in hard surfaces of approximately 2% of the total area. The result is a slight reduction in overall site permeability and therefore increased runoff; the three distinct areas of steep bush, grassed sports fields, and hard surfaces will now represent 23%, 63% and 14% respectively of the total catchment.

Furthermore, the headwaters of Motions Creek are located approximately 60 m (at its closest) from the accessway. Motions Creek is fed by groundwater and the Western Springs lake, running approximately 1.4 km to the Waitemata Harbour. As an urban waterway, it has experienced historical degradation in water quality, due in part to contaminants leaching to groundwater, wastewater overflows and stormwater discharges.

Stormwater Infrastructure

As shown in Figure 2-3, there are several underground stormwater assets present at Western Springs as would be expected given the proximity of Motions Creek (the ultimate receiving body for stormwater discharges). This infrastructure includes a 3.05 m diameter stormwater pipe beneath the accessway. This stormwater pipe takes flows from Great North Road, Ivanhoe Road, Tuarangi Road and Wexford Road. The nearest catch pits are located in Stadium Road.

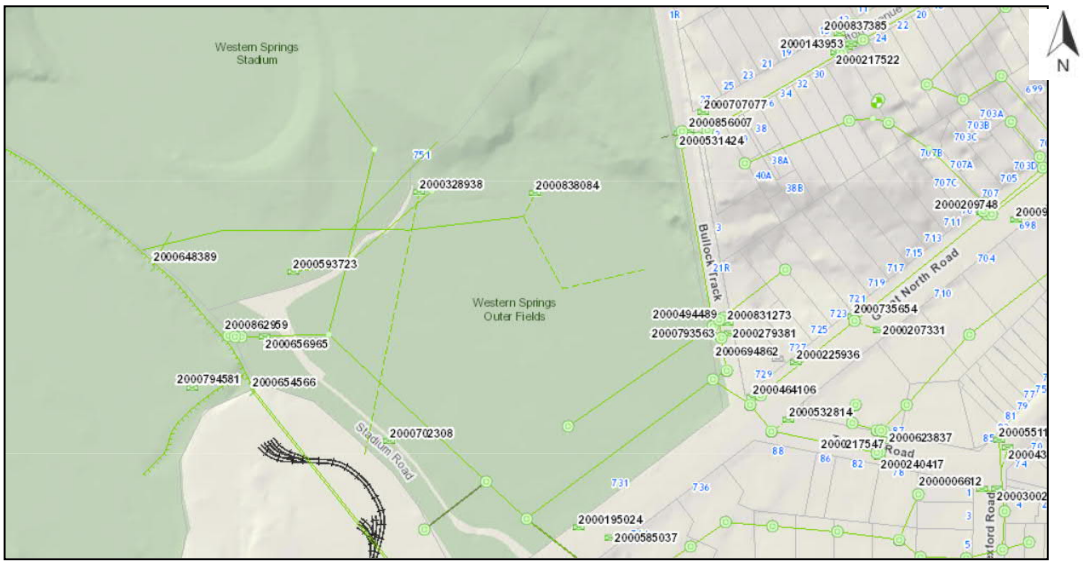


Figure 0-3: Local Stormwater Infrastructure

Capture and discharge of stormwater runoff from the new accessway into existing piped infrastructure is to be via the proposed half dish channel and raingarden.

Stormwater Calculations

The following calculations and assessment have employed these relevant Auckland Council documents and standards:

- Technical Publication 108 - Guidelines for stormwater runoff modelling in the Auckland Region (TP108);
- E8.6.1 - General standards of the AUP(OP); and
- E8.6.3.1. Diversion and discharge of stormwater runoff from impervious areas greater than 1000 m^2 and up to 5000 m^2 within an urban area.

Stormwater Runoff Calculations

TP108 has been used to model stormwater runoff. Modelling included a pre-development calculation and post-development calculation and provides a calculated increase in site runoff volume across design events of approximately 1.7 – 2.8 %. The same modelling provides very little to no-change in peak flowrate for each event.

Table 3.1 below provides modelled results for runoff volume and peak flowrate prior to, and following, completion of the accessway across the 100-year, 10-year, and 2-year rainfall events. The accessway is located at the very bottom of a large contributing catchment (approx. catchment size 1057 hectares). The accessway is located approximately 60 metres from the headwaters of the Motions Creek. The Motions Creek is the receiving body of water for the large contributing catchment. The increase in peak flowrates is therefore considered less than minor.

Table 0-1: Stormwater Volume Runoff Calculations[2]

Design Event	Catchment Runoff Volume Pre-Accessway (m^3)	Catchment Runoff Volume Post-Accessway (m^3)	Runoff Volume Increase (m^3)	Runoff Volume Increase (%)	Change in Peak Flowrate (L/s)
100 year	8,471	8,612	141	1.7	43
10 years	4,606	4,704	98	2.1	9
2 years	1,755	1,805	50	2.8	5

Modelling shows the increased stormwater produced to be minimal across all 3 events.

[2] The stormwater volume calculations have been completed assuming Haul Road impervious area is 1,500m^2

Stormwater Design

Stormwater Runoff Calculations

A range of site-specific features has been considered for this controlled activity to address the increase in stormwater runoff volumes shown in Table 3-1 and the overall stormwater design for the accessway. In addition, stormwater treatment has been considered given the requirements of the AUP(OP).

In summary, site-specific features and design considerations include:

- The proximity of the site to Motions Creek;
- The lack of any habitable floor areas downstream of the accessway;
- The site proximity to the existing stormwater infrastructure utilised for conveyance purposes;
- The minimal use of the accessway for vehicle movements (as opposed to a public road) and likely frequent use by park users;
- The safety of park users in relation to the proposed stormwater infrastructure;
- The water sensitive design approach to the proposed stormwater infrastructure;
- The retention of park amenity and avoiding the loss of recreation space; and
- Ensuring that pedestrian pathways are provided between accessway and Stadium Road.

Stormwater Concept Design

In addressing the above considerations, the concept design has been developed to manage the marginal increase in stormwater runoff as well as to provide stormwater retention, detention and treatment via a raingarden from the newly created impervious area. Design will provide for the following:

- The existing OLFP is to remain unchanged;
- Conveyance of stormwater runoff from the accessway via a half-dish channel and its discharge to the raingarden;
- Provide retention, detention and water quality treatment of road runoff via the raingarden, designed to Auckland Council GD01 standard;
- Overflow from the raingarden will discharge to the existing public stormwater pipe. As the discharge point is located right at the bottom of the catchment it is not expected to noticeably affect the pipe capacity;
- Utilise water sensitive design approach to stormwater management; and
- Maintain pedestrian access to the playing fields.

Design Summary

Given the above measures described in Section 4.2, the raingarden will address the stormwater impacts of the accessway in a manner that meets the AUP(OP)'s matters for control.

The raingarden will provide stormwater runoff treatment as well as retention and detention prior to discharge to Motions Creek. The raingarden is considered appropriate for a public reserve and hence is considered the best practicable option[3].

[3] See Section 2 of the RMA for the definition of "Best Practicable Option".

Appendix 1 - Stormwater TP108 Calculations and Raingarden Sizing

Calculation Cover Sheet

PROJECT:	**CI - Haul Rd**
Document:	**Western Springs - Haul Road TP108 SW Runoff Calculations**
CLIENT:	**Auckland Water**
JACOBS JOB	**IZ027501**
TITLE:	**JNZ-WSL-CIP-CL-0000048**

REVISION DETAILS

STATUS/ REV	*PAGES (incl. Cover)*	*BY*	*DATE*	*REVIEWED BY*	*REVIEWED DATE*	*APPROVED BY*	*APPROVED DATE*
Rev. A	3	Brendon Henshaw	30-May-20	Tess Gillham	9-Jun-20		
Rev. B	5	Eugene Salmin	18-Feb-21	Tess Gillham	19-Feb-21		

AIM

Estabilish increase in SW runoff following the development of a permanent sealed haul road at Western Springs Outer Fields and develop SW management for concept design

SHEET	TITLE
1	Cover
2	Catchment Details
3	TP108 Runoff Calculations
4	SMAF Calculator
5	Bioretention

METHODOLOGY

1	<u>Review Catchment</u> Confirm using Auckland Council Geomaps catchment area and sub-areas of permeable and inpermeable surfaces
2	<u>Calculations</u> Using catchment information and AR Guidelines for SW runoff calculate the storm event run-off volumes and peak flowrates via the TP108 methodology for Pre and Post development of the haul road.
3	<u>Concept Design</u> Consider whether activity to discharge is a restricted or permitted activity Use Auckland GeoMaps data to understand existing overland flowpaths and proximity to creek discharge Consider increased flow and site constraints to provide appropriate SW management method

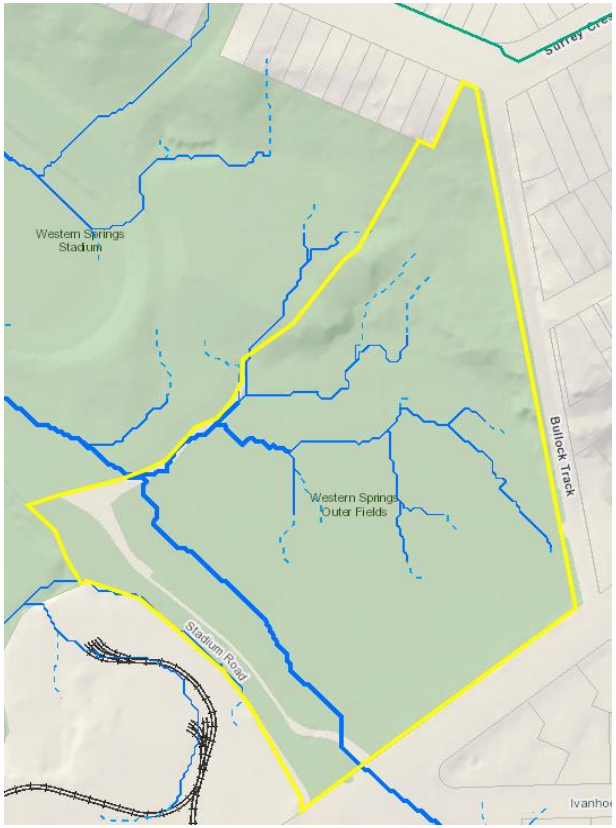
BASIS/ ASSUMPTIONS

1	Hydrological soil group B assumed for all soils
2	Assume that Tc is 10 minutes as per Section 4.2 of TP108 guidance when calculated Tc is below 10 minutes.
3	Contours and Distances to determine the maximum flow path and impervious areas have been estimated from Auckland Council GeoMaps; from the top of catchment following contours
4	Rainfall intensities for TP108 have been adjusted for climate change as per Table 4.1 of the Auckland Council Stormwater Code of Practice.
5	Because of the infrequent use of the site by vehicles, water quality does not need to be considered under GD01 as the site is not classified as a high-use car park.

REFERENCES

1	As referenced in notes in calculation and assumptions above.

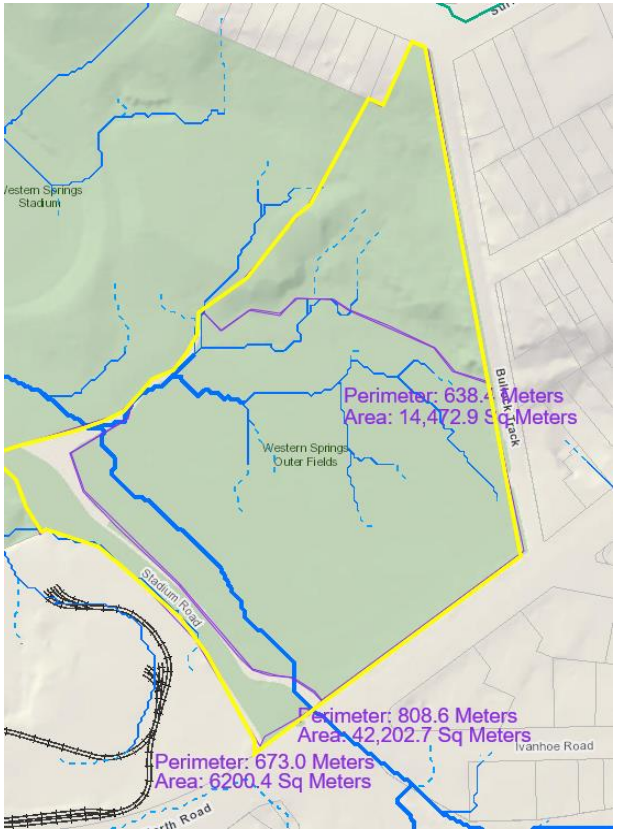
Catchment area 64413 m2



Using poly-lines from AC Geomaps

Pre haul Rd	**m2**	
Total Catchment	64413	
Tree/bush	14473	22.5%
Grass fields	42203	65.5%
Ex. carpark/access	7737	12.0%

Post haul Rd - 214m L x 4.5m W		
Total Catchment	64413	
Tree/bush	14473	22.5%
Grass fields	40703	63.2%
Ex. carpark/access	7737	12.0%
New paved area	1500	2.3%



Project Name:	CI - Haul Rd	PURPOSE OF CALCULATION
Description:	TP108 Run-Off Calculations	The purpose of this calculation is to use TP108 methodology to calculate total 24-hour run-off volumes and peak flowrates for four storm events outlined in GD01. These results will be used to consider SW design for the project.
Calculated by:	Brendon Henshaw	
Date:	30/05/2020	
Reviewed by:	Tess Gillham	
Date:	9/06/2020	

TP108 Run-Off Calculations

Soil Name & Classification	Cover Description	CN	Area m2	Product of CN x Area
B	Good condition (grass cover >75%)	61	42203	2574383
B	Trees/bush	55	14473	796015
	carpark/access	98	7737	758226
				0
				0
		Totals	64413	4128624
			Pervious area	56676
CN(weighted)	total product / total area	64.096		
Ia (weighted)	5x pervious area / total area	4.3994	mm	
Chanelisation factor ©	From Table 4.2 TP108	0.775976899		
Catchment length (L)	(along drainage path)	0.33	km	from AC geomaps
Catchment slope (Sc)	From Existing Levels	0.109090909	m/m	
Runoff Factor	CN/(200-CN)	0.471628435		
tc	0.14 *C *L^0.66 (CN / (200 - CN))^ -0.55 Sc^-0.30	0.105879397	hrs	
tc to use	If less than 10 mins	0.166666667	hrs	

1 PRE

Catchment Area	0.064413	km2
Curve No.	64.09612966	
Ia	4.399422477	
Tc	0.166666667	hrs

2 Calculate Storage

s= 25.4x ((1000/CN)-10)	142.2797775	mm

3	Storm #1	Storm #2	Storm #3	Storm #4	
ARI (Years)	100	10	2		
P24 mm (from Appendix C Figures in TP108)	221.92	147.16	81.75		With Climate change adj. (ref Table 4.1 - right)
$c^* = \frac{P_{24} - 2Ia}{P_{24} - 2Ia + 2S}$	0.428	0.327	0.204	-0.032	
q* (fig 5.1)	0.122	0.094	0.064		
Peak Flowrate (m3/s) $q_p = q^* A P_{24}$ (m³/s)	1.74	0.89	0.34	0.00	
Runoff Depth - Q24 (mm) $Q_{24} = \frac{(P_{24} - Ia)^2}{(P_{24} - Ia) + S}$ (mm)	131.50	71.50	27.24	0.14	
Runoff volume - V24 (m3) $V_{24} = 1000 \times Q_{24} A$	8470.57	4605.57	1754.72	9.04	

q* values

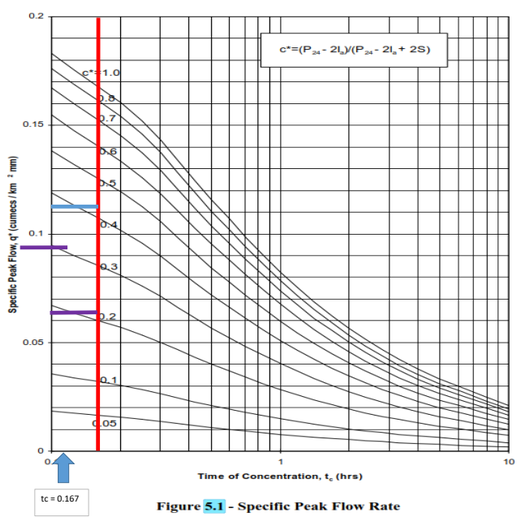


Figure 5.1 - Specific Peak Flow Rate

Soil Name & Classification	Cover Description	CN	Area m2	Product of CN x Area
B	Good condition (grass cover >75%)	61	40703	2482883
B	Trees/bush	55	14383	791065
	carpark/access	98	7737	758226
	new access	98	1590	155820
				0
		Totals	64413	4187994
			Pervious area	55086
CN(weighted)	total product / total area	65.018		
Ia (weighted)	5x pervious area / total area	4.2760	mm	
Chanelisation factor ©	From Table 4.2 TP108	0.771040007		
Catchment length (L)	(along drainage path)	0.33	km	from AC geomaps
Catchment slope (Sc)	From Proposed Levels	0.109090909	m/m	
Runoff Factor	CN/(200-CN)	0.481677261		
tc	0.14 *C *L^0.66 (CN / (200 - CN))^ -0.55 Sc^-0.30	0.105083854		
tc to use	If less than 10 mins	0.166666667		

Table 4.2 - Channelisation factors	
Piped stormwater system	C = 0.6
Engineered grass channels	C = 0.8

1 POST

Catchment Area	0.064413	km2
Curve No.	65.01783801	
Ia	4.276000186	
Tc	0.166666667	

2 Calculate Storage

s= 25.4x ((1000/CN)-10)	136.662021	mm

3	Storm #1	Storm #2	Storm #3	Storm #4	
ARI (Years)	100	10	2		
P24 mm (from figures in TP108)	221.92	147.16	81.75		With Climate change adj, (ref Table 4.1 - right)
$c^* = \frac{P_{24} - 2Ia}{P_{24} - 2Ia + 2S}$	0.438	0.336	0.211	-0.032	
q* (fig 5.1)	0.125	0.095	0.065		
Peak Flowrate (m3/s) $q_p = q^* A P_{24}$ (m³/s)	1.79	0.90	0.34	0.000	
Runoff Depth - Q24 (mm) $Q_{24} = \frac{(P_{24} - Ia)^2}{(P_{24} - Ia) + S}$ (mm)	133.69	73.03	28.03	0.14	
Runoff volume - V24 (m3) $V_{24} = 1000 \times Q_{24} A$	8611.69	4704.22	1805.49	8.90	

off increase from Pre-			
1 (m3)	141.12	98.64	50.77
	1.67%	2.14%	2.89%

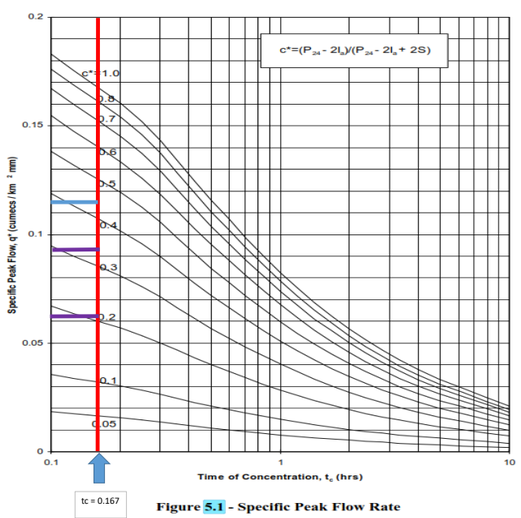


Figure 5.1 - Specific Peak Flow Rate

Table 4.1: Percentage Increase in 24-hour Design Rainfall Depth

Annual Exceedance Probability (AEP)	Percentage Increase in 24-Hour Design Rainfall Depth Due to Future Climate Change*
50%	9.0%
20%	11.3%
10%	13.2%
5%	15.1%
2%	16.8%
1%	16.8%

* assuming 2.1°C increase in temperature

	Difference in peak flow
2 year	5.266 l/s
10 year	9.48 l/s
100 year	42.88 l/s

GD01 Design Sheet - SMAF Calculator

For use with GD01 - Stormwater Guidelines for the Auckland Region

Date: 24/02/2021

Address: Western Springs Outer Fields

Project: Central Interceptor Tunnel **Reviewer:**

INITIAL PARAMETERS

	Input
	Calculation
	Results

Total site area	64413	m^2	
Pre-construction site areas			
Impervious area	7737.00	m^2	
Pervious area	56676.0	m^2	
% Imperviousness	12.01%	%	
Post-construction site areas			
Impervious area	9237.0	m^2	
Pervious area	55176.0	m^2	
% Imperviousness	14.34%	%	
Total site imperviousness > 50%	No		
Area for hydrology mitigation	1500	m^2	[1]

CONTROL DATA

Rainfall depth	35.0	mm	[2]
Possibility for re-use	Yes		[3]
Hydrological soil group	Group_C	70	[4]
Impervious SCS curve number (CN)	98		

SUMMARY

	Impervious	Pervious	% imp.
Pre-development condition	0	1500	0%
Post-development condition	1500	0	100%

Post-development runoff volume	45.73	m^3	
Pre-development runoff volume	9.72	m^3	
Hydrology mitigation volume	**36.01**	m^3	
Retention volume	7.50	m^3	[5]
Detention volume	28.51	m^3	[6]

Notes:

[1a] If post-dev. % imprv. < 50%, area for hydrology mitigation is new impervious area E.10.6.4 (1a)

[1b] If post-dev. % imprv. > 50%, area for hydrology mitigation is total site impervious area E.10.6.4 (1b)
In this case (1b), pre-development is considered an entirely grassed site. (CN = 74)

[2] Select rainfall based on 24-hour 90th/95th percentile rainfall event

[3] If soil infiltration < 2mm/hr AND no option of re-use, then Hydrology Mitigation Volume is considered as all detention

[4] CN of 98 for impervious areas. Refer TP108 Table 3.3 for CN to pervious areas.

[5] Retention vol. = 5mm over the new impervious area of the area for hydrology mitigation.

[6] If retention vol > difference between post- and pre- dev. runoff, then required detention is zero (not negative)

TP108 Calculations	Value	Unit		Value	Unit
	Pre-development			Post development	
Weighted CN	70	-		98.00	-
Pre-storage	108.86	mm		5.18	mm
Initial abstraction weighted	5.00	-		0.00	-
Pre rainfall	6.48	mm		30.49	mm

GD01 Design Sheet - Bioretention

For use with GD01 - Stormwater Guidelines for the Auckland Region

Date: 24/02/2021

Address: Western Springs Outer Fields

Project: Central Interceptor Tunnel **Reviewer:**

INITIAL PARAMETERS

	Input
	Calculation
	Results

Catchment contributing to device	1500	m^2	
Treatment Type	SMAF 1		[1]
Bioretention Media Infiltration Rate	0.3	m/hr	[2]
Soil Infiltration Rate	2	mm/hr	[3]
Evapotranspiration Rate	2	mm/day	[4]

Sizing for SMAF

Retention Volume	7.5	m^3	[5]
Detention Volume	28.5	m^3	

CONTROL DATA

Bioretention Layer	Area (m^2)		Depth (mm)	Min. depth
Ponding layer	70		200	200
Media + transition layer	-		600	600
Drainage layer	-		200	200
Storage layer	50		500	450
	At least 15 sqm			

Bioretention Void Space Ratio	Void space (%)	**Dimensions**	Length (m)	Width (m)
Bioretention Media	35%	Ponding	35	2
Drainage Media	30%	Drainage	30	1.666666667

SUMMARY

		Void %
Ponding volume	14.0	100%
Media + transition layer	12.5	35%
Drainage volume	3.0	30%
Achievable Detention	29.5	
Drainage volume	7.5	30%
Achievable Retention	7.5	

Notes:

[1] SMAF 1 & 2 will provide retention, detention and water quality treatment
Water quality only will provide no retention or detention; this type of device will require less area.

[2[Required retention and detention as calculated using SMAF spreadsheet

[3] Infiltration rate through the biomedia. Maximum value of 1 m/hr.

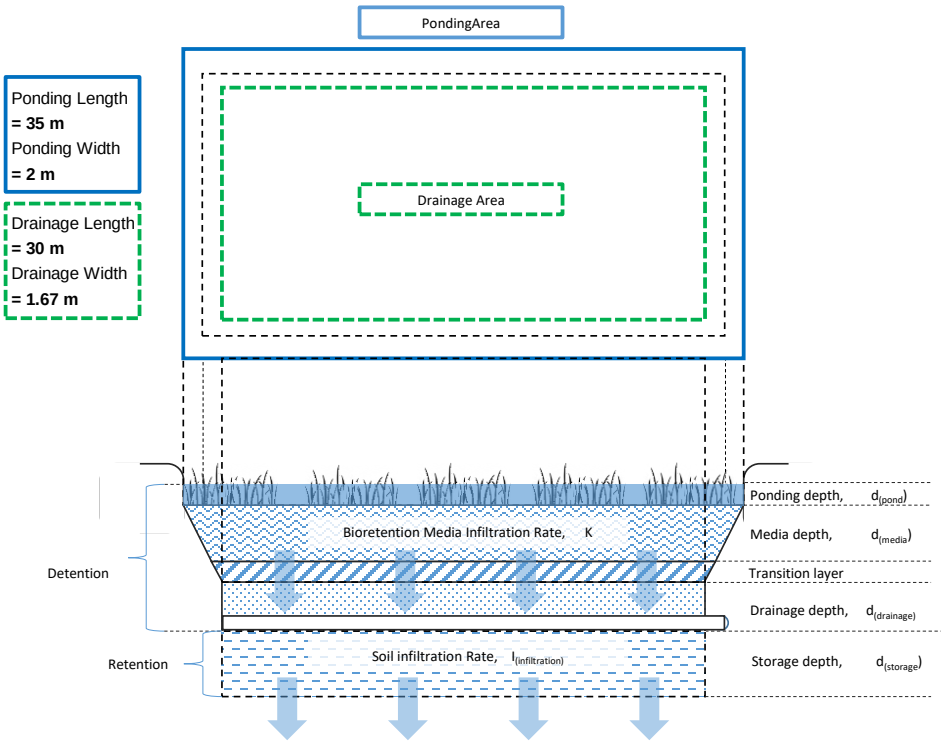
[4] Infiltration rate through underlying soils. Lower infiltration rates will result in larger required area for device.
As infiltration rates are small (compared to soakage) infiltration is assumed through base only (not sides)

[5] Evapotranspiration rates for trees = 3 or vegetation/shrubs = 1 - 2
Bioretention design assumes trapezoidal shape with linear slopes.

[6] For sizing the minimum device area, the simplified method is provided as a rule of thumb.
The spreadsheet allows for more accurate calculation and validation of design.

Minimum requirements as per GD01			
	SMAF 1	SMAF 2	Water Quality
Min. area as % of catchment contributing to device - **simple method**			
Inf. Area (m^2)	3.5%	3.5%	0.0%
Pond. Area (m^2)	5.0%	3.5%	2.0%
Minimum depth of individual layers			
Ponding depth	200	150	100
Media depth	600	600	600
Drainage depth	200	200	200
Storage depth	450	450	0
Calculating minimum infiltration area			
Infiltration time per GD01		72	hours
Depth infiltrated via soil.		144	mm
Depth infiltrated via evap.		6	mm
Achiveable retention depth		150	mm
with drainage void space ratio		500	mm
Minimum area to inf. retention vol.		15.00	m^2

[6]



Appendix 2 – Site Layout

Appendix E. Objectives and Policies Assessment

Reference	Objective/Policy	Is the Proposal Consistent?	Comment
Regional Policy Statement			
Objectives B3.2.1	(1) Infrastructure is resilient, efficient and effective. (2) The benefits of infrastructure are recognised, including: a) providing essential services for the functioning of communities, businesses and industries within and beyond Auckland; b) enabling economic growth; c) contributing to the economy of Auckland and New Zealand; d) providing for public health, safety and the well-being of people and communities. (3) Development, operation, maintenance, and upgrading of infrastructure is enabled, while managing adverse effects on: (a) the quality of the environment and, in particular, natural and physical resources that have been scheduled in the Unitary Plan in relation to natural heritage, Mana Whenua, natural resources, coastal environment, historic heritage and special character; (b) the health and safety of communities and amenity values. (4) The functional and operational needs of infrastructure are recognised. (8) The adverse effects of infrastructure are avoided, remedied or mitigated. (And Policies 1, 2, 6, 8)	Yes	The proposed works are required to provide additional access to key infrastructure – including Western Springs Stadium and wastewater infrastructure as part of the CI works. The proposed accessway will provide a dedicated access road that can be used to service critical infrastructure as well as Stadium Road if required. The adverse effects from the discharges from contaminated land will be appropriately mitigated with a SMP prior to construction.
B10.4 – Contaminated Land	(1) Human health and the quality of air, land and water resources are protected by the identification, management and remediation of land that is contaminated. (And Policy 3)	Yes	Human health and the quality of air, land and water resources will be protected via implementation of appropriate management procedures prior to construction. As discussed in Section 5 above, the potential effects of discharges from contaminated land will be less than minor.

Unitary Plan Objectives and Policies			
Chapter E1 Water Quality and Integrated Management			
E1.2	(2) The mauri of freshwater is maintained or progressively improved over time to ensure traditional and cultural use of this resource by Mana Whenua. (3) Stormwater and wastewater networks are managed to protect public health and safety and to prevent or minimise adverse effects of contaminants on freshwater and coastal water quality. (And Policies 1, 2, 4, 5, 6, 9, 10, 11, 13 and 14)	Yes	The proposed stormwater discharge will slightly increase the hard surface of the total area of the site by 2%. Given the increase impervious area, it is proposed to install a rain garden to treat the stormwater runoff. It was determined that the raingarden is considered appropriate for a public reserve and hence is considered the best practicable option.
Chapter E30 Contaminated Land			
E30.2	(1) The discharge of contaminants from contaminated land into air, or into water, or onto or into land are managed to protect the environment and human health and to enable land to be used for suitable activities now and in the future. (And Policies 1 and 2)	Yes	As discussed in Section 5, appropriate management procedures will be implemented on site prior to construction as part of a SMP. The implementation of these procedures will ensure the discharges from contaminated land are appropriately managed and the effects of discharges from contaminated land into air, or into water, or onto or into land will be avoided and mitigated.
Chapter I335 Western Springs Stadium Precinct			
I335.2	Western Springs Stadium is protected as a regionally and nationally important venue for all of the following primary activities: • organised sports and recreation; • informal recreation; • motorsport activities; • concerts, events and festivals; • markets, • fairs and trade fairs; • functions, • conferences, • gatherings and meetings; and • displays and exhibitions.	Yes	It is recognised that Western Springs Stadium is protected as regionally and nationally important venue. The proposed accessway will support the stadium and provide a dedicated access road that can be used to service the Stadium as required. The proposed works are not anticipated to adversely affect the operation of the Stadium, and not adversely affect the surrounding land uses.

	(2) A range of activities compatible with, or accessory to, the primary activities are enabled. (3) The adverse effects of the operation of Western Springs Stadium are avoided, remedied or mitigated as far as is practicable recognising that the primary activities will by virtue of their nature, character, scale and intensity, generate adverse effects on surrounding land uses which are not able to be fully internalised. (And Policies 1, 3, and 4)		