Application for Land Use Consent

Harewood Investments Limited

30-64 Harewood Road, 22 Chapel Street and 41 Langdons Road, Christchurch

October 2014

Christchurch City Council

Reference: 254009

Revision: Consent Lodgement (updated V4)

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QUALITY ASSURANCE

Project Reference:	254009
Title:	Application for Land Use Consent – 30-64 Harewood Road, 22 Chapel Street and 41 Langdons Road, Christchurch
Applicant:	Harewood Investments Limited P O Box 16323 Hornby, Christchurch Attention: Andrew Smith
Filename:	254009 141211 Consent Application.dd.rje.Lodgement V4.doc
Version:	Consent Application Version 4 (updated to reflect matters identified n the Council RFI dated 7 October 2014)
Lodgement Date:	31 October 2014
Planning Assessment prepared By:	Damienne Donaldson Planner
Transportation Assessment prepared by:	Ray Edwards Managing Director Urbis TPD Limited
Client Release Review by:	Ray Edwards Managing Director Urbis TPD Limited

1.0 INTRODUCTION

The following application relates to a Mitre 10 Mega store proposed to be constructed and established on the Sanitarium Health Food factory site in Papanui.

The site is bounded by Harewood Road, Chapel Street and Langdons Road, Christchurch. The site is known as 54 Harewood Road, 22 Chapel Street, 41 Langdons Road and 32 and 36 Harewood Road.

The proposed activity itself is considered to be a 'trade supplier' as per the definition of the City Plan which is an anticipated activity in the Business 4 zone.

The applicant intends to undertake a two staged approach to the development. This staged approach will enable the Sanitarium factory to continue operations and the manufacturing of their products (notably Marmite) from the northern part of the site whilst the factory transfers its manufacturing and processing production lines to the Auckland Sanitarium facility. It may take up to five years for Sanitarium to fully vacate the Papanui site. On cessation of the Sanitarium activity the balance of the proposed Mitre 10 Mega building will be constructed along with the associated parking, landscaping and signage.

Given the non-compliance with a Critical Standard regarding content of excavation, the proposal is considered as a **non-complying** activity. However it is noted that the site contamination aspects of the proposal would be considered as a restricted discretionary activity under the NES.

This application addresses the character of the land, the proposed land use activity and the relevant provisions of the Christchurch City Plan (the Plan). This application also includes an assessment of effects on the environment as required by the Fourth Schedule to the Resource Management Act 1991.

1.1 Summary of Applicant and Proposal Details

Applicant:	Harewood Investments Limited
Site Address:	30-64 Harewood Road, 22 Chapel Street and 41 Langdons Road
Legal Descriptions:	Multiple – see Table 1 below
Certificate of Title:	Multiple – see Table 1 and Annexure A
District Plan Zoning:	Business 4 Zone

Site Area:	3.2ha
Proposal:	Land use consent is sought to establish a 13,518m² Mitre 10 Mega store in two stages with associated car parking and landscaping on the site at 30-64 Harewood Road, 22 Chapel Street and 41 Langdons Road.

1.2 Activity Classification

Given the non-compliance with a Critical Standard regarding content of excavation, the proposal is considered as a **non-complying** activity. However it is noted that the site contamination aspects of the proposal would be considered as a restricted discretionary activity under the NES.

The remainder of the proposal (i.e. other than content of excavation) would otherwise require resource consent as a **restricted discretionary** activity owing to breaches of eleven development standards in the City Plan.

2.0 SITE AND SURROUNDS

2.1 Site Information

The application site is located at 30-64 Harewood Road, 22 Chapel Street and 41 Langdons Road, Christchurch with the majority of the site known as the Sanitarium Health Food Factory site. The site is held in multiple Certificates of Title, with legal descriptions and title references detailed in Table 1 below. The site has an overall site area of 32,889m² as shown in Figure 1 on the following page.

Street Address	Certificate of Title	Legal Description	Site Area
30 Harewood Road	CB37C/360	Pt Lot 2 DP 59153	3,004 m²
36 Harewood Road	CB46C/360	Lot 1 DP 63391	543m²
54-64 Harewood Road	CB37C/1080	Lots 2 -8 DP 9715	6,411 m²
	CB37C/1080	Pt Lot 12 DP 9715	12,899m²
	CB37C/1080	Pt Lot 1 DP 9715	755m²
	CB37C/1080	RS 41027	876m²
	CB37C/1080	Pt Lot 1 DP 204	2,010m²
41 Langdons Road	CB36A/232	Lot 1 DP 59153	5,206m²
22 Chapel Street	CB37C/1080	Lot 10 DP 9715	705m²
	CB37C/1080	Pt Lot 9 DP 9715	660m²
		Total Land Area	**32,889m² approx.**

Table 1: Certificates of title, legal descriptions, title areas for the Application site.

Also as noted earlier, these land parcels are zoned Business 4 (Suburban Industrial) as identified on Planning Map 24C of the City Plan.

In accordance with Planning Map 24C the subject site has a heritage item being a notable tree (Lirodendron Tulipitere) located on Lot 12 DP9715.

The application site also features an environmental asset waterway known as Kruses Drain as shown in Part 9, Appendix 1 of the City Plan which runs from the east side of Chapel Street to the railway line.

Figure 1: Indicative location of the application site, Kruses Drain and protected tree

Figure 1 shows that the application site is bounded by the Special Purposes (Rail) corridor to the east, Chapel Street to the west, Harewood Road to the south and Langdons Road to the north.

2.2 Current Land Uses

The application site currently contains a number of buildings with different land use activities.

54-64 Harewood Road, 41 Langdons Road and 22 Chapel Street

54-64 Harewood Road, 22 Chapel Street and 41 Langdons Road presently contains the Sanitarium Health Food Papanui factory along with associated areas of car parking, landscaping and signage and forms the largest portion of the application site.

The site has an operative Business 4 zoning and has been used as a food production facility for over a century. The mid-section of the processing building was removed following the Canterbury earthquakes and is now split and categorised as manufacturing in the north and distribution in the south.

The main manufacturing and processing building is located to the north of the site, orientated in a south north direction. The manufacturing building includes the boiler room, food testing laboratory, Marmite production line and stores on the ground level. The first floor contains; offices, canteen, maintenance department, yeast processing and bulk ingredients stores. Four grain silos are located adjacent the northern façade manufacturing building, these are to be removed as part of Stage 2 of the site redevelopment.

A gardener's compound and former dangerous goods store are located in the southwest corner of the site.

The western portion of the site features style landscape plantings and an expanse of open space with a large fountain being the central feature and landmark. A number of mature trees including the notable tree (Lirodendron Tulipitere) and a portion of Kruses Drain.

Kruses Drain, a tributary of the Styx River, originates in Papanui and is largely fed by the piped stormwater network. There is a 130m open section that flows in a northwest direction through the application site, before being piped as shown in Figure 2 below. This reach is classified as an "environmental asset waterway" in the City Plan.

Figure 2: Location of Kruses Drain and infrastructure

The balance of the site is utilised for associated parking and manoeuvring areas. Vehicle access to this portion of the site is via two access points from Harewood Road and one access points from Chapel Street. This is further illustrated in the Annexure A “Existing Site Plan”.

22 Chapel Street is located in the northwest portion of the site and is legally held in certificate of title Lot 10 DP 9715 and held in certificate of title CB37C/1080. This portion of the site currently contains a residential styled building used as administrative offices in association with the Sanitarium factory. Access to this building is via the access point servicing the entire Sanitarium site from Chapel Street.

36 Harewood Road

36 Harewood Road is located in the south western portion of the site, adjacent the railway corridor and is legally held in certificate of title Lot 1 DP 63391 and held in certificate of title CB46C/360.

The site has an operative Business 4 zoning and has been used for commercial and industrial purposes for many years and presently contains Christchurch Security Centre a retail locksmith along with associated areas car parking, landscaping and signage. Vehicle access is via a single access via Harewood Road only.

30 Harewood Road

30 Harewood Road is located in the south western corner of the site and is legally held in certificate of title Pt Lot 2 DP 59153 and held in certificate of title CB37C/360.

The site has an operative Business 4 zoning and has been used for commercial and industrial purposes for many years and previously contained Wilderness Motorhomes along with associated areas of car parking, landscaping and signage. Vehicle access is via two access points from Harewood Road providing ingress and egress only.

2.3 Site Contamination

The National Environmental Standards[1] (NES) manage activities which involve the disturbance of land which may be contaminated. This is determined by whether activities have or are likely to have occurred on the site, which are listed in the Hazardous Activities and Industries List (HAIL). If soil is being disturbed, the NES will apply.

The site at 54-64 Harewood Road contained two underground fuel tanks and one above ground storage tank. In addition historic aerial images indicate a railway siding and goods handling building were present on the site. Therefore the NES applies to activities on the site.

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[1] The NES for Assessing and Managing Contaminants in Soil to Protect Human Health came into effect on the 1st of January 2012 and all territorial authorities are required to give effect to and enforce the requirements of the NES.

The applicant has commissioned Geoscience Consulting Ltd to prepare a Detailed Environmental Site Investigation (DSI) for the site with the objective of evaluating and identifying potential sources of contamination from past and present site activities and any potential risks to future site users (refer Annexure B). This was been conducted through the inspection of relevant historical records, including historical aerial photographs, certificates of title and Council documents (CCC and ECAN) and conducting a site walkover and interviews. The Geoscience Consulting Ltd report is discussed further in Section 3.3 below.

2.4 Surrounds Information

The surrounding area is mixed in zoning and land use as shown by the extract from the City Plan Planning Map 24C in Figure 3 below:

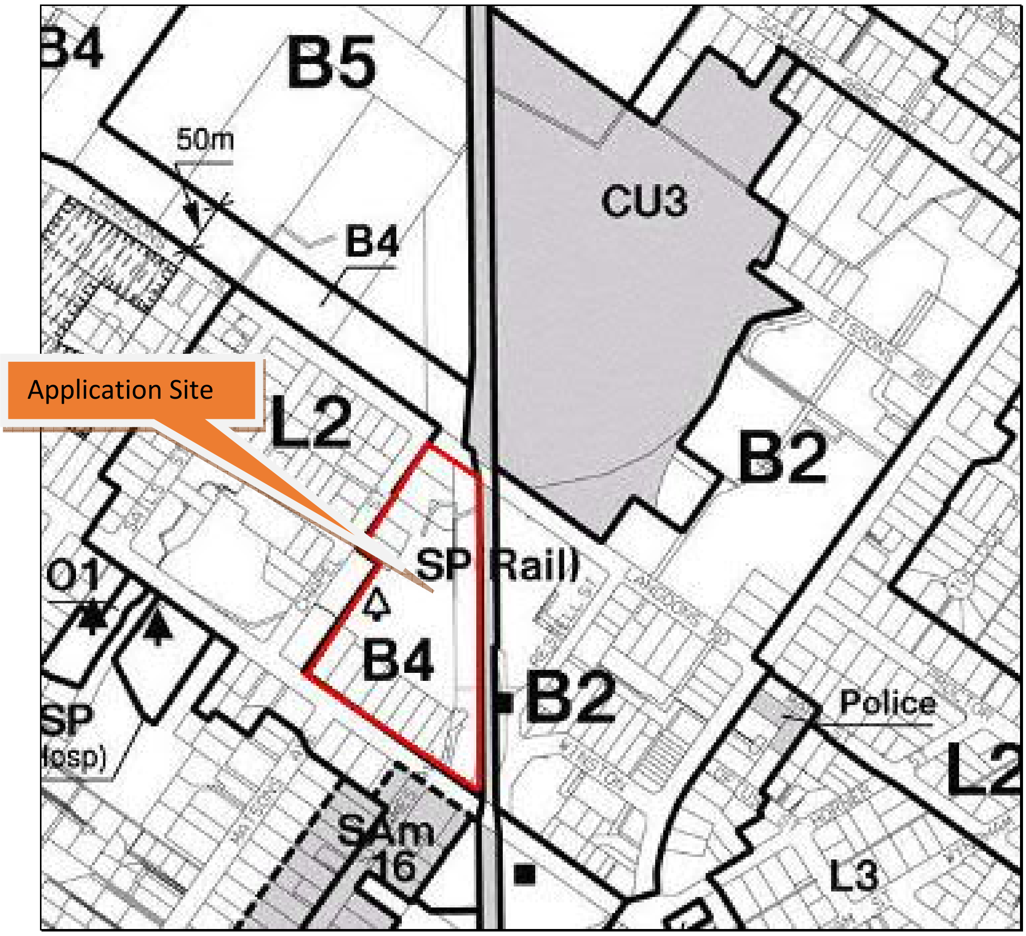

Figure 3: Zoning Information from the Christchurch City Plan

The surrounding area is somewhat mixed in zoning and use:

- Immediately adjoining the site to the west are two parcels of Living 2 zoned land which contains a spiritual activity; the Christchurch North Methodist Church, with an large expanse of land utilised for parking purposes.
- Further to the west (across Chapel Street) and beyond is zoned Living 2 and is predominantly developed for residential purposes including the 'Albarosa Rest Home' located on the north east corner of Chapel Street and Harewood Road.
- The site immediately to the north (across Langdons Road) is zoned Business 4 and whilst largely undeveloped features a Bridgestone Firestone repair centre which is ancillary and additionally acts as a buffer to the adjacent Business 5 zoning heavy industrial activities of Firestone. The Council has recently issued some consents to enable development of part of this site for office and office/warehouse purposes.
- A rail corridor runs adjacent the site to the east and separates Restell Street from the site. The surrounding area to the east of Restell Street and the rail corridor is zoned Business 2 and features a mix of smaller retail and commercial activities with further afield to the north east is the large suburban shopping complex known as "Northlands".
- Immediately, to the east of this is the CU3 zone containing Papanui High School.
- To the south of the site (across Harewood Road) is zoned Living 2 zone and is predominantly developed for residential purposes. Properties 29 to 35 Harewood Road and 130-138 St James Ave are also zoned Living 2 under the City Plan and are located within Special Amenity Area 16 (SAM16) which covers the length of St James St extending from Harewood Avenue to Windermere Avenue. The surrounds are predominantly developed accordingly with residential properties featuring wooden bungalows with low pitched roofs dwellings and well vegetated front yards in keeping with the aspirations of SAM 16.

2.5 The Road Network

Harewood Road

Harewood Road is classified as a minor arterial road in the Council's roading hierarchy. The City Plan describes minor arterial roads as having a planned primary function of providing connections between major arterial roads and inter-connecting the major rural, suburban, commercial and industrial areas. Harewood Road provides an important north west-south east connection between Main North Road and Johns Road (SH1).

In the general vicinity of the application site, Harewood Road has a single traffic lane and a cycle lane in each direction separated by a painted median. Immediately adjacent to the application site, Harewood Road is provided with a single 5.5m wide traffic lane and a 1.5m wide cycle lane in the northbound and southbound direction. There is also a pedestrian refuge island located within the painted median immediately to the east of Matsons Avenue.

Except in the proximity of intersections and vehicle crossings, unrestricted on-street parking is generally available on both sides of Harewood Road in the vicinity of the site. There are also bus stops on both the northern and southern sides of Harewood Road mid way along the site frontage. The bus stop on the north side of the road is provided with a small shelter.

The most recent Council traffic count data available for Harewood Road in the vicinity of the site is from March 2012 at the railway crossing. This data indicates an average weekday traffic volume of around 14,000 vehicles per day and around 1,200 vehicles per hour during the AM and PM peak periods. Eastbound and westbound flows across the day are fairly similar, except for a slight westbound bias in the PM peak period as illustrated in Figure 4 on the following page. The data also indicates a slightly lower volumes on Saturdays of around 12,900 vehicles per day and 1,100 vehicles per hour during the mid day peak period. As with weekday traffic patterns, eastbound and westbound flows on the Saturday were fairly even as illustrated in Figure 5 on the following page.

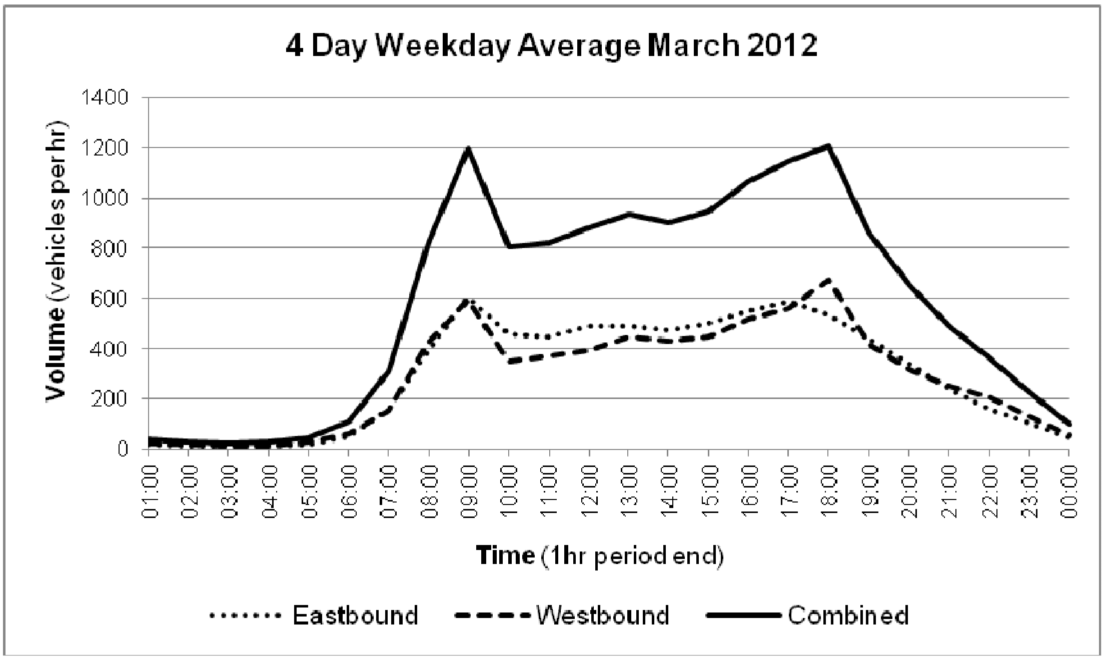

Figure 4: Harewood Road Average Weekday Traffic Volumes (CCC, March 2012)

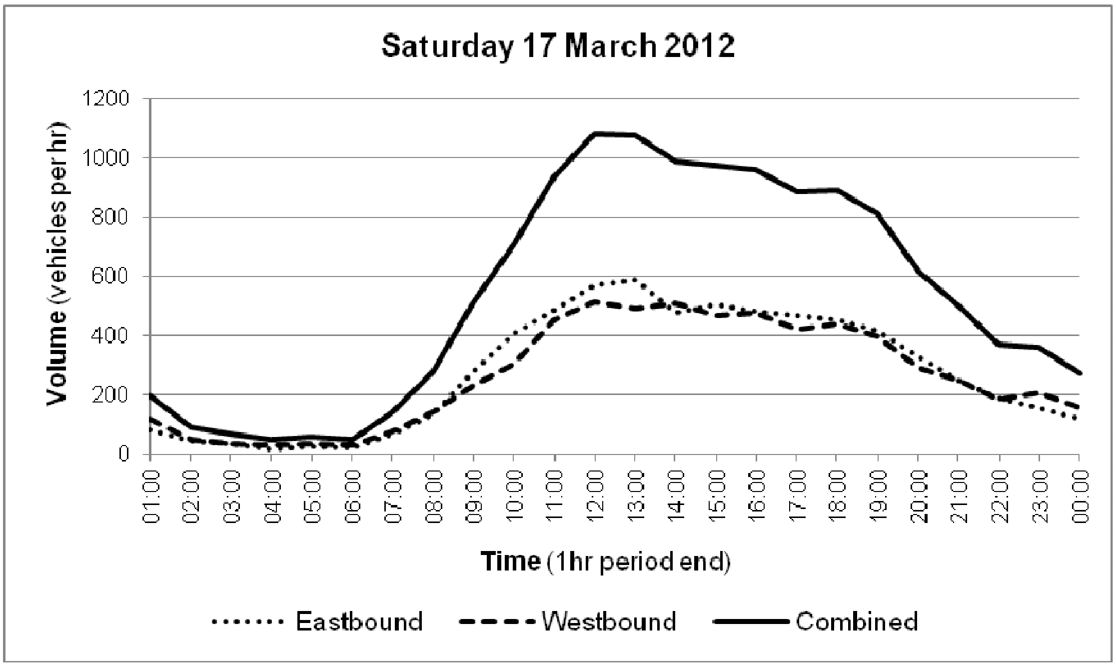

Figure 5: Harewood Road Saturday Traffic Volumes (CCC, March 2012)

Langdons Road

Langdons Road is classified as a collector road in the City Plan. The City Plan describes collector roads as having a balanced traffic movement and property access function, as well as linking the arterial network, neighbourhoods and rural communities, and often being used as bus routes. Recognising this function, Langdons Road links the arterial routes of Main North Road and Greers Road, and also provides a key connection to the Northlands shopping centre.

In the vicinity of the application site, Langdons Road is formed with 12m wide carriageway effectively providing a single traffic lane in each direction separated by a marked centre line. Unrestricted parking is generally available on both sides of Langdons Road, except near intersections and vehicle crossings. On-street parking is also banned in the immediate vicinity of the railway crossing, and for the full length of the application site frontage on the south side of the road.

The most recent Council traffic count data available for Langdons Road in the vicinity of the site is from June 2012 at the railway crossing. This data indicates an average weekday traffic volume of around 8,600 vehicles per day and around 700-800 vehicles per hour during the AM and PM peak periods. As with Harewood Road, eastbound and westbound flows across the day are fairly similar as illustrated in Figure 6 on the next page. The data also indicates a slightly lower daily volumes on Saturdays of around 7,500 vehicles per day, but with a similar peak volume of around 800 vehicles per hour during the mid day peak period. Again, traffic flows on the Saturday were evenly distributed eastbound and westbound across the day as illustrated in Figure 7 on the next page.

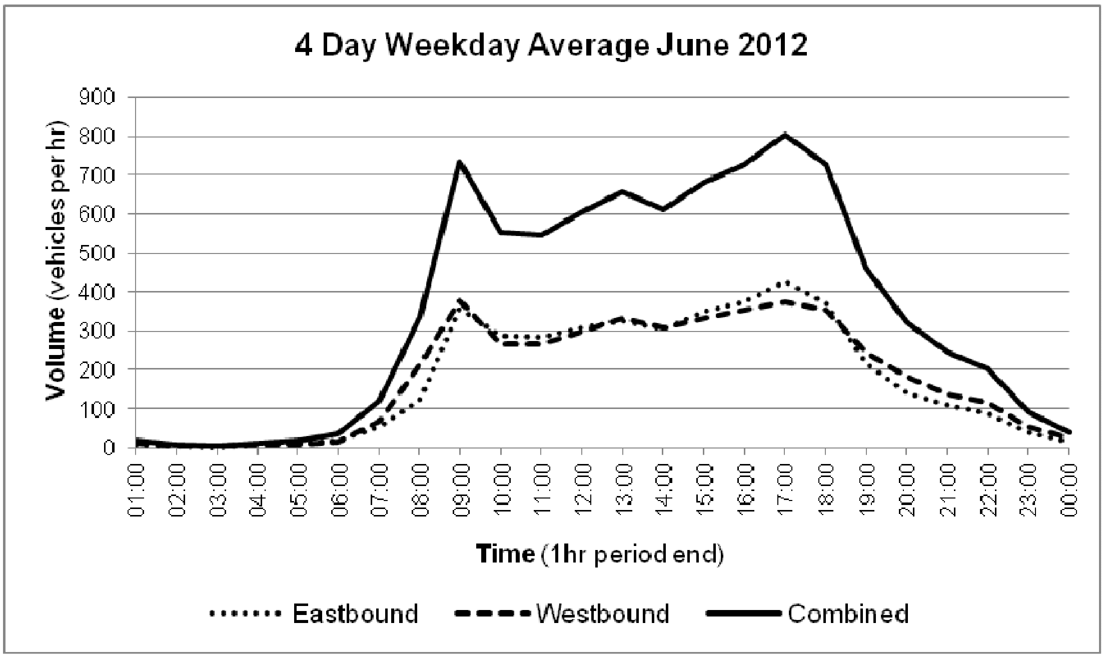

Figure 6: Langdons Road Average Weekday Traffic Volumes (CCC, June 2012)

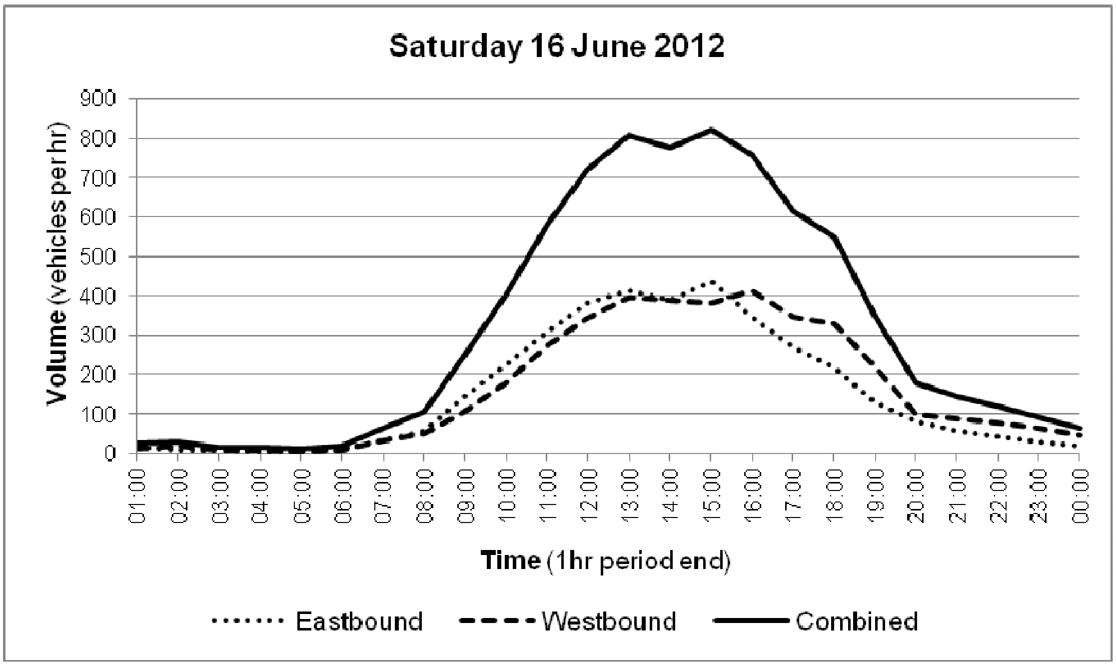

Figure 7: Langdons Road Saturday Traffic Volumes (CCC, June 2012)

Chapel Street

Chapel Street is classified as a local road in the Council's roading hierarchy. The primary function of local roads is the provision of property access with less emphasis on through traffic movement.

Chapel Street is formed with a 9m wide carriageway, although there are narrowed threshold treatments towards the southern (Harewood Road) and northern (Langdons Road) ends of the road, as well as mid way along the road at the intersection with Hoani Street. Away from intersections and the threshold treatments noted above, unrestricted on-street parking is generally available on both sides of Chapel Street.

Other Network Links

Restell Street (local road) connects with Harewood Road immediately east of the railway crossing, and extends through to Langdons Road at a point approximately 150m east of the railway crossing. Movements at the intersection with Harewood Road are restricted to left turns into and out of Restell Street only due to its proximity to the railway crossing and the restricted visibility as a result of the railway crossing being at a higher level than the sections of Harewood Road either side of the railway crossing. The intersection of Restell Street with Langdons Road is controlled by a roundabout, from which Sissons Drive (local road) continues north to Sawyers Arms Road (collector road).

Sissons Drive is somewhat unique as it is formed more like a service lane, with carriageway widths along much of its length being only 6m, and provides direct access to the Northlands shopping centre car park and service areas as well as the Graham Condon Recreation and Sports Centre.

Connecting to the southern side of Harewood Road, opposite the application site, are two local residential roads (Matsons Avenue and St James Avenue). Casual observation and local knowledge indicates that these roads experience some 'rat-running' between Harewood Road and the collector routes of Wairakei Road or Blighs Road to the south. The intersections of Matsons Avenue and St James Avenue with Harewood Road are both uncontrolled priority T-junctions.

Public Transport

The site is well served by public transport services, with the Comet and Orbiter bus routes passing the application site on Harewood Road, and the #28 (Papanui/Lyttelton & Rapaki) service circulating the site clockwise on Harewood Road, Chapel Street and Langdons Road. In addition, the #119 (Bishopdale/Northlands) and Blue Line services use Main North Road (250-350m from the application site).

The closest bus stops are located on Harewood Road immediately in front of the application site, and on Chapel Street southeast of Hoani Street.

2.6 Road Safety

Traffic Safety

A review of the NZTA Crash Analysis System (CAS) database for the block bounded by Harewood Road, Chapel Street, Langdons Road and Restell Street (including within 50m of all intersections) reveals a total of 19 reported crashes for the most recent 5 year period 2009-2013 plus available 2014 data. These crashes are illustrated in Figure 8 below, and summarised in Annexure C.

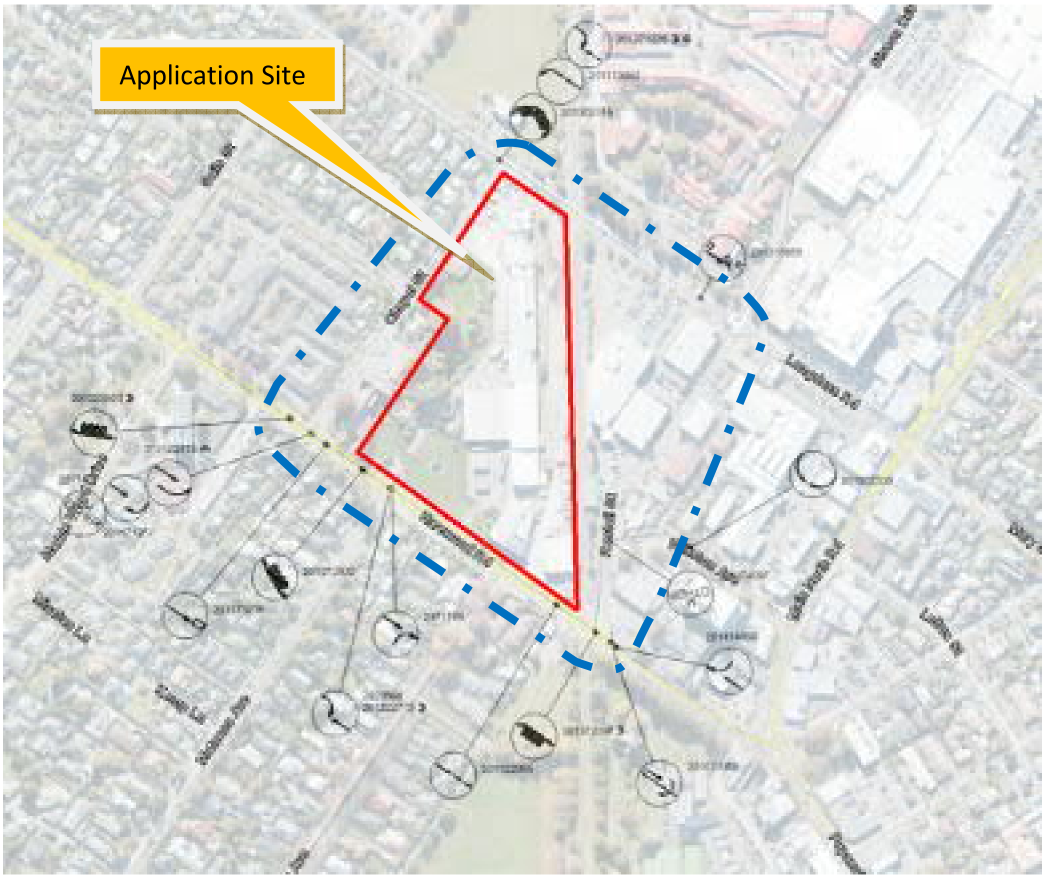

Figure 8: Reported Crashes 2009-2013

Figure 8 shows that the majority of the reported crashes occurred at or near the intersections of Harewood Road with Chapel Street, Restell Street and Matsons Avenue, and also the intersection of Langdons Road with Chapel Street. Of particular relevance to this application and proposal is that none of the reported crashes were associated with the operation of any on the existing site accesses.

3.0 THE PROPOSAL

3.1 General Description

As noted earlier, the site has a Business 4 zoning and a combined area of 3.2ha. The site presently contains the existing Sanitarium Health Food factory and some smaller commercial activities.

The proposal seeks to construct and establish a 13,518m² Mitre 10 Mega store with associated parking, goods loading, pedestrian access areas, landscaping and signage on the application site in a staged approach. As such, a portion of the proposed building is to be constructed and established prior to the decommissioning of the existing Marmite manufacturing plant such that the activities will operate concurrently for a duration of up to five years until all Sanitarium manufacturing facilities are transferred off site.

The 13,518m² Mitre 10 Mega building will be sectioned off to allow for the following floor areas; 7,788m² main retail warehouse area (including the 132m² entry lobby), 500m² mezzanine for administration offices, 1,920m² garden centre, 131m² water store, 175m² ancillary café, 256m² goods unloading and a 2,748m² and drive through area with a canopy.

The location of the building has been carefully considered with the proposed building running parallel to the eastern boundary (adjacent the railway corridor) and setback 6m from the site boundary. This allows provision for a 6m wide access for heavy goods vehicles to access the dedicated 256m² loading area located on the south eastern side of the building. In addition, the location of the building ensures the allocation of sufficient green space around the periphery to mitigate the bulk of the building.

The building design is synonymous with large format retail developments although the design incorporates features which provide relief to the expansive facades by incorporating modulation, varying heights, canopies, glazing and entranceways.

The proposal is described in more detail below and is further illustrated by the development plans included in Annexure D to this application.

3.2 Proposed Buildings

It is proposed to develop the application site in two stages with speculative dates for commencement of Stage 1 from September 2014, commencement of Stage 2 from 2016-2018 with overall completion targeted for 2019. It is important to note that these dates are not definitive as they are partly driven by Sanitarium's phasing of the transfer of Marmite production off site.

- Stage 1 of the redevelopment relates to the retention of the Sanitarium processing plant and infrastructure shed located in the north eastern portion of the site and sectioning off the northern perimeter of the site, demolition and decommissioning of the remaining buildings which lie under the redeveloped areas footprint and construction of 10,551m² of the overall 13,518m² retail building. This is further detailed in Table 2 below.

- Stage 2 involves the decommissioning and demolition of the Sanitarium processing plant and the construction of a 2,967m² extension to the northern elevation for additional retail areas and the garden centre which will have customer access from within the main retail warehouse area, café and water store. Thereby increasing the overall gross floor area of the building to 13,518m² also as shown in Table 2 below:

	Floor Areas	
	Stage 1	**Stage 2**
Retail Showroom	5,852m²	7,788m²
Drive Thru	2,748m²	2,748m²
Inwards Goods	256.7m²	256.7m²
Offices	500m²	500m²
Garden Centre	1,195m²	1,920m²
Cafe		175m²
Water Store		131m²
	10,551m²	**13,518m²**

Table 2: Stage 1 and Stage 2 Floor Areas

3.3 Contamination

The site is listed on the HAIL register and it is known that whilst there are no significant environmental issues relating to the current operations of the site there are a number potential issues resultant from the sites historical uses.

Of particular relevance to this application the HAIL report identified four areas where the potential for soil contamination may be likely as a resultant effect of previous and current activities on site. These activities are detailed below:

- Former kerosene UPSS: not investigated at time of removal, soil and groundwater condition unknown;
- Former petrol UPSS: not investigated at time of removal, soil and groundwater condition unknown;

- LFO residual contamination beneath boiler room: the MWH LFO investigation report indicates that there is likely to be residual contamination remaining at the site beneath the boiler house building; and
- ACM in soil surrounding factory: ACM is known to have been present at the site in the past prior to 1966 and after the rebuild. Following the factory fire in 1966 asbestos fibres and debris waste may have been deposited to the land.

Although there is the potential for residual historical contaminated material to be on the site, there is no conclusive proof that the material exists. Therefore, the HAIL assessment recommends that an intrusive investigation be undertaken.

Geoscience Consulting have prepared a Detailed Site Investigation (DSI) and this report is provided as Annexure B to this consent application. The reader is referred to that report for more information on this particular issue.

3.4 Proposed Landscaping Provision

The City Plan requires activities in the Business 4 zone to provide landscaping at a minimum rate of 10% of the site area. Therefore the 32,899m² site requires a minimum of 3,289m² of landscaping to be provided around the site.

The application proposes to landscape the site with permeable landscaping populated with a mix of both new and transplanted trees, shrubs, hedging, lawn and other natural or manmade materials as well as impermeable surfaces to provide pedestrian connectivity to and within the site in accordance with the landscape plan attached as Annexure E.

The landscape design aims to create a functional space for the primary purpose of a commercial activity whilst complimenting public amenity. In particular, the site has been specifically designed around the retention of the fountain, Lirodendron Tulipitere and mature trees along the sites western boundary. Therefore, the planting framework is a continuation of the existing ecological representation of the site and surrounds with design considerations relating to the residential landscape styles evident within the surrounding environs as well as the a reference to the past heritage of the site, through a park like design.

In particular, the planting framework is designed around a number of landscaping zones within the site. Whilst these zones are designed to provide a varied landscape when combined they provide not only a high level of visual interest yet are functional in providing a buffer between the site and surrounding properties. Each of the zones have specific landscaping features: gardenesque plantings being traditional garden planting; amenity plantings represents a continuation of the historic landscaping evident on the site and feature plantings provide visual interest and link the proposed building.

Additionally, the proposal includes the construction of impervious pedestrian paths to run along the western elevation providing pedestrian connectivity to the building entrance and car park areas as well as a structured pedestrian access route from Harewood Road providing a linkage not only to the site but also allowing public access to the fountain.

The landscape design also includes specimen trees of *Prunus Yedoensis* along each of the road frontages and *Fraxinus ornu* and *Sophora microphylla* within the car park. Feature plantings of *Cornus alba*, *Coprosma* “Rainbow”, *Phormium* “Chocomint”, *Hebe* ‘topiara’, *Libertia* and *Comprosma Lobster* will feature at the entrance to Harewood Road and these combined with the amenity plantings will create a striking visual impact at the site’s entrance.

All existing high enclosed fencing will be removed and replaced with pen palisade style fencing or similar, this fencing will be setback from the site boundaries to allow sufficient landscape strips for plantings.

The total proposed area of landscaping on the site equates to approximately 3,832m². This is a landscape supply equating to 11.5% of the site area.

Car Park Landscaping

The application site has a road boundary length of approximately 205m along Harewood Road, approximately 110m along Chapel Street and approximately 60m along Langdons Road. The combined road boundary length of approximately 375m therefore requires a total of 38 road frontage trees. A total of 38 trees are proposed along the road boundary. These road frontage trees are planted within a 5.0 m minimum depth along each road frontage. The proposed species are detailed in the Landscape Plan and further detailed in the planting plan also included in Annexure E to this application.

In addition to the above a number of trees (46) will be planted or retained within and adjacent to the car park area.

3.5 Protected Tree

The proposal will involve work within 10 metres of a notable tree in particular, a portion of the car park (totalling 14 spaces) and a 6m wide pedestrian connection will be constructed within 10m of the Lirodendron Tulipitere. The pedestrian connection is by way of a footpath constructed of precast concrete pavers and exposed aggregate. A methodology detailing how the proposed works within

10 metres of the protected tree is also provided in documents prepared by Allwood Trees and Structex limited included within Annexure E.

3.6 Stormwater

The proposal seeks to install five 30,000L tanks capturing all of the roof runoff, with a combined single 100mm orifice which can adequately attenuate the three critical events to below (or close to in the case of the 5 hour event) pre-development levels. The stormwater design has been subject to consultation between Andrew Tisch of e2 Environmental Limited and Brian Norton from The Council's Asset and Network Planning, Team Greenspace. In principal Brian Norton has advised via email to David Wilson at E2 Environmental the 19th August 2014 that the proposed stormwater design meets the conditions of CRC131249.

3.7 Environmental Asset Waterway

The proposal seeks to enclose and pipe the environmental asset waterway known as Kruses Drain as shown in Part 9, Appendix 1. Kruses Drain originates in Papanui and, while it is largely fed by the piped stormwater network, there is a 130m open section that flows in a northwest direction through the application site. The proposal seeks to pipe this section of Kruses Drain.

At the outset, it is imperative to acknowledge that a Voluntary Private Developer agreement has been signed between Council and the Applicant in relation to compensation for fully piping the stream through the Sanitarium site.

In addition, an assessment of the freshwater ecology of this section of Kruses Drain prepared by Boffa Miskell forms Annexure F to this application. This report examines the existing environmental condition and ecological values of Kruses Drain, identifies any potential environmental effects associated with piping this section of the waterway, and recommendations towards mitigating any effects.

Further, a sediment control plan prepared by e2 Environmental Limited is provided as Annexure H to this application.

3.8 Lighting

It is proposed to illuminate both the on-site signage and the car park areas.

The main components of the building signage will be externally illuminated by standard signage lighting systems. No lights will be directed at any road frontage and flashing or animated displays will not be used.

All parking and loading areas that are used at night shall be illuminated to a minimum maintained level of 2 lux with high uniformity during the hours of operation. This is to be achieved by a combination of wall mounted lighting and bollard lighting.

3.9 Signage

It is proposed to erect approximately 534m² of site specific signage associated with the retail activity. In particular, it is proposed to erect three freestanding plinth pylon signs along each of the road frontages being; Harewood Road, Langdons Road and Chapel Street. In addition it is proposed to erect signage on the southern, eastern, western and northern building facades.

The location and sizes of the proposed on-site signage have been specifically identified on the development plans and will be controlled to provide a cohesive and consistent design and appearance on the site. (Refer Appendix A Signage).

3.10 Proposed Parking and Loading Provision

A total of 294 on-site parking spaces will be provided for the Stage 1 development (10551m²), and this will be increased to 340 spaces upon completion of the Stage 2 development (13518m²). The majority of the on-site parking spaces are provided in front of the main entrance on the west side of the proposed building, a small number of spaces provided within the drive thru and outside the drive thru adjacent to the Harewood Road frontage. The additional parking spaces provided with the Stage 2 development will mostly be created at the northern end of the site adjacent to Langdons Road.

It is proposed to mark 47 of the proposed 294-340 spaces for staff parking purposes. For Stage 1 the 47 spaces will consist of 19 spaces in the secure compound area plus 28 spaces provisionally nominated in the southwest corner of the site as shown in Figure 9 on the following page.

Figure 9: Provisional Location of 28 Stage 1 Staff Parking Spaces

In addition to this Sanitarium will provide additional staff parking alongside the north-eastern side of their existing building area.

For Stage 2, when Sanitarium fully vacates the site, the 28 spaces shown in Figure 9 above will be relocated towards the north-western corer of the site as shown in Figure 10 below. Such relocation of staff parking spaces is specifically permitted by Development Standard 13-2.2.4.

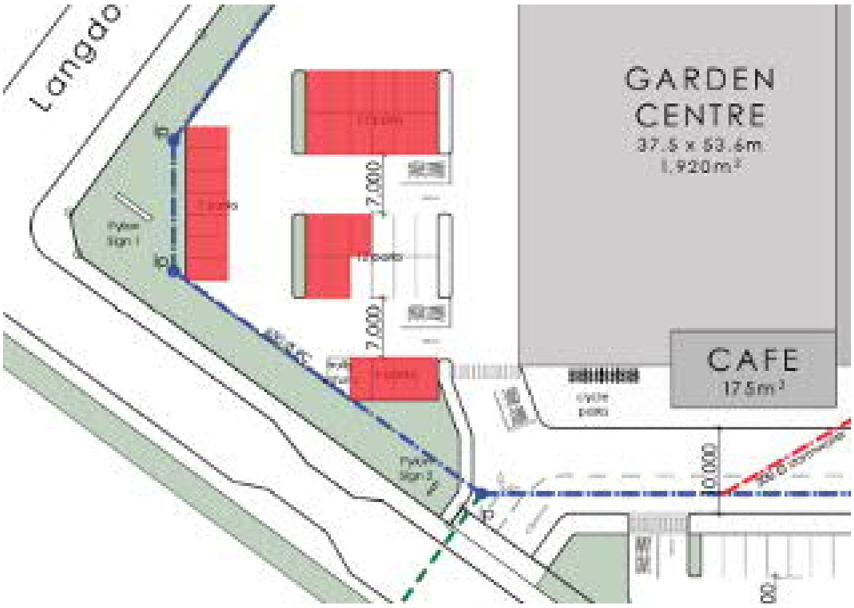

Figure 10: Provisional Location of 28 Stage 2 Staff Parking Spaces

The proposed 47+ space staff parking supply will cater for the anticipated peak parking demand for both Sanitarium (Stage 1) and Mitre 10 Mega staff.

The design of the on-site parking spaces is generally based on a 2.6m wide by 5.0m deep stall with a 7.0m wide aisle. The main circulating aisle along the front (west side) of the building however is 9.0-10.0m wide. The parking area includes seven accessible parking spaces, all of which are located immediately in front of the building on the main circulating aisle. These spaces are also 2.6m wide by 5.0m deep, and achieve the required 3.6m width by way of shared 1.0m wide wheelchair manoeuvring areas between adjacent accessible parks. This is an acceptable design solution in the NZ Building Code. Owing to the footpath along the front of the building, these spaces are also provided with the required accessible route to and from the building entrance.

An uncovered cycle stand capable of accommodating 12 staff and/or visitor cycles plus a covered shelter capable of accommodating 10 staff cycles will be provided adjacent to the southwest corner of the building for the Stage 1 development. Another stand capable of accommodating 14 cycles will be added at the northern end of the building in conjunction with the Stage 2 development, thus bringing the total on-site cycle parking supply at that time to 36 spaces (10 covered and 26 uncovered).

The main loading and service area is located in the southeast corner of the site. Access to this area is via a one-way route around the northern end of the building (or northern end of the Sanitarium facility during Stage 1) and then travelling southbound along the rear (east side) of the building.

3.11 Site Access

Access to the site is proposed in two locations - one on Harewood Road approximately 30m east of Matsons Avenue, and the other on Chapel Street midway between Langdons Road and Hoani Street. A third, egress only, access is proposed on Harewood Road in the southeast corner of the site approximately 30m west of the railway crossing.

The main Harewood Road access will have a single 4m wide entrance lane and two 3m wide exit lanes as measured along the road boundary. The vehicle crossing, measured along the kerb and channel, with have additional length to properly provide for occasional articulated truck manoeuvres into the site as shown in Figure 11 below:

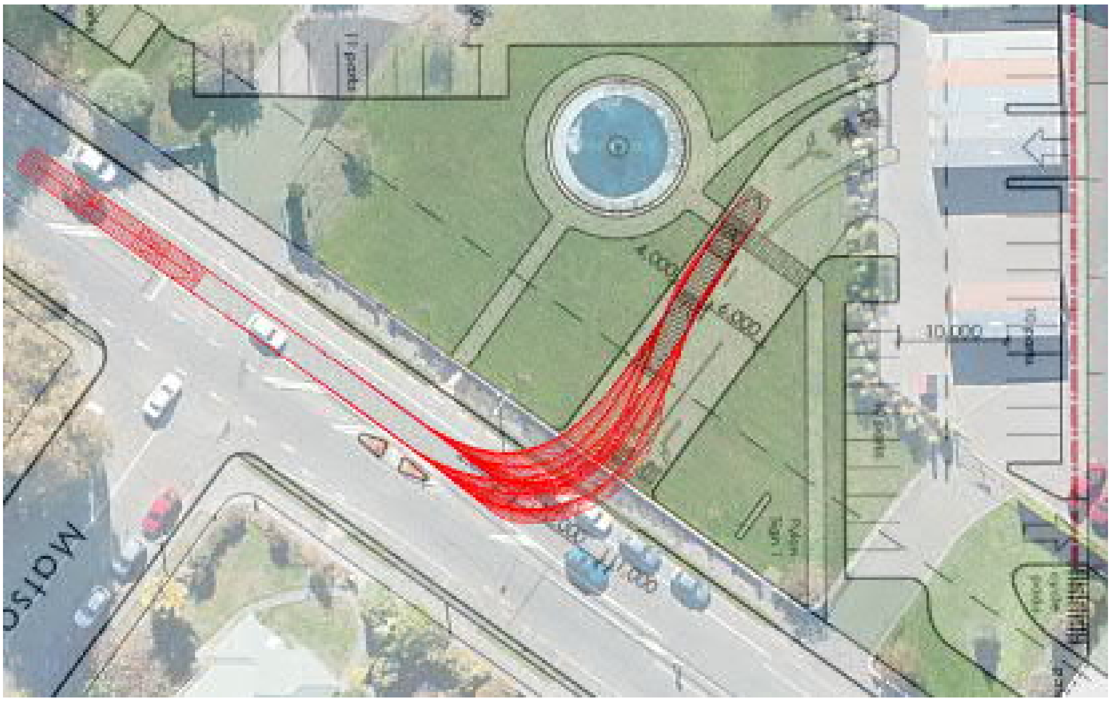

Figure 11: B-Train Swept Path Turning Left Into Site From Harewood Road

The second Harewood Road access is 8m wide and provides for left turn exit manoeuvres only onto Harewood Road. A gate is located on this access approximately 5m back from the Harewood Road boundary. This access, which utilises the existing two-way access and vehicle crossing, will predominantly be used as the exit for larger vehicles from the loading dock and canopy at the rear of the building, but may also be used by some staff vehicles.

The 10m wide Chapel Street access essentially utilises the existing Sanitarium access, and will provide a single 5m entry lane and a single 5m wide exit lane. It is intended that this access will be the main entry point for larger service and delivery vehicles, which will then circulate clockwise around the northern end of the site to access the loading dock and canopy at the rear of the site. Due to the use of the Chapel Street access for larger service and delivery vehicles, the existing 14-15m long vehicle crossing will also be retained.

Pedestrian connections will also be provided to/from Harewood Road and Chapel Street as well as within the site, including pedestrian crossing facilities on the main circulating access between the building entrance and the main parking area.

3.12 Estimated Traffic Generation

Upon completion of Stage 2 of the development, the proposed Papanui Mitre 10 Mega store is estimated to generate a weekday traffic volume of around 2330 vehicle trips per day, and around 4160 vehicle trips per day on Saturdays during the peak November trading month.

During the weekday PM peak period on the adjoining road network the proposal is estimated to generate around 230 vehicle trips per hour, while during the Saturday peak period the proposal is estimated to generate around 620 vehicle trips per hour.

The basis of the above site generated traffic estimates is described in more detail in the traffic assessment attached as Appendix I.

4.0 CITY PLAN COMPLIANCE ASSESSMENT

4.1 Zoning

As noted earlier, the sites is zoned **Business 4** (Suburban Industrial) as identified on Planning Map 24C of the City Plan. In accordance with Planning Map 24C the subject site has one heritage item being a notable tree (Lirodendron Tulipitere) located on Lot 12 DP 9715. The application site also features an environmental asset waterway (Kruses drain) as shown in Part 9, Appendix 1 which flows in a northwest direction through the application site.

4.2 Anticipated Environmental Results

This proposed Mitre10 Mega is contained with the Business 4 zone.

The zone's purpose is to provide for light industry, warehousing and service industries, and some commercial activities such as offices. Some retailing is provided for in these areas, with an emphasis on retail activities of a nature and scale that do not lead to significant adverse effects on the function and amenity of the central city and district centres.

The environmental results anticipated for this zone are as follows:

- *A diverse range of light industrial activities, some office and commercial service activities and limited retail activities, with frontages of larger industrial enterprises set aside for parking, landscaping and offices.*
- *A zone environment with a high density and scale of industrial, office and commercial service buildings. Some limited retail activity buildings establishing at a small to medium scale in reflection of traditional established activities. A proportion of smaller sites developed intensively.*
- *Relatively high levels of traffic generation with standards for access and manoeuvring to mitigate adverse effects.*
- *A visually mixed environment, with a predominantly industrial character but with standards on development to improve and enhance street scene character, with requirements for frontage landscaping and street setbacks for buildings to mitigate building scale and storage areas as development and redevelopment takes place.*
- *Concentration of office or residential accommodation on site frontages, to enhance the visual impact of industrial and other activities.*

It is considered that the proposed use of the sites is consistent with the anticipated environmental results. In particular, it provides a design which minimises the effects arising from parking, site access and manoeuvring and provides a level of amenity through building design and landscaping which enhances the surrounding environment.

4.3 Activity Definition

The proposed activity itself is considered to be a 'trade supplier' as per the definition of the City Plan which is an anticipated activity in the Business 4 zone. A Trade Supplier is defined in the City Plan as a business engaged in sales to businesses and institutional customers and may also include sales to the general public, and includes suppliers of goods in the following category:

- building suppliers

Building Suppliers is defined as a business primarily engaged in selling goods for consumption or use in the construction, modification, cladding, fixed decoration or outfitting of buildings and without limiting the generality of this term, includes suppliers of:

- awnings and window coverings;
- bathroom, toilet and sauna installations;
- electrical materials and plumbing supplies;
- heating, cooling and ventilation installations;
- kitchen and laundry installations, excluding standalone appliances;
- paint, varnish and wall coverings;
- permanent floor coverings;
- power tools and equipment;
- safes and security installations;
- timber and building materials; and
- any other goods allowed by any other definition under 'trade supplier'.

It is considered the proposed Mitre 10 Megastore is a Building Supplier and therefore meets the definition of a Trade Supplier.

4.4 Compliance Assessment–Business 4 Zone Rules

The proposal has been assessed against the relevant requirements of the City Plan and the following commentary is provided.

Development Standard 3-5.2.3 Street Scene

Clause a) of Development Standard 3-5.2.3 requires buildings to be setback a minimum 6 metres from road boundaries. Clause b) additionally requires buildings opposite a living zone to be set back 6m where the separating road has more than two lanes or is an arterial road and 10m where the separating road has only two lanes and is not classified as an arterial road.

The proposed buildings are set back in excess of 10m along all road frontages thereby achieving compliance with the above standard.

Development Standard 3-5.2.4 Separation from Neighbours

The City Plan requires a minimum building setback of 3m from the boundary with a living zone. The proposed building is located in excess of 3m from the adjoining Living 2 zone boundary, thereby achieving compliance.

Development Standard 3-5.2.5 Sunlight and Outlook for Neighbours

Buildings shall not project beyond a building envelope constructed by recession planes from points 2.3 metres above the boundary with a living, cultural, conservation or open space zone. The proposal does not seek to construct a building within the recession plane requirements, thereby achieving compliance.

Development Standard 3-5.2.6 Visual Amenity

Clause a) Offices and showrooms are required to be located at the front of the buildings facing the street. The proposed building is orientated perpendicular to Harewood Road with the retail showroom projected west towards the street frontage.

Clause b) Outdoor storage areas shall not be located within the required setbacks. The proposal does not seek any outdoor storage areas within the required setbacks additionally, all loading and unloading is contained within the building.

Based on the above the proposal complies with the above.

Development Standard 3-5.2.7 Landscaped Areas

Clause a) of Development Standard 3-5.2.7 of the City Plan specify that the minimum percentage of the site to be set aside for landscaping shall be 10% and all required landscaping located along the road frontage of the site. It is proposed to landscape 11.5 % of the site.

Clause a) iv) sites on the opposite side of the living zone the landscaping strip shall have a minimum average width of 4.5 metres and a minimum width of 1.5 metres along the road frontage, except across vehicle crossings. The proposed landscape strip along the Harewood Road, Chapel Street and Langdons Road frontages have a minimum width of 5m.

Clause a) (v) requires at least half the required landscaping shall be located along the zone boundary to at least 1.8m in height along the zone boundary. The proposal does not provide half the landscaping being (1,644m²) along the zone boundary.

Clause b) (i) Development Standard 3-4.2.5 specifies a road frontage of at least 10 metres shall be planted with a minimum of one tree, plus one additional tree for every 10 metres of road frontage. The application site has three road frontages; Harewood Road 205m, Chapel Street 110m and Langdons Road 60m therefore requires 38 trees to be planted along the road frontage. It is proposed to plant 38 trees (29 x Magnolia Kobus, 6x Prunus Yedonensis and 3x cedars (existing)) along the road frontages and therefore compliance is achieved.

Clause b) (iv) of Development Standard 3-5.2.7 requires one tree for every five parking spaces provided on the site. The proposal provides 340 car parks within the site thus requiring 68 trees within or adjacent the car park area. The proposal features 46 trees (31 x Magnolia Kobus , 13 x Prunus Yedonensis, 1 x Liriodendron tuilperfera and 1 x Deciduous Tree) within or adjacent the parking areas resulting in a shortfall of 22 trees.

Based on the above the proposal does not comply with Clause a) (v), and clause b) (iv) of the above standard.

Development Standard 3-5.2.9 Height

The maximum height of any building shall be 15m. The proposed building is 11m and therefore complies with the height standard.

Community Standard 3-5.3.1 Retail Activities

The City Plan requires that retail activities within the Business 4 zone shall consist only of one or more of the following:

5.3.1(b) (i) yard based suppliers.

(ii) trade suppliers.

(iii) second hand goods outlets.

(iv) food and beverage outlets.

(v) retail activities (other than those specified in (i) to (iv) above), which comprise either:

- *a single tenancy; or*

- *a group of tenancies sharing vehicle access and/or parking;*
- *and which comprise no more than 2000m² of gross leasable floor area.*

As noted earlier, the proposed Mitre 10 Mega activity is classified as a *Trade Supplier* for the purpose of assessment against the City Plan in compliance with the above rule.

4.5 Compliance Assessment – General City Rules

Development Standard 9-5.2.4 Filling, excavation and building adjacent to waterways

Any filling or excavation, or the erection of buildings shall be a discretionary activity within 3m of an environmental asset waterway shall be a discretionary activity. The proposal seeks to enclose and pipe the environmental asset waterway known as Kruses Drain as shown in Part 9, Appendix 1 where there is a 130m open section that flows in a northwest direction through the application site. Additionally, the proposal seeks to establish car parking within the 3m setback of the piped utility waterway. Based on the above the proposal is to be assessed as a discretionary activity with Councils discretion limited to the matter(s) subject to the standard.

Critical Standard 9 – 5.8.1 Content of Fill and Excavated Material

In addition to compliance with the standards relating to the volume and depth of filling and excavation any filling or excavation of land, is a non-complying activity where:

(a) the fill or excavated material contains putrescible, pollutant, inflammable or hazardous components; and/or

(b) fill consists of material other than soil, gravel, sand, silt, or demolition material, and/or has a particle size in excess of 200mm; and/or

(c) fill material consists of vegetation which comprises more than 5% of any load by volume, and/or which is derived from a different site to the rest of the fill material**.**

As mentioned previously, Geoscience Consulting has undertaken a detailed site investigation to determine potential sources of contamination at the site (Annexure B). The reader is referred to that document for more information on the site contamination issue. This application document simply records that the DSI discusses a minor level of asbestos contamination on the site. Therefore the proposed site earthworks do not comply with clause a) above.

4.6 Provisions of the NES (National Environmental Standards)

The NES standard became operative on the 1st January 2012 and seeks to ensure that land affected by contaminants in soil is appropriately identified and assessed before its developed and if necessary the land is remediated or contaminants contained to make the land safe for human use.

Regulation 8 – Permitted Activities

Regulation 8(3)(c) sets the limit of contaminated soil disturbance at no more than $25m^3$ per $500m^2$ of land. The proposal is to disturb around $839m^2$ (185m long x 11m wide x 0.3m depth (610m3) + 10% bulking factor following excavation (671m3) + 25% contingency Total = 839m3) of the site area compared to a permitted volume of $1650m^3$.

Regulation 8(3)(d) stipulates that a maximum of $5m^3$ per $500m^2$ of contaminated soil may be removed from a site in any calendar year. The proposal will disturb up to $839m^3$ of soil which could potentially require up to up to $60m^3$ (28m long x 6m wide and 0.3m depth (50.4m3) + 10% bulking factor (55.44m3) + 25% contingency = 69.3m3) of soil to be removed from the site compared to a permitted volume of $66m^3$.

Regulation 8(3)(f) specifies a time limit of 2 months duration for the activity. Any soil disturbance work related to the soil remediation is proposed to be conducted within the permitted NES timeframes for soil disturbance,. Therefore, it is highly likely that earthworks will be completed within a 2 month time limit.

Regulation 8(4)(b) specifies that a 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. The PSI states that the quantification of contaminants is not possible without further investigation.

Therefore, based on the above, compliance with the above standard(s) is not met. Under Regulation 8(5) specifies that if the proposal does not meet the requirements of 8(1) to (3) the activity is a controlled activity providing it complies with Regulation 9(1). Under Regulation 8(6) specifies that is the proposal does not meet the requirements of 8(4) the activity is a controlled activity providing it complies with Regulation 9(3).

Regulation 9 – Controlled Activities

Regulation 9(1)(b) provides for soil disturbance as a controlled activity provided that a detailed site investigation must exist and the detailed site investigation must state that the soil contamination does not exceed the applicable standard in Regulation 7.

Regulation 9(3)(a) provides for change of use of land as a controlled activity provided that a detailed site investigation must exist, the site investigation must state that the soil contamination does not exceed the applicable standard in Regulation 7.

As mentioned previously, a detailed site investigation has been prepared by Geoscience which identified only one sample which fibre concentration (% w/w) that exceeded the WA DOH guideline level of 0.001% w/w. As the concentrations present are above the adopted guideline levels the soil in this area of the site then Regulation 9(6) states that if the proposal does not comply with any of the above regulations 9(1)(b) and 9(3)(a) the activity is restricted discretionary.

4.7 Compliance Assessment – Heritage and Amenity Rules

Development Standard 10-2.3.1 Protected Trees

Any work defined by clause 10-2.2.4 (a) removal of any tree and 10-2.2.4 (b) the construction of any building, or laying of overhead or underground services, any sealing, paving, soil compaction, or any alteration of more than 75mm to the ground level existing prior to work commencing, any depositing of chemical or other substances harmful to the tree within 10 metres of the base of any protected tree is a discretionary activity.

The proposal seeks to undertake works within 10 metres of the notable tree (Lirodendron Tulipitere) therefore, the proposal is to be assessed as a discretionary activity with the exercise of the Council's discretion limited to the impact of the works on the tree.

Development Standard 10-3.4.1 Display of Outdoor Advertising

Clause d)i) The application site is permitted 187.5m² (375m frontage x $^{5}/_{10}$) outdoor advertising. This area is calculated on the combined road frontage length of Harewood Road, Chapel Street and Langdons Road. The maximum area of any single freestanding sign shall be 18m². It is proposed to erect 534m² of site specific signage associated with the Mitre 10 Mega activity and therefore exceeds the permitted total signage area by 346.5m².

Clause d)ii) The total number of free-standing outdoor advertisements on any site shall be one except that for sites with more than 40m of road frontage where the maximum number of free standing outdoor advertisements shall be one for every 20m of road frontage provided that no more than two of these free-standing outdoor advertisements shall exceed 1m² in area. The proposal also seeks to erect three freestanding signs along the Harewood Road, Langdons Road and Chapel Street road frontages with areas of 39.25m², 39.25m² and 5.4m² respectively.

Based on the above compliance with clause d)i) is not achieved.

Development Standard 10-3.4.3 Height

The maximum height of any free-standing outdoor advertising shall be 9m. The proposed freestanding signs are 2m x 8m and 1m x3m in height therefore achieving compliance.

Development Standard 10-3.4 5 Street Scene

The street scene rule for a building in that zone shall apply to free standing outdoor advertisements, three dimensional outdoor advertisements and any structures supporting outdoor advertisements where any such outdoor advertisement fails to comply with Rule 3.4.1 - Area and number and/or Rule 3.4.3 Height in this part of the Plan.

The proposed 40m² freestanding signage is located within the 10m Harewood Road and Chapel Street setback and within the 6m Langdons Road setback. Compliance is not achieved.

4.8 Compliance Assessment – Health and Safety Rules

Development Standard 11-1.3.3 Noise Standards

The City Plan sets out noise limits under development standard 11-1.3.3, which requires that all activities are to be conducted to ensure that certain specified noise limits are not exceeded at the common boundary.

The City Plans sets out noise standards in order to avoid incompatible activities and potential effects on the character and amenity of surrounding areas. The City Plan specifies the following critical standards for noise limits for Group 1; daytime 57dBA Leq and nightime 49dBA Leq. The night-time LAmax criterion of 75dBA in the Plan is primarily in place to protect against sleep disturbance.

Given the above, the combination of; passive nature of activity, setback distances, distance to the nearest residential neighbour, adjoining land uses, ambient traffic noise it is anticipated the activity will achieve compliance with the Plan noise standards.

4.9 Compliance Assessment – Transport Standards

In relation to Chapter 13 (Transport) the following non-compliances have been identified:

Development Standard 13-2.2.1 – Parking Space Numbers

The proposal has been assessed as requiring 471 on-site parking spaces for the Stage 1 development, increasing to a 591 on-site parking space requirement upon completion of the Stage 2 development as shown in Tables 3a and 3b on the next page.

It should be noted that the above assessments assume a nominal 30% of drive through area as being used for parking and vehicle manoeuvring.

As noted earlier, the proposal includes a 294 space on-site parking supply, increasing to 340 spaces upon completion of Stage 2. The Stage 1 proposal therefore has a City Plan parking shortfall of 136 spaces, increasing to a 251 space shortfall upon completion of the Stage 2 development.

The proposed on-site parking areas also depart slightly from the City Plan design standards in that the parking spaces will be marked at 5.0m deep whereas the City Plan requires a minimum depth of 5.4m. As the 5.0m stall depth fully complies with current design standards (it is the City plan that is out of date) no further consideration will be given to this non-compliance in this application.

Development Standard 13-2.2.4 – Staff Parking Provision

Under this standard, all required staff parks are to be signed and marked for the exclusive use of staff employed on the site. The Stage 1 staff parking requirement is 75 spaces, increasing to 77 spaces for stage 2. Instead it is proposed to mark 47 staff parking spaces on the site in the locations as described earlier. Therefore there is a 28-30 space staff park shortfall.

Development Standard 13-2.2.5 – Parking Spaces for People with Disabilities

The City Plan requires that the 294 parking spaces provided for the Stage 1 development include 6 accessible parking spaces. Upon completion of the Stage 2 development, 7 accessible spaces are required to be included in the overall 340 space on-site parking supply.

A total a 7 accessible parking spaces are provided thereby complying with the number of disabled spaces required. The design of these spaces (with the shared 1m wide wheelchair manoeuvring area between adjacent spaces) however is not specifically allowed for in the City Plan parking design standards despite the design being an acceptable solution in the NZ Building Code. Again it is the City plan that is out of date and not further consideration will be given to this non-compliance in this application.

Activity	Area	Activity Category	Visitor	Staff	Cycle	99%ile	HGV
Retail Showroom	5852	Retail	4.6 spaces / 100m^2 = 357.88	0.5 spaces / 100m^2 = 38.90	1 space / 200m^2 = 38.90	N/A	1 bay / 1600m^2 to 6400m^2 then 1 bay per 5000m^2 = 4.52
Drive Thru (gross area)	2748	Retail					
Drive Thru (access/parking)	-820	Retail					
Garden centre	1195	Retail	3.0 spaces / 100m^2 = 35.85	0.5 spaces / 100m^2 = 5.98	1 space / 200m^2 = 5.98		
Inward Goods	256	Industrial	1 space / 800m^2 = 0.32	11 spaces / 800m^2 = 3.52	1 space / 300m^2 = 0.85		1 bay / 1000m^2 = 0.26
Offices	500	Office	5% of staff req'ment = 0.63	2.5 spaces / 100m^2 = 12.50	1 space / 200m^2 = 2.50	1 bay / 8000m^2 (1 min) = 1.00	1 bay / 8000m^2 = 0.06
Total (excluding Sanitarium)			**395**	**61**	**49**	**1**	**5**
Sanitarium	1000 (nominal)	Industrial	1 space / 800m^2 = 1.25	11 spaces / 800m^2 = 13.75	1 space / 300m^2 = 3.33	N/A	1 bay / 1000m^2 = 1.00
Total (including Sanitarium)			**396**	**75**	**52**	**1**	**6**

Table 3a: City Plan Parking Requirement (Stage 1)

Activity	Area	Activity Category	Visitor	Staff	Cycle	99%ile	HGV
Retail Showroom	7788	Retail	4.6 spaces / 100m^2 = 454.99	0.5 spaces / 100m^2 = 49.46	1 space / 200m^2 = 49.46	N/A	1 bay / 1600m^2 to 6400m^2 then 1 bay per 5000m^2 = 5.08
Drive Thru (gross area)	2748						
Drive Thru (access/parking)	-820						
Cafe	175						
Garden centre	1920	Retail	3.0 spaces / 100m^2 = 57.60	0.5 spaces / 100m^2 = 9.60	1 space / 200m^2 = 9.60		
Inward Goods	256	Industrial	1 space / 800m^2 = 0.48	11 spaces / 800m^2 = 5.32	1 space / 300m^2 = 1.29		1 bay / 1000m^2 = 0.39
Water Store	131						
Offices	500	Office	5% of staff req'ment = 0.63	2.5 spaces / 100m^2 = 12.50	1 space / 200m^2 = 2.50	1 bay / 8000m^2 (1 min) = 1.00	1 bay / 8000m^2 = 0.06
Total (excluding Sanitarium)			**514**	**77**	**63**	**1**	**6**

Table 3b: City Plan Parking Requirement (Stage 2)

Development Standard 13-2.2.6 – Cycle Parking

The City Plan requires the provision of 52 on-site covered cycle parking spaces for the Stage 1 development, increasing to a 63 space requirement upon completion of the Stage 2 development.

It is proposed to provide a covered cycle stand capable of accommodating 10 cycles and an uncovered stand for 12 cycles adjacent to the southwest corner of the building as part of the Stage 1 development, with the addition a 14 space cycle stand with Stage 2 thereby increasing the overall on-site cycle parking supply to 36 spaces. The proposal therefore has a 27-30 space cycle parking shortfall against the City Plan requirements, and also doesn't achieve compliance with the requirement to cover all of the provided cycle parking spaces.

Development Standard 13-2.2.7 – Loading Areas

The City Plan requires the provision of 6 HGV loading bays for both stages of the development. In addition, a 99 percentile (car) loading bay is required in association with the office component of the proposal.

Owing to the operational characteristics of the proposal, the provision of 6 separately marked HGV loading bays is not warranted even though there is ample space within and around the proposed loading dock and canopy to accommodate the required HGV and 99%ile loading bays such that compliance is considered to be achieved.

Development Standard 13-2.2.14 – Queue Space

The City Plan requires a queue space provision of 25.5m on accesses serving more than 150 parking spaces. Where a parking area is served by more than one access however, the queue space requirement can be calculated by apportioning the on-site parking spaces to each access according to the expected usage. The assumed distribution of site generated traffic is such that around two thirds of all vehicles entering the site are expected to do so via the main Harewood Road access, with the remaining one third entering via the Chapel Street access. Based on the same proportions, two thirds (196-219 spaces) of the on-site parking spaces will be accessed via the main Harewood Road access, and thus a 25.5m queue space provision is still required on this access. The proposal provides a queue space of around 35-40m on the main Harewood Road access, and therefore complies.

The remaining one third (98-110 spaces) of the on-site parking spaces will therefore accessed via the Chapel Street access. The City Plan requires a queue space of 15.5m on accesses serving 51-100 parking spaces, and 20.5m on accesses serving 101-150 parking spaces. The Chapel Street site access is provided with a queue space of around 5-6m, and therefore does not achieve compliance for either the Stage 1 or Stage developments.

Development Standard 13-2.3.3 – Length of Vehicle Crossing

The City Plan specifies minimum and maximum lengths for non-residential vehicle crossings of 4m and 9m respectively.

The proposed new main Harewood Road access is 10m wide at the road boundary, and the vehicle crossing will be splayed to have a fully dropped kerb length of approximately 13m. The Chapel Street access is also 10m wide at the road boundary but will utilise the existing 15m long vehicle crossing. On this basis, both of these vehicle crossings do not comply with this standard.

Development Standard 13-2.3.8 – High Traffic Generators

Retail activities on Business 4 zoned sites outside the Central City zones that generate more than 250 vehicle trips per day and/or provide more than 25 on-site parking spaces are deemed by the City Plan to be discretionary activities with Council's discretion limited to any traffic effects of the proposal.

As detailed earlier, the proposal is estimated to generate 3,800-5,300 vehicle trips per day upon completion of the Stage 2 development and provides more than 25 on-site parking spaces.

4.10 Activity Classification

In summary of the above assessment, the proposal has the following City Plan non-compliances:

- Development Standard 3-5.2.7 Landscaped Areas
- Development Standard 9-5.2.4 Filling, excavation and building adjacent to waterways
- Critical Standard 9–5.8.1 Content of Fill and Excavated Material
- Development Standard 10-2.3.1 Protected trees
- Development Standard 10-3.4.1 Display of outdoor advertising
- Development Standard 10-3.4 5 Street scene (signage only)
- Development Standard 13-2.2.1 – Parking provision
- Development Standard 13-2.2.4 – Marked staff parking provision
- Development Standard 13-2.2.6 – Cycle parking provision
- Development Standard 13-2.2.14 – Queue space provision (Chapel St only)
- Development Standard 13-2.3.3 – Length of vehicle crossing
- Development Standard 13-2.3.8 – High traffic generator

Based on the assessment above the overall activity status is for a **non-complying activity** as a result of the breach of City Plan Critical Standard 9 – 5.8.1 (although the NES requires assessment of the contaminated site issue as a restricted discretionary activity in which case the overall activity status would also be restricted discretionary).

5.0 ASSESSMENT OF EFFECTS

5.1 Unbundling the Application

As noted above, the application is required to be assessed as a **non-complying** activity owing to a breach of a critical standard relating to content of fill. The proposal otherwise requires consent as a restricted discretionary activity noting other non-compliances.

The City Plan requires that earthworks on sites known to contain contaminated soils are assessed as a non-complying activity. This activity status affords Council consideration on any potential adverse effect. However, the NES standard became operative on the 1st January 2012 and seeks to ensure that land affected by contaminants in soil is appropriately identified and assessed before its developed and if necessary the land is remediated or contaminants contained to make the land safe for human use. The provision of the NES requires assessment of the activity as a restricted discretionary activity.

It is considered appropriate to "unbundle" the application and consider the majority of the application as a restricted discretionary activity, and only the content of fill under the particular tests applicable to non-complying activities. Case law supports such an approach where the effects of exercising two consent categories would not overlap or have consequential or flow-on effects on each other; two categories can be treated separately. [2]

Overall it is considered that any adverse effects relate directly back to the identified non-compliances and that the City Plan assessment matters form a robust methodology upon which to assess potential adverse effects. On this basis an assessment of effects on the environment relevant to this proposal follows.

5.2 Permitted Baseline

Prior to carrying out an assessment of effects, it is useful to consider the permitted baseline. This is now a discretionary statutory based test, codified by section 104(2) of the Act. Whilst it is no longer mandatory to consider the permitted baseline, there are no reasons to depart from a permitted baseline assessment in these circumstances.

Section 104(2) of the Act provides that a consent authority may disregard an adverse effect of an activity on the environment if the Plan permits an activity with that effect. In terms of the Mitre 10 proposal, the overall activity per se is anticipated to establish as a trade supplier within the business 4 zone. In terms of off-site effects, it is considered that the critical issue is traffic generation via the

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[2] *Locke v Avon Motor Lodge NSTPA17 SC, Southpark Corporation Ltd v Auckland City Council Decision A111/ 2000, Methodist Church of NZ v Auckland City Council A050/2003, Darby v Queenstown Lakes District Council C69/2007*

existing Chapel Street site access. The following baseline assessment considers this matter in detail.

Historic Scale of Sanitarium Activity

As outlined above, the existing environment consists of a site with an area of approximately 3.2ha featuring a food processing and manufacturing plant and ancillary buildings with expansive areas of parking, loading and landscaping. The site was far from fully developed, and what is currently operating from the site does not reflect the scale of Sanitarium activity that has operated from the site in previous years.

A key off-site effect of the Sanitarium activity was traffic generation and in particular heavy goods traffic generation at the Chapel Street site access. It is important to recognise that the Sanitarium activity established to its present level of site development (note not the present level of activity) pre-City Plan and as such had no controls on traffic generation or site access location. That said, it is considered reasonable to assess any existing use rights with respect to traffic generation in terms of the scale of activity that operated from the site when the City Plan became operative.

Sanitarium have advised that at the peak the production (early to mid 1990's) manufacturing staff numbers were 120+ people. In addition there were distribution staff of approximately 10 people and the sales and administration team of approximately 5-7 people. These latter two groups of people travelled to and from the site frequently during the day while servicing customers. Most of the vehicle activity was via the Chapel Street entrance and is estimated to have been around 250-280 trips per day including 30-40 courier deliveries per week. It is assumed that this generation is split into two shifts with the peak hour coinciding with one shift leaving and a new shift arriving (125-140 trips in the PM peak hour).

Typical daily heavy goods traffic consisted of 5-6 containers being delivered to or dispatched from the site and 10-12 large truck deliveries/pick up/tankers. It is assumed that of this only 2 HGV trips occur in a weekday peak hour.

While in more recent times the scale of activity at the Sanitarium site has reduced, this was driven more by the type of goods delivery system rather than a change in the scale of manufacturing operation itself. In particular the advent of the main distribution centres for Foodstuffs and Progressive has minimised Sanitarium traffic generation because individual retailer deliveries are no longer made. However it is important to note that there is nothing to prevent Sanitarium returning to its historic scale of activity without further consent. For simplicity this is considered to be around 200 light vehicle trips per day (75% of 250-280 trip total) and around 10-12 HGV trips per day (67% of 15-18 HGV total) across the Chapel Street site access.

Permitted Development of the Site for Other Purposes

Noting that the Business 4 zone is anticipated to generate relatively large volumes of traffic, and noting the availability of site access from Chapel Street, the critical baseline issue is considered to be a question of how much traffic can permitted site development generate onto Chapel Street.

The maximum permitted site development potential is realised through an initial subdivision of the northern end of the site where the current five titles would be adjusted to create six titles. The subdivision application would be for a controlled activity which the Council cannot decline. Each allotment would then be able to be developed in accordance with the Business 4 zone rules provided each allotment did not contain more than 24 parking spaces or generate more than 250 trips per day. Accordingly, there are two relevant scenarios permitted by the Plan to which the proposed activity could be compared from a traffic generation perspective:

A. If the site is developed with specialty retail activities, and;

B. If the site is developed with office activities only.

A design exercise has been completed to investigate the permitted development potential of the northern end of the site with site access solely from Chapel Street (the balance of the site would be separately developed with access to Harewood Road - and probably for a Mitre 10 Mega activity such as what is currently proposed but of a slightly smaller scale). Calculations used to determine the two above baseline scenarios are provided in Annexure G.

Development Option A is for six individual 3-storey office buildings. It is not considered fanciful for this type of development to occur as it is consistent with several developments within Christchurch (e.g. 70-76 Moorhouse Avenue and others). Key points to note from this type of permitted development are:

- Each site has 25 parking spaces which in turn allows for a 3-level building totalling 975m² GFA.
- Based on surveyed suburban offices, this type of development is estimated to generate around 176 trips per day per site onto Chapel Street which is less than 250vpd and therefore permitted. This is a total of 1056vpd from the six office sites.
- The estimated weekday PM peak hour generation is 120vph from the six office sites.
- HGV generation is unknown but unlikely to be significant. Assume one HGV trip per day per site and one trip overall in the weekday peak hour.
- However on Saturday it is fair to assume that Mitre 10 activity would generate a lot more traffic than the permitted office scenario as the offices would tend to be closed. No specific weekend generation assessment is therefore necessary.

Development Option B is for six individual single-level retail activities akin to what has occurred alongside the Hornby Mitre 10 Mega activity. Key points to note from this type of permitted development are:

- This assessment notes the exclusions set by the City Plan in relation to retailing either located wholly or partly within a B2 Zone. A survey of retail activities within 200 metres of the application site was conducted and revealed there are no other existing or approved retail floor space, located within 200 metres of any part of the proposed development. Based on this assessment there is 3,000m² of retail available to be developed on the northern end of the Sanitarium site with sole access to Chapel Street.
- A six retail-unit development could occur with each on its own site and with its own 25-space car park and own vehicle access. The site layout is the same as for the office scenario discussed above, except that each building is now a 450m² single-level specialty retail activity .
- This would generate 250 trips per day per site which equates to a permitted total of 1500vpd from the six retail sites. It is assumed that Saturday peak hour generation rates do not exceed Thursday peak hour generation rates (Saturday is a busier day, but an individual peak hour might not be any busier than what occurs on a Thursday).
- Weekday PM peak is 140vph from the six retail sites and the Saturday peak hour generation is 290vph from the six retail sites.
- Goods delivery and/or HGV generation is unknown as it would depend upon the type of retail activity, however it is considered reasonable to estimate 4 HGV delivery trips per unit per weekday. No delivery trips on weekends.

Comparison with the Proposal

Again concentrating on likely traffic usage of Chapel Street, the preceding analysis shows that:

- Historic Sanitarium use of the Chapel Street site access is estimated to have been around 200 light vehicle trips per day and around 10-12 HGV trips per day from one site access point.
- Permitted retail development would generate around 1500 light vehicle trips per day and around 24 HGV trips per day from six site access points.

By comparison, it is anticipated that the proposal will generate:

- Light Traffic – An estimated weekday PM peak hour generation of 70 vehicle trips per hour (which represents around 30% of the total estimated weekday PM peak volume of 230vph) and an estimated Saturday peak hour generation of around 250 vehicle trips per hour (which represents around 40% of the total estimated Saturday peak volume of 620vph). Assuming the proportion of daily site generated traffic using the Chapel Street access is the same as the above peak period percentages, the estimated daily generation on the Chapel Street access would be around 700 vehicle trips per day during weekdays (2330 x 30% = 699) and around 1660 vehicle trips per day on Saturdays (4160 x 40% = 1664).

- Heavy traffic (including small, curtain sider truck and B-Trains). 50-60 per week = around 20 HGV trips per day over five days. Assume 67% via the Chapel Street site access (noting that large deliveries such as timber can be made from Harewood Road direct to the front yard area) and noting all exits to Harewood Road) equates to around 7 HGV trips per day across the Chapel Street site access. Deliveries are not normally made on weekends.

Table 4 below summarises the traffic generation scenarios discussed above

Chapel Street Access	**Weekday Peak Hour**		**Weekday Daily**		**Saturday Peak Hour**		**Saturday Daily**	
Vehicle type	Light	HGV	Light	HGV	Light	HGV	Light	HGV
Historic Sanitarium	125-140	2 (est)	200	10-12	Not assessed as unlikely to be significant			
Permitted Offices	120	1 (est)	1056	6				
Permitted Retail	140	4 (est)	1500	24	290	0	1500	0
Proposed Mitre 10 Mega	70	1 (est)	700	7	250	0	1660	0

Table 4: Comparison of Estimated Chapel Street site access volumes for varying activity types.

In terms of the use of Chapel Street for site access, Table 4 shows that for the proposed Mitre 10 Mega activity:

- The weekday peak hour light vehicle generation is up to 50% lower than what Sanitarium would have generated and up to 50% lower than the two permitted baseline scenarios;
- The weekday peak hour heavy vehicle generation is very low in all scenarios;
- The light vehicle daily generation is much higher than what Sanitarium likely generated in the past, but notably less then both baseline scenarios;
- The weekday daily heavy vehicle generation is about the same as Sanitarium and the offices scenario, and much less than for the permitted retail scenario;
- The Saturday peak hour generation is less than the permitted retail scenario.
- It is only the Saturday daily generation that is higher, and even then the additional estimated 160 trips per day spread across a ten hour trading day represents an average of less than 16 trips per hour. This difference is considered inconsequential.

Based on the above, it is concluded that with Mitre 10 Mega traffic utilising the Chapel Street access the generation numbers are broadly similar and there will be no noticeable additional effects over and above those associated with the previous and existing environment.

5.3 Landscaping Provision

The City Plan requires 10% of the site area to be landscaped of which at least half the required landscaping shall be located along the zone boundary to at least 1.8m in height along the zone boundary. The proposal provides 11.5% of the site area in landscaping with a minimum depth exceeding 1.8m.

In addition, the City Plan requires one tree for every five parking spaces provided on the site. The proposal provides 340 car parks thus requiring 68 trees within or adjacent the car park area. The proposal features 46 trees within or adjacent the parking areas resulting in a shortfall of 22 trees. The relevant assessment matters for this non-compliance primarily considers the increased prominence of buildings, the reduction in screening of commercial buildings and outdoor activity areas, and the importance of landscaping in the particular location. In broad terms, the assessment matters are principally concerned with ensuring that any reduction in landscaping does not result in a loss of visual amenity for the site and locality.

The *Assessment of Landscape Effects* prepared by Earthwork Landscape Architects (Annexure E) is to be read in conjunction with the assessment matters addressed below.

3-6.7.6 (a) The effect of any reduced landscaping in terms of the scale and appearance of the buildings in the zone.

The proposed landscaping seeks to provide 11.5% of landscaping over the site, 38 trees along the road frontage and 46 trees within and/or adjacent to the car park area. It is noted that the area of landscaping proposed is 1.5% greater than that required although there is a shortfall of 22 trees within the site. In the context of the 3.2ha site area, it is considered that the amount of proposed landscaping is typical for the type of retailing proposed for the site and that this type of retailing is anticipated in the Business 4 zone.

Furthermore, the proposed landscaping has been designed to enhance the site by introducing amenity and feature plantings to the site whilst retaining many of the historical references of the site being trees, shrubs and water fountain. By combining the present and past elements in the design it is considered this will not only visually enhance the site but will retain a linkage to the sites history whilst acknowledging the surrounding residential landscape styles.

3-6.7.6 (b) The effect of any reduction in landscaping and screening on the visual impacts of outdoor storage areas.

The goods delivery bays are located to the east of the building adjacent the rail corridor and will not be visible form the road. The landscape zone to the south of the building will provide an outdoor storage area for landscape supplies. The outdoor storage area will not intrude the required setbacks, will be screened by a combination of road frontage plantings and the intervening rail corridor and is considered these factors serve to sufficiently mitigate the potential effects of the external appearance of outdoor storage area.

3-6.7.6 (c) *The extent to which the site is visible from adjoining sites, particularly those in living zones, and the likely consequences of any reduction in landscaping standards or screening.*

As discussed previously, the nearest residential properties are located some 20 metres west of the site and are separated by a two lane minor arterial road. Irrespective, it is noted that the site currently features simplistic landscaping along the road frontage incorporating large expanses of grassed areas surrounding the fountain and a limited number of specimen trees along the road frontage, a small concrete and single rail fence spans the length of the frontage. The existing warehouse buildings towards the centre of the site remain visible from Harewood Road.

In contrast, the south east portion of the site will feature traditional garden plantings many of which will be transplanted from within the site whilst retaining its existing open space character. These plants will be of varying heights with the largest specimens located at the eastern most corner of the site and road boundaries to aid in visual screening of the site and built form from adjacent residential properties. It is important to note that southwest corner of the building has been chamfered to not only allow an increased setback from Harewood Road yet also allow planting provisions adjacent the façade. Additionally, a number of specimen trees (Prunus Yedoensis) border the eastern side of the Harewood Road access points and provide further visual screening of the built form from Harewood Road.

The proposed landscaping is being concentrated along the Harewood Road and Chapel Street frontages such that views of the car park will be softened and screened and a suitable standard of amenity will be achieved on site. In particular, it is proposed to plant additional feature trees along each road frontage to reduce the perceived scale of the building with areas of under plantings to further enhance the site. The proposal seeks to retain the openness of the central portion of the site by incorporating a combination of lawn, low hedges and tree planting within this area to ensure maximum visibility of the fountain.

Noting this, it is considered that the development will achieve the standard of amenity sought for the site under the Business 4 zoning and no loss of visual amenity will occur.

3-6.7.6 (d) *Any compensating factors for reduced landscaping or screening, including the nature of planting or materials used, the location of parking, manoeuvring or storage areas, and office accommodation.*

3-6.7.6 (h) *The effect of any reduction in tree planting provision, in respect to the visual appearances of car parking or vehicle storage and loading areas.*

In terms of parking it is noted that the car park has been specifically located to the west of the proposed building such that the amount of hard standing area for car parking is visually reduced from the frontage roads. A conscious decision was made to retain the existing water feature and open space adjacent Harewood Road (rather than locate parking within this area) which provides opportunities to partially screen the car park area with tree and plantings.

As discussed previously the location of the loading bays are located to the east of the site with all loading contained within the building such that these will not be visible from either of the road frontages. This is considered an important positive attribute in terms of the aesthetics of the overall development of the site.

3-6.7.6 (e) *The visual appearance of the site in terms of the length of road frontage or the length of any adjoining living zone boundary.*

As mentioned previously, the site has three road frontages of which a coordinated and comprehensive landscaping design has been considered for each frontage. In particular, Langdons Road will be partially screened by medium to high gardenesque plantings and large boundary trees, Chapel Street whilst more visible owing to the removal of 22 Chapel Street will feature a combination of trees, shrubs planting and hedging coupled with the retention of the existing mature cedar trees and Harewood Road retain the existing water feature and open space whilst providing opportunities for additional with tree and plantings.

It is considered that these landscaping features not only create visual interest along each frontage yet more importantly will reduce the visibility of the building and hard standing areas from the adjacent living zones and will overall enhance the appearance of the site.

3-6.7.6 (f) *The relative importance of landscaping on the particular site concerned, taking account of the visual quality of the surrounding environment, particularly where a low standard of visual amenity exists and improvement is necessary.*

As noted earlier, the surrounds feature a mix of zones and land uses resulting in a visual quality which is varied. The landscaping design is a continuation of the existing ecological representation of the site and surrounds, with design considerations relating to the residential landscape styles evident within the surrounding environs as well as the a reference to the past heritage of the site through a park like design.

In addition the landscaping has been concentrated along the Harewood Road, Langdons Road and Chapel Street road frontages and Langdons Road/Chapel Street intersection, such that views of the building and car park will be softened and screened and a suitable standard of amenity will be achieved on site.

In the context of the 3.3ha site area and approximate 18,518m² building area, it is considered that the landscaping shortfall proposed will not be perceptible when viewed from beyond the site.

3-6.7.6 (g) *The nature of the Business activity itself, and any particular adverse visual impacts it may have.*

The proposed activity is of a relatively passive use where all trading activity is undertaken indoors and of a good building design of modern appearance.

Given the assessment above, it is considered that the proposed landscaping shortfall will have insignificant adverse effects. In forming this conclusion, it is noted that a coordinated approach in design is being utilised with a planting framework which is a continuation of the existing ecological and historical representation of the site. Noting this, it is considered that the development will achieve the standard of amenity sought for the site under the Business 4 zoning and no loss of visual amenity will occur.

5.4 Filling, excavation and building adjacent to waterways

Kruses Drain is classified as both a “utility” waterway and an “environmental asset” waterway in the City Plan owing to its composition. The majority of Kruses Drain is a classified as a utility waterway (an artificial waterway) however, the 130m reach within the application site is classified as an environmental asset waterway. The City Plan requires filling, excavation and buildings be set back a minimum of 7 metres from an environmental asset waterway. This is due to the fact that filling, excavating or building works adjacent to waterways can have adverse effects in terms of flood management, ecological and natural value and visual effects.

The proposed piping of Kruses Drain results in the total visual loss of the drain within the application site and a section of the car park will be constructed alongside the piped waterway.

Extensive consultation has been undertaken between the Applicant, applicant’s Ecologist (Dr Tanya Blakely of Boffa Miskall), Engineer (Structex) and the Councils Asset and Network Planning, Team Greenspace (Dr. Belinda Whyte and Brian Norton) on the piping of Kruses Drain within the application site.

As mentioned previously, a Voluntary Private Developer agreement has been signed between Council and the Applicant in relation to compensation for fully piping the stream through the

Sanitarium site. On the basis of this agreement with Council it is considered this approach an appropriate form of mitigation to compensate for the loss of the environmental asset waterway and any effects will be nil.

5.5 Content of Fill and Excavated Material

The National Environmental Standards (NES) manage activities which involve the disturbance of land which may be contaminated. This is determined by whether activities have or are likely to have occurred on site, which are listed in the Hazardous Activities and Industries List (HAIL). If soil, is being disturbed, the NES will apply. As mentioned previously, historical and current land use activities has resulted in the site being included on the Hazardous Activities and Industries List, although, the level of soil contamination is unknown.

The City Plan requires that earthworks on sites known to contain contaminated soils are assessed as a non-complying activity. However, under the provisions of the NES any earthworks associated with the proposal would be assessed as a restricted discretionary activity.

Notwithstanding the above, the NES for Contaminated Soils and Human Health requires a detailed site investigation prior to making an application for site earthworks. As mentioned previously, a detailed site management plan has been prepared by Geoscience Consulting Limited (Annexure B). This document provides a full risk assessment in accordance with Regulation 9 of the NES.

Given the information above, the assessment matters pertaining to filling and excavation are located in Section 9-5.9.6 of the City Plan are listed and then individually discussed with regards to the proposal below.

9-5.9.6 (a) *The effect of filling and excavation with respect to the extent of any versatile soils on the site, and the degree to which this would be lost to production, or have its physical and biochemical qualities compromised.*

No versatile soils will be lost as a result of earthworks required for the proposal.

9-5.9.6 (b) *Any potential impacts of the filling or excavation in terms of water or wind erosion, and including dust nuisance and sedimentation.*

The sediment control plan prepared by E2 environmental provides detailed measures to be taken during site works which minimise and, if possible, eliminate erosion and the chances of sediment reaching existing drains or waterways, as a result of construction processes. The scope of this plan covers the following:

- Piping of Kruses Drain, which currently flows in an open channel through the site

- Earthworks for site clearance and levelling:
    - Stage 1 – Demolition of existing Weetbix factory and construction of Mitre10 store, carpark and landscaping
    - Stage 2 – Demolition of existing Marmite factory and extension of Mitre10 store and carpark
- Decommissioning of an existing above-ground fuel storage tank; and
- Construction of services for the developed.

Furthermore, during the excavation works all personnel will follow the prescribed procedures and requirements of the Management Plan.

9-5.9.6 (c) Any adverse visual effects of the filling or excavation.

Any adverse visual appearance of the site during the construction process will be negligible given the temporary nature of the earthworks and the location of the construction area within the bounds of the site and will not be overly visible from any adjoining sites.

On completion of the construction phase the site will be comprehensively landscaped.

9-5.9.6 (d) The extent of vehicular traffic generated as a result of filling and excavation on neighbouring properties, and on the road network particularly heavy vehicles.

As mentioned previously, it is proposed to excavate and remove approximately 14,000m^3 of excavated material from the site and import around 12,000m^3 of engineered fill. The frequency and occurrence of vehicle movements associated with these volumes will be spread across the two-stage construction programme, but with concentrations of earthworks related HGV traffic at the start of the build program and near the end of the build program.

The Harewood Road access will be used as the primary construction access. Harewood Road itself is designed to carry significant traffic volumes and the site access points are presently of a design that will safely accommodate HGV traffic associated with the construction process.

9-5.9.6 (e) Any potential changes to the patterns of surface drainage or subsoil drains, and whether adjoining land will be at higher risk of inundation runoff, or a raised water table.

9-5.9.6 (g) Any alteration to natural ground levels in the vicinity, and consequently on the height and bulk of buildings that may be erected on the site.

The proposed building areas will be retained near original site levels by the importation of clean fill to form the foundation slabs for the proposed buildings.

9-5.9.6 (l) Any adverse effect on the quality of groundwater

As detailed in the sediment control plan the mitigation measures proposed ensure there will be no adverse effects on the quality of groundwater.

Furthermore, the proposed stormwater design which incorporates five 30,000L tanks capturing all of the roof runoff with a 100mm orifice, can adequately attenuate the three critical events to below (or close to in the case of the 5 hour event) pre-development levels and will improve the condition of the land involved and will have no effect upon groundwater.*9-5.9.6 (f) The stability of adjoining land, and its susceptibility to subsidence or erosion upon excavation taking place.*

All of the proposed buildings are located inside the site boundaries. As above, there will be no effects upon adjoining land.

9-5.9.6 (h) The significance of ecological or natural values of the land affected, and whether these would be adversely compromised by filling or excavation.

9-5.9.6 (i) The future development potential of land for permitted activities, taking account of the nature of fill material proposed.

There shall be no effect upon natural or ecological values of the land affected as clean fill will be imported and the removal of the contaminated soils will in fact improve the quality of the land concerned. Any loss of natural or ecological values associated with the piping of Kruses Drain have been sufficiently mitigated as detailed earlier.

The proposed earthworks will facilitate the development of buildings anticipated to establish in the B4 zone.

9-5.9.6 (j) Any impact on sites or areas of significance to tangata whenua, particularly significant areas as shown in Part 10, Appendix 3.

9-5.9.6 (k) Any adverse effect on an archaeological site.

The application site has no cultural or archaeological significance.

Overall it is concluded with respect to this non-compliance that any adverse effects are able to be suitably mitigated through the implementation of a site management plan and through earthworks monitoring.

5.6 Protected Tree

The City Plan protects trees which are identified as notable. Notable trees are important in the landscaping of neighbourhoods and have varied characteristics which make them worthy of protecting such as size, age, landscape value and botanical or scientific significance.

The proposed work as described in sections 3.5 and 4.7 above, and detailed further within the documents provided in Annexure E, will be undertaken within 10m of the Lirodendron Tulipitere which is located centrally within the car park area. The works in close proximity to the tree include the construction of 13 parking spaces and a 6m wide pedestrian footpath.

The parking layout and pedestrian connection design has specifically considered the tree. It is proposed to install permeable surfacing which will allow for water penetration through the car park surface to the roots of the existing tree, additionally a large area of soft landscaping around the tree will be provided.

In terms of consideration of alternatives to the location of parking spaces and pedestrian connections within the required 10m setback it is considered that this would significantly reduce the efficient and effective use of the site owing to irregular the shape and the placement of clusters of trees dispersed around the sites periphery. Furthermore, consideration was given to the removal of the tree however, the Applicant wanted to retain the protected tree as well as the maximum number of established trees on site and this is considered the most practicable option.

It is considered that allowing for works to be undertaken within the setback, the visual amenity of the area will be enhanced as the retention of the tree, coupled with the proposed landscaping and amended site layout will be such that the view of the tree will be more dominant than that which exists.

Based on the above it is concluded that provided mitigation measures are undertaken the proposal will have no more than minor adverse effects on the environment.

5.7 Outdoor Advertising Area and Number

The City Plan controls the display of outdoor signage in order to maintain or enhance the amenity values and to ensure that advertisements do not prejudice public pedestrian or vehicular safety in trafficked areas.

The permitted signage area is based on the total road frontage lengths of the site. The road frontages for the nominated site are Harewood Road, Chapel Street and Langdons Road which have a total frontage length of 375m. The 375m frontage allows for a total of 187.5m² of signage for the site.

It is proposed to erect approximately 534m² of site specific signage associated with the proposed activity. In particular, it is proposed to erect signage on the southern, eastern, western and northern facades and the erection of three plinth pylons signs.

The Council's consideration is restricted to the relevant assessment matters outlined in clause 10/3.6.2(a) for signage area. As such the following assessment of effects is limited to these matters which have been grouped into like issues for the following assessment:

10-3.6.2 (i) The visual amenities and characteristics of the locality (including tree or other planting) and whether the proposed display would be obtrusively visible beyond 50 metres (particularly in residential areas).

10-3.6.2 (ii) The proximity of dwellings and the visual intrusion of the proposed display from dwellings on adjoining property or across any road from the proposed display.

10-3.6.2 (iii) The nature and degree of compatibility of any other existing land use activities within 50 metres of the proposed display.

The individual size and total area of outdoor advertisements is a major factor in the visual impact created by outdoor advertising. Accordingly, the City Plan rules controlling sign sizes have regard to the relative sensitivity of the local environment to visual impacts. The City Plan notes that much more generous sizes are permitted in the Business zones given that outdoor advertising is a significant and essential part of the built environment in these zones.

In this regard, the proposed signs associated with the activity will only be visible by pedestrians and traffic on the immediately adjoining sections of Harewood Road, Chapel Street and Langdons Road.

In terms of surrounding land uses, it is noted that commercial sites with extensive areas of advertising are located to the west of the application site. Areas of prominent outdoor advertising are evident nearby along Harewood Road (e.g., Super Liquor, Wildnerness/ Hire Quip) and individual shops east of Restell Street. As such the signage proposed is not considered to be incompatible or out of character with existing land uses in the vicinity.

There are no areas of particularly high visual amenity in this location (e.g., open spaces, heritage buildings, etc). The nearest residential dwellings are located approximately 30 metres south of the southernmost building (across Harewood Road), given the position of the proposed signage relative to these dwellings, the building scale and orientation, intervening car park, building setback and landscaping, the signs will not appear visually prominent. As such the signage proposed is not considered to be incompatible or out of character with existing land uses in the vicinity.

10-3.6.2 (iv) The classification of the road together with the nature of traffic using it and average daily traffic volumes with regard to the potential of the outdoor advertisement to distract motorists.

From the outset it must be noted that reviews of published research on the potential effects of roadside adverting on road safety undertaken by both the Council and Transit confirm that there is <u>no proven link</u> between the presence of roadside advertising and a reduction in road safety.

Harewood Road is classified as minor arterial road in the City Plan and carries approximately 14,000 vehicles per day (last counted by Council in March 2012). This volume is within the anticipated range for an minor arterial road given that the City Plan anticipates such roads to carry up to 15,000 vehicles per day.

Langdons Road is classified as a collector road and links onto Main North Road to the northwest of the application site. Collector roads have a planned traffic function of collecting and distributing traffic within and between neighbourhoods. The road has a single traffic lane in each direction and Council traffic counts indicate that it presently carries around 8,500 vehicles per day. This is above the planned maximum traffic volume for a collector road of around 6,000 vehicles per day.

Chapel Street is classified as a local road and provides a connection between Harewood Road and Langdons Road. Chapel Street was last recorded (2005) as carrying around 1,800 vehicles per day by the City Council which is in the upper limit of the anticipated levels for a local road of around 2,000 vehicles per day.

For advertising signage to be effective must provide advance visibility. Whilst the signage exceeds the maximum total area permitted for the site it has been designed to ensure that it provides the required information in a concise and clear manner to traffic on Harewood Road, Chapel Street and Langdons Road. Whilst Harewood Road carries high levels of vehicular traffic the straight alignment means that sight distances meet relevant geometric design requirements, furthermore, the locations of the signs are not anticipated to distract motorists e.g., separated from signals and no flashing, moving or reflective lights.

10-3.6.2 (v) *The range and nature of land use activities on the site concerned, and whether it necessitates larger outdoor advertisements.*

10-3.6.2 (vii) *The area of the proposed display in relation to the architectural characteristics of the building involved, or the site and/or frontage (where no buildings are involved).*

10-3.6.2 (xi) *The sympathy of the proposed outdoor advertisement placement to the architectural features of the building onto which it is to be placed, or the site on which it will be located.*

The site has a significant site area of 3.2ha with the proposal encompassing a GFA of 13,518m^2. As such, it is considered the relative scale of the signage to the buildings is appropriate.

The proposed signage incorporates two pylon signs and signage painted to the south, north, west and east building facades.

- The signs located on the eastern façade are located adjacent the rail corridor and Restell Street directly opposite commercial activities (Super Liquor).
- Signage located on the northern façade will generally only be briefly visible by traffic passing the site.
- Signage located along the northern façade are adjacent a large expanse of Business 5 zoned land.

Signage located on the southern and western facades are located along Harewood Road and opposite residential activities. Although more visible, the advertising is coordinated in form, and given the orientation of the building the viewing angle will prevent simultaneous views from a single vantage point and will not appear visually prominent given they are visually confined to within the development. These attributes will reduce the visual dominance of the signs and help to ensure that visual clutter does not occur. In addition, as the majority of the building façade is free of signage, the frontage of the building will remain clear and open.

Whilst residential dwellings are located to the south of the site the position of the proposed sign relative to these dwellings, car parking, landscaping and the layout of Harewood Road will ensure that the signs do not appear visually prominent.

In terms of the freestanding pylon signs it is considered that given the angle of the proposed sign it will primarily be visible to traffic on the immediately adjoining section of the Harewood Road, Chapel Street and Langdons Road. These signs are positioned at right angles to the frontage roadway such the proposed sign will only be visible from dwellings located to the northwest and northeast of Harewood Road and northwest and southwest of Chapel Street. The freestanding sign located along Langdons Road is opposite a large expanse of Business 5 zoned land and given its angle will only be visible to briefly passing traffic along Langdons Road.

These signs will not be obtrusively visible when viewed beyond the site, nor of a scale that will adversely affect the amenity enjoyed from nearby properties.

The signage design and colouring is relatively simple and synonymous with the commercial colour scheme of Mitre 10 Mega which will help to avoid visual clutter and dominance. As such these signs are unlikely to appear so distinct or prominent that they will detract from the amenity of the site or the general amenity of the street and surrounds.

With regard to the placement of the signs on the building, the signs will be clear of windows and will not obscure daylight access or the architectural features of the building. Furthermore, large sections of the building façade remain free from advertising, reducing the visual dominance of the on site advertising and ensuring that visual clutter does not occur.

10-3.6.2 (vi) The length of the road frontage of the site concerned and the area of display proposed.

The permitted signage area is based on the total road frontage lengths of the site. The road frontages for the nominated site are Harewood Road, Chapel Street and Langdons Road which have a total frontage length of 375m. The 375m frontage allows for a total of 187m² of signage for the site.

The application site adjoins the rail corridor to the east adjacent to Restell Street whilst this is technically not a road frontage there is 309 metre vantage point to the site. If this length of road frontage was included as part of the application site this would then provide an additional 154m² (309 x 5/10) permitted area of outdoor advertising increasing the total area of on site signage from 187m² to 341m².

Although the signage area is in excess of what is permitted, these signs are spread along four facades, adjacent to three road boundaries with approximately half of the signage facing west which is setback some 40 metres from Harewood Road such that visual clutter is avoided.

Furthermore, it is considered that the position of the proposed signage in conjunction the intervening car park, building orientation and setback and landscaping, the signs will not appear visually prominent. As such the signage proposed is not considered to be incompatible or out of character with existing land uses in the vicinity.

10-3.6.2 (ix) The likely visual prominence of the proposed display in comparison with what it may have looked like in compliance with the area rule concerned.

The proposed signage area for the site, at 534m² is significantly greater than the 187.5m² permitted by the City Plan. However this scale of signage is typical for large format retail activities. Reducing the proposed on-site signage to around one-third of what is proposed would result in signage appearing out of scale (too small) relative to the size of the application site and the size of the buildings it will contain. Signage would be 'lost' within the scale of the proposed building – a scale of building that is otherwise anticipated to establish in the Business 4 zone.

10-3.6.2 (x) The nature of existing or likely future land use activities in the vicinity of the proposed display, together with any relevant environmental results anticipated for that zone.

The application site is dominated by a mix of established commercial and residential activities. As such the proposed signage for the site is consistent with the signage scale and style provided on the neighbouring sites. Therefore, this application is not introducing something unduly conspicuous or incongruous into the surrounding environment.

10-3.6.2 (xiii) The extent to which advertisements will result in visual clutter and loss of visual coherence of the character and amenity of the environment.

The signage design and colouring is relatively simple in design which will help to avoid visual clutter and dominance. The design is also consistent with those activities of a nature similar to that proposed and evident elsewhere in Christchurch.

10-3.6.2 (xii) The extent to which the proposed outdoor advertisements are sensitive to heritage values, public open spaces or areas possessing significant natural values.

10-3.6.2 (viii) The heritage values, architectural characteristics and visual amenities of the buildings and/or sites in the immediate vicinity, including the number and sizes of any other existing outdoor advertisements either on the site concerned or immediately adjoining (and the need to avoid the cumulative effect of "clutter").

In broad terms, there are no significant heritage values, architectural characteristics or visual amenities of the buildings and/or sites in the immediate vicinity that will be adversely affected by the proposed signage. Further, the signs will not appear incongruous with the site or compromise any architectural characteristics of the building. Although the scale and area is larger than what is permitted in the City Plan the colour, content and construction of the signage is not particularly distinct and as such the signs are unlikely to appear so distinct or prominent that it detracts from the surrounding area. Given its location on the site, no adverse effects in terms of traffic safety are anticipated.

Overall, considering the relevant assessment matters for sign area, it is noted that the site has a generous frontage length and as such the proposed signs and total area of signage on the site will not appear visually dominant or cluttered in the context of a commercial site of this size. Similarly, the signs proposed are entirely consistent with the nature of signage which is expected (and found) on other similar commercial complexes of this type elsewhere in the city. Considering the matters above, and noting the anticipated extent of outdoor advertising on other commercial sites in the immediate vicinity, it is considered that the proposal will have insignificant adverse effects.

5.8 Street Scene (Signage Only)

As mentioned previously, the three freestanding signs intrude the street scene setback in varying degrees being an 8m intrusion into the 10m setback along Harewood Road and Chapel Street and a 3m intrusion into the 6m setback along Langdons Road.

The reason for street scene setbacks to be the same as those for buildings is to ensure that a coherent streetscape is not fragmented. More so, within the Business 4 zone which acts as a buffer between Business 5 and more sensitive zones such as Living zone the setback is used as a buffering mechanism.

The Council's consideration is restricted to the relevant assessment matters outlined in clause 10-3.6.2(f) for signage area. As such the following assessment of effects is limited to these matters which have been grouped into like issues for the following assessment:

> *10-3.6.2(f) i)* *The extent to which the proposed outdoor advertisements and support structure will be compatible with the scale of other similar support structures, buildings and other developments in the surrounding area.*

As mentioned previously, there are commercial sites with prominent outdoor advertising nearby along Harewood Road and individual shops east of Restell Street. Furthermore, when considered in the context of the site size, the length of the road frontages and scale of the building the signage proposed is not considered to be incompatible or out of character with existing land uses in the vicinity.

> *10-3.6.2(f) (ii)* *The extent to which the proposed outdoor advertisement and support structure will detract from the outlook, pleasantness, coherence, openness and attractiveness of the site as viewed from the street and adjoining sites.*

Whilst the built environment within the site is changing, the design and appearance of the proposed development retains a number of existing features within the site notably the fountain and large expansive areas of landscaping along each of the road frontages thereby ensuring and retains the openness and pleasantness of the site. These features will ensure that reduced setback intrusion will disrupt the streetscape.

> *10-3.6.2(f) (iii)* *The existing extent and quality of garden, tree planting and landscaping in the vicinity of road boundaries and the opportunity to provide for further such garden, tree planting and landscaping and the maintenance thereof.*

The application proposes to landscape the site with a mix of plant materials, permeable landscaping and raw materials. Furthermore, the proposed landscaping has been designed to enhance the site by not only introducing a mix of landscaping materials and plants yet also retaining many of the existing landscaping features within the site i.e. fountain, tulip tree and road frontage fence this will not only visually enhance the site but will create a linkage to the historical features of the site.

> *10-3.6.2(f) (iv)* *The extent to which the proposed outdoor advertisement and support structure is sensitive to heritage values, public open spaces and areas possessing significant natural values.*

There are no areas of particularly high visual amenity in this location (e.g., open spaces, heritage buildings, etc.).

5.9 Parking Provision

As shown in Table 3a earlier, the proposed Stage 1 development has been assessed to have a City Plan parking requirement of 471 spaces, whereas 294 spaces will be provided.

As shown in Table 3b earlier, the proposed Stage 2 development has been assessed to have a City Plan parking requirement of 591 spaces, whereas 340 spaces will be provided.

The parking requirement and supply assessments are summarised in Table 5 below:

		Stage 1	**Stage 2**
City Plan Parking Requirement	Visitor	396	514
	Staff	75	77
	Total	**471**	**591**
Parking Supply	Visitor	224	270
	Drive Thru	23	23
	Staff	47	47
	Total	**294**	**340**
Shortfall	**Total**	**175**	**251**

Table 5: Parking Requirement and Supply Summary

The following assessment matters are considered relevant in relation to this application:

13-3.2.1 d) Where the required number of off-street car parking spaces are not to be provided:

(i) the extent to which the nature of the particular activity is such that it will generate more or less parking and/or staff parking demand than is required by this Plan;

(ii) whether the required parking can physically be accommodated on the site;

(iii) the extent to which the traffic function and/or safety of the surrounding road network may be adversely affected by extra parked and manoeuvring vehicles on these roads;

(iv) the effect of vehicles parked on the street, on the amenity of adjoining land uses;

(v) whether the site is well served by public transport;

(vii) the cumulative effect of the lack of on-site parking spaces for the proposal in conjunction with other developments in the vicinity which are not providing the required number of parking spaces;

(viii) the extent to which the reduction in parking will affect the ability of future activities on the site to meet the parking requirements;

(ix) the extent to which the safety of pedestrians, particularly children, will be affected by being set down on-street.

The City Plan parking rates are generic and do not always accurately reflect the actual parking demand of a given activity. In addition, the City Plan parking rates assume a direct linear relationship between floor area and parking demand. In Urbis' experience this is often not the case, particularly in relation to large format retail activities and trade suppliers.

It should also be noted that the City Plan does acknowledge a lower parking demand associated with large format retail activities (including trade retail), and accepts a lower parking rate of 2.5 visitor spaces and 0.5 staff spaces per 100m² for some of these activities within the B3 zone. However, the City Plan does not allow this lower parking rate to be applied to those activities in the B4 zone and this seems an anomaly given the types of retailing anticipated in these zones.

In order to fully assess the potential parking demand of the proposal, reference is made to surveys of parking demand that have previously been completed at a number of large format trade retail stores in Christchurch during the busy (for this type of activity) 2010 Labour Weekend. The following points are noted in relation to the survey methodology:

- Where the activity was located on its own site, with clearly defined parking areas that were obviously not associated with any other activity, the surveys recorded the actual number of cars parked on the site and also recorded any on-street parking that was clearly associated with the activity.
- Where the activity was on a site with other activities and/or a shared parking, the surveys recorded the number of customer 'groups' plus the number of staff in the store. For the purpose of the surveys, customer 'groups' were considered to be families, couples and other groups of people that were considered to have most likely arrived on the site in the same vehicle – usually a group size of 2-3 people. The parking demand of these customer 'groups' was therefore considered to be one space per group.
- In terms of staff parking demand, it was assumed that 80% of staff would bring a vehicle to the site with the remaining 20% sharing a ride or using alternative transport modes such as bus or cycle.

Table 6 on the next page summarises the survey data and shows that the maximum parking demand rate of 2.53 spaces per 100m² was recorded at the Bunnings Homebase store on Marshlands Road. As noted in the comments column of Table 6, this store was running a number of promotions and was extremely busy at the time of the survey. It should also be noted that for this store both on-site parking and the number of customer groups and staff inside the building were recorded. In the first instance, the total number of vehicles parked on the site was recorded as 242. The survey staff then counted the number of people (customer 'groups' and staff) visible in the stores other than Bunnings.

This was recorded as 65 people/groups, which was then assumed to equate to 65 vehicles (i.e. each customer 'group' and staff member had a car on the site). Subtracting this from the total number of cars parked on the site suggested that the remaining 177 vehicles (242 – 65 = 177) were associated with the Bunnings store. By comparison, a total of 140 customer 'groups' and 32 staff were counted inside the Bunnings store. Assuming each of these customer groups and 80% of the staff and had a vehicle parked on the site, the Bunnings activity would have generated a parking demand of 166 vehicles. As can be seen, there is reasonable consistency between Bunnings parking demand estimates derived from the two different survey methods.

Location	**Floor Area**	**Day / Time**	**Comment**	**Customer Groups In Store**	**Staff In Store**	**Actual Parking**		**Estimated Parking**		**Adopted Parking Demand**	**Total Parking Demand Rate**
						On Site	**On Street**	**Vis**	**Staff**		
								1.0	**0.8**		
Placemakers Mandeville	7000	Thu 21 Oct 17:12				27				27	0.39
Mitre 10 Ferrymead	8975	Sat 23 Oct 11:00	Labour Weekend. Very busy.	84	24			84	19	103	1.15
Bunnings Marshlands Road	7000	Sat 23 Oct 12:00	Labour Weekend. Very busy. Big in-store promotions - bouncy castle, face painting, 2 radio stations, etc	140	32	177	0	140	26	177	2.53
Placemakers Cranford St	3678	Sat 23 Oct	Labour Weekend. 15% sale on.			36	0			36	0.98
Placemakers Mandeville	7000	Sat 23 Oct 12:45	Labour Weekend			57	1			58	0.83
Bunnings Tower Junction	9975	Sat 23 Oct 12:55	Labour Weekend	120	40			120	32	152	1.52
Mitre 10 Chappie Pl	5966	Sat 23 Oct 13:20	Labour Weekend			114	0			114	1.91
								Avg (Saturday Only)			**1.49**
								85%ile (Saturday Only)			**2.07**
								Max			**2.53**

Table 6: 2010 Labour Weekend Trade Retail Parking Surveys

As noted earlier however, and illustrated in the survey results, there is not a direct linear relationship between floor area and parking demand. This is particularly evident with the larger Bunnings Tower Junction store (9975m² compared to 7000m² at the Marshland Road site) which was also very busy during the surveys but generated a significantly lower parking demand rate of 1.52 spaces per 100m². For this reason it is considered unlikely that the parking demand generated by the proposed Stage 2 floor area of 13518m² will reach the maximum surveyed rate of 2.53 spaces per 100m².

Based on the above, the 85th percentile parking demand rate of 2.07 spaces per 100m² is considered to reasonably represent the typical peak parking demand of the proposal. Applying this rate to the proposed Stage 1 floor area of 10551m² indicates that the proposal will generate:

- A typical Stage 1 (10551m²) peak parking demand of around 218 spaces (including staff parking demand) versus a 294 space supply, and;
- A typical Stage 2 (13518m²) peak parking demand of around 280 spaces (including staff parking demand) versus a 340 space supply.

This analysis confirms that the proposed on-site parking provision will more than adequately cater for the typical peak parking demand. It follows that providing the required 471 (for Stage 1) or 591 spaces on the site (for Stage 2) would result in an inefficient use of the land resource and would be contrary to resource management principles.

Overflow on-street parking is unlikely to occur as a result of an inadequate off-street parking supply because the estimated peak parking demand of the activity for both development stages is notably less than the proposed on-site parking supply. While this will not prevent some staff from choosing to park on street, overflow on-street parking will be discourage by the provision of a 47-space dedicated staff parking area that will accommodate 100% of the likely staff parking demand of the activity.

The ability to cater for all expected parking demand on site (with a predicted parking surplus on a peak trading weekend for both stages of development) means that the proposal will not result in any cumulative parking effects in association with other activities in the area.

The proposed parking supply ably meets estimated peak parking demand levels and as such the proposal will not result in pedestrians being set down on street apart from, possibly, very low levels of parking demand generated by staff who prefer to park on street rather than on site.

Overall it is considered that only negligible adverse effects may arise as a result of the City Plan parking shortfall. These effects would be generated by staff who might choose to park on street despite the availability of on-site parking spaces.

5.10 Cycle Parking Provision

Development Standard 13-2.2.6 of the City Plan requires that 52-63 covered cycle parks be provided on-site for the proposal. It is proposed to provide a total of 22 cycle parks on the site (10 covered plus 12 uncovered) for the Stage 1 proposal, increasing to 36 cycle parks (10 covered plus 26 uncovered) upon completion of Stage 2.

The relevant assessment matters for the 27-30 space cycle park shortfall are contained within 13-3.2.2 of the City Plan as follows:

13-3.2.2 (a)	*The extent to which alternative, secure, covered parking is available which is within easy walking distance of the development.*
13-3.2.2 (b)	*Whether the parking can be provided and maintained in a jointly used cycle parking area.*

Neither of the above assessment matters relate to a cycle parking shortfall. The assessment matters for Development Standard 13-2.2.1 are also silent in terms of assessing cycle parking shortfalls. In effect the Council has no ability to consider cycle parking shortfalls in terms of likely cycle parking demand.

That said, given the nature of the proposed activity it is unlikely that there will be much (if any) demand for on-site customer cycle parking.

In terms of staff parking demand, the expected typical staff numbers will be around 40-45 people, of which 80% (32-36 people) are expected to come by private car. Allowing for other modes such as car pooling, public transportation and walking therefore, the actual staff cycle parking demand is unlikely to exceed 4-5 spaces. This demand will be catered for by the proposed 10-space covered cycle parking area located alongside the southwest corner of the building.

Overall therefore, the provision of 22 on-site cycle parking spaces for the Stage 1 development and 36 cycle parking spaces for the Stage 2 development is expected to be more than adequate to cater for the expected staff and visitor cycle parking demand generated by the activity.

The proposed cycle parks are located less than 100m from the main store entrance lobby, and are thus considered to be conveniently located for both staff and visitors.

For the above reasons, it is considered that the proposed on-site cycle parking provision will adequately cater for the expected demand generated by the proposal and there will be no adverse effects in terms of cycle parking supply.

5.11 Queue Space Provision (Chapel Street only)

The Chapel Street site access does not provide the required 15.5m queue space. A 6m queue space is proposed. The relevant assessment matters pertaining to queuing spaces are contained within 13-3.2.9 of the City Plan as follows:

13-3.2.9 (a)	*Whether there would be any adverse effects on the safety and/or function of the frontage road.*

13-3.2.9 (b)	*The effect of queuing vehicles on the safety of pedestrians.*
13-3.2.9 (c)	*The extent to which the safe circulation of vehicles on the site will be affected.*

As noted earlier, Chapel Street is classified as a local road in the City Plan. The planned function of local roads is to provide property access. The queue space non-compliance only arises as a result of the location of the internal exit from the northern staff parking area and this will be a low volume exit that will only carry traffic outside peak trading periods for the retail activity. The potential for vehicle conflict within the site will be negligible and there will be no measurable effects on pedestrian safety or the function of chapel Street.

5.12 Length of Vehicle Crossing

The City Plan specifies a maximum length for non-residential vehicle crossing of 9 metres. The proposed Harewood Road site access is 10m wide at the road boundary, and the vehicle crossing will be splayed to have a fully dropped kerb length of approximately 13m. The Chapel Street access is also 10m wide at the road boundary and will utilise the existing 15m long vehicle crossing. On this basis, both of these vehicle crossings do not comply with this standard.

The relevant assessment matters pertaining to queuing spaces are contained within 13-3.2.22 of the City Plan as follows:

13-3.2.22 (a)	*The number of pedestrian movements and the number and type of vehicles using or crossing the vehicle crossing;*
13-3.2.22 (b)	*Whether the safety of pedestrians, particularly the aged and disabled will be compromised by the length of time needed to cross a wider driveway;*
13-3.2.22 (c)	*The ability for vehicles to use the access without adversely affecting the safety and/or efficiency of the frontage road;*
13-3.2.22 (d)	*The speed at which vehicles will be able to enter/exit the site and the effect on this on the safety of pedestrians and other road users.*

Peak hour traffic counts undertaken at the Harewood/Matsons intersection as part of the traffic assessment of this proposal showed that pedestrian volumes along Harewood Road past the site access are almost nil.

The additional Harewood Road access width is necessary to provide for articulated truck access into the front yard area for goods delivery purposes. An articulated truck entering the site will need to cross over the two exit lanes, however it is expected that this type of truck arrival will occur outside peak trading times for the store such that the potential for opposing vehicle conflicts will be negligible. In addition, the proposed width of vehicle crossing measured along the road boundary is only one metre greater than the permitted 9m length. This additional length will have no measurable effect on vehicle entry speeds.

The Chapel Street site access is existing. Pedestrian volumes along this Street are also almost nil. While the proposal will increase the use of this access compared to the historic situation (refer to Table 4 earlier) the additional traffic volumes are not high when spread across a ten hour trading day. No adverse effects on pedestrian safety or the operation of Chapel Street itself are anticipated as a result of the continued use of this site access.

5.13 Traffic Generation

An assessment of the potential road network effects of the proposed activity has been completed separately by Urbis and is attached as Appendix I to this application document. That assessment concludes that the proposal will have a minimal (and certainly less than minor) effect on the continued safe and efficient operation of the surrounding road network.

In terms of potential site generated traffic effects on residential amenity, the following two points are noted:

a) The permitted baseline comparison provided in Section 5.2 earlier demonstrated that the estimated volumes of Mitre 10 Mega traffic utilising the Chapel Street will be lower and, as such, there will be no additional effects over and above those associated with the previous and existing environment.

b) An analysis of the performance of the proposed main Harewood Road site access using SIDRA showed that the predicted traffic volumes generated by the proposed activity will not result in traffic congestion at this site access location that could be considered to have any noticeable effect on residential amenity (refer to Figure 12 on the next page). In terms of this it is important to keep in mind that the proposed Mitre 10 Mega activity is anticipated by the City Plan to establish in the Business 4 zone, the anticipated environmental outcomes for the zone include relatively high levels of traffic generation, that Harewood Road is a higher volume arterial road, and that the proposed site access location has been specifically identified as being the optimum location by Council engineering staff.

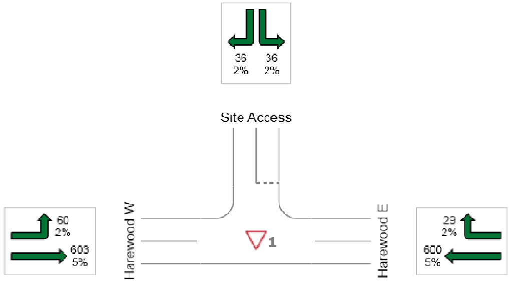
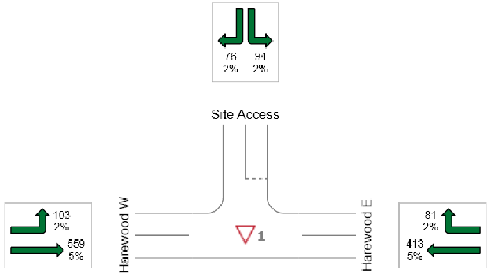
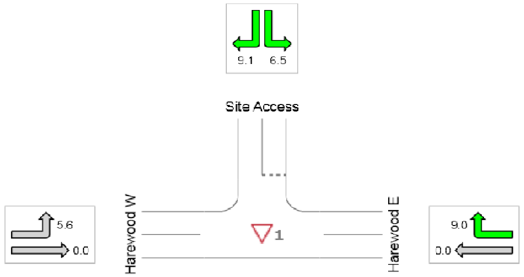
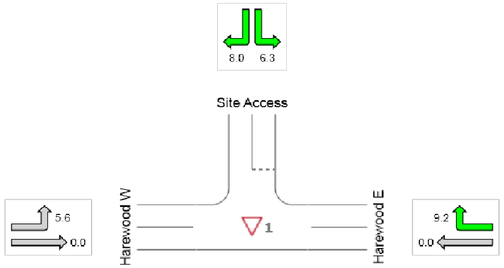
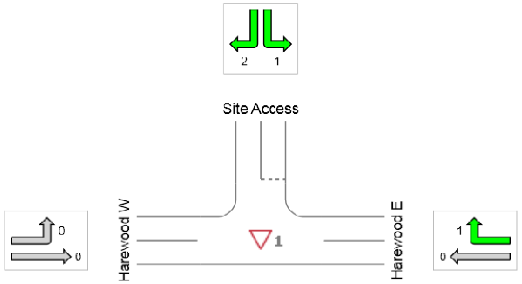
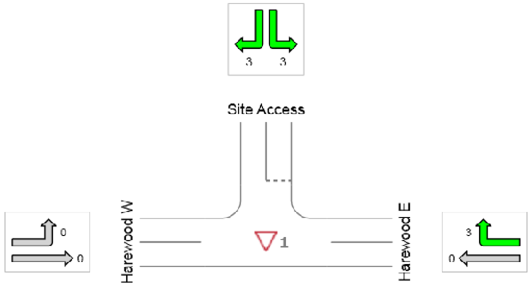
	Weekday PM Peak	Saturday Peak
Estimated Future Volume		
Avg Delay 2 Exit Lanes (seconds)		
95%ile Queue 2 Exit Lanes (metres)		

Figure 12: SIDRA analysis summary output for the proposed main Harewood Road Site access

6.0 OBJECTIVES AND POLICIES

This application seeks consent for a **non-complying** activity due to non-compliance with one critical standard (9-5.8.1) relating to Content of Fill and Excavated Material. As a result of this activity status Section 104D of the RMA requires the consideration of any actual and potential effects on the environment arising from the proposal, together with an assessment as to whether the proposal is contrary to the relevant objectives, policies and rules of the Plan.

As outlined in the preceding assessment of effects , it is considered that adverse effects on the environment are less than minor, thereby meeting the test under s104(a) as a minimum**.**

In relation to providing an assessment of objectives and policies under s104(b), it is considered that the non-complying activity status afforded to a non-compliance associated with content of fill and excavated material is unrealistic given that the non-compliance could be removed from this proposal by separating the proposal and lodging an application for earthworks separately from the proposed retail activity. As mentioned previously, beyond the breach of Critical Standard 9-5.8.1, this proposal would otherwise be classified as a restricted discretionary activity. In this situation an assessment of the objectives and policies of the City Plan would not be required.

Notwithstanding the above, when considering an application for a resource consent the consent authority must have regard to any relevant provisions of s104(1)(b)(i) “a national environmental standard”. The NES standard became operative on the 1st January 2012 and seeks to ensure that land affected by contaminants in soil is appropriately identified and assessed before its developed and if necessary the land is remediated or contaminants contained to make the land safe for human use. The provision of the NES requires assessment of the activity as a restricted discretionary activity. In this situation an assessment of the objectives and policies of the City Plan would not be required.

Based on the above, given the nature of the non-compliance that generates the activity status and the restricted discretionary status afforded to the activity under the NES , an assessment of objectives and policies is not considered relevant or necessary.

7.0 CONSIDERATION OF ALTERNATIVES

The Act requires that where it is likely that an activity will result in any significant adverse effect on the environment, an application must include a description of any possible alternative locations or methods for undertaking the activity.

As has been demonstrated in the preceding assessment of effects on the environment, any effects generated as a result of this proposal will be no more than minor. Accordingly, under Schedule 4 clause 1(b) of the Resource Management Act, there is no need for alternatives to be considered.

8.0 CONSULTATION

As noted earlier, the applicant has engaged in consultation with Council in relation to this proposal at the pre application stage and throughout the development of the proposal up to lodgement stage.

In particular, consultation has been undertaken on numerous occasions with the following representatives from Council; Kathryn Stapleton - Senior Planner, Mike Calvert - Transport Planning Engineer, Brian Norton and Dr Belinda Whtye from The Council's Asset and Network Planning, Team Greenspace. Isobel Stout - Senior Environmental Health Officer, Jennifer Dray - Senior Landscape Architect and, Dhanesh Amerasingam – Urban Designer.

Given that the proposal is for the establishment of a 'trade supplier' as per the definition of the City Plan which is an anticipated activity in the Business 4 zone the applicant had not consulted with any adjoining landowners or occupiers as these parties are not considered to be adversely affected by the proposal.

9.0 NOTIFICATION

The Changes made to the Resource Management Act 1991 (the "Act") by the Resource Management (Simplifying and Streamlining) Amendment Act 2009, have removed the presumption that applications for resource consent should be notified. This application may only be publicly notified if the activity for which consent is sought will have or is likely to have adverse effects on the environment that are more than minor (section 95A).

As set out in Section 4.10 earlier, the overall activity status for the application is for a **non-complying** activity due to non-compliance with a Critical Standard relating to content of excavation. The remainder of the proposal (i.e. other than content of excavation) would otherwise require resource consent as a **restricted discretionary** activity owing to breaches of eleven City Plan development standards and one Critical Standard.

The potential effects arising from the proposal have been assessed in Section 5 of this application and it is considered that the proposal will have less than minor adverse effects. This is primarily as a result of the proposal being anticipated within the Business 4 zone under the operative City Plan zoning. Therefore, this application for resource consent need not be publicly notified.

If the activity will not have adverse effects on the environment which are more than minor, then the consent authority must consider whether to notify the application on a limited basis. Following the changes to the Act, the focus of limited notification is on potentially affected persons. The test is now whether the activity will have adverse effects on a person that are minor or more than minor (section 95E). Once again, it is considered that the proposed activity is anticipated within the Business 4 zone and permitted baseline argument confirms any effects on the environment will be less than minor. Therefore, it is considered that this application needs not be processed on a non-notified basis.

Additionally, based on the above it is considered that there are no special circumstances which exist that would require notification under Section 95A(4).

10.0 RECOVERY STRATEGY FOR GREATER CHRISTCHURCH

The Recovery Strategy for Greater Christchurch The Recovery Strategy for Greater Christchurch (the Recovery Strategy) prepared by CERA under the Canterbury Earthquake Recovery Act became operative on 1 June 2012. It is a statutory document that must be "read together with, and forms part of" other relevant legislation within the greater Christchurch area. The City and District Plans (and a number of other statutory documents) must not be interpreted or applied in a way that is inconsistent with the Recovery Strategy. Only Section 3-8 of the Strategy have statutory effect.

“Recovery” is defined under the CER Act as including both restoration and enhancement (Section 3).

Section 4 identifies the vision for the recovery of Greater Christchurch and supporting goals relating to the six components of recovery. The following goals are of particular relevance to this application:

Leadership and Integration – Coordination between public and private sector, and communities to contribute to recovery and future growth by:

- Facilitating a timely and efficient recovery

Economic – Revitalise greater Christchurch by:

- Planning for a well-functioning Christchurch central city and thriving suburban centres
- Restoring the confidence of the business sector to enable economic recovery and growth
- Identifying and facilitating increased opportunities for early and substantial local and international investment;
- Ensuring a range of employment options

Built Environment – Develop resilient, cost effective, accessible and integrated infrastructure, building, housing and transport networks by:

- Prioritising infrastructure investment that contributes during recovery and into the future
- Rebuild infrastructure and buildings in a resilient, cost-effective and energy-efficient manner.

Section 5 of the Recovery Strategy identifies a number of priorities for recovery to address and promote social, economic, cultural and environmental wellbeing. These include:

- A functioning Central Business District and suburban areas that provide opportunities for local businesses and economic activities to relocate, maintain services and grow.

The proposal seeks to establish a locally owned business within a suburban area which will not only provide additional employment opportunities but will also assist in facilitating growth and investment. It is considered that the proposal is not inconsistent with the Recovery Strategy promotes the identified goals or priorities for recovery.

11.0 CONCLUSION

The application relates to utilising the existing Sanitarium Health Foods site and adjoining properties, which have a Business 4 (Business 4) zoning in the operative City Plan, for retailing purposes as anticipated under Business 4 zone.

Given the non-compliance with a Critical Standard regarding content of excavation, the proposal is considered **non-complying**. The remainder of the proposal (i.e. other than content of excavation) would otherwise require resource consent as a **restricted discretionary activity** owing to breaches of eleven City Plan development standards and one Critical Standard.

The visual appearance of the site and the visual quality of the surrounding area are enhanced through the existing and proposed on-site landscape provisions. The comprehensive landscaping design seeks to enhance the site by not only introducing a mix of landscaping materials and plants yet also retaining many of the existing landscaping features within the site i.e. Fountain, Tulip tree and road frontage fence this will not only visually enhance the site but will create a linkage to the historical features of the site. Additionally, comprehensive landscaping exceeds the area of landscaping required by the City Plan and provides a complying number of trees along each of the three road frontages which sufficiently serves to screen the site from surrounding land uses.

The proposed piping of Kruses Drain results in the total loss of the 130m reach of Kruses Drain within the application site. An agreement has been reached between the applicant and Council which is considered an appropriate form of mitigation to compensate for the loss of the environmental asset waterway.

In relation to potential contamination it is considered that this has been adequately covered by the adoption of the PSI and that the DSI being prepared by Geoscience Consulting Limited which will include a Contaminated Site Management Plan. These documents will provide a full risk assessment in accordance with Regulation 9 of the NES.

The proposal seeks to carry out work within 10 metres of one notable tree. It is considered that provided mitigation measures detailed in the preceding assessment are undertaken the proposal will have negligible effects on the environment.

The City Plan controls the number and size of outdoor advertisements to maintain the visual amenity and character of the area. Whilst the proposed signage area for the site, is significantly greater than permitted reducing the proposed on-site signage to around one-third of what is proposed would result in signage that would be ‘lost’ within the scale of the proposed building – a scale of building that is otherwise anticipated to establish in the Business 4 zone. Furthermore, the proposed signage is entirely consistent with the style and scale of signage at similar activities located elsewhere across the city.

In terms of parking and cycle space numbers, the proposed on-site parking supply will more than cater for the estimated parking demand associated with the activities on the site. The nature of the likely retail activities is such that there will be little demand for cycle parking, and the proposed 36 space provision will be more than adequate.

In relation to the reduction in queue space provision, the proposed Chapel Street site access already exists and the proposed use of the northern parking are as a dedicated staff car park means there will be no more than negligible effects on the operation of Chapel Street.

The design of the Harewood Road site access mitigates any potential pedestrian safety issues relating to the width of the access, while continued use of the Chapel Street site access is unlikely to have any effects on pedestrian safety or the operation of Chapel Street itself.

In terms of site generated traffic, the proposal will have a minimal (and certainly less than minor) effect on the continued safe and efficient operation of the surrounding road network, and will not result in any adverse amenity effects on adjoining residential properties over and above that which could be expected from permitted development of the site.

The above assessment and analysis of the City Plan demonstrates that the proposal to utilise the existing Sanitarium site, which has an operative Business zoning in the City Plan, for a proposed Mitre 10 Mega trade supplier activity will have less than minor effects on the environment.

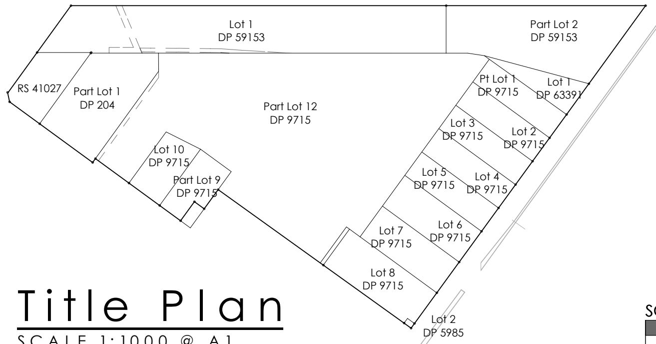
In accordance with sections 95, 95A-95F, 104, and 104C of the Act, consent may be granted without the need for notification.

ANNEXURE A: EXISTING SITE PLAN

Contractor to verify all dimensions on site. Drawings may not be to scale if received in pdf format

Existing Site Plan

SCALE 1:500 @ A1
SCALE 1:1000 @ A3

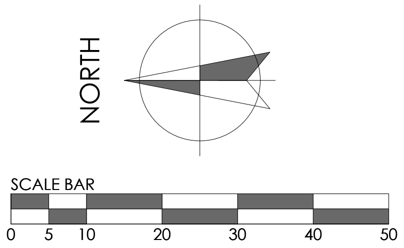


Title Plan

SCALE 1:1000 @ A1
SCALE 1:2000 @ A3

Key

	Existing open drain to be re directed
– – –	Existing drainage pipes to be removed
– · – · –	Existing stormwater pipe retained
☐ C	Existing stormwater chamber retained



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PROJECT STATUS:

Resource Consent
9-7-2014

Revision 1
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31-10-2014

EXISTING SITE PLAN

NEW DEVELOPMENT FOR

R & H INVESTMENTS

SCALE : 1:2000, 1:500
PRINTED : 31/10/14
JOB NO : 1279
DRAWN : GARETH

SHEET

A1.01

ANNEXURE B: GEOSCIENCE CONSULTING - CONTAMINATION REPORT

Detailed Environmental Site Investigation

54-62 Harewood Road
Papanui
Christchurch

Submitted to:
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10.10.2014
11139.000.001

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Appendix E: Borehole Logs

Geoscience Document Control:

Report Title	Preliminary Environmental Site Investigation 54-62 Harewood Road, Papanui		
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2	10/10/2014	Final	KK	GO	DR

1 Introduction

Mitre 10 Mega Limited requested that Geoscience Consulting (NZ) Ltd (Geoscience) undertake a detailed environmental site inspection (DSI) at 54-62 Harewood Road, Papanui, Christchurch (herein referred to as “the site”).

The environmental assessment was performed in anticipation of a financial transaction involving the site and the submission of a building consent application. Geoscience understands that the approximate 2.95 ha site is to be redeveloped for commercial use. Figure 1 indicates the location of the property which is currently owned by the Seventh Day Adventist Church Property Trustee (NZ).

1.1 Background

The Geoscience PSI (May, 2014) identified no significant environmental issues relating to the current operations at the site conducted by Sanitarium that may give rise to contamination of soil and/or groundwater. However, a number of potential historical sources of contamination were identified and considered significant to warrant further investigation. These included:

- A former kerosene Underground Petroleum Storage System (UPSS): not investigated at time of removal;
- Two former petrol UPSS: not investigated at time of removal;
- Light Fuel Oil (LFO) residual contamination beneath boiler room; and
- Asbestos containing soil (ACS) surrounding the factory: asbestos containing material (ACM) is known to have been present at the site in the past prior to 1966 and after the factory rebuild. Following the factory fire in 1966 asbestos fibres and debris waste may have been unwittingly deposited to the land.

Activities included on the Ministry for the Environment (MfE) Hazardous Activities and Industries List (HAIL) trigger the requirement for a contaminated land investigation prior to development. The following HAIL-listed activities have historically been associated with the site:

- A17: Storage tanks or drums for fuel, chemicals or liquid waste; and
- E1: Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition.

As the PSI identified activities included on the HAIL had been undertaken on the site during its recent and historical uses, a subsequent DSI was recommended and is detailed in this report.

This DSI was reported in accordance with the MfE 2001, *Guidelines for Reporting on Contaminated Sites* and undertaken in accordance with the MfE 2001, *Guidelines for Site Investigation and Analysis of soils*.

1.2 Objectives of the Assessment

The objective of this DSI was to:

- Evaluate if contaminants of concern (COC), identified in the PSI, are present at the site;
- Assess whether they pose an unacceptable risk to human health or the environment;
- Assess the suitability of the land for its proposed end use (commercial / industrial), with regards to potential COC present; and
- Evaluate possible disposal options for impacted soils that may be required to be removed from site during redevelopment.

1.3 Approach

To satisfy the objectives, Geoscience undertook the following scope of work:

- An inspection of the Site and its environs;
- Collection of representative soil samples for laboratory analysis;
- Visual and olfactory assessment of soil samples to characterise soil type and presence of petroleum hydrocarbon contamination;
- Scheduling of samples for laboratory analysis for contaminants of concern. Analytes were selected in accordance with the MfE 2011: Contaminated Land Management Guidelines No.2. Analytes included total petroleum hydrocarbons (TPH); benzene, toluene, ethylbenzene, and xylenes (BTEX), and asbestos;
- Assessment of the significance of soil contaminant concentrations and presence of asbestos;
- Liaison with asbestos surveyors, Contract Environmental, to arrange the survey of the buildings;
- Review of other environmental/ecological assessment reports previously conducted at the site and assessment of the presented concentrations in line with applicable guideline criteria;
- Completion of a revised conceptual site model for the parts of the site being investigated based on information collected during the investigation; and
- Completion of this assessment report.

2 Site Description and Setting

Site information is summarised in Table 1.

Table 1: Site Information

Item	Description
Location:	54 – 62 Harewood Road, Papanui, Christchurch, Canterbury, New Zealand
Legal Description:	RS 41027 Canterbury Dist, Lot 1 DP 204, Lot 1 DP 59153, Lot 2 DP 5985, Pt Lot 1 DP 9715, Lots 10,12,2,3,4,5,6,7,8 DP 9715, Pt Lot 9 DP 9715
Current Owner:	Seventh Day Adventist Church Property Trustee (NZ)
Current Land Use:	Commercial / Industrial - Sanitarium Health Foods Company Factory
Proposed Land Use:	Commercial / Industrial
Site Area:	2.95 ha
Territorial Authority:	Christchurch City Council
Zoning:	B4 (Business Zone 4)

The site setting is summarised in Table 2.

Table 2: Site Setting

Item	Description
Topography	Overall the site is relatively flat and has an elevation across the site of approximately 13 metres above sea level. The land in the immediate vicinity of Kruses Drain in the northern half of the site drops towards the drain relatively steeply.
Local Setting	The site is located on the western extent of a commercial zone and light industrial zone surrounding Northlands Mall. Surrounding land use is as follows: • North: Beyond Langdons Road, is the former Bridgestone tyre manufacturing facility (B4 & B5). • East: To the east beyond the railway line are commercial properties and their associated car parks (B2). • South: To the south east of the site located at 30 Harewood Road (Part Lot 2 DP 59153) is a former Hirequip store and rental vehicle compound. Beyond Harewood Road are further residential dwellings (L2). • West: The Christchurch North Methodist Church is located immediately west of the site and beyond Chapel Street residential properties. The nearest residential properties are located approximately 20 metres (m) west of the site.

Item	Description
Nearest Surface Water & Use	Kruses Drain is located on the site, entering in the south west in Lot 8 DP9715 and flowing north east across the site. The Drain has been modified and enters a concrete channel approximately 15 m west of the Marmite production building. The drain conveys water east and beneath the building offsite beneath the railway line and Langdons Road. Kruses Drain primarily use is for the conveyance of stormwater runoff. However according to correspondence between CCC and Sanitarium, sighted by Geoscience, the drain has ecological and aesthetic values further downstream in residential areas. A recent ecological survey (Boffa Miskell, 2014) of the stream concluded that '*The health of Kruses Drain (within the Sanitarium site) can be considered very poor, with low DO, potentially fluctuating water temperatures, slow flowing and sometimes stagnant water, and high levels of deposited sediments with high concentrations of heavy metals'* (Refer to Appendix A). The development proposals for the site include rerouting the drain to allow the construction of car parking. As a consequence the existing drain is likely to be filled in once the new drain pipework has been installed.

2.1 Geology and Hydrogeology

The documented geology and hydrogeology of the site and surrounding area is summarised in Table 3.

Table 3: Geology and Hydrogeology

Item	Description
Geology[3]	The geology of the Harewood / Papanui area of Christchurch is described as dominantly alluvial sand and silt overbank deposits of the Holocene Springston Formation. The on-site abstraction wells bore logs M35/1349 details the underlying geology at the site. According to the M35/1349 log drilled in 1943, the underlying geology consists of sand and clay to 11 m bgl, underlain by 'shingle' (gravel) to 15.8 m bgl underlain by clay to 20.4 m bgl which is underlain by 'shingle' (gravel) proven to 27.4 m bgl.
Hydrogeology[4]	The Christchurch groundwater system is a multi-layer, unconfined to confined aquifer system. The aquifers are composed of coarse sandy gravel sheets deposited during successive glacial and interglacial periods. Shallow groundwater in the unconfined alluvial aquifer of the Springston Formation is typically inferred to flow towards the east to south east in the Christchurch region. The ECan GIS depicts the piezometric contours in the area of the site in a south easterly direction. The GIS also depicts the site located on the western extent of the coastal confined aquifer system with the unconfined/ semi-confined aquifer system boundary located approximately 250 m west. A previous environmental investigation at the site (MWH, 2006) encountered groundwater at a depth of between 1.2 to 1.8 m bgl in the north of the site. Refer

Item	Description
	to the Geoscience PSI for the CRC bore search information.
Groundwater Abstractions	The facility obtains water from three groundwater abstractions bores located on the site to the east of the Manufacturing building. The registered and consented bores on site are M35/1383, M35/1349 and M35:7809-4585. M35/1383 (known as Sanitarium South Well) and M35/1349 (North Well) are both reported to be 27.4 metres deep and 0.15m diameter. M35/1349 is reported to have been installed in December 1943. There are several off-site groundwater abstraction wells within a 500 m radius of the site. The closest well and registered for domestic use is the Papanui High School located approximately 100 metres north of the Site. The closest down gradient abstraction well is located approximately 200 m east of the site, with the use of the well unknown. There are no public supply wells within a 500 m radius of the site.
Discharge Consents	Sanitarium hold a consent to discharge cooling water into Kruses Drain under consent CRC012082.1. The consent was issued in April 2011 and expires on 20 July, 2036. According to CCC correspondence sighted (Refer to Geoscience, 2014 PSI), the discharge of groundwater is of importance in providing a base flow to Kruses Drain and therefore ensures aesthetic and ecological values of the water course further downstream and off-site are maintained.

2.2 Groundwater & Surface Water Sensitivity

Groundwater is shallow, understood to be at a depth of approximately 1.2 – 1.8 m bgl. A groundwater bore search indicated that groundwater is being used for industrial and domestic purposes within 500 m of the site, however, most of the abstractions are from deeper aquifers (>20 m bgl).

Given the urban setting of the site and that the surrounding area are on reticulated water supply, the abstraction and future use of groundwater from the shallow aquifer for potable use in the vicinity of the site is considered unlikely. Groundwater is therefore considered to be of moderate vulnerability due to its shallow depth and of moderate sensitivity due to its industrial use.

An assessment to establish whether the shallow groundwater aquifer below the site is a 'sensitive aquifer' as defined by the Ministry for Environment (MfE) Guidelines, (2011) has been undertaken. It is noted that an aquifer is sensitive when either all of the first three criteria set out below are met or the fourth criterion is met in accordance with Module 5.2.3 of the MfE Guidelines.

Table 4: Groundwater & Surface Water Sensitivity

Criteria	Assessment
The aquifer is not artesian or confined; and	**Yes**. The ECan GIS indicates the site is located upon a confined aquifer. However, the GIS viewer shows that the site is located within 250 m of the border of an unconfined aquifer to the west. Given the unknown accuracy of the ECan GIS, for conservatism, the aquifer has been assumed to be unconfined.
The aquifer is expected to be less than 10 m below the potential suspected source of impact; and	**Yes**. Previous MWH (2006) works encountered shallow groundwater at approximately 1.2 – 1.8 m bgl on site.
The aquifer is of quality appropriate for use, can yield water at a useful rate and is in an area where abstraction and use of groundwater may be reasonably foreseen; or	**No. The shallow aquifer is not considered to be of a quality appropriate for use**. Although the properties adjacent to the site will be on a reticulated water system, there are numerous abstraction wells for domestic and commercial use within 500 m of the site but these are all from the deeper confined aquifers.
The source is less than 100 m from a sensitive surface water body (i.e. a surface water body where limited dilution is available to mitigate the impact of contaminated groundwater discharging into the surface water body).	**No. Source of contaminants not identified within 100m.** The nearest water body is the Kruses Drain. Although modified for the majority of its length through the site and supplemented with a baseflow from groundwater following its use in cooling processes at the site, the drain is of aesthetic and ecological importance to CCC further downstream. Kruses Drain on site has been described (Boffa Miskell, 2014) as being in '*poor condition with low ecological value'*.
Sensitivity Assessment	Based on the above, the shallow aquifer is considered to be **not sensitive**.

Groundwater is considered to be not sensitive in relation to the MfE sensitive aquifer assessment. Based on Geoscience's experience in the Canterbury Region, ECan has indicated that although use of the shallow aquifer may not be currently occurring or likely in the future, discharges to shallow groundwater above potable criteria are not a permitted activity according to Rule WQL47 of the NRRP. Section 15 of the Resource Management Act prohibits the discharge of contaminants to groundwater unless specifically allowed for in a regional plan rule.

3 Site History and Contaminant Distribution

The site history has previously been documented in the Geoscience (May, 2014) PSI which the reader is referred to for information.

3.1 Previous Environmental Reports

Geoscience are aware of four previous environmental investigation reports relating to the site. They are;

- *Montgomery Watson Harza (MWH), September 2006; Sanitarium Health Food Company Light Fuel Oil Investigation;*
- *Envirochem, February 2009, The report on the removal of above ground light fuel oil tank at Sanitarium Health Foods Company, 54-64 Harewood Road, Papanui, Christchurch;*
- *Geoscience, May 2014, Preliminary Environmental Site Investigation, 54-62 Harewood Road, Papanui; and*
- *Boffa Miskell, 20 June 2014, Kruses Drain, Ecological Assessment, Prepared for R & H Investments Ltd.*

A summary of MWH (2006) and Envirochem (2009) reports have previously been provided in the Geoscience PSI. As the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) regulations do not introduce more recent applicable soil contaminant standards for TPH or BTEX, the guidelines adopted in those reports are still considered valid and appropriate.

R & H Investments Ltd commissioned Boffa Miskell Ltd to undertake an assessment of the freshwater ecology of a section of Kruses Drain which runs through the site. The report is summarised in section 3.1.1 and presented in Appendix A.

3.1.1 Boffa Miskell, June 2014; Kruses Drain, Ecological Assessment

According to Boffa Miskell, the 130 m reach of Kruses Drain that flows through the site that may need to be piped and re-routed during the commercial redevelopment is classified as an “environmental asset waterway” in the Christchurch City Plan.

Kruses Drain on site has been described (Boffa Miskell, 2014) as being in ‘*poor condition with low ecological value’*. The proposal to re-route the drain through underground pipework was concluded by Boffa Miskell to be of a less than minor significance. It was recommended that the shortfin eel population within Kruses Drain be captured and relocated to a suitable alternative waterway prior to rerouting the drain.

If the proposed rerouting of the drain occurs, the only identified ecological receptors, the shortfin eels would be removed from the sediment containing elevated concentrations of heavy metals. Therefore in effect the ecological receptor has been removed and the exposure pathway broken. Although appropriate to use the ANZECC criteria given the current conceptual site model (CSM), with the future proposed CSM, more appropriate assessment criteria to determine if the sediment required remediating would be the NES SCS and the protection of groundwater criteria.

The Boffa Miskell study examined the existing environmental condition and ecological values of Kruses Drain, and the potential significance of any environmental effects associated with piping the waterway. The study included collecting sediment samples from three locations along the 130 m stretch. The sediment results are presented in Table 5.

Table 5: Comparison of Kruses Drain Sediment to NES SCS$^{(Health)}$

Heavy metal / metalloid	Sample Location and concentration in Kruses Drain (total recoverable, mg/kg dry weight)			Guideline Criteria		
	Upstream	Mid	Downstream	ANZECC (2000) ISQG-low trigger value	ANZECC (2000) ISQG-high trigger value	NES SCS (2012) Commercial / Industrial
Arsenic	8	**30**	**30**	20	70	70
Cadmium	0.35	0.55	0.77	1.5	10	1,300
Chromium	31	28	19	80	370	6,300 (Cr VI)
Copper	21	53	**79**	65	270	NL
Lead	**198**	**138**	**189**	50	220	3,300
Nickel	11	12	13	21	52	3,000^{a}
Zinc	**340**	**800**	**1070**	200	410	35,000^{a}

Notes:
Bold text indicates concentration exceed ANZECC ISQG - Low. Bold underlined indicates concentration exceeds ANZECC ISQG – High.

^{a} National Environmental Protection Council (1999). Schedule B (1) Guideline on Investigation Levels for Soil and Groundwater, Table 5-A, category A, E and F. Australian National Environmental Protection.

4 Intrusive Investigation

4.1 Scope of Work

To achieve the objectives stated in Section 1, the following scope of work was undertaken:

- Collection of 16 soil samples from five areas of concern, as highlighted in the PSI (May 2014) and indicated on Figures 3 & 4;
- The collection and analysis of a further 21 samples for the presence of asbestos fibres;
- Submission of soil samples to Hill Laboratories for scheduled analysis;
- Assessment of soil concentrations for contaminants of concern with applicable standards and soil acceptance criteria for the protection of human health and the environment, and,

- Liaison with certified asbestos sub-contractor, Contract Environmental, to undertake an asbestos survey of the existing on-site buildings.

4.2 Field Work Methodology

The sampling works were undertaken by Geoscience in three stages. Photographs of the site work are presented in Appendix B. On 8 August 2014, the following work was undertaken:

- Six hand augers were progressed to the target depth of 2.0 m bgl in four areas of concern, namely the former kerosene tank pit, both former petrol UST tank pits and the area of the historical LFO spill /leak; Due to access restrictions including the existing buildings and the thickness and competence of the concrete slab at the site, additional sample locations could not be progressed within the immediate vicinity of the historical LFO spill/leak.
- The soil samples collected from the hand auger locations investigating the potential petroleum hydrocarbon impacted areas were collected at various depths between the ground surface and the target depth of 2.0 m bgl;
- Samples were collected directly from the hand auger at each location and inspected for visual and olfactory indicators of contamination; and
- Soil samples were screened on-site for ionisable volatile organic compounds (VOCs) using a photo ionisation detector (PID) fitted with a 10.6 eV lamp. The PID was calibrated in accordance with the manufacturer’s instructions.

On 28 August 2014, the following work was undertaken:

- Five further soil samples were collected from the top soil (0 – 0.1 m bgl) adjacent to the main production building that suffered fire damage in the 1960s;
- The topsoil composite samples were collected by trowel at four locations in each of the five areas of investigation (S1 – S5). Following their collection, the four subsamples were evenly mixed and placed into a laboratory supplied sample jar; and,
- Following receipt of the samples by Hills, the asbestos composite samples (S1 – S5) were analysed by the Intertek Christchurch Laboratory for the identification of asbestos fibres.

On the 18 and 19 September 2014, a supplementary investigation was undertaken which included the following;

- A further 20 soil sampling locations were excavated manually with the collection of 50 soil samples collected. The locations were selected based on the site surface seal coverage observed in historical aerial imagery from the 1965. Based on this evaluation, the parts of the site that were unsealed and therefore where asbestos fibres could have accumulated in the soil were observed to be in the east of the site in the railway siding and to the north of the site now occupied by the current Sanitarium building and previously the malt tanks;
- Soil samples were collected at various depths, targeting material beneath recent fill material. Samples of the top soil (0 – 0.1 m bgl) adjacent to the eastern façade of the main production building were collected to confirm the quantity of fibres previously detected in these locations;
- The soil samples were collected by manually using hand augers and trowels at each sampling location. Following their collection, the samples were placed into a laboratory supplied sample jars;

- Assessment of ACM in soil was conducted by marking out a 1 m^2 area each sampling zone and raking the soil over (At least 2 passes of raking/picking made with 90^o direction change between each). Items of suspected ACM were collected for identification;
- Following receipt of the samples by Hills, the asbestos samples were selected and scheduled initially for the identification of asbestos fibres and also the quantification of asbestos fibres (if present). The samples were analysed by the Intertek Christchurch Laboratory for the identification of asbestos fibres.

The following sampling procedures were adhered to during all three phases of investigation;

- All soil samples were placed in jars supplied by Hill Laboratories Limited (Hills), which were then sealed, labelled with a unique identifier and placed in chilled containers (chilly bins) prior to transportation to the laboratory. Samples were transported to Hills under the standard chain of custody documentation provided in Appendix C;
- To reduce the potential for cross contamination, each sample was collected using disposable nitrile gloves that were discarded following the collection of each sample;
- After collection of each sample, the sampling equipment was decontaminated by scrubbing with a solution of Decon90 and rinsing with tap water followed by deionised water; and
- The intrusive sampling was completed in accordance with Geoscience standard operating procedures while geological logging was completed in accordance with the New Zealand Geotechnical Society Inc. ‘Guideline for the Field Classification of Soil and Rock for Engineering Purposes’ December 2005;
- All field work and sampling was undertaken in general accordance with the procedures for the appropriate handling of potentially contaminated soils as described in the *MfE Contaminated Land Management Guidelines no.5: Site Investigation and Analysis of Soils*; and
- Soil samples were collected in general accordance with the WA DOH sampling guidelines.

4.3 Sampling Rationale and Analysis Schedule

In total, 16 soil samples were collected and 7 analysed for petroleum hydrocarbons and 5 composite samples analysed for the presence of asbestos. The initial soil samples were collected on 21 August 2014, were submitted to Hills on the same day and received by the laboratory on 22 August 2014. Laboratory results were provided to Geoscience on 29 August 2014.

The soil samples analysed for asbestos were collected on the 28 August, received by the Laboratory on 29 August and reported on 2 September 2014. The Hills analysis report and chain of custodies for both sets of data are presented in Appendix C.

The asbestos tests performed are an initial screening assessment to identify if fibres are present and did not quantify the amount of fibres in the soil. Recent refinements of analytical procedures in laboratories in New Zealand has allowed for semi-quantitative analysis of asbestos fibres in soil. Prior to this, the presence of asbestos fibres, regardless of quantity, was considered sufficient for the soil to be considered ‘contaminated’. Further, international research and the recent release of guidance documents when considering asbestos fibres in soil has increased the acceptance of the risk assessment approach.

The sampling locations, rationale and analysis schedule are summarised in Table 6 below and the locations displayed on Figure 4 and 5.

Table 6: Summary of the Collected Soil Samples and Requested Analyses

Area of Investigation	Sample Name(s)	Rationale for Sampling	Analysis Schedule
Former kerosene UST	HA01, HA02	Located between potential source (former kerosene UPSS) and Kruses Drain	BTEX, TPH
Former petrol UST (9.1kl)	HA03	Located between potential source (former petrol UPSS) and Kruses Drain	BTEX, TPH
Former petrol UST (3.4kl)	HA06	Located between potential source (former petrol UPSS) and Kruses Drain	BTEX, TPH
LFO spill/leak	HA04, HA05	Located within close proximity to the LFO remediation area.	BTEX, TPH
Asbestos possibly from 1960s factory fire or historical incorrect ACM removal.	S1 – S5 (Composite samples composed of 4 sub samples)	Target exposed soil adjacent to the building understood to have been fire damaged in 1960s. Initial investigation focused on unsealed areas of the site closest to main production building.	Asbestos Presence Absence (AS 4964 (2004))
	SS01 – SS10 and S1B-S1, S1B-S2, S2B-S1 and S5B-S2.	The locations were selected based on the site surface seal coverage observed in historical aerial imagery from 1965. Based on this evaluation, the parts of the site that were unsealed and therefore where asbestos fibres could have accumulated in the soil were observed to be the railway siding in the east of the site and to the north of the site now occupied by the current Sanitarium building and previously the malt tanks.	Asbestos Presence Absence (AS 4964 (2004))
	S2B-S2, S3B-S1, S3B-S2, S4B-S1, S4B-S2 and S5B-S1.		Asbestos Presence Absence (AS 4964 (2004)) Asbestos Semi quantitative (AS 4964 (2004)).

Notes;

BTEX; benzene, toluene, ethylbenzene, total xylenes, TPH – total petroleum hydrocarbons.

4.4 Field Observations

The soils encountered during the investigation consisted of a silt and occasionally fill material (HA01 and HA04) to a depth of between 0.4 – 1.1 m bgl overlying a fine to medium sand proven to 2.0 m bgl. Groundwater was encountered at a depth of between approximately 1.1 – 1.3 m bgl.

Low PID readings (comparable to ambient air) were recorded for the soils screened in the areas of investigation ranged from < 0.0 – 1.7 parts per million (ppm). There was no visual or olfactory evidence of petroleum hydrocarbon contamination encountered in the soil in the six hand auger holes. PID results for the soil bores completed on 21 August 2014 are presented on the borehole logs in *Annex E*.

4.5 Quality Assurance and Quality Control

The quality assurance / quality control (QA / QC) procedures undertaken during the works included:

- The use of standard sample registers and chain of custody records for all samples;
- Each soil sample was given a unique identification number, which consisted of a site and sample location identifier (e.g. HA01). In addition the sample date and time were included;

- Sampling equipment was decontaminated using the triple wash method (as previously discussed) between each sample location; and
- Hills is an International Accredited and New Zealand (IANZ) Accredited laboratory and were engaged to conduct all laboratory analysis. To maintain their International Accreditation, Hills undertakes rigorous cross checking and routine duplicate sampling testing to ensure the accuracy of their results.

5 Regulatory Framework and Assessment Criteria

The regulatory frameworks and rules relating to the management and control of contaminated sites in the Canterbury region are specified in three documents; the NES (2012), the Christchurch City District Plan and Environmental Canterbury (ECan) Regional Plan. A summary of each and its implications for the site is provided in Sections 5.1 – 5.3. Section 5.4, 5.5 and 5.6 provide additional information relating to sites potentially impacted with hydrocarbons and asbestos and requirements for the disposal of soil respectively.

5.1 NES

The NES for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations under the Resource Management Act (1991) came into effect on 1 January 2012.

The NES introduced 12 soil contaminant standards (SCSs) for priority contaminants for the protection of human health at a variety of land use scenarios. 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 SCS is not available. The NES do not consider environmental receptors, accordingly the application of guidelines relevant to environmental receptors shall be implemented according to the MfE Contaminated Land Management Guideline No.2 and any relevant rules in Regional Plans.

In addition, the local background concentrations in soil have been referenced to establish consenting implications under the NES Soil and disposal requirements with respect to clean fill sites. Background levels for metal concentrations in soils in the area were obtained from ECan online GIS – Trace Level 2 concentrations.

5.2 Christchurch City district plan

The NES now prevails over the rules in the Christchurch City District Plan, except where the rules permit or restrict effects that are not dealt with in the NES Soil.

Rule 5.8 of Part 9 of the Plan contains the following standard regarding content of fill or excavated material:

"In addition to compliance with the standards relating to the volume and depth of filling and excavation in Clauses 5.2 and 5.3 of these rules, any filling or excavation of land, is a non-complying activity where:

- the fill or excavated material contains putrescible, pollutant, inflammable or hazardous components; and/or

- *fill consists of material other than soil, gravel, sand, silt, or demolition material, and/or has a particle size in excess of 200 mm; and/or*
- *fill material consists of vegetation which comprises more than 5% of any load by volume, and/or which is derived from a different site to the rest of the fill material except that this rule shall not apply to any filling or excavation on any land within the Special Purpose (Landfill) Zone, and rule 5.4.1 (b) shall not apply to the Rural Quarry Zone in respect to particle size."*

According to Rule 5.8 of Part 9 of the Plan, as asbestos is considered as a hazardous material and is present in the soil, CCC are likely to consider the excavation of the affected land as a non-complying activity.

5.3 Environment Canterbury regional plan

The ECan Natural Resources Regional Plan (NRRP) is operative, but only has limited rules relating to contaminated land. The primary rule relates to the discharge of contaminants for the purposes of remediating land.

The recently notified ECan Land and Water Plan (pLWRP) does not have specific rules relating to the excavation of contaminated land. However, the presence of contaminated or potentially contaminated land may impose consent requirements for discharges (to land or water) from the site.

5.4 Petroleum Hydrocarbons (TPH & BTEX)

The Tier 1 soil assessment criteria were selected for comparison to soil sample analytical results, in accordance with the NES. Soil contaminant standards (SCS) were used for priority contaminants (as defined in the NES). For those contaminants that are not priority contaminants, the MfE Contaminated Land Management Guidelines (2): Hierarchy and Application in New Zealand of Environmental Guideline Values, revised 2011 were applied.

In particular, the results have been compared to the MfE Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, (revised 2011) '*All Pathways Soil Criteria*' which is a composite of the limiting (or lowest value) acceptance criteria concentrations drawn from the following:

- The inhalation, soil ingestion, dermal and produce ingestion pathway; and
- Protection of maintenance/excavation workers (based on soil ingestion, dermal absorption and inhalation exposure pathways).

Tables A and B presented in Appendix D list the corresponding Tier 1 'All Pathways' soil acceptance criteria for commercial/industrial use (sand and silty sand soil types) applied to the investigation's soil sample analytical results.

As groundwater is considered not sensitive in relation to the MfE sensitive aquifer assessment and based on Geoscience's experience in the Canterbury Region, ECan has indicated discharges to shallow groundwater above potable criteria are not a permitted activity in accordance with Rule WQL47 of the NRRP.

5.5 Asbestos

Currently there is no national guidance provided by the MfE on the acceptable concentration of asbestos in soil. There are well established exposure levels for airborne occupation exposure limits

(NZ Workplace Exposure Standards (WES)), however these are not directly comparable as Tier 1 soil acceptance criteria. The MfE does provide a framework (MfE, CLMG No.2, 2011) for adopting international guidance. Therefore the Western Australian (WA) Department of Health (DOH) Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (May 2009) has been adopted for asbestos in soil.

The WA DOH guidance has been adopted as it presents a risk assessment approach to asbestos in soil that considers the type and quantity of asbestos present. The WA DOH guidance criteria are presented in Table 7 and summarised below.

Table 7: Adopted Asbestos Investigation Criteria

Soil Asbestos Investigation Criteria	Site End Use
0.001 % w/w asbestos for FA and AF	All site uses
0.01 % w/w asbestos for ACM	Residential use, day care centres, preschools, etc.
0.04 % w/w asbestos for ACM	Residential, minimal soil access
0.02 % w/w asbestos for ACM	Parks, public open spaces, playing fields, etc.
0.05 % w/w asbestos for ACM	Commercial/Industrial

Notes;

ACM; asbestos-containing material i.e. asbestos bound in a matrix; material that cannot pass through a 7mm x 7mm sieve;

FA; fibrous asbestos. Encompasses friable asbestos material, such as severely weathered ACM, and asbestos in the form of loose fibrous material such as insulation products. Friable asbestos is defined here as asbestos material that is in a degraded condition such that it can be broken or crumbled by hand pressure;

AF; asbestos fines. It includes free fibres of asbestos, small fibre bundles and also ACM fragments that pass through a 7mm x 7mm sieve. Both FA and AF have the potential to generate or be associated with free asbestos fibres, which can pose a considerable inhalation risk if made airborne.

A summary of the WA DOH investigation criteria is as follows:

- The investigation criterion or clean-up goal used by DOH is 0.001% asbestos in soil on a weight for weight basis (w/w) for free fibre-related materials including fibrous asbestos and free fibre itself;
- Depending on site use, DOH applies at least 10-fold higher criteria to asbestos-containing materials (ACM) in sound condition, such as commonly found asbestos cement fragments, since these pose much lower risks to human health;
- For remediation purposes, the top 10 cm of soil should also be made free of visible asbestos or ACM;
- The asbestos air-quality limit for protecting the public around contaminated sites is 0.01 fibres per millilitre (f/ml) (using the membrane filter method) as endorsed by the enHealth Council in Management of asbestos in the non-occupational environment 2005 document (enHealth 2005).

5.6 Disposal criteria

The results of the analysis were also compared to MfE Hazardous Waste Guidelines for a ‘Class A’ and ‘Class B’ Landfills. This was undertaken to provide a preliminary assessment of the possible soil disposal options should the need for soil to be removed during the work arise.

In addition to specifying investigation / consenting criteria, an assessment of potential off-site disposal options for any excess spoil generated during site development works has been conducted. Dependant on the contamination conditions of the spoil, off-site disposal options range from disposal to “cleanfill” sites to managed fill sites (Portlink and Burwood Landfill) to licensed Class A and B landfills. As outlined in the publication “A Guide to the Management of Clean Fills” (MfE, 2002), cleanfill is defined as:

“Material that when buried will have no adverse effect on people or the environment. Cleanfill material includes virgin natural materials such as clay, soil and rock, and other inert materials such as concrete or brick that are free of:

- Combustible, putrescible, degradable or leachable components.
- Hazardous substances.
- Products or materials derived from hazardous waste treatment, hazardous waste stabilisation or hazardous waste disposal practices.
- Materials that may present a risk to human or animal health such as medical and veterinary waste, asbestos or radioactive substances.
- Liquid waste.”

Due to the presence of asbestos fibres in the soil, all be it at very low concentrations, the soil is likely to not be accepted at clean fill or managed fill sites.

6 Analytical Results

A summary of the analytical results is provided in Sections 6.1 and 6.2.

6.1 Soil Analytical Results Compared with Tier 1 Criteria

The results of the laboratory analyses are summarised in *Tables A & B in Appendix D* along with the corresponding soil assessment criteria. Certified laboratory reports including chain of custody documentation are included in *Appendix C*.

Neither BTEX nor TPH compounds were detected above the laboratory limit of reporting (LOR) within the seven soil samples analysed. The LOR are sufficiently low to conclude that the concentrations are therefore considered to meet the Tier 1 acceptance criteria for a commercial land use. No further analysis was therefore required.

6.2 Asbestos in Soil

Asbestos fibres were detected in three (S3, S4 and S5) of the five composite samples collected during the initial DSI investigation. In all three samples chrysotile (white) asbestos fibres were identified in the soil. The results of the analysis are presented in Table 8 below. The analytical report is provided in Appendix C.

Table 8: Asbestos in Soil - Initial Laboratory Results

Sample Name:	**S1**	**S2**	**S3**	**S4**	**S5**
Lab Number:	1318394.1	1318394.2	1318394.3	1318394.4	1318394.5
Soil Depth (m bgl)	0.0 – 0.1	0.0 – 0.1	0.0 – 0.1	0.0 – 0.1	0.0 – 0.1
Asbestos Presence Absence	Asbestos Not Detected	Asbestos Not Detected	**Chrysotile (White Asbestos) Detected**	**Chrysotile (White Asbestos) Detected**	**Chrysotile (White Asbestos) Detected**

In order to quantify the percentage of fibres detected and delineate the extent of asbestos fibres at the site, further asbestos sampling was undertaken in September 2014. The results of this supplementary investigation are provided in Table 9.

Table 9: Supplementary Investigation - Asbestos in Soil Laboratory Results

Sample Name:	**SS01**	**SS02**	**SS03**	**SS04**	**SS05**	**SS06**
Lab Number:	1328659.1	1328659.2	1328659.3	1328659.4	1328659.5	1328659.6
Soil Depth (m bgl)	0.5	0.6	0.6	0.8	0.5	0.4
Asbestos Presence Absence	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected

Sample Name:	**SS07**	**SS08**	**SS08**	**SS09**	**SS10**	**S1B_S1**
Lab Number:	1328659.7	1328659.8	1328659.9	1328659.10	1328659.11	1328659.12
Soil Depth (m bgl)	0.5	0.6	1.1	0.5	0.5	0.1
Asbestos Presence Absence	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected

Sample Name:	**S1B_S2**	**S2B_S1**	**S2B_S2**	**S3B_S1**	**S3B_S2**	**S4B_S1**
Lab Number:	1328659.13	1328659.14	1328659.15	1328659.16	1328659.17	1328659.18
Soil Depth (m bgl)	0.1	0.1	0.1	0.1	0.1	0.1
Asbestos Presence Absence	Not Detected	Not Detected	**Chrysotile (White Asbestos) Detected**	**Crocidolite (Blue Asbestos) Detected**	**Chrysotile (White Asbestos) Detected**	**Chrysotile (White Asbestos) Detected**

Sample Name:	**S4B_S2**	**S5B_S1**	**S5B_S2**
Lab Number:	1328659.19	1328659.20	1328659.21
Soil Depth (m bgl)	0.1	0.1	0.1
Asbestos Presence Absence	**Chrysotile (White Asbestos) Detected**	**Amosite and Chrysotile (Brown and (White Asbestos) Detected**	Not Detected

Asbestos fibres were detected in six of the 21 additional sample locations. Of the six samples, only one sample (S5B_S1) contained sufficient fibres to be analysed and quantified.

Further analysis of the samples with positive asbestos identification was performed in order to semi-quantify the percentage of asbestos present. The results are presented in Table 10:

Table 10: Quantification of asbestos fibres

Sample Name	Sample Weight (g)	Asbestos Fibre Weight (g)	Asbestos Types Detected	Calculated Percentage of Asbestos Fibres w/w %	WA DOH Guideline Criteria
S5B_S1 (Lab ID 1328659.20)	671	0.01598	Amosite (Brown), Chrysotile (White)	**0.00235**	0.001 % w/w asbestos
Samples with asbestos below laboratory limit of reporting (LOR)					
S2B_S2 (Lab ID 1328659.15)	-	<0.1 g/kg	Analysis not possible[1]	<0.01	0.001 % w/w asbestos
S3B_S1 (Lab ID 1328659.16)	-	<0.1 g/kg	Analysis not possible[1]	<0.01	0.001 % w/w asbestos
S3B_S2 (Lab ID 1328659.17)	-	<0.1 g/kg	Analysis not possible[1]	<0.01	0.001 % w/w asbestos
S4B_S1 (Lab ID 1328659.18)	-	<0.1 g/kg	Analysis not possible[1]	<0.01	0.001 % w/w asbestos
S4B_S2 (Lab ID 1328659.19)	-	<0.1 g/kg	Analysis not possible[1]	<0.01	0.001 % w/w asbestos

[1] According to correspondence with the Laboratory, samples S2B_S2 to S4B_S2 only contained one or two fibre bundles that were collected during the initial fibre presence characterisation analysis. Consequently the ability to quantify the concentration of fibres was lost.

The summarised results provided in Table 10, and the full analytical results (Appendix C) indicate that the majority of the reported asbestos fibre concentrations are below the adopted soil guideline level of 0.001% w/w with the exception of S5B_S1.

6.3 Disposal Options

This section of the report evaluates disposal options available for the contaminants identified on site.

6.3.1 Asbestos

Asbestos contaminated soil can only be disposed of at a licenced facility capable of handling hazardous waste. Kate Valley Landfill is able to accept asbestos impacted soil. Based on our assessment the volume of material to be disposed of is likely to be limited to the area around sample location S5B_S1. Other asbestos contaminated soil could be managed at the site

6.3.2 Kruses Drain Sediment

This assessment has classed the shallow aquifer as ‘not sensitive’ and therefore the potential discharge of heavy metals to the underlying aquifer is considered to have an effect that is no more than minor. However we understand that the sediment may require to be excavated during the earthworks. As the concentrations in the sediment are above the background concentrations but below the NES, management of the works will be required. Should the material be required to be removed from site to be replaced with stronger geotechnical material, the soil could be relocated to another part of the site, or could be disposed of at one of the locally managed landfill sites (Burwood or Portlink)

Table 11: Comparison of Soil Concentrations with Disposal Criteria

Metal / Metaloid	Sample Location and Analytical Results (mg/kg)			Soil Assessment Criteria		
	Upstream	Mid	Downstream	Recreational CCC Burwood Landfill acceptance criteria	Industrial Portlink Industrial park criteria	Background concentrations
Arsenic	8	30	30	80[a]	70 [a]	10.2 [b]
Cadmium	0.35	0.55	0.77	400 [a]	1,300 [a]	0.2 [b]
Chromium	31	28	19	2,700 [a]	6,300 [a]	18.5 [b]
Copper	21	53	79	>10,000 [a]	>10,000 [a]	23.3 [b]
Lead	198	138	189	880 [a]	3,300 [a]	34.9 [b]
Nickel	11	12	13	600 [c]	3,000 [c]	15.6 [b]
Zinc	340	800	1070	14,000 [c]	35,000 [c]	138.0 [b]

[a] MfE 2012: Users’ Guide; National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health. Ministry for the Environment, Wellington.

[b] ECan 2007: Background Concentrations of Selected Trace Elements in Canterbury Soils. Addendum 1: Additional Samples and Timaru Specific Background Levels. Report prepared for Environment Canterbury by Tonkin & Taylor Limited, Christchurch. Report Number R07/1/2. Tonkin & Taylor Reference: 50875.003 (Table 2, applied soil group “Christchurch urban - gley”).

[c] National Environmental Protection Council (1999). Schedule B (1) Guideline on Investigation Levels for Soil and Groundwater, Table 5-A, category F and E. Australian National Environmental Protection.

7 Asbestos-Containing Materials (ACM) Building Survey

An asbestos survey was undertaken at the site by Contract Environmental Limited (CEL) employee John O'Grady (New Zealand Asbestos Certificate of Competence No 7186) on 22 August 2014.

The survey included all of the existing Sanitarium buildings and involved the collection and analysis of four building material samples for the identification of asbestos. The four samples were submitted to Dowdells Laboratory for analysis. All four samples returned non-detects for the presence of asbestos, Refer to Table 12 for the summary and Appendix C for the Laboratory Report.

Table 12: Building Survey Asbestos Analysis

Laboratory Reference	CEL Sample Reference / Description	Result
2563	1 Distribution building toilet Vinyl	No Asbestos Detected
2564	2 Distribution barn toilet floor	No Asbestos Detected
2565	3 Distribution building S office	No Asbestos Detected
2566	4 Pattemen frieze, old main	No Asbestos Detected

Although the samples analysed returned no asbestos, there are still locations and equipment in the factory that for various reasons could not be characterised. The following locations could not be sampled and classified:

- Lift brake pad in former Weetbix Packing Plant. It was difficult to obtain a sample;
- Front building roof – too high to sample. It is recommended that this is re-assessed at the time of demolition;
- Switchboard panels in the electrical room. Panels 1 and 2. Occasional these panels have asbestos backing boards;
- Main boiler – Anecdotal evidence from workshop fitters advised that there are still internal asbestos gaskets in this boiler; and,
- Lab drying oven – this may contain internal asbestos although this was not visible externally.

The asbestos survey was a non-destructive survey. The locations sampled and listed above were the only places where potential asbestos was detected but there may also be asbestos in non-visible locations which require some destruction of surface coverings or structural components to reveal.

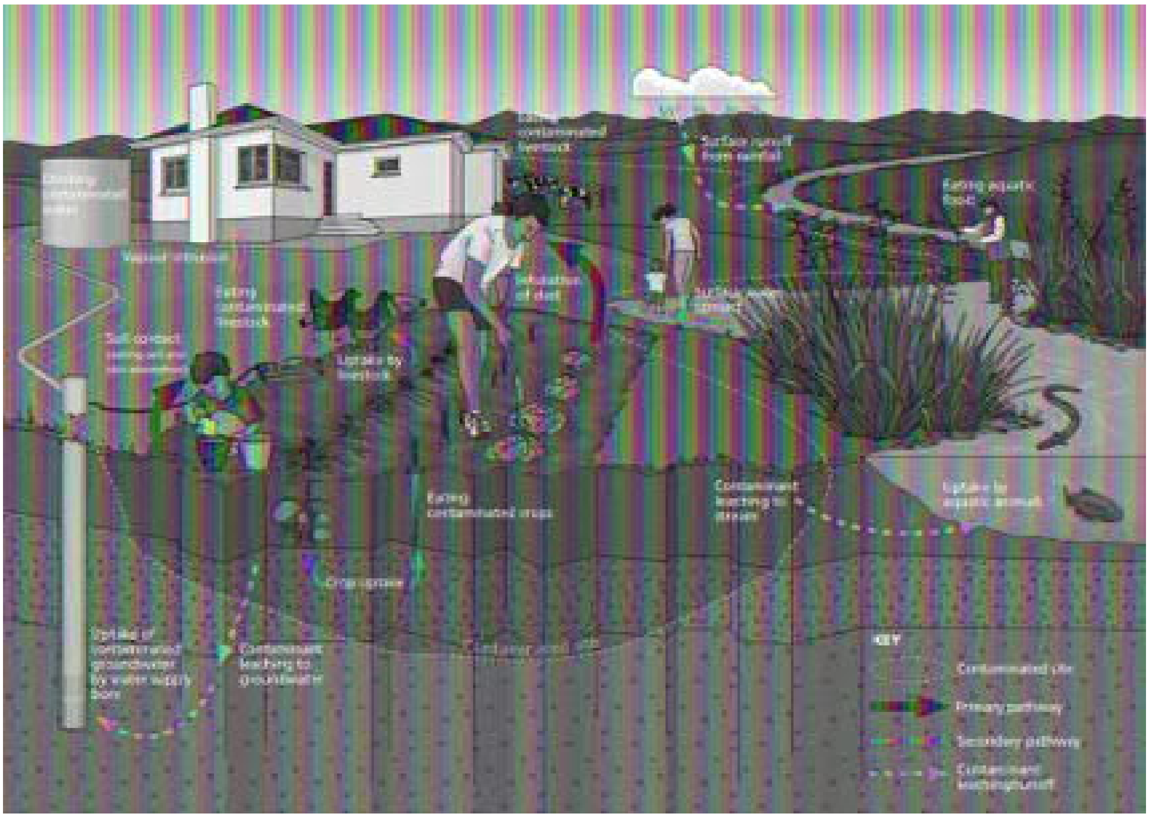
8 Revised Conceptual Site Model

A conceptual site model consists of four primary components. For a contaminant to present a risk to human health or an environmental receptor, all four components are required to be present and connected. The four components of a conceptual site model are:

- Source of contamination;
- Pathway(s) in which contamination could potentially mobilise along (e.g. vapour or groundwater migration);
- Sensitive receptor(s) which may be exposed to the contaminants; and
- An exposure route, where the sensitive receptor and contaminants come into contact (e.g. ingestion, inhalation, dermal contact)

A diagram depicting a potential residential source, pathway, receptor pollutant linkage is displayed in Diagram 1, while the potential source, pathway, receptor linkages at this subject site are provided in Table 13.

Diagram 1: Pathways by which contaminants in the soil can affect human health[1]



The conceptual site model (CSM) presented in tabular format in Table 5 has been updated from the PSI report for this site and has been updated to reflect the soil analysis results.

Table 13: Updated Conceptual Site Model

Potential Sources	Contaminants of concern	Exposure route and pathways	Receptors	Acceptable risk? Do samples meet acceptance criteria?
Former Kerosene USTs	TPH BTEX	• Dermal contact with impacted soil, accidental ingestion and dust inhalation during redevelopment. • Offsite discharge of impacted groundwater • Inhalation of vapours within occupied buildings	• Shallow aquifer • Current and future occupants of adjacent on-site buildings • On-site redevelopment construction workers	Yes
Former Petrol UPSS	TPH BTEX			Yes
LFO contamination beneath boiler room	TPH BTEX			Yes
Urban runoff & Sanitarium consented discharge to Kruses Drain	Heavy metals / metalloids	• Ingestion by aquatic organisms & uptake by plants.	• Flora & Fauna within the Drain.	Yes. Although sediment concentrations exceed the ANZECC (2000) ISQG-Low for arsenic, copper, lead and zinc, the drain is to be rerouted therefore removing the ecological receptors from the sediment.
		• Dermal contact with impacted soil, accidental ingestion and dust inhalation during redevelopment.	• Current and future occupants of adjacent on-site buildings • On-site redevelopment workers	Yes
		• Offsite discharge of impacted groundwater	• Shallow aquifer	Yes. Leaching of metals to shallow aquifer is expected to have a no more than minor effect.
ACM and asbestos fibres in soil surrounding factory	Asbestos	• Inhalation of asbestos fibres during disturbance of the soil as a part of the redevelopment	• On-site redevelopment construction employees • Off-site residential receptors	**No.** Asbestos fibres present in soil and at a concentration that exceeds guideline levels in a single location.

Due to the presence of asbestos in the soil sampled at three of the five locations, the likely exposure pathways during redevelopment and long term use of the site for commercial / industrial use, a complete contaminant exposure pathway is considered to exist.

9 Conclusions

Mitre10 Mega commissioned Geoscience to undertake a Detailed Environmental Site Investigation to accompany their building consent application for land at 54-62 Harewood Road, Papanui, Christchurch.

The site is surrounded by a mixture of commercial and residential land use. The nearest residential properties are located approximately 20 m west of the site boundary. Kruses Drain is located on-site and has been modified and diverted to flow beneath the boiler house extension.

A number of documented potential historical sources of contamination were identified during the Geoscience (2014) PSI and considered significant enough to warrant further investigation. These included:

- Former kerosene UPSS: not investigated at time of removal, soil and groundwater condition unknown;
- Former petrol UPSS: not investigated at time of removal, soil and groundwater condition unknown;
- LFO residual contamination beneath boiler room; and
- ACM in soil surrounding factory; Following the factory fire in 1966 asbestos fibres and debris waste may have been unwittingly deposited to the land.

Due to the HAIL activities previously undertaken at the site, in accordance with Regulation 11 of the NES, an intrusive investigation (DSI) was undertaken to assess if the soil had been impacted by the former land uses identified in the PSI.

Soil samples collected and analysed for BTEX and TPH compounds were reported to all be below the laboratory limit of reporting (LOR) and are therefore considered to meet the Tier 1 acceptance criteria for a commercial land use.

The asbestos results from the laboratory analyses indicate that asbestos fibres were detected in soil samples collected along the eastern side of the main production buildings. Three of the initial five composite samples collected and six of the subsequent 21 collected during the supplementary investigation contained asbestos fibres. Further analysis of the asbestos fibre concentration identified only one of the six samples contained sufficient fibres to be quantified. This single sample S5B1 from the top soil on the eastern side of the processing factory contained a fibre concentration (% w/w) that exceeded the WA DOH guideline level of 0.001% w/w.

Asbestos poses a human health risk through the inhalation of its fibres. If deposited in the lungs, the fibres can initiate diseases that take many years to produce major health effects (WA DOH, 2009). These effects include asbestosis, lung cancer and the normally rare cancer mesothelioma. These impacts tend to be the result of higher levels of exposure, most often occupational, but mesothelioma can also result from low level exposures. During the land disturbance and earthworks there is the potential to disturb asbestos fibres and cause these to become airborne. Once airborne, fibres may be inhaled by redevelopment staff or neighbouring off-site receptors.

We understand that the soil along the eastern façade of the processing building is to be excavated and replaced with imported material with sufficient geotechnical properties. Therefore the excavation of this soil should be conducted in a controlled and supervised manner to avoid unnecessary exposure. As the concentrations are present above the adopted guideline levels the soil in this area of the site triggers the NES and is likely to be considered as a restricted activity.

Based on the laboratory analysis results and the proposed redevelopment for the site, a potentially complete contaminant exposure pathway is considered to exist. Given the detection of asbestos fibres, the proposed land use change is likely to be considered as a restricted discretionary activity under Regulation 10 of the NES for Assessing and Managing Contaminants in soil to protect human health.

Due to access restrictions including the existing buildings and the thickness and competence of the concrete slab at the site, sample locations could not be progressed within the immediate vicinity of the historical LFO spill/leak. Contingency controls should be prepared should significant LFO contamination be encountered during the building slab demolition or subsequent earthworks.

According to Rule 5.8 of Part 9 of the Plan, as asbestos is considered as a hazardous material and is present in the soil, CCC are likely to consider the excavation of the affected land as a non-complying activity.

10 Recommendations

10.1 Remediation Strategy

In accordance with international guidance (WA DOH, 2009), there are several options available to mitigate the risks to human health that asbestos fibres may present and therefore enable the site to be redeveloped for commercial/industrial land use. Although cost, time, convenience and future owner perception are important considerations when considering the remedial option, the arguments presented for selection should be primarily stated in terms of public and worker protection. The available remedial options considered are:

- Option A: Off-site disposal. Excavation and removal of soil containing asbestos fibres and ACM fragments to a controlled Class A hazardous landfill (Kate Valley). This option would mean that the sites certificates of title are free of reference to asbestos soil contamination and 'remediated/managed' flags. This may affect the land value. Soil volumes containing asbestos should be confirmed and disposal rates at off-site landfills should be investigated to determine the costs associated with this option. This option has the potential to generate considerable dust and possibly asbestos fibres which require management and monitoring to ensure there are no off-site impacts. It is also comparably more expensive than other options and is generally suitable for small volumes of significantly contaminated soil;
- Option B: Management in situ/capping on site. This primarily involves the isolation of the contaminated area with barriers and covers so that it cannot be readily disturbed and therefore will not generate airborne fibres in the future. The barrier or cover is usually a layer of clean fill (sand or soil). This fill should be demonstrated to be free of contamination. Nominally, the

depth of the clean fill should be at least 0.5 m for uses such as commercial activities (WA DOH, 2009). Geotextiles with warning tape are often included in the fill material above the asbestos impacted soil to provide visual warnings should the soil be accidentally disturbed. Ideally the in-situ fill area would be located in a previously asbestos impacted area, be located in an area free of underground services that may require future maintenance and would be covered with hard-standing such as car park asphalt. If this option is chosen it is likely that CCC would require a Site Management and Validation Report (SMVR); and

- Option C: Treatment on-site. This is the undertaking of some physical treatment or manipulation of the contaminated soil on-site, specifically ACM hand-picking, tilling and possibly screening. Generally only suitable in areas where there are not neighboring residential receptors in close proximity and where the asbestos is present as ACM and not fibres. As asbestos fibres have been identified in the soil samples analysed so far, this option may not be suitable in isolation.

Geoscience recommend that a remedial strategy is developed to manage the soil that contains asbestos fibres or ACM in areas of the site identified in this report.

Based on the investigations, a Site Management Plan (SMP) or in some cases an Asbestos Management Plan will need to be developed and then implemented. To ensure that this has been undertaken appropriately, the work will need to be verified in the form of a Site Management and Validation Report (SMVR). The SMP and/or SMVR may also need to include a commitment to and details of long–term future management of the site if asbestos remains in situ such as restrictions on land use/activities at a site.

Although the investigation does not suggest extensive LFO contamination, some areas of the site could not be investigated to determine if there was any remaining LFO contamination. The SMP for the site works should also include contingency measures should LFO contaminated soil be encountered during the site works.

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12 Limitations

i. We have prepared this report in accordance with the brief as provided. This report has been prepared for the use of our client, Mitre 10 Mega Limited, their professional advisers and the relevant Territorial Authorities in relation to the specified project brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.

ii. The recommendations in this report are based on the ground conditions indicated from published sources, site inspections and subsurface investigations described in this report based on accepted normal methods of site investigations. Only a limited amount of information has been collected to meet the specific financial and technical requirements of the Client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it must be appreciated that actual conditions could vary from the assumed model.

iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.

iv. This Limitation should be read in conjunction with the IPENZ/ACENZ Standard Terms of Engagement.

v. This report is not to be reproduced either wholly or in part without our prior written permission.

We trust that this information meets your current requirements. Please do not hesitate to contact the undersigned on 03 328 9012 if you require any further information.

For and on behalf of Geoscience Consulting (NZ) Ltd,

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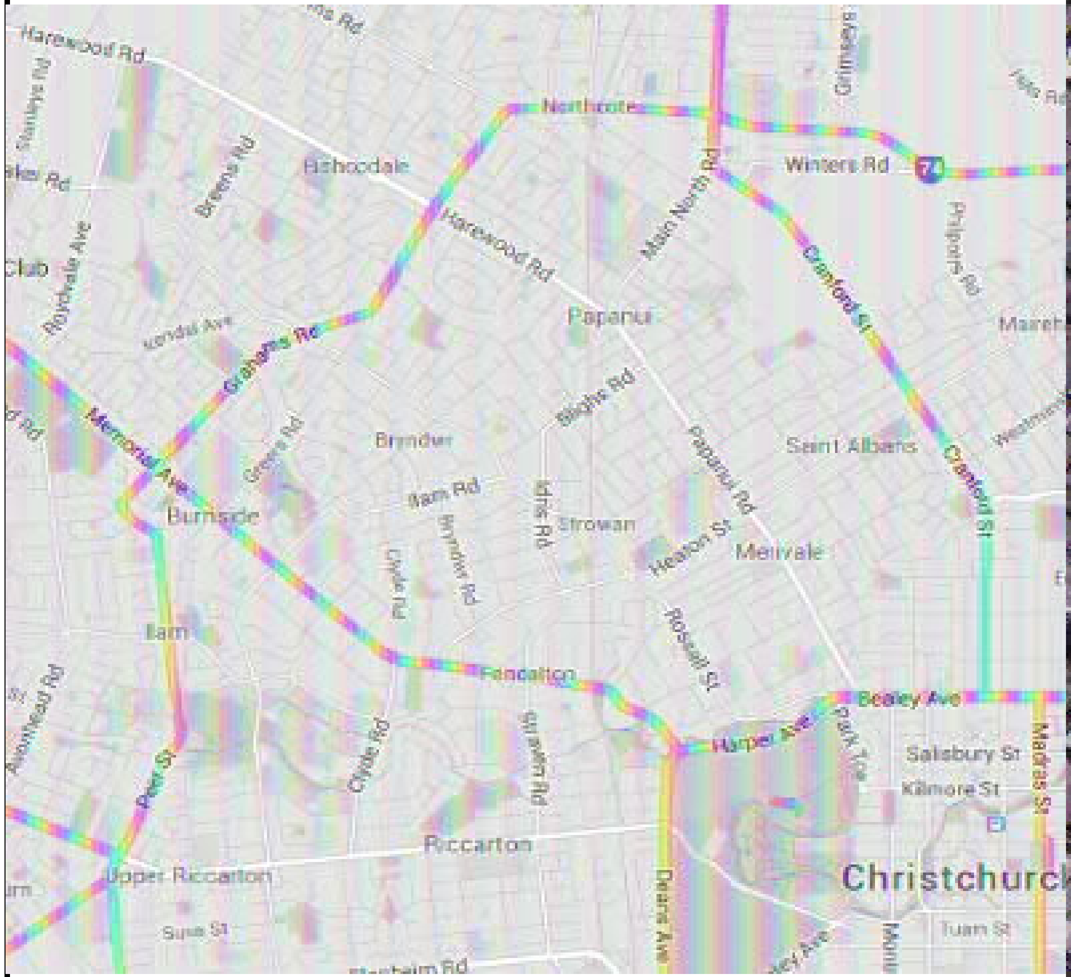

Note: Aerial Photograph sourced from Canterbury Maps

Date	11.09.2014	**Client**	**Mitre 10 Mega Ltd**		
Drawn by	GO/CM	**Project**	**Sanitarium, Harewood Rd**		
Approved by	DR	**Description**	**Site Location Plan**		
Scale	NTS	**Figure Number**	1	**Project Number**	11139

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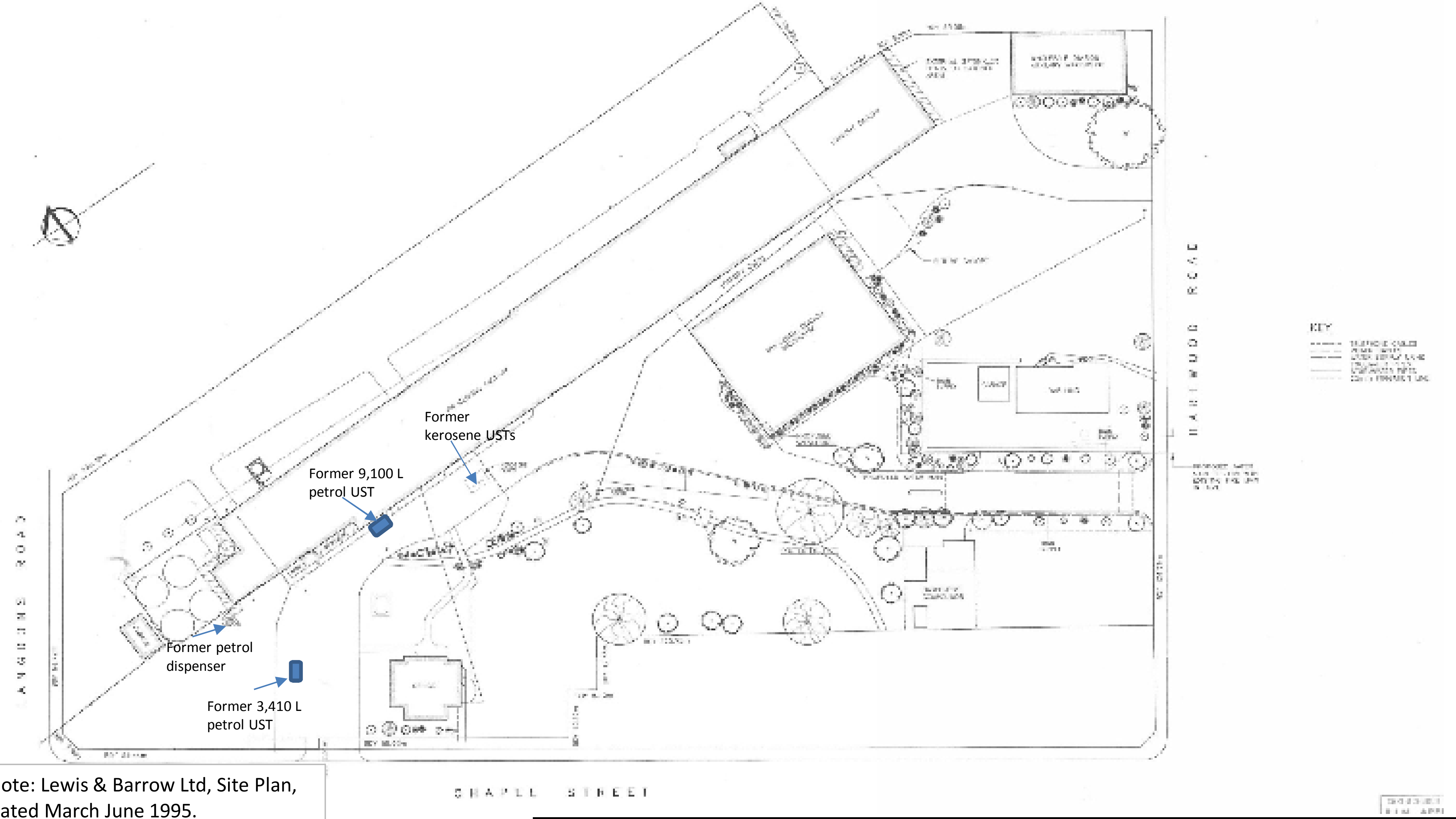
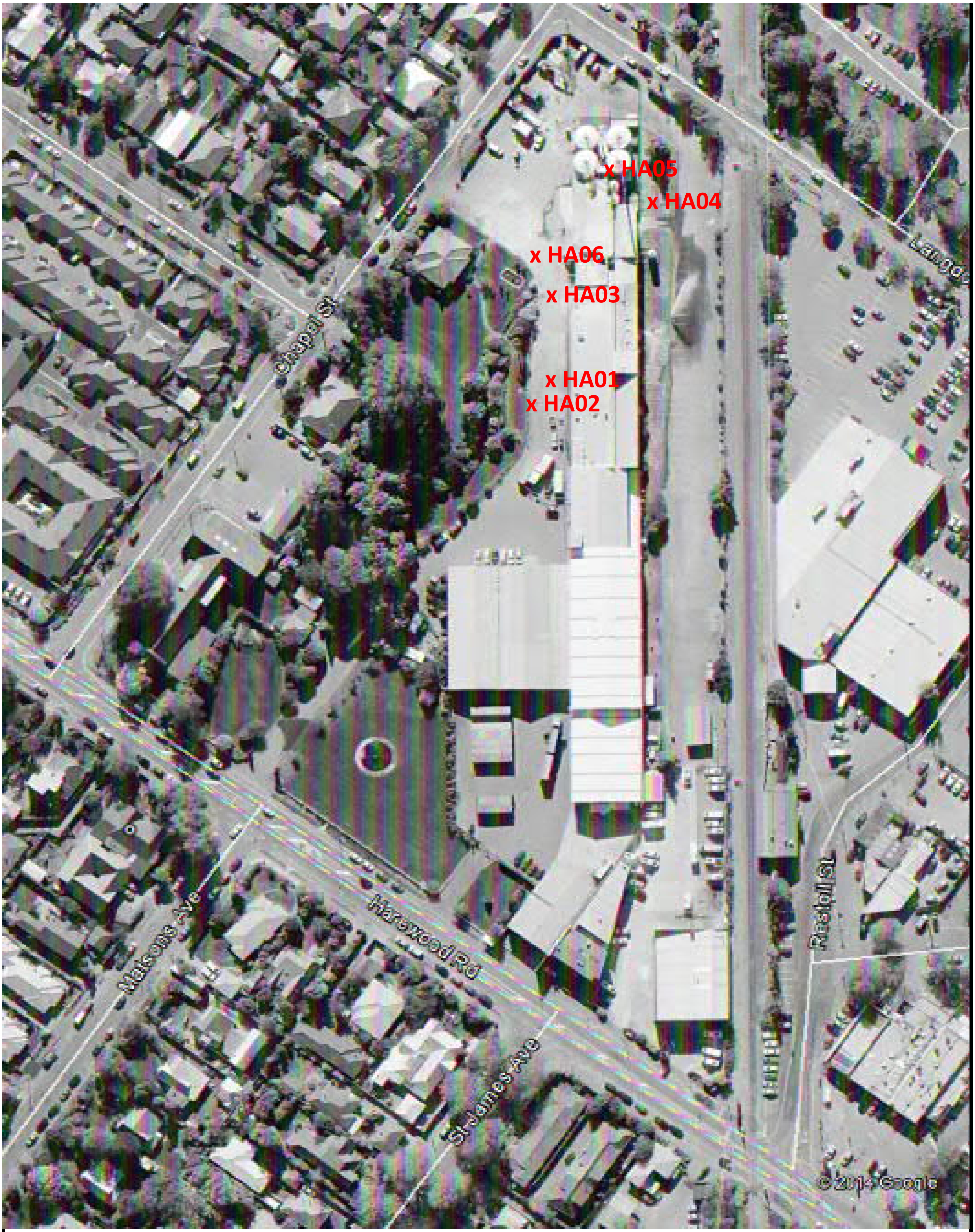
Date	11.09.2014	**Client**	**Mitre 10 Mega Ltd**		
Drawn by	GO/CM	**Project**	**Sanitarium, Harewood Rd**		
Approved by	DR	**Description**	**Site Layout Plan, 2012**		
Scale	NTS	**Figure Number**	2	**Project Number**	11139

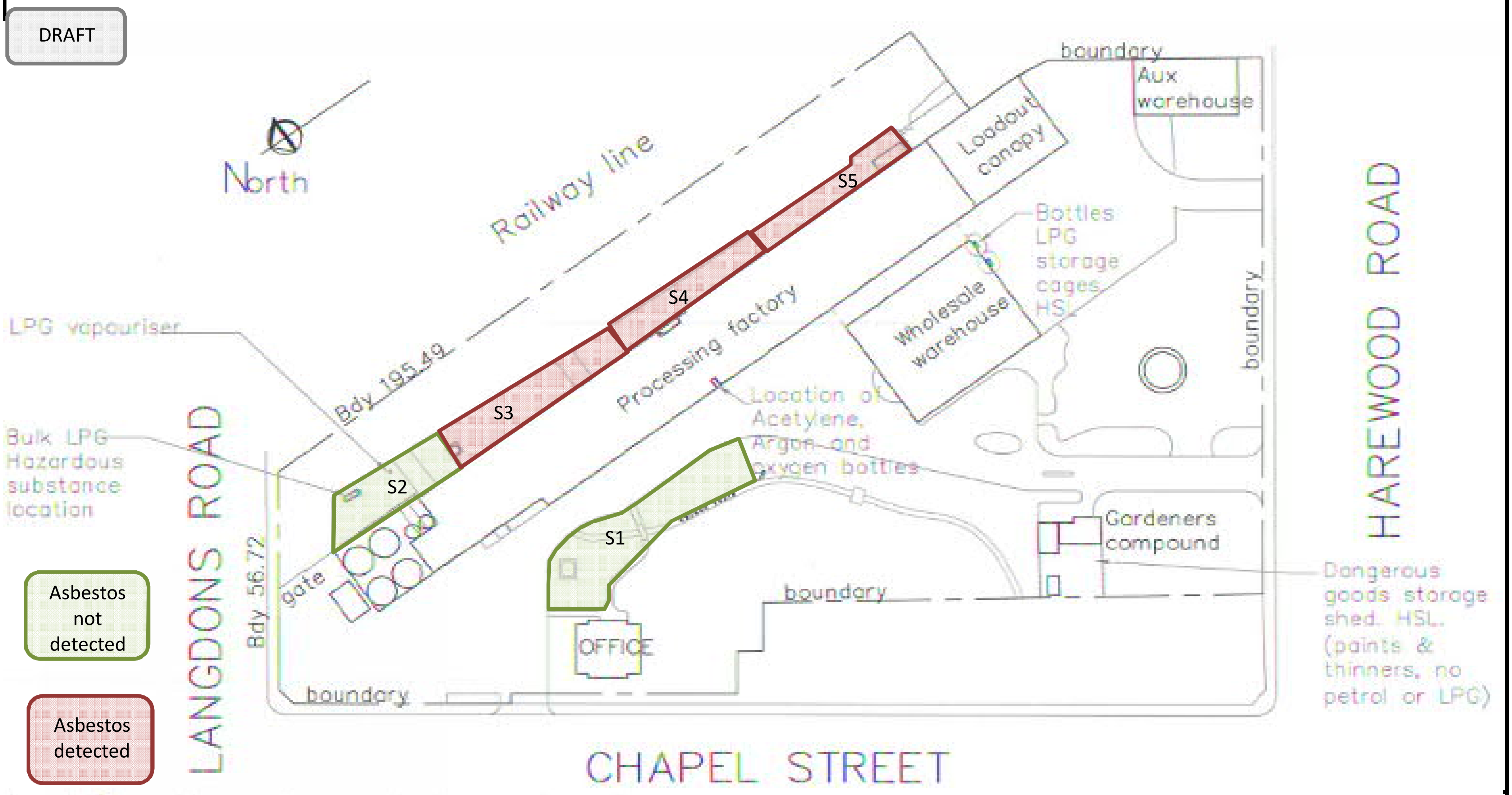


Note: Lewis & Barrow Ltd, Site Plan, Dated March June 1995.

Date	11.09.2014	**Client**	Mitre 10 Mega Ltd		
Drawn by	GO/CM	**Project**	Sanitarium, Harewood Rd		
Approved by	DR	**Description**	PSI Areas of Concern.		
Scale	NTS	**Figure Number**	3	**Project Number**	11139



Date	11.09.2014	**Drawn by**	GO	**Client**	**Mitre10 Mega Limited**		
Scale	NTS	**Approved by**	DR	**Project**	**Sanitarium, Harewood Rd**		
GEOSCIENCE CONSULTING				**Description**	**Sample Location Plan**		
				Figure No.	4	**Project Number**	11139



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Date	03.09.2014	**Client**	**Mitre 10 Mega Ltd**		
Drawn by	GO/CM	**Project**	**Sanitarium, Harewood Rd**		
Approved by	DR	**Description**	**Location of asbestos detects in soil**		
Scale	NTS	**Figure Number**	1	**Project Number**	11139

Appendix A

Ecological Report for Kruses Drain

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Kruses Drain

Ecological Assessment
Prepared for R & H Investments Ltd

20 June 2014

Document Quality Assurance

Bibliographic reference for citation: Boffa Miskell Limited 2014. *Kruses Drain: Ecological Assessment*. Report prepared by Boffa Miskell Limited for R & H Investments Ltd.		
Prepared by:	Dr Tanya Blakely Ecologist Boffa Miskell Limited	
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Template revision: 20140326 0000

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Cover photograph: Kruses Drain looking downstream, May 2014

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Figure 2. The 130 m reach of Kruses Drain within the Sanitarium site from upstream (top left), mid (top right and bottom left) to downstream (bottom right). Note the negligible flow, high in-stream organic and sediment conditions and sparse exotic riparian plantings along much of the waterway. 12

Figure 3. Average macroinvertebrate community composition (%) calculated from the three kick-net samples taken along Kruses Drain, 27 May 2014. Annelida = oligochaete worms; Crustacea = seed shrimp ostracods; Diptera = chironomid midge fly larvae; Mollusca = snails and freshwater clams; and Platyhelminthes = freshwater flatworm. 14

Figure 4. Size distribution of shortfin eels (*Anguilla australis*) captured using electric-fishing techniques from a 130 m survey reach of Kruses Drain within the Sanitarium site. 14

Executive Summary

R & H Investments Ltd is considering developing the existing Sanitarium site in Papanui, Christchurch. As part of this potential commercial development, the 130 m reach of Kruses Drain that flows through the site may need to be piped. This reach is classified as an "environmental asset waterway" in the Christchurch City Plan and, as such, piping of this waterway is a discretionary activity.

R & H Investments Ltd commissioned Boffa Miskell Ltd to undertake an assessment of the freshwater ecology of this section of Kruses Drain. This study examines the exiting environmental condition and ecological values of Kruses Drain, identifies any potential environmental effects associated with piping the waterway, and makes recommendations of ways to mitigate these potential effects.

The health of Kruses Drain (within the Sanitarium site) can be considered very poor, with low DO, potentially fluctuating water temperatures, slow flowing and sometimes stagnant water, and high levels of deposited sediments with high concentrations of heavy metals. A Stream Ecological Valuation of the reach also indicated that there is very limited ecological function remaining. Furthermore, there was only one species of fish found, the shortfin eel, which is considered the most tolerant of freshwater fish species, while the macroinvertebrate community was depauperate and dominated by pollution-tolerant taxa. The MCI calculated for the reach was very low, indicating 'poor' water quality with probable severe enrichment.

It is anticipated that piping of Kruses Drain will result in the total loss of habitat, including that used by shortfin eel. However, given the current condition and ecological value of the waterway, and that this reach is essentially isolated due to the extensive piping immediately up- and downstream of the Sanitarium site, the significance of the effects is expected to be less than minor. We recommended that the shortfin eel population within Kruses Drain be captured and relocated to a suitable alternative waterway. Discussions between R & H Investments and the Christchurch City Council around some monetary compensation may also be warranted due to the loss of the Council's environmental asset waterway.

1.0 Introduction

R & H Investments Ltd commissioned Boffa Miskell Ltd (Boffa Miskell) to undertake an assessment of the freshwater ecology of Kruses Drain, where it flows through the Sanitarium grounds in Papanui, Christchurch. R & H Investments Ltd is considering buying the Sanitarium site for a new commercial development, and therefore applying for a consent from the Christchurch City Council (CCC) to pipe the existing, above ground portion of Kruses Drain as part of this proposed land development project. This study examines the existing environmental condition and ecological values of this section of Kruses Drain, discusses any potential environmental effects of piping the waterway, and makes recommendations of ways to mitigate any potential adverse ecological effects. This report does not consider potential effects associated with other activities that may be required as part of the proposed land development (e.g. earthworks, stream diversion).

2.0 Scope

R & H Investments Ltd commissioned Boffa Miskell to conduct the ecological survey in May 2014, in order to:

- Describe the existing ecological values of Kruses Drain (where it flows through the Sanitarium site), with respect to in-stream and riparian physical habitat, macrophyte (aquatic plants) and periphyton (aquatic algae) cover, and fish and macroinvertebrate communities;
- Assess the potential effects of piping the waterway; and
- Make any recommendations to mitigate any potential adverse ecological effects of piping Kruses Drain.

3.0 Methods

3.1 Site Location

Kruses Drain, a tributary of the Styx River, flows through a mix of residential, commercial and rural land (Figure 1). It originates in Papanui, northern Christchurch, largely fed by the piped stormwater network from the Chapel Street area. There is a 130 m open section that flows in a north-west direction through the Sanitarium site, before again being piped for some 500 m, under the railroad, Langdons Road, and along Sisson Drive before again flowing above ground around the eastern and northern perimeter of Northlands Mall. The waterway is then open (above ground) for much of its remaining path, except for approximately 370 m of piped section from the intersection of Cranford Street and Main North Road, and another 280 m section under Grimseys Road. Kruses Drain joins Horners Stream and then the Styx River (approximately 2.5 km downstream).

Under the Christchurch City Plan (CCC 2012), the majority of Kruses Drain is classified as a “utility waterway” (defined as “an artificial waterway without a natural floodplain but often having potential for enhancement”). However, the 130 m section within the Sanitarium site (and the section around the perimeter of Northlands Mall) is classified as an “environmental asset” waterway. Environmental asset waterways generally have some natural character with a high potential for restoration. Filling, excavation, or disturbance of soil within 7 m of any environmental asset waterway is a discretionary activity (CCC 2012).

Three sections (an upstream, mid and downstream section) of the 130 m reach of Kruses Drain (within the Sanitarium site) were surveyed for riparian and in-stream habitat conditions, and macroinvertebrate and fish communities on 27 May 2014 (Figure 1).

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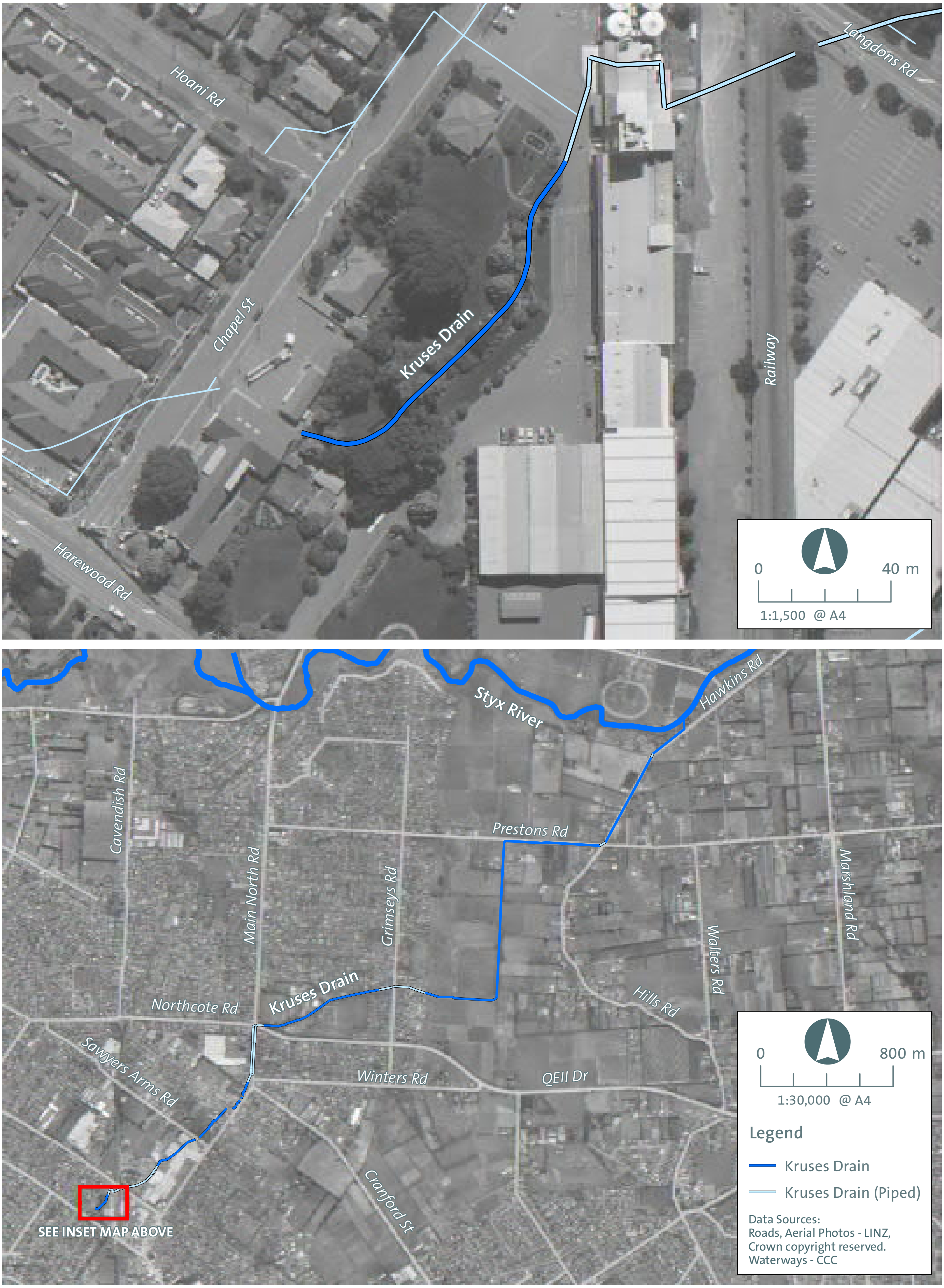

Boffa Miskell

www.boffamiskell.co.nz

ECOLOGICAL ASSESSMENT

Kruses Drain

Date: 17 June 2014

Plan prepared for CCC by Boffa Miskell Limited

Project Manager: tanya.blakely@boffamiskell.co.nz | *Drawn:* GWh | *Checked:* CMu

Figure 1

3.2 Water and Sediment Quality

Spot measures of pH, dissolved oxygen (DO, ppm and % saturation), specific conductivity (μS_{25} / cm) and water temperature (°C) were recorded at each site with a TPS WP82 Dissolved Oxygen meter s/n V1809 and a TPS WP81 pH / conductivity meter s/n T3579.

Three samples of deposited inorganic sediment were collected from the Kruses Drain survey reach (from upstream, mid, and downstream) and stored, separately, in PSoil250 plastic jars. These sediment samples were sent to the International Accreditation New Zealand (IANZ) accredited Hills Laboratories (Christchurch) and analysed for total recoverable arsenic, cadmium, chromium, copper, nickel, lead, and zinc using standard methods (US EPA 200.2).

3.3 Habitat Assessment

The in-stream and riparian habitat assessments were conducted in accordance with Protocol P2 of Harding et al. (2009). In summary, habitat at each site was assessed at two spatial scales: general habitat conditions were estimated at the reach scale; and more detailed habitat characteristics were measured across nine transects established along the 130 m survey reach.

- General habitat condition estimates were made along the entire survey reach:
    - The surrounding land use and type;
    - Amount of canopy cover over the stream surface;
    - The general materials covering the lower banks (e.g. grass, earth, corrugated iron, concrete posts and wooden sleepers);
    - Amount of bank erosion, and vegetation cover on the upper and lower banks.
    - Percentage of riffle, pool and run habitats;
    - The degree that coarse substrates were surrounded by fine sediments (i.e. embeddedness);
    - General substrate composition (i.e. percentage of stream bed comprised of bedrock, concrete / bricks, boulders (>256 mm), large cobbles (128-256 mm), small cobbles (64-128 mm), pebbles (4-6 mm), gravel (2-4 mm), sand (>0.01-2 mm), and mud / silt / clay (<0.01 mm)); and
    - Percent cover of submerged and emergent macrophytes, filamentous algae and algal mats.
- Detailed habitat characteristics were measured at nine of the ten Stream Ecological Valuation (SEV) cross sections (see Section 3.6 below for details on SEV):
    - Bank measurements, including angle (°), height (cm), and undercut (cm), as well as amount of overhanging (cm), floating (cm) and emergent (cm) vegetation was recorded on the left and right banks of each transect at each site. Total channel width and total wetted width at each of the three transects were also recorded; and
    - Soft sediment depth (mm) was measured with a 1 m metal ruler at distances 10%, 30%, 50%, 70%, and 90% across the channel at each cross section.

A substrate index (SI), modified from Jowett & Richardson (1990), was calculated for the survey reach using the formula:

- SI = (0.07% boulder) + (0.06% large cobble) + (0.05% small cobble) + (0.04% pebble) + (0.03% gravel) + (0.02% sand) + (0.01% silt) + (0.01% concrete / bedrock).

The calculated SI ranged between 1 and 7, where an SI of 1 indicated 100% silt and 7 indicated 100% boulders. That is, the larger the SI, the coarser the overall substrate.

Average wetted width, water depth, soft-sediment depth, and velocity were calculated from the multiple measures collected along the 130 m survey reach. Similarly, the multiple bank attributes (lower and upper bank height, bank undercut) measured along the reach were expressed as average values for a site.

3.4 Benthic Macroinvertebrate Community

Macroinvertebrates (e.g., insects, snails and worms that live on the stream bed) can be extremely abundant in streams and are an important part of aquatic food webs and stream functioning. Macroinvertebrates vary widely in their tolerances to both physical and chemical conditions, and are therefore used regularly in biomonitoring, providing a long-term picture of the health of a waterway.

The macroinvertebrate community was assessed at each of three equidistant locations (downstream, mid, and upstream) along the 130 m survey reach. A single and extensive composite kick-net (500 µm mesh) sample was collected from each location in accordance with protocols C1 and C2 of Stark et al (2001). Approximately 0.6 m^2 of stream bed was sampled at each of the three locations (i.e. each kick net sampled approximately 0.3 m x 2.0 m of stream bed), including sampling the variety of microhabitats present (e.g. stream margin, mid channel, undercut banks, and macrophytes where present) so as to maximise the likelihood of collecting all macroinvertebrate taxa present at a site, including rare and habitat-specific taxa.

Macroinvertebrate samples were preserved, separately, in 70% ethanol prior to sending to Ryder Consulting, Dunedin, for identification and counting in accordance with protocol P3 of Stark et al (2001) (see Appendix 1 for further details on processing methods).

The following macroinvertebrate metrics and indices were calculated, where the three kick-net samples collected from along Kruses Drain were treated as replicates (i.e. an average was calculated from these three samples), to provide an indication of stream health:

- **Total abundance** – the average number of individuals collected in three kick-net samples collected along Kruses Drain. Macroinvertebrate abundance can be a useful metric as it tends to increase in the presence of organic enrichment, particularly for pollution-tolerant taxa.

- **Taxonomic richness** – the average number of macroinvertebrate taxa recorded from three kick-net samples. Streams supporting high numbers of taxa generally indicate healthy communities, however, the pollution sensitivity / tolerance of each taxon needs to also be considered (e.g. Macroinvertebrate Community Index).

- **EPT taxonomic richness** – the average number of Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies) from three kick-net samples. These three insect orders (EPT) are generally sensitive to pollution and habitat degradation and therefore the numbers of these insects present provide a useful indicator of degradation. High EPT richness suggests high water quality, while low richness indicates low water or habitat quality.

- **EPT taxonomic richness (excl. hydroptilids)** – the average number of EPT taxa excluding caddisflies belonging to the family Hydroptilidae, which are generally more tolerant of degraded conditions than other EPT taxa.

- **%EPT richness** – the average percentage of macroinvertebrates that belong to the pollution-sensitive EPT orders found in the three kick-net samples, i.e. relative to the average richness of all macroinvertebrates collected from the survey reach. High %EPT richness suggests high water quality.

- **%EPT (excl. hydroptilids)** – the average percentage of EPT taxa, excluding the more pollution-tolerant hydroptilid caddisflies.
- **Macroinvertebrate Community Index (MCI-sb)** – this index is based on tolerance scores for individual macroinvertebrate taxa found in soft-bottomed streams (Stark and Maxted 2007). These tolerance scores, which indicate a taxon's sensitivity to in-stream environmental conditions, are summed for the taxa present at a site, and multiplied by 20 to give MCI-sb values ranging from 0 – 200.
- **Quantitative Macroinvertebrate Community Index (QMCI-sb)** – this is a variant of the MCI-sb, which instead uses abundance data from quantitative macroinvertebrate sampling. The QMCI-sb provides information about the dominance of pollution-sensitive species at a site.

Table 1 provides a summary of how MCI-sb and QMCI-sb scores can be used to evaluate stream health.

Table 1. Interpretation of MCI-sb and QMCI-sb scores for soft- bottomed streams (Stark & Maxted 2007).

Stream health	Water quality descriptions	MCI	QMCI
Excellent	Clean water	>119	>5.99
Good	Doubtful quality or possible mild enrichment	100-119	5.00-5.90
Fair	Probable moderate enrichment	80-99	4.00-4.99
Poor	Probable severe enrichment	<80	<4.00

Note, the MCI and QMCI were developed primarily to assess the health of streams impacted by agricultural activities and should be interpreted with caution in relation to urban systems.

3.5 Fish Community

The fish community was surveyed along the entire 130 m reach of Kruses Drain using a single pass with a Kainga EFM300 backpack mounted electro-fishing machine (NIWA Instrument Systems, Christchurch). Fish were captured in a downstream push net or in a hand (dip) net and temporarily held in buckets. All fish were then identified, counted and measured (length, mm) before being returned alive to the stream.

The New Zealand Freshwater Fish Database (NZFFD) was also searched for previous fish records in Kruses Drain.

3.6 Stream Ecological Valuation – Ecological Function

A Stream Ecological Valuation (SEV) was conducted along the entire 130 m reach of Kruses Drain that flows through the Sanitarium site (Neale et al. 2011). The SEV system was originally developed for the Auckland Regional Council as a tool to quantify ecological functions and values of waterways and to develop an 'exchange currency' for 'off-setting' mitigation (e.g. when piping or modifying small streams during development) based on current and expected stream quality (Storey et al. 2011). The SEV system has been used, predominantly in the North Island, but is generally applicable to waterways across New Zealand.

In summary, the SEV involves the measurement of a range of parameters that are then entered into the 'SEV calculator' to assess the 14 functions and 4 broad functional types for the study reach:

- **Hydraulic functions** – natural flow regime, floodplain effectiveness, connectivity for natural species migrations, and natural connectivity to groundwater;
- **Biogeochemical functions** – water temperature control, dissolved oxygen levels maintained, organic matter input, in-stream particle retention, and decontamination of runoff of pollutants;
- **Habitat provision functions** – fish spawning habitat, aquatic fauna habitat; and
- **Biodiversity provision functions** – fish fauna intact, invertebrate fauna intact, riparian vegetation intact[1].

An overall SEV score, based on the following parameters, can be calculated for the site, where the SEV score is between 0 (no remaining ecological function) and 1 (intact ecological function). Refer to Neale et al. (2011) for a full description of the SEV methodology.

A formula can then be applied to generate an Environmental Compensation Ratio, which gives an indication of the relative amount of stream rehabilitation (or compensation) that might be required to replace the functional values that would be lost due to a proposed activity (e.g. piping).

The parameters measured for the SEV are conducted at both the reach scale and along ten cross sections established within the reach (Neale et al. 2011).

The ten cross sections were established along the entire 130 m reach of Kruses Drain within the Sanitarium site. The first cross section was located at the downstream most end of Kruses Drain, immediately prior (upstream of) to where it is piped under the buildings before leaving the site. The remaining nine cross sections were then spaced at approximately 10 - 12 m intervals along

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[1] The macroinvertebrate and fish community information collected for Kruses Drain was incorporated into the SEV score as described in Neale et al. (2011).

the waterway in an upstream direction. The final (tenth) cross section was located immediately downstream of the piped input to Kruses Drain at the perimeter of the Sanitarium site.

The following parameters were measured at each cross section:

- Velocity was estimated using the floating particle method; the time a short stick took to travel 1 m was measured three times. The velocity estimate was calculated as '*distance travelled / time taken'*;
- Water depth (mm) was measured with a 1 m metal ruler at distances 10%, 30%, 50%, 70% and 90% across the stream channel;
- Substrate composition was assessed using the Wolman method, where the B-axis (i.e. second longest axis) of ten particles randomly was measured. This included an assessment of woody debris (i.e. sticks and logs). Each particle measured was then categorised as silt/sand (< 2mm), small gravel (2-8 mm), small medium gravel (8-16 mm), medium large gravel (16-32 mm), large gravel (32-64 mm), small cobble (64-128 mm), large cobble (128-256 mm), boulder (> 256 mm), bedrock, small wood (< 50 mm), medium wood (50-100 mm), or large wood (> 100 mm);
- The amount of organic material (i.e. leaf litter, periphyton, moss, macrophytes) overlying the substrate was assessed;
- Proportional cover of macrophytes (aquatic plants) present in a 1 m band was recorded;
- Amount of shade at the water surface, from both vegetation and topography, was estimated, and categorised as very high shading (> 90%), high shading (71-90%), moderate shading (51-70%), low shading (31-50%), very low shading (11-30%), or no effective shading (< 10%); and
- Permanence of vegetation shading (i.e. the proportion of canopy cover in the immediate riparian zone that was not deciduous) was estimated.

In addition to the above cross-sectional measures, the following SEV parameters were measured or estimated along the entire 130 m reach:

- The number and size of stormwater pipes and drains that flowed into the reach;
- The number and type of artificial barriers to fish and invertebrate migration;
- Assessment of the type and extent (proportion) along the reach of:
    - Channel modification (e.g. channelization, culverts, weirs);
    - Channel lining (i.e. artificial bank and / or bed lining);
    - Riparian vegetation (20 m either side of the waterway);
    - Intactness of riparian zone (20 m either side of the waterway);
    - Filtering capacity (i.e. run off) of the riparian zone;
    - Connection between riparian zone and waterway channel; and
    - Interaction between flood waters and floodplain (taking into account artificial barriers to floodplain connectivity – e.g. channel widening, artificial bank lining);
- Indicators of oxygen reducing processes present, categorised as *optimal*, *sub-optimal*, *marginal*, or *poor*;
- General assessment of in-stream and riparian physical habitat quality; and
- Assessment of the extent and quality of Galaxiidae spawning habitat.

4.0 State of the Existing Environment

4.1 Water and Sediment Quality

A summary of the water and sediment quality measures taken in Kruses Drain on 27 May 2014 is presented below. Sampling occurred approximately 18 hours after a small fresh that was preceded by several weeks' of low flows. Some stormwater discharges would have been occurring in the 24 hours prior to sampling.

4.1.1 Spot measures of basic water chemistry and temperature

Water temperature was cool, measuring 10 °C on the day of sampling. New Zealand's freshwater fauna have wide ranging thermal tolerances; stoneflies are often absent from waterways with summer temperatures >19 °C (Quinn and Hickey 1990), and the mayfly *Deleatidium* has an upper tolerance somewhere around 22 °C, while snails (e.g. *Potamopyrgus*) are generally less temperature sensitive with an upper limit of around 31 °C (see Cox and Rutherford 2000, and references therein). This water temperature recorded in late autumn is well within the tolerance levels of most aquatic biota (Quinn et al. 1994) and met the recommended guidelines of the proposed Canterbury Land and Water Regional Plan (pLWRP) (i.e. maximum water temperature of 20 °C for spring-fed (plains) urban waterways). However, it is possible that summer temperatures of the unshaded and slow flowing areas within this reach of Kruses Drain may rise to temperatures some taxa, especially the sensitive EPT taxa, will not tolerate.

Dissolved oxygen (DO) levels were relatively low with 65% saturation and 7.06 mg / l recorded in the upper section of the reach. Although sensitivity to low levels of DO is species specific, most freshwater fish species will become distressed when DO falls below 2 – 4 mg / l and death usually occurs at concentrations below 2 mg / l. Large fish are often affected by low DO before smaller fish. The recorded DO concentration of 65% saturation was below (i.e. the guideline was not met) the minimum of 70% saturation recommended in the pLWRP for spring-fed – plains, urban waterways.

pH was circum-neutral (7.2) and within the ANZECC trigger values for lowland streams (pH 7.2 – 7.8; ANZECC 2000). Specific conductivity, which can be indicative of pollution (e.g. dissolved heavy metals) was moderately low (103.4 µS / cm), and what might be expected in an urban waterway receiving stormwater contributions.

4.1.2 Heavy metals in deposited sediments

It is important to have a good understanding of heavy metal concentrations in the environment as these can be acutely and chronically toxic to freshwater flora (plants) and fauna (animals) at high concentrations.

Copper, lead and zinc are the most commonly detected heavy metals in urban freshwater ecosystems, while cadmium, chromium, and nickel, and the metalloid arsenic can also be present. These heavy metals (and metalloid) can accumulate on impervious surfaces in urban areas, such as car parks and roads, often as a result of nearby industry and building materials on some houses, and pollutants from motor vehicles. These are then transported into urban waterways during rainfall events, via stormwater discharges.

All seven heavy metals / metalloid tested for were at or above detectible limits in the deposited sediments of Kruses Drain. More importantly, arsenic, copper, and lead exceeded the ANZECC (2000) interim sediment quality guidelines (ISQG) for ISQG-low trigger values recommended for sediment quality in freshwaters (Table 2). Zinc exceeded both the ISQG-low and ISQG-high trigger values in the mid and lower sections of the waterway.

Table 2. Concentrations of six heavy metals (cadmium, chromium, copper, lead, nickel and zinc) and one metalloid (arsenic) in sediment collected from downstream, mid and upstream sections of Kruses Drain within the Sanitarium site on 27 May 2014. The ANZECC (2000) ISQG-low and ISQG-high trigger values are shown for comparative information on recommended guidelines. Values in bold indicate where a metal / metalloid exceed the ISQG-low value, while bold and underline indicate both ISQG-low and ISQG-high trigger values have been exceeded.

Heavy metal / metalloid (total recoverable, mg / kg dry weight)	Upstream	Mid	Downstream	ANZECC (2000) ISQG-low trigger value	ANZECC (2000) ISQG-high trigger value
Arsenic	8	**30**	**30**	20	70
Cadmium	0.35	0.55	0.77	1.5	10
Chromium	31	28	19	80	370
Copper	21	53	**79**	65	270
Lead	**198**	**138**	**189**	50	220
Nickel	11	12	13	21	52
Zinc	**340**	<u>**800**</u>	<u>**1,070**</u>	200	410

4.2 Habitat

Kruses Drain within the Sanitarium site ranged from 1.1 to 2.0 m wide, with an average channel width of 1.5 m and an average wetted width of 1.13 m. The water depth varied along the 130 m survey reach with an average water depth of less than 4 cm. The greatest water depth of 8 cm was found upstream near the stormwater input pipe. The waterway was very shallow and slow flowing in places, particularly in the mid to lower reaches (Figure 2). A piped input from a water fountain was contributing to the flow into the piped network at the downstream most end of the Kruses Drain survey reach.

Soft sediment, of variable depths, dominated the bed substrates. The soft sediment was up to 20 cm in places, with an average soft sediment depth of 11 cm along the survey reach. Leaf litter and fine organic materials were abundant along the waterway. The Substrate Index of 1.2 indicated the bed substrates were dominated by silt and sand, with few coarser substrates present and only in the upper areas of the reach.

Undercut banks, which can provide important in-stream habitat for freshwater fishes, were absent from the survey reach; the banks were reinforced by rock walls along the entire survey reach.

Riparian vegetation was limited in places, with manicured lawns to the water's edge along much of the waterway. Some tall exotic trees, such as willows, rhododendrons and other evergreen species were present in the wider riparian margin. Nevertheless, there was little effective shading from riparian vegetation, except in the mid sections, where the introduced *Gunnera* and native ferns were abundant. No algae was visible growing on the substrates and macrophytes were virtually absent from the waterway, except for two small patches of the native *Nitella hookeri* in the upper section of the reach.

Figure 2. The 130 m reach of Kruses Drain within the Sanitarium site from upstream (top left), mid (top right and bottom left) to downstream (bottom right). Note the negligible flow, high in-stream organic and sediment conditions and sparse exotic riparian plantings along much of the waterway.

4.3 Macroinvertebrate Community

Table 3 gives an overview of the macroinvertebrate community found in Kruses Drain. In summary, a total of 2,534 macroinvertebrates belonging to 10 taxonomic groups were collected in the three kick-net samples with an average total abundance of 844 (±405) macroinvertebrates, and an average taxonomic richness of 8 (±0.3).

The macroinvertebrate community was dominated by molluscs (the ubiquitous native mud snail *Potamopyrgus antipodarium* and the tiny freshwater clam *Sphaerium*) and oligochaete worms. Seed shrimp ostracods (Crustacea) and chironomid midge fly larvae (Diptera, Chironomidae) were present, but generally in low numbers.

All of the macroinvertebrate taxa found were particularly pollution-tolerant taxa, and no 'clean-water taxa' (e.g. caddisflies) were found in Kruses Drain (Figure 3). This absence of caddisflies and the dominance of highly tolerant taxa was also reflected by the MCI-hb and QMCI-hb scores calculated for the site. The average MCI-hb score for Kruses Drain was 56.9 and the average QMCI-hb was 2.5 (Table 3), both of which fell well within Stark and Maxted's (2007)'poor' stream health category, indicating probable severe enrichment (see Table 1).

Table 3. Macroinvertebrate biotic indices from the three kick-net samples collected from along the 130 m reach of Kruses Drain surveyed 27 May 2014. Refer to Section 3.4 for details on the calculation of these biotic metrics. Refer to Table 1 for information on how to interpret the MCI-hb and QMCI-hb scores.

Biotic Indices	Upstream	Mid	Downstream	Average for Kruses Drain
Total abundance	615	1633	286	844 (±405)
Taxonomic richness	9	8	8	8 (±0.3)
EPT richness	0	0	0	0
EPT richness (excl. hydroptilids*)	0	0	0	0
% EPT richness	0	0	0	0
% EPT (excl. hydroptilids*)	0	0	0	0
MCI-hb	55.6	57.5	57.5	56.9 (±0.6)
QMCI-hb	2.1	3.1	2.2	2.5 (±0.3)

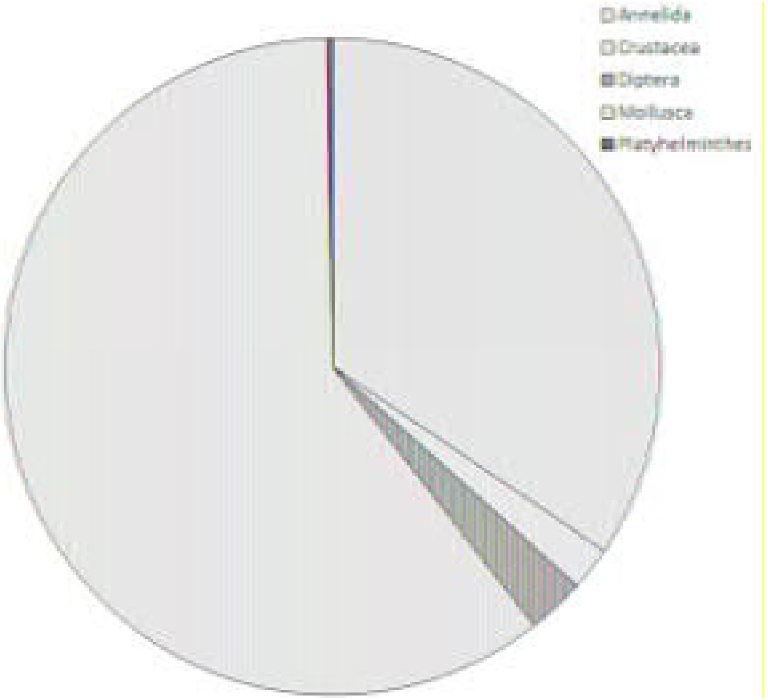

Figure 3. Average macroinvertebrate community composition (%) calculated from the three kick-net samples taken along Kruses Drain, 27 May 2014. Annelida = oligochaete worms; Crustacea = seed shrimp ostracods; Diptera = chironomid midge fly larvae; Mollusca = snails and freshwater clams; and Platyhelminthes = freshwater flatworm.

4.4 Fish Community

Shortfin eel (*Anguilla australis*) was the only species of freshwater fish to be found in Kruses Drain. This migratory species is native to New Zealand, thought to be the most tolerant of native species, and is currently listed as not threatened (Goodman et al. 2013). A total of 61 shortfin eels were captured in the 130 m reach fished ranging in size from 90 to 500 mm in length. The average size was 223 mm (±11 mm), while the majority of eels were less than 300 mm in length (Figure 4).

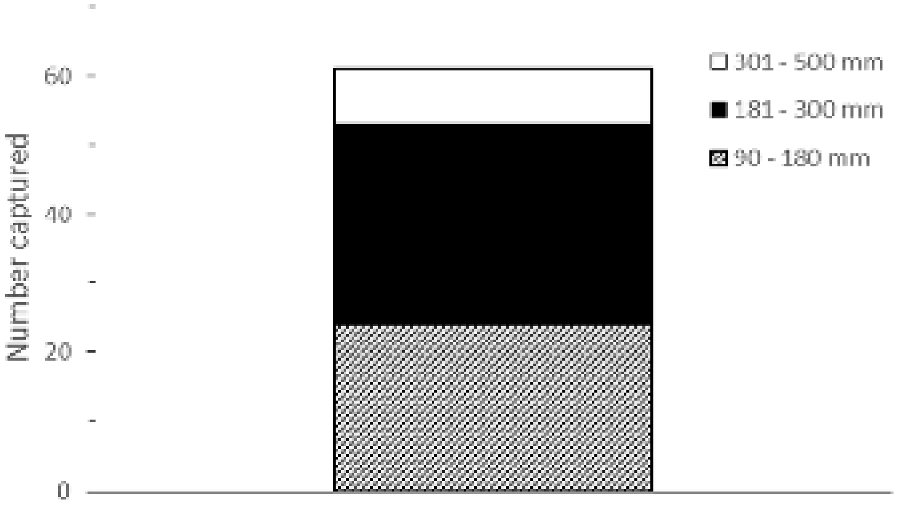

Figure 4. Size distribution of shortfin eels (*Anguilla australis*) captured using electric-fishing techniques from a 130 m survey reach of Kruses Drain within the Sanitarium site.

4.4.1 New Zealand Freshwater Fish Database

There were no records listed for Kruses Drain in the New Zealand Freshwater Fish Database, however, shortfin eels have been previously recorded further downstream in Kruses Drain (downstream of Grimsey's Road and upstream of the confluence with Horner's Stream).

4.5 Stream Ecological Valuation – Ecological Function

The overall SEV score for Kruses Drain was 0.21 out of a possible 1.0, where 0 indicates no remaining ecological function and 1 indicates an intact ecological function. Therefore, the SEV for Kruses Drain indicated that the survey reach currently retains only very limited ecological function.

The SEV consists of four broad functional types (hydraulic, biogeochemical, habitat provision and biodiversity provision). Biodiversity function was the lowest scoring of these four broad functional types, scoring 0.11 (out of a possible maximum of 1.0). Hydraulic function was the next lowest with 0.17 (out of 1.0), then habitat provision function (0.19 out of 1.0) and biogeochemical function (0.29 out of 1.0). Overall, this indicated the low SEV score was influenced by a range of factors (including issues with hydraulic flows, stream structure and water quality, lack of habitat diversity and riparian cover, and associated poor biodiversity values), all of which contributed to the poor ecological functioning of the stream reach.

Although SEV hasn't been applied much (if at all) to waterways in Canterbury, based on knowledge from around the North Island, we anticipate that SEV scores for reference waterways would fall somewhere between 0.7 and 0.8. The literature also suggests that a stream (reach) with an SEV score of less than 0.4 is unlikely to be of sufficient ecological function to warrant restoration (i.e. off-site, rather than on-site, restoration should be applied; Rowe et al. 2008).

5.0 Assessment of Ecological Values

The health of this reach of Kruses Drain can be considered to be very poor, with low DO, potentially fluctuating water temperatures, slow flowing and sometimes stagnant water, lots of deposited sediments with high concentrations of heavy metals, little riparian and poor in-stream habitat availability. This was reflected by the depauperate and pollution-tolerant macroinvertebrate and fish communities, and the low MCI and QMCI values, which indicated 'poor' water quality with probable severe enrichment.

It must be noted that Kruses Drain was found to provide habitat for shortfin eels, however, those captured (and seen but not captured) in Kruses Drain were mainly small, juvenile fish. This may indicate that, in their search for suitable freshwater habitat, elvers and juveniles are navigating upstream from the Styx River through the piped stormwater system, and subsequently residing (possibly only temporarily) within Kruses Drain. It is likely that many of these eels migrate downstream in search of more suitable habitat, and those that remain may die due to the less than optimal habitat conditions and poor food resources available in Kruses Drain. The macroinvertebrate community is also limited to a few pollution-tolerant taxa, due to poor riparian and in-stream habitat conditions. All of the macroinvertebrate taxa found are considered to be very pollution-tolerant taxa (i.e. they all have MCI scores of less than 5, out of a possible 10). While poor habitat conditions are likely to be the one of the main drivers limiting the fish and macroinvertebrate communities that reside within Kruses Drain, the lack of ecological connectivity with upstream and downstream reaches almost certainly also plays a role.

The Christchurch City Plan (2012) classifies Kruses Drain within the Sanitarium site as an environmental asset waterway. Environmental asset waterways are described as generally having some natural character with a high potential for restoration (CCC 2012). It is noteworthy that the SEV of Kruses Drain indicated only very limited ecological function remaining (SEV score of 0.2). Rowe et al. (2008) suggest that a stream (reach) with an SEV score of less than 0.4 is unlikely to be of sufficient remaining ecological function to warrant restoration. Therefore, despite its classification as an environmental asset waterway, it is unlikely that the ecology of Kruses Drain could be greatly enhanced even with concentrated rehabilitation efforts. This is particularly relevant given the limited ecological connectivity along Kruses Drain due to the piped (underground) network immediately up- and downstream of the Sanitarium site, as discussed below.

Many of New Zealand's clean-water (or more pollution-sensitive) taxa are aquatic insects, such as mayflies, stoneflies and caddisflies. Aquatic insects, which generally have a winged adult stage, can populate waterways via three main pathways: downstream drift (where juveniles drift downstream with the current to colonise a new area); upstream migration (where juveniles crawl upstream); and aerial dispersal of a winged adult. However, the piped network immediately upstream and downstream of this part of Kruses Drain, along with the highly urban nature of the surrounding environment, probably restricts not only the upstream and downstream migration of juveniles but also the ability of winged adult aquatic insects to navigate to this 'isolated' section of Kruses Drain.

There is good evidence that ecological connectivity along a waterway is a crucial element for maintaining both fish and macroinvertebrate communities. Even short sections of piped waterways (e.g. road culverts) can have a marked influence on the ability of freshwater fauna to navigate through a stream network. A poorly constructed and placed road culvert (or longer piped system) can act as a barrier to fish passage, thereby preventing its migration along a waterway (Boubée et al. 1999). Many of New Zealand's freshwater fish species, including shortfin eels, are migratory, requiring access to the sea during certain life stages. Shortfin eels are present in Kruses Drain, and throughout many of Christchurch's natural and human-made waterways; no other fish species were found in Kruses Drain. Road culverts are also known to impede the movement of crustaceans along a waterway (Resh 2005) and can limit the dispersal of the winged adult stages of aquatic insects, such as caddisflies (Blakely et al. 2006). It may be that aquatic insects cannot navigate through culverts, or that predation pressure is increased by a great number of spiders that often sit-and-wait inside road culverts. It is highly likely that aquatic insect adults cannot (or will not) navigate through longer piped sections of a waterway.

Adult aquatic insects may also disperse overland (i.e. between waterways), but it's probable that built-up areas they may become disconnected from the stream and lost in the urban environment. Thus, the likely lack of ecological connectivity along Kruses Drain (i.e. with long sections immediately upstream and downstream of the Sanitarium site being piped) almost certainly play a role in limiting the fish species and macroinvertebrate taxa that reside within this 130 m reach of open waterway.

Taking all of this into consideration the ecological values of Kruses Drain are considered very low, and much lower than many other waterways within the Christchurch metropolitan area (Boffa Miskell 2014, EOS 2008).

6.0 Assessment of Potential Ecological Effects

The proposed piping of Kruses Drain will result in the total loss of the 130 m reach of Kruses Drain within the Sanitarium site. This total loss of habitat will affect the limited number of pollution-tolerant macroinvertebrate taxa and shortfin eels present in the waterway. However, given the low ecological values of Kruses Drain, the limited ecological connectivity with up- and downstream areas of the catchment, and that it is part of a highly modified (piped) system of little or no conservation value, the significance of this effect is anticipated to be less than minor. Therefore the only recommended mitigation required is:

- To relocate the shortfin eel population from the waterway to a suitable site downstream, prior to piping of the waterway:
  - We recommend that dewatering, when required, should be done gradually over several days to provide the shortfin eels present the opportunity to move downstream;
  - A suitably qualified and experienced freshwater ecologist should then search the ponded areas for any stranded shortfin eels;
  - These will need to be relocated to an appropriate alternative site;
  - There will need to be some consideration of the local, resident eel population when selecting a suitable relocation site; and
- Enter into discussions with the CCC regarding appropriate forms of offset or mitigation to compensate for the loss of an environmental asset waterway.

7.0 Conclusion

Kruses Drain (within the Sanitarium site) is of poor condition with low ecological value. The existing ecological function suggests that even with concentrated rehabilitation efforts, the ecological values is unlikely to be improved. This is particularly relevant given the isolated nature of the 130 m reach of Kruses Drain within the Sanitarium site. The piped network immediately up- and downstream of the survey area is expected to greatly limit the existing and potential future (i.e. if the waterway was enhanced) ecological function and values. Based on this assessment, we conclude that although piping of this reach of Kruses Drain would result in a total loss of this freshwater habitat, the significance of this effect would be less than minor. However, we recommend that the shortfin eel population of Kruses Drain be relocated to a suitable alternative site prior to piping of the waterway. It may also be appropriate for R & H Investments Ltd to enter into discussions with the CCC regarding potential compensation for the loss of an environmental asset waterway.

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Appendix 1: Ryder Consulting – Macroinvertebrate Processing

Boffa Miskell

C14066, May 2014

Summary of Freshwater Macroinvertebrate Sample Processing & Results

Prepared by Katie Blakemore, BSc. (Hons.) and Ben Ludgate, MSc.

June 2014

Ryder Consulting Limited
PO Box 1023
Dunedin
New Zealand
Ph: 03 477 2119
Fax: 03 477 3119

Background

Preserved benthic macroinvertebrate samples were provided to Ryder Consulting by Boffa Miskell. Boffa Miskell staff collected these samples in May 2014. Ryder Consulting Ltd was engaged to process the C14066 samples, and report the results of taxonomic composition.

Laboratory Analysis

Samples were passed through a 500 µm sieve to remove fine material. Contents of the sieve were then placed in a white tray and macroinvertebrates were counted and identified by eye and under a dissecting microscope (10-40x) using criteria from Winterbourn *et al.* (2006).

Results

The macroinvertebrate results have been forwarded to Boffa Miskell in electronic form.

References

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Appendix B

Site Photographs

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www.nzgeoscience.co.nz

10.10.2014
11139.000.001


Photo 1: View north towards office


Photo 2: Location of former petrol UPSS


Photo 3: View of HA01


Photo 4: View south from office entrance


Photo 5: View south showing grassed area sampled (S2)


Photo 6: Gravel fill in HA01.

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Date taken	11.09.2014	**Client**	**Mitre 10 Mega Ltd**		
Taken by	GO	**Project**	**Sanitarium, Harewood Rd**		
Approved by	DR	**Description**	**Site Photographs - 21.08.2014**		
Scale	N/A	**Photo No.**	1 to 6	**Project Number**	11139

Appendix C

Analytical Reports

Geoscience Consulting (NZ) Limited
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ENVIRONMENTAL Analysis Request Form

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Hill Laboratories

131 4562

RESULTS TO

Additional Information

Chain of Custody Record

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Job Information Summary

Page 1 of 1

Client:	Geoscience Consulting (NZ) Limited	**Lab No:**	1314562
Contact:	Gareth Oddy C/- Geoscience Consulting (NZ) Limited PO Box 373 CHRISTCHURCH 8140	**Date Registered:**	22-Aug-2014 9:58:20 am
		Priority:	High
		Quote No:	62187
		Order No:	
		Client Reference:	Sanitarium/Harewood Rd
		Add. Client Ref:	
		Submitted By:	H Atkins
		Charge To:	Geoscience Consulting (NZ) Limited

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	HA01 S1 @ 1.0m 21-Aug-2014 10:15 am	Soil	GSoil300, PSoil250	TPH + BTEX profile, Soil
2	HA01 S2 @ 1.5m 21-Aug-2014 10:15 am	Sediment	GSoil300, PSoil250	Hold Cold
3	HA02 S1 @ 0.0-0.5m 21-Aug-2014 10:35 am	Soil	GSoil300, PSoil250	TPH + BTEX profile, Soil
4	HA02 S2 @ 1.9m 21-Aug-2014 10:35 am	Soil	GSoil300, PSoil250	TPH + BTEX profile, Soil
5	HA03 S1 @ 0.5m 21-Aug-2014 10:46 am	Soil	GSoil300, PSoil250	TPH + BTEX profile, Soil
6	HA03 S2 @ 1.5m 21-Aug-2014 10:45 am	Sediment	GSoil300, PSoil250	TPH + BTEX profile, Soil
7	HA04 S1 @ 0.2m 21-Aug-2014 11:00 am	Soil	GSoil300, PSoil250	Hold Cold
8	HA04 S2 @ 1.5m 21-Aug-2014 11:05 am	Soil	GSoil300, PSoil250	TPH + BTEX profile, Soil
9	HA05 S1 @ 0.5m 21-Aug-2014 11:24 am	Soil	GSoil300, PSoil250	Hold Cold
10	HA06 S1 @ 0.5m 21-Aug-2014 11:40 am	Soil	GSoil300, PSoil250	Hold Cold
11	HA06 S2 @ 1.6m 21-Aug-2014 11:40 am	Soil	GSoil300, PSoil250	TPH + BTEX profile, Soil

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis US EPA 8260B. Tested on as received sample [KBIs:5782,26687,3629]	0.05 - 0.10 mg/kg dry wt	1, 3-6, 8, 11
Total Petroleum Hydrocarbons in Soil	Sonication extraction in DCM, Silica cleanup, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines. Tested on as received sample [KBIs:5786,2805,10734]	8 - 60 mg/kg dry wt	1, 3-6, 8, 11
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	1, 3-6, 8, 11

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ANALYSIS REPORT

Client:	Geoscience Consulting (NZ) Limited	**Lab No:**	1314562 SPv1
Contact:	Gareth Oddy	**Date Registered:**	22-Aug-2014
	C/- Geoscience Consulting (NZ) Limited	**Date Reported:**	29-Aug-2014
	PO Box 373	**Quote No:**	62187
	CHRISTCHURCH 8140	**Order No:**	
		Client Reference:	Sanitarium/Harewood Rd
		Submitted By:	H Atkins

Sample Type: Soil

Sample Name:		HA01 S1 @ 1.0m 21-Aug-2014 10:15 am	HA02 S1 @ 0.0-0.5m 21-Aug-2014 10:35 am	HA02 S2 @ 1.9m 21-Aug-2014 10:35 am	HA03 S1 @ 0.5m 21-Aug-2014 10:46 am	HA04 S2 @ 1.5m 21-Aug-2014 11:05 am
Lab Number:		1314562.1	1314562.3	1314562.4	1314562.5	1314562.8
Individual Tests						
Dry Matter	g/100g as rcvd	89	78	75	83	83
BTEX in Soil by Headspace GC-MS						
Benzene	mg/kg dry wt	< 0.05	< 0.06	< 0.06	< 0.05	< 0.05
Toluene	mg/kg dry wt	< 0.05	< 0.06	< 0.06	< 0.05	< 0.05
Ethylbenzene	mg/kg dry wt	< 0.05	< 0.06	< 0.06	< 0.05	< 0.05
m&p-Xylene	mg/kg dry wt	< 0.10	< 0.11	< 0.12	< 0.10	< 0.10
o-Xylene	mg/kg dry wt	< 0.05	< 0.06	< 0.06	< 0.05	< 0.05
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 8	< 9	< 9	< 8	< 8
C10 - C14	mg/kg dry wt	< 20	< 20	< 20	< 20	< 20
C15 - C36	mg/kg dry wt	< 40	< 40	< 40	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	< 70	< 70	< 70	< 70

Sample Name:		HA06 S2 @ 1.6m 21-Aug-2014 11:40 am				
Lab Number:		1314562.11				
Individual Tests						
Dry Matter	g/100g as rcvd	81	-	-	-	-
BTEX in Soil by Headspace GC-MS						
Benzene	mg/kg dry wt	< 0.05	-	-	-	-
Toluene	mg/kg dry wt	< 0.05	-	-	-	-
Ethylbenzene	mg/kg dry wt	< 0.05	-	-	-	-
m&p-Xylene	mg/kg dry wt	< 0.10	-	-	-	-
o-Xylene	mg/kg dry wt	< 0.05	-	-	-	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 9	-	-	-	-
C10 - C14	mg/kg dry wt	< 20	-	-	-	-
C15 - C36	mg/kg dry wt	< 40	-	-	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	-	-	-	-

Sample Type: Sediment

Sample Name:		HA03 S2 @ 1.5m 21-Aug-2014 10:45 am				
Lab Number:		1314562.6				
Individual Tests						
Dry Matter	g/100g as rcvd	79	-	-	-	-

Sample Type: Sediment						
Sample Name:		HA03 S2 @ 1.5m 21-Aug-2014 10:45 am				
Lab Number:		1314562.6				
BTEX in Soil by Headspace GC-MS						
Benzene	mg/kg dry wt	< 0.06	-	-	-	-
Toluene	mg/kg dry wt	< 0.06	-	-	-	-
Ethylbenzene	mg/kg dry wt	< 0.06	-	-	-	-
m&p-Xylene	mg/kg dry wt	< 0.11	-	-	-	-
o-Xylene	mg/kg dry wt	< 0.06	-	-	-	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 9	-	-	-	-
C10 - C14	mg/kg dry wt	< 20	-	-	-	-
C15 - C36	mg/kg dry wt	< 40	-	-	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	-	-	-	-

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis US EPA 8260B. Tested on as received sample [KBIs:5782,26687,3629]	0.05 - 0.10 mg/kg dry wt	1, 3-6, 8, 11
Total Petroleum Hydrocarbons in Soil	Sonication extraction in DCM, Silica cleanup, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines. Tested on as received sample [KBIs:5786,2805,10734]	8 - 60 mg/kg dry wt	1, 3-6, 8, 11
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	1, 3-6, 8, 11

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

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

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Carole Rodgers-Carroll

Carole Rodgers-Carroll BA, NZCS
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BETTER TESTING BETTER RESULTS

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ANALYSIS REPORT

Client:	Geoscience Consulting (NZ) Limited	**Lab No:**	1318394	SPv2
Contact:	H Atkins	**Date Registered:**	29-Aug-2014	
	C/- Geoscience Consulting (NZ) Limited	**Date Reported:**	04-Sep-2014	
	PO Box 373	**Quote No:**	63403	
	CHRISTCHURCH 8140	**Order No:**		
		Client Reference:	Harewood Road	
		Submitted By:	H Atkins	

Amended Report

This report replaces an earlier report issued on the 02 Sep 2014 at 3:08 pm
Additional analyst comment to Intertek report.

Sample Type: Soil

Sample Name:	S1	S2	S3	S4	S5
Lab Number:	1318394.1	1318394.2	1318394.3	1318394.4	1318394.5
Asbestos Presence Absence	See attached report	See attached report	See attached report	See attached report	See attached report

Analyst's Comments

Appendix No.1 - Intertek Report

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Asbestos Presence Absence	Dried at 100-105°C, Ashed at 400C. Polarised Light Microscopy and dispersion staining techniques. Subcontracted to Intertek Christchurch. AS 4964 (2004) - Method for the Qualitative / Semi-Quantitative Identification of Asbestos in Bulk Samples.	-	1-5

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

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

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Chemistry Team Leader - Christchurch Branch

Intertek

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01 September 2014

Hill Laboratories
101 C Waterloo Road
PO Box 16607
Hornby
Christchurch 8042

Attention: Rhodri Williams/Craig Radford

Report on Asbestos Analysis

Sampled by:	Client
Date Received:	29th August 2014
Job No. :	10-5210/14-08-007 (Amended)
Location/Description:	Harewood Road
Your reference:	1318394
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.

Sample No.	**Description**	**Sample Size**	**Result**
1318394.1 (S1)*	Soil	**111g**	Asbestos **Not** Detected
1318394.2 (S2)*	Soil	**186g**	Asbestos **Not** Detected
1318394.3 (S3)*	Soil	**195g**	**Chrysotile (White Asbestos)** Detected
1318394.4 (S4)*	Soil	**118g**	**Chrysotile (White Asbestos)** Detected
1318394.5 (S5)*	Soil	**105g**	**Chrysotile (White Asbestos)** Detected

** Numbers in brackets are Geoscience Consulting (NZ) Limited sample numbers*

Intertek

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Yours Faithfully

R.N. Mumford NZCS, Dip SM, Mmgt (OSH)
Asbestos Analyst

ilac-MRA IANZ ACCREDITED LABORATORY

NOTE:

1. This report must not be altered or reproduced except in full.
2. All analysis was performed at the Intertek Christchurch Laboratory.
3. Where asbestos was detected, it was only present as small isolated fibre bundles.

Appendix D

Assessment Tables

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10.10.2014
11139.000.001

APPENDIX D– RESULTS OF LABORATORY ANALYSES

Table A: Discrete Soil Sample Results – Total Petroleum Hydrocarbons and BTEX compared to the Ministry for the Environment Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites and the Burwood Landfill Acceptance Criteria.

Sample Name	**HA02_S1**	**HA03_S1**	**Soil acceptance criteria: Commercial / Industrial use (mg/kg)[a]**	**Soil acceptance criteria for protection of groundwater quality (mg/kg)[a]**	**Burwood Landfill Acceptance Criteria (mg/kg)[b]**	
Sample Depth (m bgl)	**0.0 to 0.5**	**0.5**				
BTEX in Soil						
Benzene	<0.06	<0.05	3.6	0.029	/	
Toluene	<0.06	<0.05	270	6.0	/	
Ethylbenzene	<0.06	<0.05	200	7.2	/	
Xylenes	<0.17	<0.15	200	3.7	/	
Total Petroleum Hydrocarbons in Soil						
C7-C9	<9	<8	500	5,200	/	
C10-C14	<20	<20	1,700	9,200	/	
C15-C36	<40	<40	NA (a)	NA (b)	180 (aromatics)	11,200 (aliphatics)

Notes:

[a] MfE,1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand. Applied depth: '<1m', applied soil type: 'sandy silt' and GW 2 m.

[b] MWH, 2009. Soil Management/Disposal ex Burwood Landfill.

NA (a): indicates estimated criterion exceeds 20,000 mg/kg. At 20,000 mg/kg residual separate phase is expected to have formed in soil matrix. Some aesthetic impact may be noted.

NA (b): indicates estimated contaminant not limiting as estimated health-based criterion is significantly higher than that likely to be encountered on site (i.e. 10.000 mg/kg).

Exceedances of the soil acceptance criteria for Commercial / Industrial land use are shown in **bold**.

Exceedances of the Burwood Landfill Acceptance criteria are shown in *italic.*

Exceedances of the soil acceptance criteria for protection of groundwater quality are underlined.

/ : no criteria are available

Table B: Discrete Soil Sample Results – Total Petroleum Hydrocarbons and BTEX compared to the Ministry for the Environment Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites and the Burwood Landfill Acceptance Criteria.

Sample Name	HA01_S1	HA02_S2	HA03_S2	HA04_S2	HA06_S2	Soil acceptance criteria: Commercial / Industrial use - All Pathways(mg/kg)[a]	Soil acceptance criteria for protection of groundwater quality (mg/kg)[a]	Burwood Landfill Acceptance Criteria (mg/kg)[b]	
Sample Depth (m bgl)	**1.0**	**1.9**	**1.5**	**1.5**	**1.6**				
BTEX in Soil (mg/kg)									
Benzene	<0.05	<0.06	<0.06	<0.05	<0.05	3.0	0.78	/	
Toluene	<0.05	<0.06	<0.06	<0.05	<0.05	94	200	/	
Ethylbenzene	<0.05	<0.06	<0.06	<0.05	<0.05	300	280	/	
Xylenes	<0.15	<0.18	<0.17	<0.15	<0.15	150	120	/	
Total Petroleum Hydrocarbons in Soil (mg/kg)									
C7-C9	<8	<9	<9	<8	<9	120	NA (b)	/	
C10-C14	<20	<20	<20	<20	<20	1,900	NA (b)	/	
C15-C36	<40	<40	<40	<40	<40	NA (a)	NA (b)	180 (aromatics)	11,200 (aliphatics)

Notes:

[a] MfE,1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand. Applied depth: ‘1 m-4 m’, applied soil type: ‘sand’ and GW 4 m.

[b] MWH, 2009. Soil Management/Disposal ex Burwood Landfill.

NA (a): indicates estimated criterion exceeds 20,000 mg/kg. At 20,000 mg/kg residual separate phase is expected to have formed in soil matrix. Some aesthetic impact may be noted.

NA (b): indicates estimated contaminant not limiting as estimated health-based criterion is significantly higher than that likely to be encountered on site (i.e. 10.000 mg/kg).

Exceedances of the soil acceptance criteria for Commercial / Industrial land use are shown in **bold**.

Exceedances of the Burwood Landfill Acceptance criteria are shown in *italic.*

Exceedances of the soil acceptance criteria for protection of groundwater quality are underlined.

/ : no criteria are available

Appendix E

Borehole Logs

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HAND AUGER BOREHOLE - HA01

(Page 1 of 6)

54-62 Harewood Road

Papanui

Christchurch

Client	: Mitre 10 Mega Ltd	**Date**	: 21/08/2014
Project	: Detailed Site Investigation	**Hole Depth**	: 1.50 m
Geoscience Ref.	: 11139	**Shear Vane No.**	: N/A
Drilling Method	: Hand auger	**Logged By**	: HA
Hole Diameter	: 50 mm	**Reviewed By**	: GO

Depth (m)	Material	USCS Symbol	DESCRIPTION	Graphic Log	Water Level	Moisture Condition	PID ppm		0 2 4 6 8 10 12 14
0.0 0.5	FILL	GC	Sandy fine to coarse GRAVEL; greyish brown. Well graded, subrounded to subangular. Sand, fine to coarse, well graded, subrounded to subangular. [FILL].	▨		M	1.5		
1.0	ALLUVIUM	SP	Fine to medium SAND; greyish brown. Poorly graded, subrounded to subangular.	░		W	1.1		
1.5			Becomes saturated and brownish grey at 1.2 m depth.	░		S	0.9		
2.0			End of hole: 1.5 m						

Termination: Target depth was reached at 1.5 m depth.

09-11-2014 \\geo-sbs\geodata\Projects\Project - 11101 to 11200\11139 Mega Mitre 10 Papanui\Field_Lab Testing\11139_HA01.bor

HAND AUGER BOREHOLE - HA02

(Page 2 of 6)

54-62 Harewood Road

Papanui

Christchurch

Client : Mitre 10 Mega Ltd
Project : Detailed Site Investigation
Geoscience Ref. : 11139
Drilling Method : Hand auger
Hole Diameter : 50 mm
Date : 21/08/2014
Hole Depth : 2.0 m
Shear Vane No. : N/A
Logged By : HA
Reviewed By : GO

Depth (m)	Material	USCS Symbol	DESCRIPTION	Graphic Log	Water Level	Moisture Condition	PID ppm		0 2 4 6 8 10 12 14
0.0	ALLUVIUM	ML	SILT; dark brown.			M			
0.5							1.7		
		ML	SILT; light brownish yellow. Becomes grey. Becomes wet at 0.7 m depth.						
						W			
1.0							1.3		
1.5							1.1		
2.0							0.9		

End of hole: 2.0 m

Termination: Target depth was reached at 2.0 m depth.

HAND AUGER BOREHOLE - HA03

(Page 3 of 6)

54-62 Harewood Road

Papanui

Christchurch

Client	: Mitre 10 Mega Ltd	**Date**	: 21/08/2014
Project	: Detailed Site Investigation	**Hole Depth**	: 2.0 m
Geoscience Ref.	: 11139	**Shear Vane No.**	: N/A
Drilling Method	: Hand auger	**Logged By**	: HA
Hole Diameter	: 50 mm	**Reviewed By**	: GO

Depth (m)	**Material**	**USCS Symbol**	**DESCRIPTION**	**Graphic Log**	**Water Level**	**Moisture Condition**	**PID ppm**		0 2 4 6 8 10 12 14
0.0	TOPSOIL	ML	Sandy SILT with trace gravel and rootlets; dark brown. Low Plasticity. Sand fine to medium, poorly graded, subrounded to subangular. [TOPSOIL].			M			
0.5	ALLUVIUM	SP	FIne to medium SAND; brown with orange mottles. Poorly graded, subrounded to subangular.			W	0.7		
1.0			Becomes saturated at 0.9 m depth.			S	0.4		
1.5			Colour changes to grey at 1.4 m depth.				0.4		
2.0							0.5		
			End of hole: 2.0 m						

Termination: Target depth was reached at 2.0 m depth.

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HAND AUGER BOREHOLE - HA04

(Page 4 of 6)

54-62 Harewood Road

Papanui

Christchurch

Client	: Mitre 10 Mega Ltd	**Date**	: 21/08/2014
Project	: Detailed Site Investigation	**Hole Depth**	: 2.0 m
Geoscience Ref.	: 11139	**Shear Vane No.**	: N/A
Drilling Method	: Hand auger	**Logged By**	: HA
Hole Diameter	: 50 mm	**Reviewed By**	: GO

Depth (m)	Material	USCS Symbol	DESCRIPTION	Graphic Log	Water Level	Moisture Condition	PID ppm		0 2 4 6 8 10 12 14
0.0	TOPSOIL	ML	Sandy SILT with trace gravel and rootlets; dark brown. Low plasticity. Sand fine to medium, poorly graded, subrounded to subangular. [TOPSOIL].	▩		M			
	FILL	SP	Gravelly fine to medium SAND; brownisch black. Poorly graded, subrounded to subangular. Gravel is fine to medium, poorly graded, subrounded to subangular. [FILL]	░					
	ALLUVIUM	SP	Fine to medium SAND; greyish brown. Poorly graded, subrounded to subangular.	░			0.9		
0.5									
1.0							0.8		
1.5			Becomes wet at 1.5 m depth.			W	0.5		
			Becomes saturated at 1.6 m depth.			S			
2.0							0.5		
			End of hole: 2.0m						

Termination: Target depth was reached at 2.0 m depth.

HAND AUGER BOREHOLE - HA05

(Page 5 of 6)

54-62 Harewood Road

Papanui

Christchurch

Client	: Mitre 10 Mega Ltd	**Date**	: 21/08/2014
Project	: Detailed Site Investigation	**Hole Depth**	: 0.0 m
Geoscience Ref.	: 11139	**Shear Vane No.**	: N/A
Drilling Method	: Hand auger	**Logged By**	: HA
Hole Diameter	: 50 mm	**Reviewed By**	: GO

Depth (m)	**Material**	**USCS Symbol**	**DESCRIPTION**	**Graphic Log**	**Water Level**	**Moisture Condition**	**PID ppm**		0 2 4 6 8 10 12 14
0.0			Practical refusal was met at 0.0 m.						
0.5									
1.0									
1.5									
2.0									

Termination: Practical refusal was met at 0.0 m depth.

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HAND AUGER BOREHOLE - HA06

(Page 6 of 6)

54-62 Harewood Road

Papanui

Christchurch

Client	: Mitre 10 Mega Ltd	**Date**	: 21/08/2014
Project	: Detailed Site Investigation	**Hole Depth**	: 2.0 m
Geoscience Ref.	: 11139	**Shear Vane No.**	: N/A
Drilling Method	: Hand auger	**Logged By**	: HA
Hole Diameter	: 50 mm	**Reviewed By**	: GO

Depth (m)	**Material**	**USCS Symbol**	**DESCRIPTION**	**Graphic Log**	**Water Level**	**Moisture Condition**	**PID ppm**		0 2 4 6 8 10 12 14
0.0	TOPSOIL	ML	SILT with trace sand and rootlets; dark brown. Low plasticity. [TOPSOIL].			W			
0.5 1.0	ALLUVIUM	ML	SILT; greyish brown with orange mottles. Low plasticity.				0.4 0.3		
1.5		SP	Fine to medium SAND with minor silt; grey.			S	0.3 1.6		
2.0			End of hole: 2.0m						

Termination: Target depth was reached at 2.0 m depth.

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Preliminary Environmental Site Investigation

54-62 Harewood Road

Papanui

Christchurch

Submitted to:

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30.05.2014

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Appendix I: Sanitarium Hazardous Substances Register
Appendix J: HSNO Certificates
Appendix K: Sanitarium Transformer Maintenance Documents
Appendix L: Sanitarium Environmental Incident Reports

Geoscience Document Control:

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Rev	Date	Revision Details/Status	WP	Author	Reviewer
1	30/05/2014	Draft	BK	GO	DR

1 Introduction

Geoscience Consulting (NZ) Ltd (Geoscience) was requested by Mitre 10 Mega Limited to undertake a preliminary environmental site inspection (PSI) at 54-62 Harewood Road, Papanui, Christchurch (herein referred to as "the site"). The environmental assessment was performed in anticipation of a financial transaction involving the site. Geoscience understands that the approximate 2.95 ha site is to be redeveloped for commercial use. Figure 1 indicates the location of the property which is currently owned by Seventh Day Adventist Church Property Trustee (NZ).

This PSI has been completed in accordance with *the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health* (NES)[1] and in accordance with the Ministry for the Environment (MfE) 2001, *Guidelines for Reporting on Contaminated Sites*[2].

1.1 Objectives of the Assessment

The objective of this PSI was to evaluate and identify conditions indicative of releases and threatened releases of hazardous substances on, at, in or to the subject property and report on the potential risk posed to future site users and identified environmental receptors.

1.2 Approach

To satisfy the objectives, Geoscience sought to gather information regarding the following:

- current and past property users and occupancies;
- current and past users of hazardous substances including petroleum products;
- waste management and disposal activities that could have caused a release or threatened release of hazardous substances;
- current and past corrective actions and response activities to address past and on-going releases of hazardous substances at the subject property;
- engineering controls at the subject property;
- regulatory controls at the subject property; and
- properties adjoining or located near the subject property that have environmental conditions that could have resulted in conditions indicative of releases or threatened releases of hazardous substances to the subject property.

Geoscience's PSI included the following scope of work:

- An on-site inspection of the subject property to evaluate current conditions and identify areas of potential concern;
- A review of property history through a review of aerial photographs, certificate of title ownership records, and historical mapping;

- Observation of adjacent properties and the local area to evaluate the potential for adverse environmental impact to the subject property;
- Review of Christchurch City Council (CCC) and Canterbury Regional Council (CRC) records; and
- Interviews with current Sanitarium employees on site history and current processes.

Photographs of the site and surrounding areas were taken to document current conditions and are included in Appendix A. Previous environmental investigation reports, environmental records and consents, reasonably obtainable at the time of the site visit and during the council records search, were reviewed and copies are included in this report, as appropriate.

2 Site Description and Setting

Site information is summarised in Table 1.

Table 1: Site Information

Item	Description
Location:	54 – 62 Harewood Road, Papanui, Christchurch, Canterbury, New Zealand
Legal Description:	RS 41027 Canterbury Dist, Lot 1 DP 204, Lot 1 DP 59153, Lot 2 DP 5985, Pt Lot 1 DP 9715, Lots 10,12,2,3,4,5,6,7,8 DP 9715, Pt Lot 9 DP 9715
Current Owner:	Seventh Day Adventist Church Property Trustee (NZ)
Current Land Use:	Commercial / Industrial - Sanitarium Health Foods Company Factory
Proposed Land Use:	Commercial / Industrial
Site Area:	2.95 ha
Territorial Authority:	Christchurch City Council
Zoning:	B4 (Business Zone 4)

The site setting is summarised in Table 2.

Table 2: Site Setting

Item	Description
Topography	Overall the site is relatively flat and has an elevation across the site of approximately 13 metres above sea level. The land in the immediate vicinity of Kruses Drain in the northern half of the site drops towards the drain relatively steeply.
Local Setting	The site is located on the western extent of a commercial zone and light industrial zone surrounding Northlands Mall. Surrounding land use is as follows: • North: Beyond Langdons Road, is the former Bridgestone tyre manufacturing facility (B4 & B5). • East: To the east beyond the railway line are commercial properties and their associated car parks (B2). • South: To the south east of the site located at 30 Harewood Road (Part Lot 2 DP 59153) is a former Hirequip store and rental vehicle compound. Beyond Harewood Road are further residential dwellings (L2).

Item	Description
	- West: The Christchurch North Methodist Church is located immediately west of the site and beyond Chapel Street residential properties. The nearest residential properties are located approximately 20 metres (m) west of the site.
Nearest Surface Water & Use	Kruses Drain is located on the site, entering in the south west in Lot 8 DP9715 and flowing north east across the site. The Drain has been modified and enters a concrete channel approximately 15 m west of the Marmite manufacturing building. The drain conveys water east and beneath the manufacturing building offsite beneath the railway line and Langdons Road. Kruses Drain primarily use is for the conveyance of stormwater runoff. However according to correspondence between CCC and Sanitarium, sighted by Geoscience, the drain has ecological and aesthetic values further downstream in residential areas.

2.1 Geology and Hydrogeology

The documented geology and hydrogeology of the site and surrounding area is summarised in Table 3.

Table 3: Geology and Hydrogeology

Item	Description
Geology[3]	The geology of the Harewood / Papanui area of Christchurch is described as dominantly alluvial sand and silt overbank deposits of the Holocene Springston Formation. The on-site abstraction wells bore logs M35/1349 details the underlying geology at the site. According to the M35/1349 log drilled in 1943, the underlying geology consists of sand and clay to 11 m bgl, underlain by ‘shingle’ (gravel) to 15.8 m bgl underlain by clay to 20.4 m bgl which is underlain by ‘shingle’ (gravel) proven to 27.4 m bgl. Refer to Appendix B for the above bore logs.
Hydrogeology[4]	The Christchurch groundwater system is a multi-layer, unconfined to confined aquifer system. The aquifers are composed of coarse sandy gravel sheets deposited during successive glacial and interglacial periods. Shallow groundwater in the unconfined alluvial aquifer of the Springston Formation is typically inferred towards the east to south east in the Christchurch region. The ECan GIS depicts the piezometric contours in the area of the site in a south easterly direction. The GIS also depicts the site located on the western extent of the coastal confined aquifer system with the unconfined/ semi-confined aquifer system boundary located approximately 250 m west.

	A previous environmental investigation at the site (MWH, 2006)[5] encountered groundwater at a depth of between 1.2 to 1.8 m bgl in the north of the site. Refer to Appendix C for the CRC bore search information.
Groundwater Abstractions	The facility obtains water from three groundwater abstractions bores located on the site to the east of the Manufacturing building. The registered and consented bores on site are M35/1383, M35/1349 and M35:7809-4585. M35/1383 (known as Sanitarium South Well) and M35/1349 (North Well) are both reported to be 27.4 metres deep and 0.15m diameter. M35/1349 is reported to have been installed in December 1943. Refer to Appendix D for all CRC consents relating to the site. There are several off-site groundwater abstraction wells within a 500 m radius of the site. The closest well and registered for domestic use is the Papanui High School located approximately 100 metres north of the Site. The closest down gradient abstraction well is located approximately 200 m east of the site, with the use of the well unknown. There are no public supply wells within a 500 m radius of the site.
Discharge Consents	Sanitarium hold a consent to discharge cooling water into Kruses Drain under consent CRC012082.1 (Refer to Appendix D). The consent was issued in April 2011 and expires on 20 July, 2036. According to CCC correspondence sighted, the discharge of groundwater is of importance in providing a base flow to Kruses Drain and therefore ensure aesthetic and ecological values of the water course are maintained.

2.2 Groundwater & Surface Water Sensitivity

Groundwater is shallow, understood to be approximately 1.2 – 1.8 m deep. A groundwater bore search indicated that groundwater is being used for industrial and domestic purposes within 500 m of the site, however most of the abstractions are from deeper aquifers (>20 m bgl).

Given the urban setting of the site and that the surrounding area are on reticulated water supply, the abstraction and future use of groundwater from the shallow aquifer for potable use in the vicinity of the site is considered unlikely. Groundwater is therefore considered to be of moderate vulnerability due to its shallow depth and of moderate sensitivity due to its industrial use.

An assessment to establish whether the shallow groundwater aquifer below the site is a 'sensitive aquifer' as defined by the Ministry for Environment (MfE) Guidelines, (2011)[6] has been undertaken. It is noted that an aquifer is sensitive when either all of the first three criteria set out below are met or the fourth criterion is met in accordance with Module 5.2.3 of the MfE Guidelines.

Table 4: Groundwater & Surface Water Sensitivity

Criteria	Assessment
The aquifer is not artesian or confined; and	**Yes**. The ECan GIS indicates the site is located upon a confined aquifer. However, the GIS viewer shows that the site is located within 250 m of the border of an unconfined aquifer to the west. Given the unknown accuracy of the ECan GIS, for conservatism, the aquifer has been assumed to be unconfined.
The aquifer is expected to be less than 10 m below the potential suspected source of impact; and	**Yes**. Previous MWH (2006) works encountered shallow groundwater at approximately 1.2 – 1.8 m bgl on site.
The aquifer is of quality appropriate for use, can yield water at a useful rate and is in an area where abstraction and use of groundwater may be reasonably foreseen; or	**Yes.** Although the properties adjacent to the site will be on a reticulated water system, there are numerous abstractions wells for domestic and commercial use within 500m of the site.
The source is less than 100 m from a sensitive surface water body (i.e. a surface water body where limited dilution is available to mitigate the impact of contaminated groundwater discharging into the surface water body).	**Yes**. The nearest water body is the Kruses Drain. Although modified for the majority of its length through the site and supplemented with a baseflow from groundwater following its use in cooling processes at the site, the drain is of aesthetic and ecological importance downstream.
Sensitivity Assessment	Based on the above, the shallow aquifer is considered to be **sensitive**.

3 Assessment of Past Land Use and Operations

3.1 General Information

Based on interviews with site personnel and a review of historical photographs and records, the property is understood to have been used as a commercial food production facility for over a century. The site was used as a residential property prior to 1900 and purchased by the Christchurch Health Home in 1900. At that time it was known as the 'Sanitarium'. By January 1901 the site began producing health food products for its patients and later the public. By 1920, a new factory had been built on the site to cope with the increased demand for products. In 1931, following the closure of an associated factory in Belfast, further production lines were added at the Harewood Road site. Extensions were added to the original factory throughout the 1920's, 30's and 40's.

A railway siding serviced the factory in the 1950's. A fire in the processing building in October 1966 devastated the factory, which was rebuilt during the late 60's. Through the 1970's to 2011, the factory continued to produce food goods including Marmite, Weetbix, peanut butter and bottled water / juice drinks. Following the Canterbury earthquakes in 2010 and 2011, Sanitarium relocated the majority of production lines to their Auckland factory, with the exception of the Marmite production line which was operational during the Geoscience site visit.

3.2 CCC Property File Review

The property file for the site held by CCC was reviewed as part of this PSI. A number of records documented the development and use of the on-site buildings since 1966. The relevant and applicable findings in relation to our environmental assessment of this search have been summarised in Table 5 and are provided in Appendix E.

Table 5: Review of Christchurch City Council Property File

CCC Reference	Date	Description
ABA10119292	25 Oct 2012	Consent issued for earthquake repairs to main processing building
Project Number 10115532	10 Sept 2012	Earthquake Strengthening to existing building
WOF 50323	1 June 2011	Owner of the site listed as Seventh Day Adventist Church Property Trustee (NZ)
WOF 50323	1 June 2009	Owner of the site listed as Australasian Conference Association Limited
PIM 10088739	23 Oct 2008	Consent to remove above ground storage tank, platform and ladder and install new stairs. Consent ABA 10088739 issued 21 November 2008.
Consent 10033694	10 April 2003	Consent to demolish residential building on Lot 6 DP9715
Consent ABA 100	October 2001	Drainage alterations within the bottling plant
-	23 April 1999	Consent to install LPG AST

CCC Reference	Date	Description
	29 Sept 1998	Removal of 9,100 L UST previously used to store 3B hazardous substances. Tank reported to be in good condition. Soil samples taken, results or assessment not provided. Oil Company responsible reported to be Shell.
Code Compliance Certificate Project 95002420	3 August 1995	Certificate issued for the construction of new Industrial silo foundations
Code Compliance Certificate Project 94010725	21 Dec 1994	Certificate issued for a new storage building (9 x 3.1 m) for archives/storage
94007607	10 Oct 1994	Consent application for the construction of a mezzanine floor in existing auxiliary warehouse
93011220	23 Sept 1993	Consent application for Building extension and reroof of existing manufactory building in north of site
CCC Hazards sheet	Undated but after 1991 (RMA)	Hazards at 54 Harewood Road listed as; *'two USTs – 12,510 L of flammable liquid. 1 above ground tank, gas cylinders and containers of flammable liquid also on site'*. 12,510 L is considered to refer to cumulative total of flammable liquids stored on site in a 9,100 L and 3,100 L UST.
CCC Letter from EHO	01 May 1988	Letter from CCC to Sanitarium regarding noise complaints related to hopper noise
-	September 1978	Application for tender specifications for 'additions to packing store and contract to demolition west wall of existing store and office and extend'
Various related to air emissions	1975 – 1978	Clean Air Act applications for consent to emit contaminants to the air from the site from the oil fired boiler, kerosene gas generator and waste incinerator (card and paper waste only)
Christchurch City Council – For City Engineer	5 March 1971	Sanitarium Health Food Co, Alteration to service lift. Site plan shows general layout in 1971.
10199	12 Dec 1969	Letter by J.M. Stiffe & Associates Architects describing proposed new buildings at the site, including additions to the warehouse and proposed retail packing store
Christchurch City Council – For City Drainage Dept.	1 Feb 1966	Proposed new gardeners shed and machinery store for the Sanitarium Health Food Co, Papanui

3.3 Listed Land Use Register (LLUR)

Canterbury Regional Council (CRC) maintains a Listed Land Use Register (LLUR) of past and current land uses within the Canterbury region. The LLUR documents sites that have or have had a hazardous activity or land use conducted according to the MfE Hazardous Activities and Industries List (HAIL)[7]. Sites that are recorded as currently or previously having had an activity on the HAIL trigger the requirement for a contaminated land investigation prior to development. The CRC LLUR property statement was requested by Geoscience on 23rd May 2014 for the site and neighbouring sites (within 100 m radius) and is presented in Appendix F.

Table 6: Summary of Canterbury Regional Council Listed Land Use Register (CRC LLUR)

Location	Period From	Period To	HAIL Activity (s)	LLUR Category
On-site				
54-64 Harewood Road (Sanitarium site)	Unknown	Present	Storage tanks or drums for fuel, chemicals or liquid waste	Verified HAIL has been partially investigated
Off-site				
Off-site; 84 Langdons Road (Bridgestone Firestone NZ Ltd)	Unknown	Current	Storage tanks or drums for fuel, chemicals or liquid waste	Review in Progress
	Unknown	c. 1960s	Persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glass houses or spray sheds	
Off-site; 30 Harewood Road (Former Hirequip)	1991	Unknown	Storage tanks or drums for fuel, chemicals or liquid waste	Verified HAIL has not been investigated

The LLUR states that in 1993 there were two underground storage tanks (USTs) on site. One UST storing 3(a) flammable liquid had a capacity of 3,400 L, while the second UST storing 3(b) flammable liquid had a capacity of 9,100 L. An AST was also reported to be present on site in 1993.

According to the LLUR, both of the aforementioned USTs were removed in 1998 without an assessment report documenting the condition of the soil or tanks removed.

The LLUR documents the involvement of Environment Canterbury (ECan) Enforcement Team during a report of oil in the stream (understood to be Kruses Drain) at the back of the Northlands Mall car park. The ‘diesel’ was traced back to the open drain in Langdons Road to the east of the site. Refer to Sections 3.5, 3.6, Appendix G and H for further information on the LFO leak.

The LLUR summarises the resulting environmental investigation and remediation efforts conducted in 2006 as well as the removal of the AST in February 2009, Refer to Section 3.6.

3.4 Historical Aerial Photograph Review

Aerial photographs obtained from the CRC online Geographical Information System (GIS) dating from 1941 to 2012 have been reviewed (refer to Figures 7 to 14). The relevant visible features are summarised in Table 7.

Table 7: Historical Aerial Photographs

Date	Figure No.	Description
1941	7	The factory is present in its current position with two rectangular buildings orientated in a south to north direction parallel to the railway line to the east. Two residential properties are located in the north of the site on Part Lot 1 DP204 and RS41027. A long rectangular building (understood to be the Goods Shed) is also located adjacent to the railway line on Lot 1 DP 59153. The railway siding to the Factory has not been developed yet. A building with frontage onto Harewood Road is located in the south of the site. The general layout of the site appears as in 2014 with access to the site from Harewood and Chapel Street. A timber processing yard is apparent off-site to the east of the site. The yard is accessed off Langdons Road and contains several stacks of timber surrounding a central building. It is unknown whether timber treatment occurred at the site.
1946	8	As in 1941, except an additional building has been built to the north of the existing factory.
1955	9	As in 1955 with the addition of a railway siding to the east of the factory.
1965	10	Four large silos have been constructed to the south of the factory.
1973	11	As in 1965.
1984	12	Two smaller tanks/silos are located between the northern building and the pre-existing four larger silos. The Distribution store has been extended to the west. The residence on Lot 1 DP204 has been removed. What is understood (from pers. comms. with Sanitarium employee Mr Ashby) to be a petrol dispenser island is apparent on this Lot, located to the west of the large grain silos.
1994	13	The Factory has extended south with the development of a large building understood to be the 'Distribution B-Store' and appears to be used for car parking. The residence on RS 41027 has been removed. The railway siding has been removed and this area of the site (Lot 1 DP 59153) appears to be used for car parking. The Papanui Timber yard to the east of the site is being redeveloped. The former Hirequip site located to the east of the site on Lot 2 DP59153 has been constructed.
2012	14	As in 1994.

A review of the Historical aerial photographs indicates that the site has been used for another HAIL not detailed in the LLUR. Railway sidings and goods sheds are visible on the site between 1955 and 1994. Mr Ashby of Sanitarium did not believe refuelling of trains occurred on the sidings. Other items/goods not related to the Sanitarium factory were also occasionally temporarily stored on site awaiting collection by train. According to the MfE '*Railway yards including goods-handling yards, workshops, refuelling facilities or maintenance areas (F6)*' are on the HAIL.

3.5 Sanitarium Environmental Incident Reports

Three environmental incident reports, documented by the Site Environmental Officer, describe three incidents at the site with the potential to cause localised contamination to the ground. The incidents are summarised as follows and provided in Appendix L:

- 17th July 2006, LFO leakage into soil from fractured delivery line (Refer to section 3.7.1);

- 10th September 2010; LFO spill on concrete due to over fill by delivery driver. Oil company contractors contain spill and clean up without any contamination of soil or stormwater system documented. An assessment to confirm this statement has not been made available to Geoscience; and

- 8th June 2011; Hydraulic oil from forklift truck splits and spills onto concrete floor. Location not documented. Spill contained and cleaned up.

3.6 Sanitarium Internal Documents and Correspondence

An email between Mr Ashby of Sanitarium and Mr Baxter of ECan, details the source of LFO leak identified in July 2006 to be an underground LFO fill pipe. Following the report of LFO/diesel in Kruses Drain, ECan requested that 'Sanitarium must take all steps necessary to avoid any further discharges'.

Sanitarium, in cooperation with Shell New Zealand Limited, their consultants MWH NZ Limited and petroleum contractors Gilbarco and Petroleum Solutions Limited (PSL), replaced the LFO fill line with an above ground line, removed impacted soil and groundwater and disposed of to Texco and Chemwaste in Christchurch and installed temporary interceptors in Kruses Drain. Copies of the correspondence are provided in Appendix G.

3.7 Previous Environmental Reports

The CRC LLUR documents two previous environmental investigation reports relating to the site. They are;

- *Montgomery Watson Harza (MWH), September 2006; Sanitarium Health Food Company Light Fuel Oil Investigation; and*

- *Envirochem, February 2009*[8]*, The report on the removal of above ground light fuel oil tank at Sanitarium Health Foods Company, 54-64 Harewood Road, Papanui, Christchurch.*

A summary of each report is provided in the following sections with the full reports provided in Appendix H.

3.7.1 MWH, September 2006; Light Fuel Oil Investigation

The report documents the site setting, source of the LFO leak, remediation and soil validation of the excavation surrounding the removed underground LFO pipe and an assessment of the analytical laboratory results.

The source of the LFO leak and subsequent impact to Kruses Drain was documented by MWH as being the LFO remote fill point on the western side of the factory building. During the removal of the LFO line, light non-aqueous phase liquid (LNAPL) LFO was observed to be tracking along the stormwater pipeline which runs west to east beneath the boiler house building. LFO was also observed to be seeping through an old brick made sump into the stormwater system. The stormwater pipe was resealed while the brick sump was replaced with a concrete sump.

During the remediation in July 2006, 48m^3 of impacted soil and 74,060 kg of impacted surface and groundwater were removed from the site. Approximately 3,500 L of LFO LNAPL was removed from the excavation beneath the boiler room building. Pre cast concrete sumps were installed to allow future inspection of the remedial area.

In addition to the remedial works centred on the LFO pipe, MWH also conducted four hand auger boreholes to the east of the boiler house building to assess if contaminants were migrating down gradient from the source. Samples of the groundwater from the potable bores on site were also collected. A total of twenty soil samples were collected from the site and analysed by Hill Laboratories for Total Petroleum Hydrocarbons (TPH) only.

According to MWH all of the soil samples representing soil remaining on site met the MfE 1999 (Revised 2011) Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, and specifically the All Pathways and the Protection of Groundwater Quality for Industrial / Commercial land use. The groundwater samples from the on-site abstraction wells met the MfE Guideline criteria for potable use. MWH concluded that the hand auger soil bores to the east of the factory and down hydraulic gradient of the LFO leak indicated no contaminant migration.

MWH also concluded that although remedial efforts to remove contaminated material were significant, '*residual contamination….beneath the building cannot be discounted*' and '*contaminated soil underlying the building is considered to be a possibility*'.

3.7.2 Envirochem, February 2009, Removal of above ground light fuel oil tank

In February 2009, Envirochem was engaged by Fuelquip (NZ) Ltd to determine the level of contamination associated with the former LFO AST. The LFO AST located in the boiler house in the north of the site was removed by Fuelquip in February 2009. The AST was reported by Envirochem to be '*very old but…. in reasonably good condition'* and had a storage capacity of approximately 19,500 L.

Approximately 6m^3 of sand within the containment bunker beneath the AST was considered to be contaminated and was disposed of to Texco in Christchurch. The bunker was reported to be 7.5m long by 2.5 m wide.

Three samples were collected at a depth of 0.45 m bgl beneath the LFO AST following its removal. The three samples were all reported to be below the laboratory detection limit for all TPH carbon bands and therefore below MfE Guideline levels.

4 Site and Operations Information

4.1 General Site Description

During the site visit conducted by Geoscience on 13 May 2014, Geoscience Environmental Consultants Gareth Oddy and David Robotham were accompanied by Sanitarium Environmental Officer Warren Ashby. The visit included a site walkover of the grounds and within accessible on-site buildings to assess the processes currently conducted and the use and storage of hazardous substances on-site. According to Mr Ashby approximately 18 staff are employed at the site. The site layout at the time of the visit was as depicted in Figure 2. Photographs taken during the site visit are provided in Appendix A.

Access to the site is gained from Harewood Road in the south and Chapel Street in the west. A Heavy Goods vehicular access is also located in the south from Harewood Road and leading to the Distribution buildings.

The mid-section of the former processing building was removed following the Canterbury earthquakes due to damage sustained. The buildings are therefore now split and have been defined by Sanitarium as ‘Manufacturing’ in the north of the site and ‘Distribution’ in the south of the site.

The main manufacturing and processing building is located in the north of the site, orientated in a south north direction running parallel to the railway line to the east. The Manufacturing building includes the boiler room, food testing laboratory, Marmite production line and bulk processed Marmite stores on the ground floor. The offices, canteen, maintenance department, yeast processing and bulk ingredient stores are present on the first floor.

The Distribution ‘B, M, and R’ Stores are located in the southern half of the site and were previously used for packing, storage and distribution of goods out of the factory.

The western half of the site is largely landscaped gardens with several large trees lining the western boundary and along Kruses Drain. A protected tree is located between Kruses drain and the vehicular site entrance from Harewood Road. A Gardener’s Compound and former Dangerous Goods Store (DGS) are located in the south west of the site.

A brick built single storey former residential building is located in the west of the site adjacent to the vehicular access from Chapel Street. Car parking is located to the west and north of the Manufacturing building.

Asphalt hard-standing extends around the Manufacturing building to the north and east to the boundary of the site in the south east.

4.1.1 Current Operations

During the site visit food production was being undertaken within the manufacturing building in the north of the site. The Marmite production line was operational and associated yeast washing and processing, as well support services such as the engineering/maintenance, laboratory, offices and canteen, were all still operational during our visit. The four large grain silos were still located on site and are due to be removed according to Mr Ashby.

The sites transformer is located within a detached building (labelled SWB on Figure 2) and was present and operational. The Distribution 'B, M, and R' Stores were observed to be predominately empty with minor volumes of produced food goods observed on pallets within the south of the Distribution B-Store.

The Manufacturing Workshop was also found to be operational, with minor welding works being conducted. Various manufacturing, electronic and maintenance tools and equipment were stored in the workshop as well as small volumes of some waste items including used oil and batteries.

The Gardener's Compound was still in use with various hazardous substances including small volumes of petrol and pesticides stored in the covered garage of the Compound.

4.2 Visual Indications of On-Site Impacts

No visual indications of on-site impacts were observed during the site inspection. Anecdotal evidence provided by the Sanitarium Environmental Officer Warren Ashby, and confirmed during the review of the MWH (2006) report, indicates that previous impact to the soil and groundwater and subsequently stormwater has occurred historically at the site. The area of impact previously located adjacent to the LFO AST and LFO fill point was covered by concrete at the time of the site visit.

All other areas of the ground surface inspected at the site, including Kruses Drain, appeared to be free of visual and olfactory indications of significant contamination.

4.3 Hazardous Substance Use and Storage

Hazardous substances used at the facility includes primarily cleaning and maintenance products as well as small volumes of chemicals utilised in the food testing laboratory. As the facility is used for food production, limited hazardous substances are used on site. The largest volumes currently stored and used on-site relate to the boiler, including up to 18,000 L of LFO and approximately 125 L of diesel.

Small volumes (up to 2.5 L each) of hazardous substances including resins, lubes, sealants and grease are stored on shelving in the Maintenance department on the second floor. Small volumes (up to 20L) of cleaning products labelled as corrosive, were identified within the chemical cage located in the Boiler room, and on dedicated cleaning trolleys located within the processing factory. Small volumes of methanol, nitric acid and methylated spirits were located within two unlocked flammable liquid cupboards within the laboratory.

Various hazardous substances related to grounds maintenance were observed within the Gardener's Compound located in the south west of the site. Substances included small volumes (up to 25 L) of diesel and petrol in 10 L containers as well as various pesticides and spray equipment. The pesticides understood to have been used at the site in the recent (last 10 years) time includes Codacide, Versatill (9.1B, 9.2A, 9.3C), Banvine (6.1E, 6.4A, 6.9A, 9.1A, 9.2A, 9.3B, 9.4C), conquest, sulphate of iron, X iron, Buster (3.1D, 6.1D, 6.3B, 6.4A, 6.8B, 6.9A, 9.1D, 9.2A, 9.3C) and Diazinon (6.1D, 6.8B, 6.9A, 9.1A, 9.2D, 9.3A, 9.4A)

A former Dangerous Goods Store (DGS) located adjacent to the Gardener's Compound was observed to be empty at the time of the audit and found to be in a good condition. According to Mr Ashby it was previously used to store paints and thinners for building and ground maintenance only. Two

Hazardous Substance Registers provided by Sanitarium (one undated and one dated November 2013) indicate that up to 280 litres of paints and thinners were stored in the DGS.

Compressed gas cylinders used in spot welding operations are stored outside the building in a fenced and secured area to the south of the Wholesale warehouse.

Geoscience did not observe evidence of significant ground surface spillage from chemical containers at the facility. The primary materials used at the facility are provided in Table 8. Geoscience were supplied with an electronic Hazardous Substance Register by Sanitarium (Refer to Appendix I).

Table 8: Chemical Usage and Storage

Hazardous Substance	Hazard Classification	Approximate Volume on Site	Location Stored	Use
Boiler Room				
Light Fuel Oil (LFO)	3.1D & 9	18,000 L	AST north of Boiler House	Fuel for Boiler
Diesel	3.1 D & 9	100 L	Outside storage beside LFO tank (60L) In boiler room (40L)	For lighting boiler
Adjunct	8	40 L	Under main manifold in boiler room	Boiler water treatment
Amersite 2010	8	Up to 120 kg		Boiler oxygen scavenger
Cleaning Cage				
Glissen detergent	8	200 L	Manufacturing	Cleaning vats
Foam Acid G	8	40L		Cleaning stains on heat exchanger end plates and sight glass taps on vat. Removes staining, product scale and baked on product.
Laboratory				
Methanol	3, 6.1	2.5L	Laboratory Flammable Cupboard	Marmite moisture testing
Methylated Spirits	3	5L	Laboratory Flammable Cabinet	Sterilise head space in taps in vats
Nitric Acid	8	5L	Laboratory Acid Cabinet	Marmite salt testing
Maintenance Department				
White spirits	3.1c	20 L	Econoclean stand	Maintenance and cleaning
Manufacturing				
Caustic Soda	8	1200 L	Chemical cage	Neutralising

Hazardous Substance	Hazard Classification	Approximate Volume on Site	Location Stored	Use
Exelerate HS-I	5.1	75 kg		Cleaning Vats

MSDSs were not reviewed as part of this PSI

4.3.1 Underground Storage Tanks (USTs)

According to facility contacts, and documents reviewed, there are no USTs currently located on the subject property, and no visual indication of the potential presence of existing USTs was noted by Geoscience during the site visit.

According to Mr Ashby of Sanitarium, a former kerosene UST and two petrol USTs were previously located on site. The approximate location of the USTs is indicated in Figure 5. The use of the kerosene UST is unknown and the extent of any subsurface pipework and associated equipment is also unknown.

The former petrol underground petroleum storage systems (UPSSs), a 9,100 L capacity UST and a 3,410 L UST were located in the north of the site. The approximate location of the former USTs is provided in CCC Hazard records (refer to Appendix E). The 9,100 L UST is understood, from conversations held with Mr Ashby, to have been located to the west of the manufacturing building, and was previously used to refuel the fleet and consisted of a dispensing island within the exit roadway. The dispenser was later moved to be adjacent to the western façade of the manufacturing building.

There are no known environmental assessments on the soil or groundwater condition adjacent to the former USTs.

4.3.2 Aboveground Tanks (ASTs)

The facility has the following aboveground storage tanks (ASTs):

- One 18,450 L metal tank (Tank ID: 2300030), manufactured in November 2008 (to design standard SWRI 95-03) stores LFO.

No other current ASTs containing hazardous substances are currently present on the subject property. A former AST located in the approximate same position on site, was removed in 2009.

4.3.3 Discontinued Operations

According to facility personnel, operations of the facility have remained generally consistent since Sanitarium began operations at the site in the 1901. Although the scale has increased and product lines have diversified, the core productions have largely remained consistent until 2011 and the Canterbury Earthquakes. Mr Ashby stated that the only product now produced at the factory is 'Marmite' and all other product lines have been relocated to the Auckland Sanitarium facility, with the exception of the water/juice products which have been discontinued.

Boilers have been used at the site for a significant length of time and were initially coal powered, changing to a light fuel oil (LFO) source in the mid 1970’s. Kerosene was also reported to have been used at the factory in the 1980’s and 1990’s for a variety of maintenance uses and heating.

According to CCC records reviewed, the factory used to have a small waste incinerator in the 1970’s for cardboard and paper disposal. The date waste incineration ceased is unknown.

An approved Handler Test Certificate, dated 20 June 2006 lists the hazardous substances in use and storage at the site as, LPG (2.1.1A), Acetylene (2.1.1A), Petrol (3.1A), Ethanol (3.1B), Acetone (3.1B), Methyl Butyl Ketone (3.1B) and Chromic Acid (6.1B).

4.4 Hazardous and Non-Hazardous Waste Management

4.4.1 Hazardous Waste

A partially filled 200 L drum, labelled ‘waste oil’ with two smaller 20 L oil drums were observed on hard standing within the Engineers workshop. Four car batteries were also observed in the workshop as were two unlabelled gas cylinders. A small quantity of hazardous waste related to the laboratory operation and cleaning processes is produced annually. The waste is understood to be disposed of off-site at appropriate waste disposal facilities. Appropriate records of waste generation and disposal were sighted during the site visit.

No other hazardous waste is understood to be generated from the processes conducted on site.

4.4.2 Non-Hazardous Waste

No staining of soils or pavement was noted in the solid waste storage areas. Geoscience did not observe evidence of solid waste disposal on the subject property. According to anecdotal evidence provided by Mr. Ashby, the facility did historically generate a lot of compostable organic material from the process and this was stored, composted and eventually used on site. It is unknown when this practice ceased.

One waste management skip was observed adjacent to the Engineers workshop during the site visit. The skip was filled with miscellaneous waste items and is considered not to represent normal waste streams at the site but due to the relocation of equipment.

4.5 Water, Wastewater and Stormwater

4.5.1 Water

The facility obtains water for cooling processes such as air conditioning and refrigeration, evaporator vapour condensing, and the cooling of vats. The water is from three groundwater abstractions bores located on the site to the east of the Manufacturing building. The registered and consented bores on site are M35/1383, M35/1349 and M35:7809-4585. The cooling water is subsequently discharged into Kruses Drain under consent CRC012082.1.

4.5.2 Wastewater

The Sanitarium facility generates sanitary wastewaters that are discharged to the City Council reticulated waste water network. A 2001 application completed by Sanitarium to discharge waste water under the trade wastes bylaw was reviewed. The application details typical trade waste contents from the Sanitarium yeast extract processing and evaporative conciliation process includes a discharge of 22,400 m^3 of waste water per year, with a daily average of 70,000 litres. The waste water was characterised as ranging between 15-30 ^{o}C, with a BOD$_5$ of 2,100 mg/L, 190 mg/L of suspended solids and a pH between 5 – 9. Oil and greases content of the waste water was described as ‘minimal’.

Further documented waste water discharges include the boiler blow down water. This discharge is described as between 500 to 1,000 litres containing water between 40 – 60 C in temperature, with a pH of between 10 – 12 and containing 1,800 mg/L of suspended solids. The last documented waste water discharge under CCC trade waste consent was related to the water and juice products produced in the former bottling plant. Other specific concentrations of chemicals are not documented in the trade waste consent.

Sanitarium hold a consent to discharge cooling water into Kruses Drain under consent CRC012082.1. The consent was issued in April 2011 and expires on 20 July, 2036 and stipulates that the flow of 10 l/s must not be exceeded and the temperature must not exceed 25 ^{o}C. No chemical treatment or additions are performed to the wastewater. Samples are not required to be collected of the cooling water discharge as part of the consent compliance.

Facility personnel reported that the site has been connected to the public sewer system since its construction, and that there are no known septic systems or dry wells on the property. Geoscience noted no obvious visual evidence of septic systems or dry wells on the property.

4.5.3 Stormwater

Precipitation that falls on the subject property is collected into sumps located in the paved areas north, east and west of the manufacturing building. Based on a drainage property drawing provided by CCC, the stormwater system appears to discharge into Kruses Drain and the municipal system located on Langdons Road which conveys stormwater east, towards Northlands Mall.

4.6 Polychlorinated Biphenyls (PCBs)

Geoscience inspected the property for types of equipment that have been historically associated with the use of PCBs as a dielectric fluid coolant and stabilizer. Geoscience observed one pad-mounted electrical transformer located within the centre of the site within a building known as the SWB (Refer to Figure 2). The transformer is owned by Sanitarium and was not labelled as to its PCB content. No significant leakage or spillage was noted on the ground surrounding the transformers.

Information provided by Sanitarium on the Transformer, including maintenance inspection records (Refer to Appendix K) indicate the Transformer, manufactured in 1978 contains 1,250 L of oil and that the system is ONAN (Oil Natural, Air Natural). The inspection conducted by Connetics in March 2014 also notes ‘a minor weep around the tap changer and drain valve’.

In addition an Orion owned substation located off-site but adjoining the property (Part Lot 9 DP9715) in the west is likely to contain transformers. The past and current oil content of the transformer is unknown.

4.7 Asbestos-Containing Materials (ACM)

An asbestos survey has not been undertaken at the site, however the following observations were made.

The roof of the original factory building was replaced following the fire at the Factory in 1966. Information provided by D. Morris indicates that the factory was significantly damaged and asbestos fragments were removed by employees during the clean-up. Given the severity of the fire and damage caused, asbestos containing material may have accidentally been deposited to ground around the factory.

A drawing by Architects Trengrove & Blunt, for the boiler room extension to the factory dated 7 March 1980, indicates parts of the factory structure exterior were composed of asbestos. This included asbestos cement roofs and fascias on the processing/manufacturing building. The plan also detailed that the new canopy would be clad with Fibrolite (asbestos).

Facility personnel were not aware of the presence of any PACM or ACM in the buildings, and were also not aware of any asbestos survey having been completed in the buildings.

5 Conceptual Site Model

A conceptual site model consists of three primary components. For a contaminant to present a risk to human health or the environment, all three components are required to be present and connected. For the potential risk to be determined each component is required to be assessed. The three components of a conceptual site model are:

- Source of contamination;
- Pathway in which contamination could potentially mobilise along; and
- Sensitive receptors which may be impacted by the contamination.

Table 9 summarises the potential source, pathway, receptor linkages considered at the site.

Table 9: Conceptual Site Model

Potential Sources	Pathways	Receptors
Former Kerosene USTs	• Inhalation of vapours within occupied buildings • Dermal contact with impacted soil and accidental ingestions, inhalation during redevelopment • Offsite discharge of impacted groundwater	• Shallow aquifer • Current and future occupants of adjacent on-site buildings • On-site redevelopment construction workers
Former Petrol UPSS		
LFO contamination beneath boiler room	• Inhalation of vapours within occupied buildings • Dermal contact with impacted soil and accidental ingestions, inhalation during redevelopment • Offsite discharge of impacted groundwater • Offsite discharge of impacted groundwater and LFO into the reticulated stormwater network	• Shallow aquifer • Stormwater network and off-site environmental receptors (Dudley Creek) • Current and future occupants of adjacent on-site buildings • On-site redevelopment construction workers
ACM in soil surrounding factory	• Inhalation of asbestos fibres during disturbance of the soil as a part of the redevelopment	• On-site redevelopment construction employees • Off-site residential receptors
Former Railway Sidings & Goods Handling	• Dermal contact with impacted soil and accidental ingestions, inhalation during redevelopment • Offsite discharge of impacted groundwater	• On-site redevelopment construction employees • Off-site groundwater receptors

6 Summary of Information

This PSI Assessment has reviewed existing information where available for the site including Council property file records, existing environmental reports, property title information and historical aerial photographs. In addition, Geoscience conducted a site walkover to visually inspect site conditions at the Sanitarium Factory located at 54–62 Harewood Road, Papanui, Christchurch.

6.1 Site History and Current Land Use

Review of historical aerial photographs, CCC property file and Sanitarium documents indicate that the Sanitarium Factory commenced in 1901 with a small operation which has expanded in volume and product range over the last 100 years. Additional buildings were erected at the site throughout the last century of operations as demand grew. As well as food production lines, the factory has included a food testing laboratory, engineer’s workshop, maintenance room, boiler room, store, offices and retail store. Grounds maintenance and staff welfare has also seen a gardener’s compound constructed as well as tennis courts and numerous car parks.

Historical aerial photographs indicate that the site was used by Sanitarium since at least the 1940’s for food production processes. A railway siding and goods handling building as well as fuel storage equipment, which have the potential to contaminate the land, have also been identified on the aerial photographs. These activities and land uses are listed on the MfE HAIL. According to the LLUR statement, additional HAIL land use has been conducted on neighbouring properties, namely the Firestone/Bridgestone Factory north of the site and the Hirequip to the south east.

6.2 Receptors and Sensitivity

The site is surrounded by a mixture of commercial and residential land use. The nearest residential properties are located approximately 20 m west of the site boundary. Kruses Drain is located on-site and has been modified and diverted to flow beneath the boiler house extension.

Depth to groundwater beneath the site is reported to be approximately 1.2 – 1.8 m bgl. Shallow groundwater is inferred to flow in an easterly direction based on surrounding topography and ECan GIS piezometric contours.

A groundwater bore search detailed three on-site bores drilled for industrial purposes with total depths of 27 m bgl. The bores are still in place with two of the three still used at the Sanitarium site. Several off-site groundwater abstractions were listed and these are all from deeper confined aquifer units. Given the urban setting of the site and that the surrounding area are on reticulated water supply, the abstraction and future use of groundwater for potable use in the vicinity of the site is considered unlikely. Groundwater is therefore considered to be of moderate vulnerability due to its shallow depth and of moderate sensitivity due to its commercial/industrial use.

6.3 Potential Soil and Groundwater Contamination Issues

No significant environmental issues relating to the current operations at the site that may give rise to contamination of soil and/or groundwater were observed during the site walkover. However, a number of potential historical sources of contamination have been identified and considered significant to warrant further investigation. These include:

- Former kerosene UPSS: not investigated at time of removal, soil and groundwater condition unknown;
- Former petrol UPSS: not investigated at time of removal, soil and groundwater condition unknown;
- LFO residual contamination beneath boiler room: the MWH LFO investigation report indicates that there is likely to be residual contamination remaining at the site beneath the boiler house building; and
- ACM in soil surrounding factory: ACM is known to have been present at the site in the past prior to 1966 and after the rebuild. Following the factory fire in 1966 asbestos fibres and debris waste may have been deposited to the land.

The site and surrounding area has a long history of commercial and industrial use (since the early 1900s) and there is potential for residual historical contamination to be present beneath the site.

7 Recommendations

Quantification of contamination (if present) is not possible without further (i.e. intrusive) site investigation. It is recommended that an intrusive investigation focused on the four potential source areas is conducted.

Due to the HAIL activities previously undertaken at the site, in accordance with Regulation 11 of the *National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health (2012)*[1] (referred to as "the NES"), if the site was to be subdivided; the land use changed; earthworks involving disturbance of greater than 25 m^3 of soil per 500 m^2 ; or off-site disposal of greater than 5 m^3 of soil per 500 m^2, a detailed site investigation would be required for the activity to be considered a permitted activity. A DSI would therefore identify financial liabilities associated with the land; enable an assessment of consent requirements relating to the site's redevelopment; allow estimates of soil disposal (if required) costs to be made; and determine health and safety requirements to be put in place during the development of the site.

No formal asbestos surveys had been undertaken to the knowledge of site management. It is therefore recommended that prior to demolition an independent survey is undertaken to confirm absence/presence of asbestos containing material in the buildings and also soil surrounding the factory.

8 References

1 MfE Apr 2012: Users' Guide National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health. Wellington, Ministry for the Environment.

2 MfE, 2011. *Contaminated Land Management Guidelines No.1: Reporting on Contaminated Sites in New Zealand.*

3 Brown, L.J., Webber, J.H., 1992. *Sheet 1 - Geology of the Christchurch Urban Area 1:25,000.*

4 ECan, 2014. *Environment Canterbury on-line GIS Database.* Viewed on 9 May 2014 at: http://canterburymaps.co.nz/Portal

5 *Montgomery Watson Harza (MWH), September 2006; Sanitarium Health Food Company Light Fuel Oil Investigation; and*

6 MfE 2011: Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand. Revised 2011. Wellington, Ministry for the Environment.

7 MfE Oct 2011: Ministry for the Environment; Hazardous Activities and Industries List (HAIL). Wellington, Ministry for the Environment.

8 *Envirochem, February 2009, The report on the removal of above ground light fuel oil tank at Sanitarium Health Foods Company, 54-64 Harewood Road, Papanui, Christchurch.*

9 Limitations

i. We have prepared this report in accordance with the brief as provided. This report has been prepared for the use of our client, Mitre 10 Mega Limited, their professional advisers and the relevant Territorial Authorities in relation to the specified project brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.

ii. The recommendations in this report are based on the ground conditions indicated from published sources, site inspections and subsurface investigations described in this report based on accepted normal methods of site investigations. Only a limited amount of information has been collected to meet the specific financial and technical requirements of the Client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it must be appreciated that actual conditions could vary from the assumed model.

iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.

iv. This Limitation should be read in conjunction with the IPENZ/ACENZ Standard Terms of Engagement.

v. This report is not to be reproduced either wholly or in part without our prior written permission.

We trust that this information meets your current requirements. Please do not hesitate to contact the undersigned on 03 328 9012 if you require any further information.

For and on behalf of Geoscience Consulting (NZ) Ltd,

Gareth Oddy	**David Robotham, CEnvP**
Senior Environmental Scientist	Associate Environmental Scientist

Figures

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PO Box 373, Christchurch 8140, New Zealand
T (+64) (3) 328 9012 F (+64) (3) 328 9013
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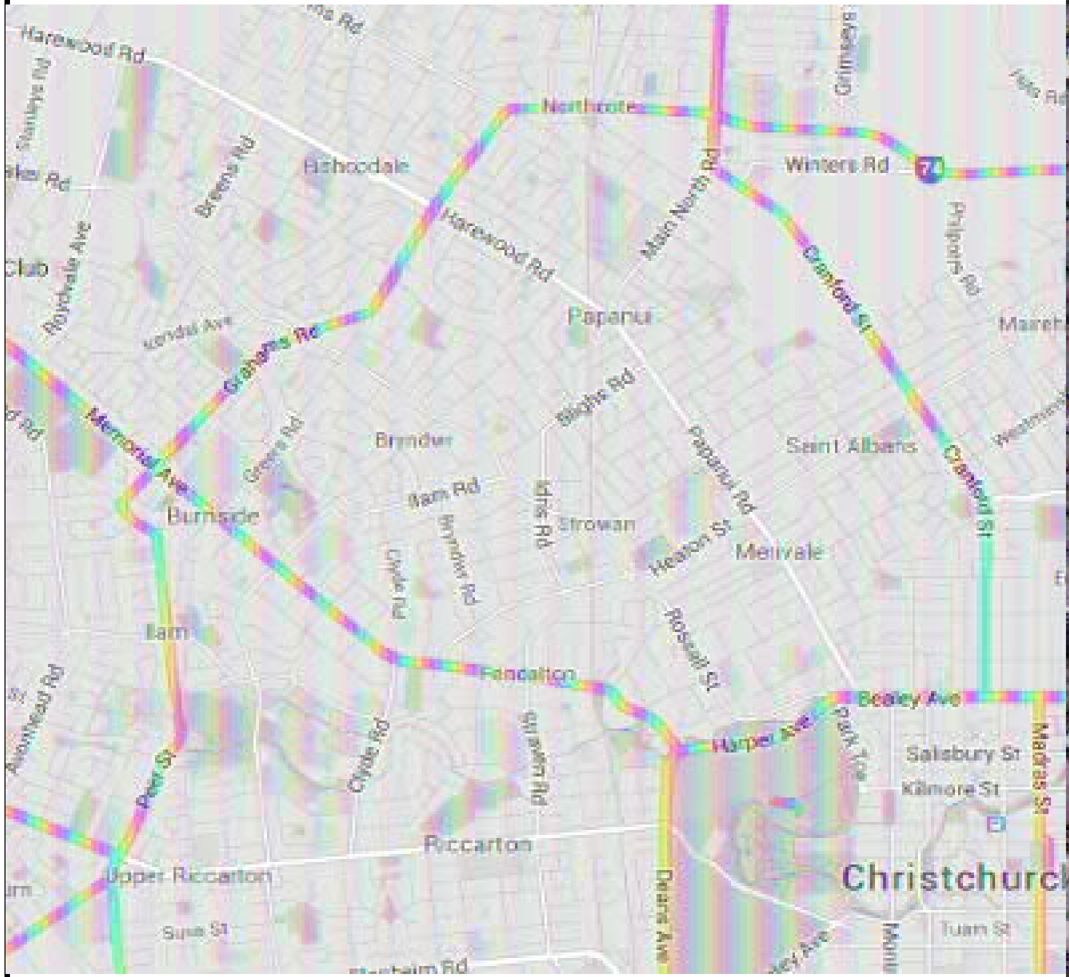
30.05.2014



Note: Aerial Photograph sourced from Canterbury Maps

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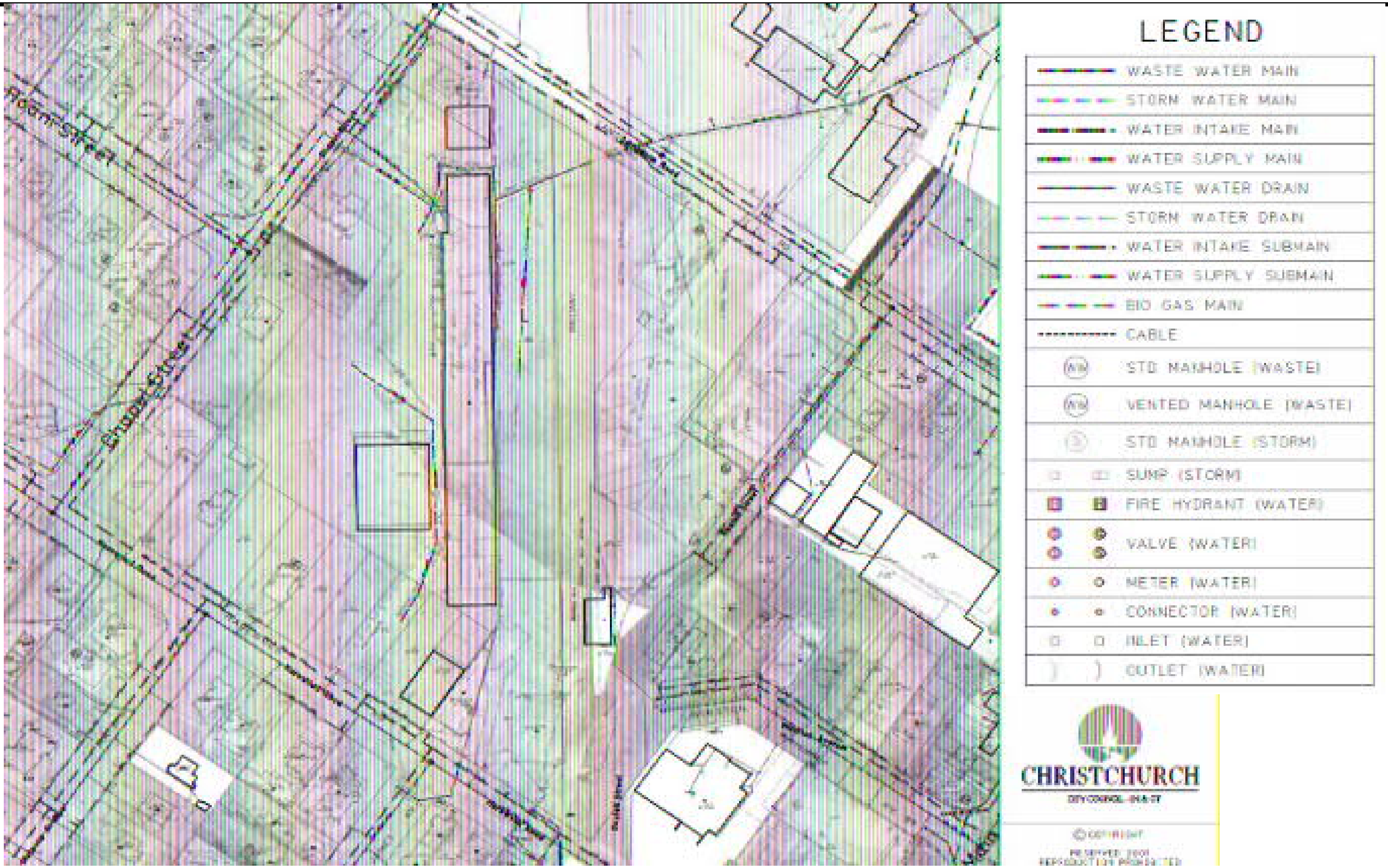
Date	15.05.2014	**Client**	**Mitre 10 Mega Ltd**		
Drawn by	GO/CM	**Project**	**Sanitarium, Harewood Rd**		
Approved by	DR	**Description**	**Site Location Plan**		
Scale	NTS	**Figure Number**	1	**Project Number**	11139

Date	15.05.2014	**Client**	**Mitre 10 Mega Ltd**		
Drawn by	GO/CM	**Project**	**Sanitarium, Harewood Rd**		
Approved by	DR	**Description**	**Site Layout Plan, 2012**		
Scale	NTS	**Figure Number**	2	**Project Number**	11139



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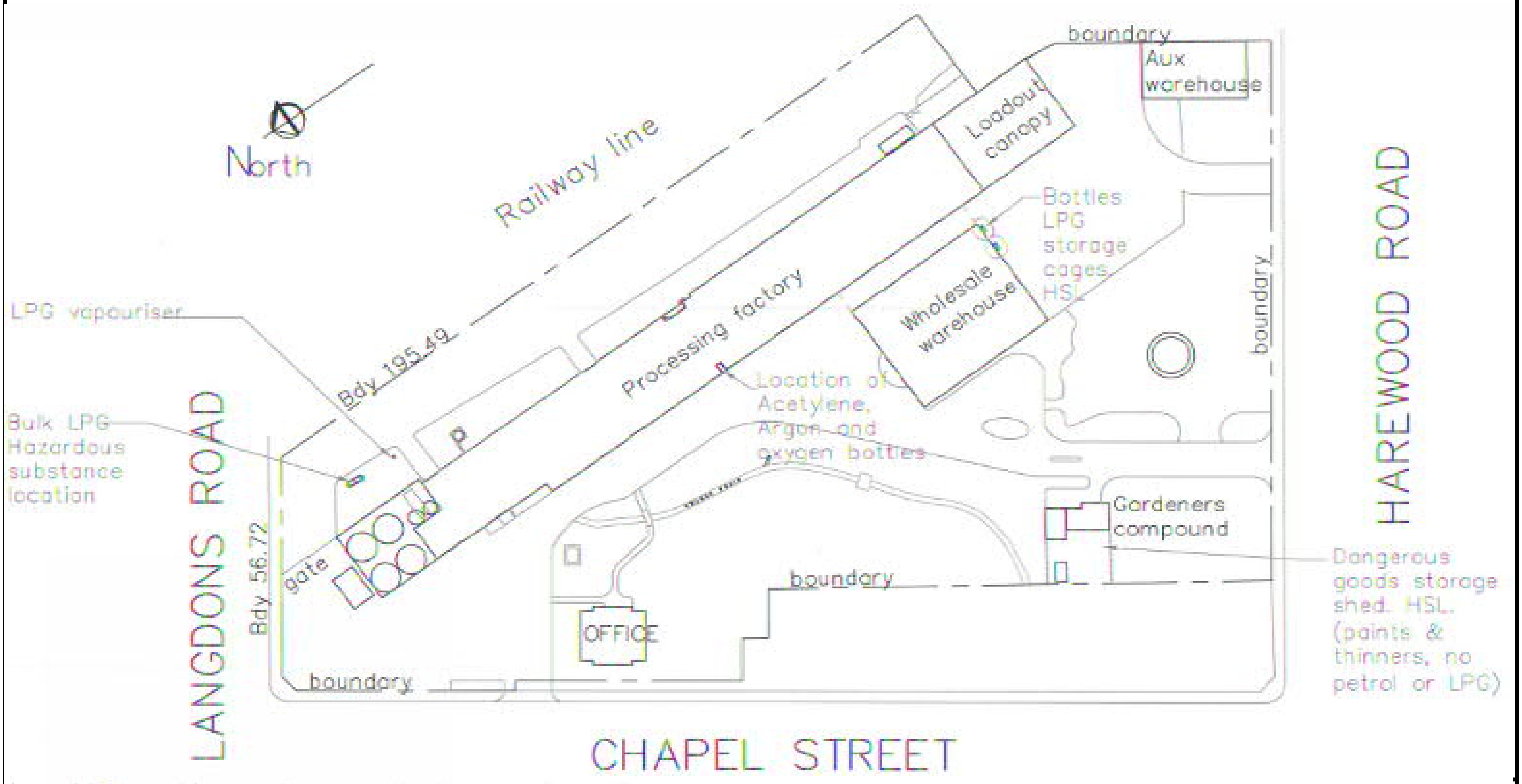
Date	15.05.2014	**Client**	**Mitre 10 Mega Ltd**		
Drawn by	GO/CM	**Project**	**Sanitarium, Harewood Rd**		
Approved by	DR	**Description**	**Site Layout Plan, Drainage**		
Scale	NTS	**Figure Number**	3	**Project Number**	11139



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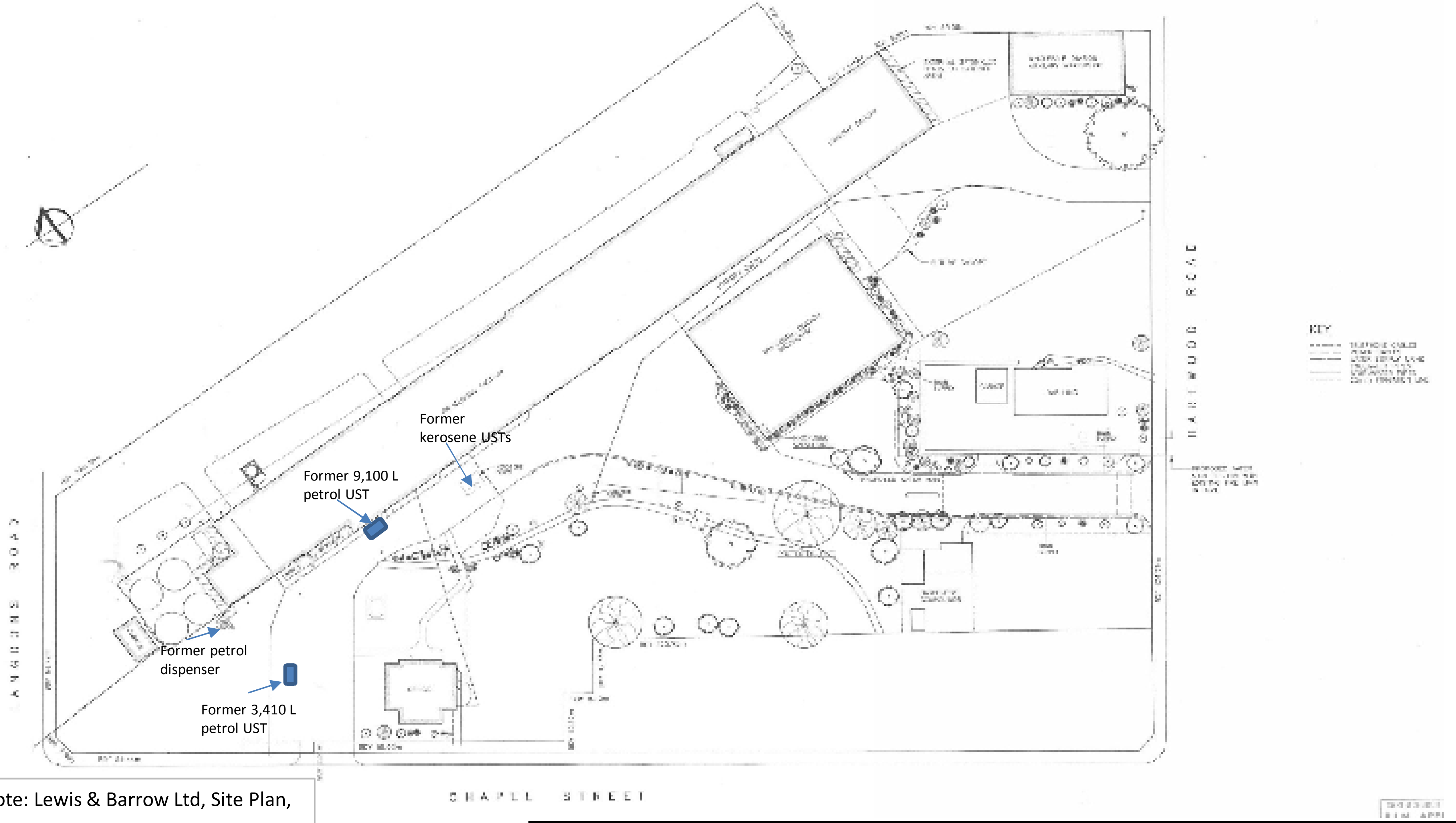
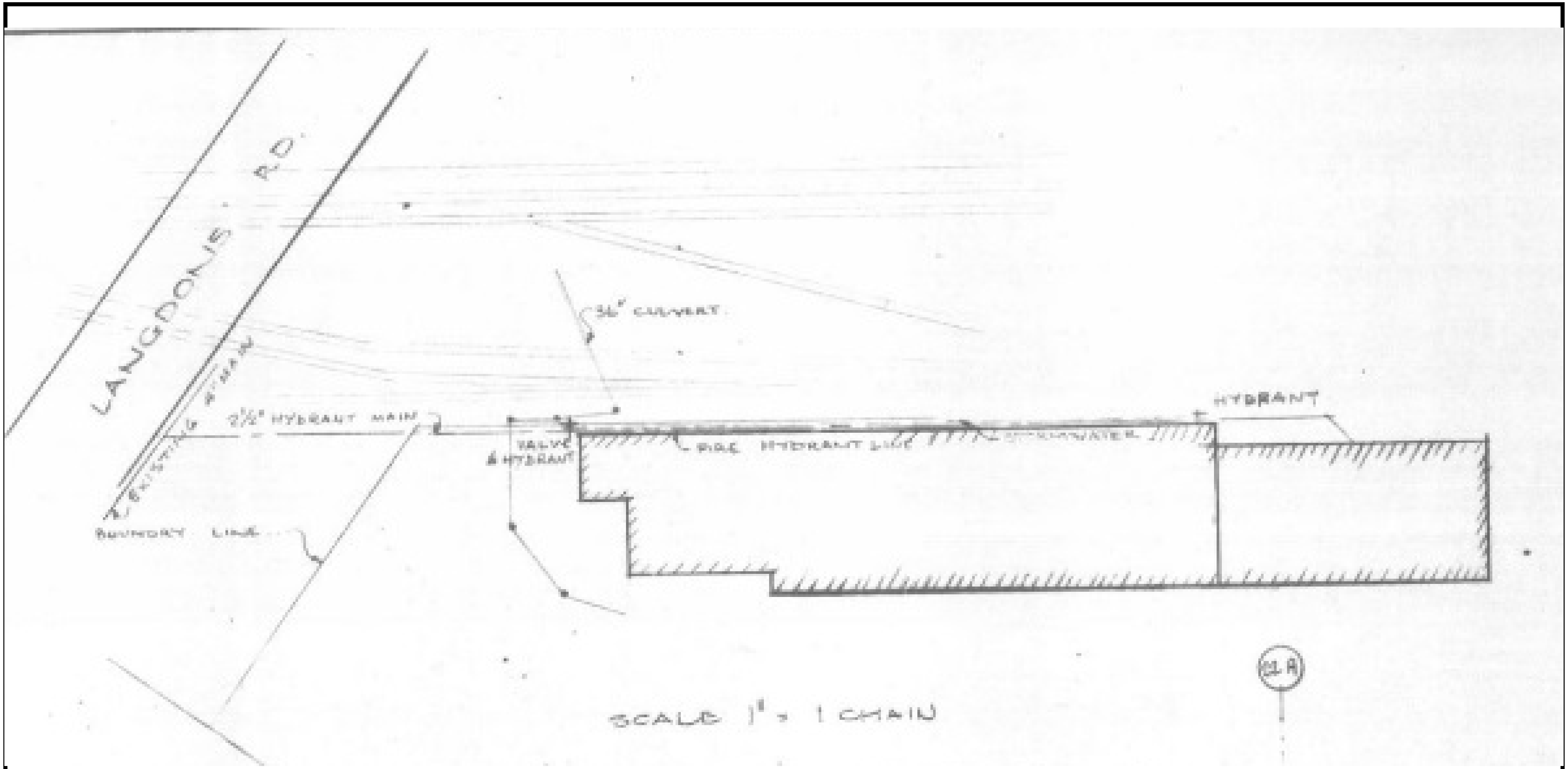
Date	15.05.2014	**Client**	**Mitre 10 Mega Ltd**		
Drawn by	GO/CM	**Project**	**Sanitarium, Harewood Rd**		
Approved by	DR	**Description**	**Locations of Hazardous Substances, 2006**		
Scale	NTS	**Figure Number**	4	**Project Number**	11139



Note: Lewis & Barrow Ltd, Site Plan,

Date	15.05.2014	**Client**	**Mitre 10 Mega Ltd**		
Drawn by	GO/CM	**Project**	**Sanitarium, Harewood Rd**		
Approved by	DR	**Description**	**1995 Site Layout Plan**		
Scale	NTS	**Figure Number**	5	**Project Number**	11139



Note: Site Plan, Dated 1966.

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Date	15.05.2014	**Client**	**Mitre 10 Mega Ltd**		
Drawn by	GO/CM	**Project**	**Sanitarium, Harewood Rd**		
Approved by	DR	**Description**	**1966 Site Layout**		
Scale	NTS	**Figure Number**	6	**Project Number**	11139

Date		**Drawn by**		**Client**	**Mitre10 Mega Limited**		
Scale	NTS	**Approved by**	MW	**Project**	**Sanitarium, Harewood Rd**		
GEOSCIENCE CONSULTING				**Description**	**Historical Aerial Site Photograph - 1941**		
				Figure No.	7	**Project Number**	11139

Date	22.05.2014	Drawn by	GO	Client	Mitre10 Mega Limited		
Scale	NTS	Approved by	DR	Project	Sanitarium, Harewood Rd		
GEOSCIENCE CONSULTING				Description	Historical Aerial Site Photograph - 1946		
				Figure No.	8	Project Number	11139

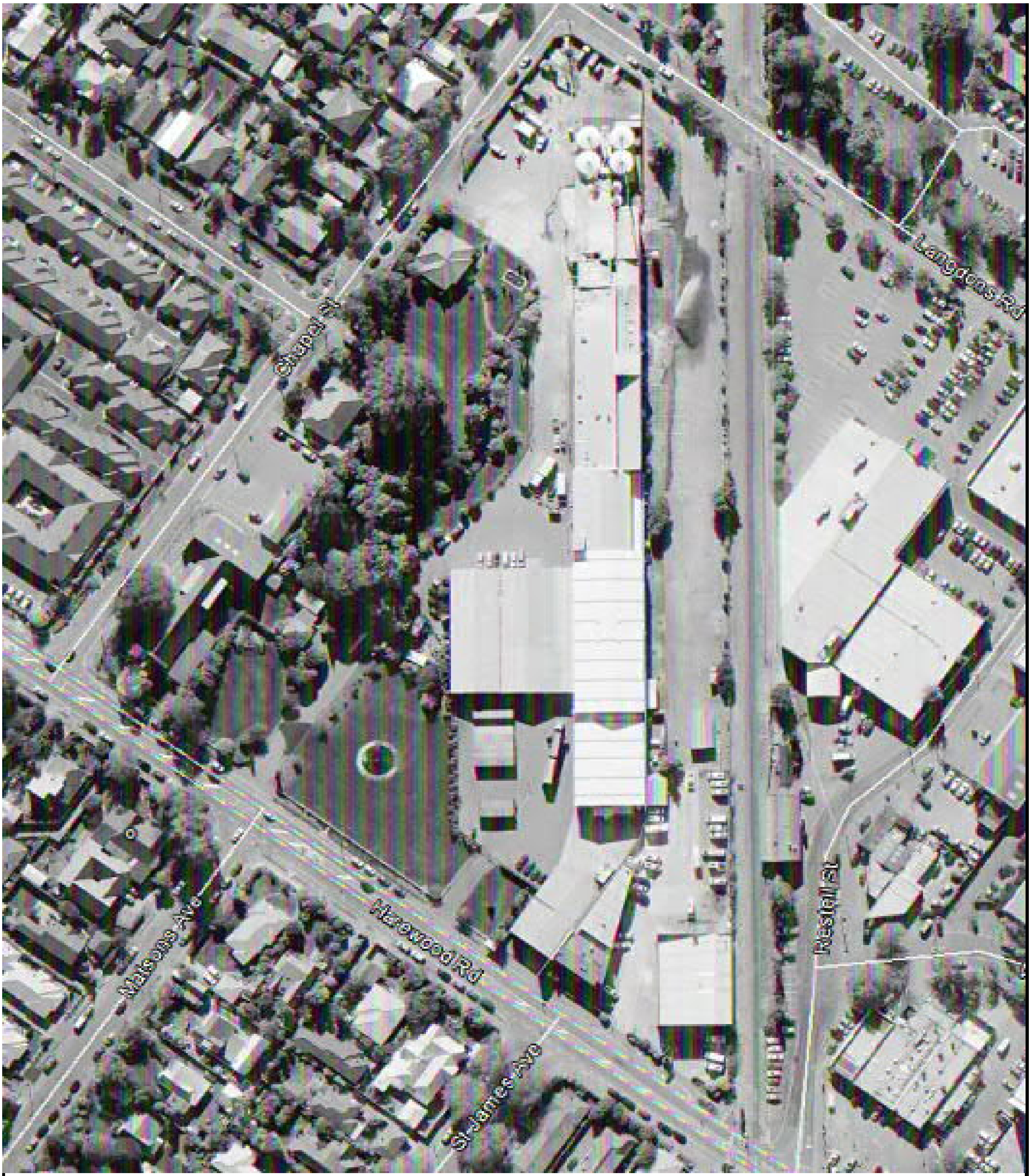
Date	22.05.2014	**Drawn by**	GO	**Client**	**Mitre10 Mega Limited**		
Scale	NTS	**Approved by**	DR	**Project**	**Sanitarium, Harewood Rd**		
GEOSCIENCE CONSULTING				**Description**	**Historical Aerial Site Photograph - 1955**		
				Figure No.	9	**Project Number**	11139

Date	22.05.2014	**Drawn by**	GO	**Client**	**Mitre10 Mega Limited**		
Scale	NTS	**Approved by**	DR	**Project**	**Sanitarium, Harewood Rd**		
GEOSCIENCE CONSULTING				**Description**	**Historical Aerial Site Photograph - 1965**		
				Figure No.	10	**Project Number**	11139

Date	22.05.2014	**Drawn by**	GO	**Client**	**Mitre10 Mega Limited**		
Scale	NTS	**Approved by**	DR	**Project**	**Sanitarium, Harewood Rd**		
GEOSCIENCE CONSULTING				**Description**	**Historical Aerial Site Photograph - 1973**		
				Figure No.	11	**Project Number**	11139

Date	22.05.2014	**Drawn by**	GO	**Client**	**Mitre10 Mega Limited**		
Scale	NTS	**Approved by**	DR	**Project**	**Sanitarium, Harewood Rd**		
GEOSCIENCE CONSULTING				**Description**	**Historical Aerial Site Photograph - 1984**		
				Figure No.	12	**Project Number**	11139

Date	22.05.2014	**Drawn by**	GO	**Client**	**Mitre10 Mega Limited**		
Scale	NTS	**Approved by**	DR	**Project**	**Sanitarium, Harewood Rd**		
GEOSCIENCE CONSULTING				**Description**	**Historical Aerial Site Photograph - 1994**		
				Figure No.	13	**Project Number**	11139



Date	22.05.2014	**Drawn by**	GO	**Client**	**Mitre10 Mega Limited**		
Scale	NTS	**Approved by**	DR	**Project**	**Sanitarium, Harewood Rd**		
GEOSCIENCE CONSULTING				**Description**	**Historical Aerial Site Photograph - 2012**		
				Figure No.	14	**Project Number**	11139

Appendix A

Site Photographs


Photo 1: View north towards office


Photo 2: LFO AST


Photo 3: View South over Kruses Drain


Photo 4: View north of silos


Photo 5: View south


Photo 6: View south towards former Hirequip

Date taken	13/05/2014	**Client**	**Mitre 10 Mega Ltd**		
Taken by	GO	**Project**	**Sanitarium, Harewood Rd**		
Approved by	DR	**Description**	**Site Photographs - 11/05/2014**		
Scale	N/A	**Photo No.**	1 to 6	**Project Number**	11139

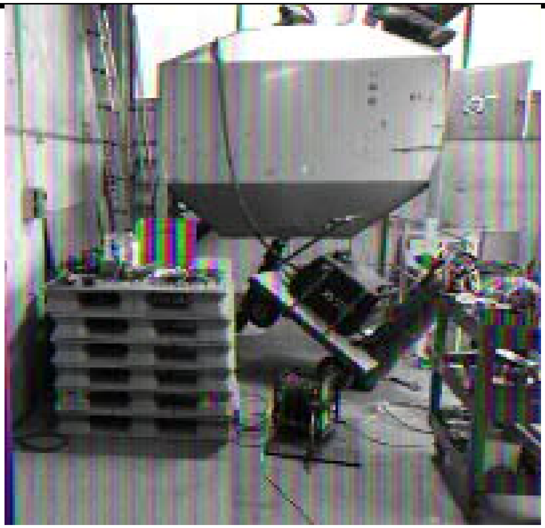


Photo 7: Maintenance Workshop

Photo 8: Waste Oil Collection

Photo 9: Gardeners compound

Photo 10: Minor hazardous substance storage

Photo 11: Cleaning products on 1st Floor

Photo 12: Hazchem cage ground floor

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Date taken	13/05/2014	**Client**	**Mitre 10 Mega Ltd**		
Taken by	GO	**Project**	**Sanitarium, Harewood Rd**		
Approved by	DR	**Description**	**Site Photographs - 13/05/2014**		
Scale	N/A	**Photo No.**	7 to 12	**Project Number**	11139

Appendix B

CRC Borelogs

29.05.2014

11139.000.000/001/01

Bore or Well No: M35/1383
Well Name: Sanitarium South Well
Owner: New Zealand Health Associated Limited

Environment Canterbury
Your regional council

Street of Well: PAPANUI ROAD
Locality: PAPANUI
NZGM Grid Reference: M35:7809-4585 QAR 3
NZGM X-Y: 2478090 - 5745850
Location Description:
ECan Monitoring:
Well Status: Active (exist, present)

File No: CO6C/01735
Allocation Zone: Christchurch/West Melton
Uses: Commercial / Industrial

Drill Date:
Well Depth: 27.40m -GL
Initial Water Depth:
Diameter: 152mm

Measuring Point Ait: 14.10m MSD QAR 2
GL Around Well: 0.00m -MP
MP Description:

Driller: not known
Drilling Method: Driven Pipe
Casing Material:
Pump Type: Unknown
Yield: 0 l/s
Drawdown: 0 m
Specific Capacity:

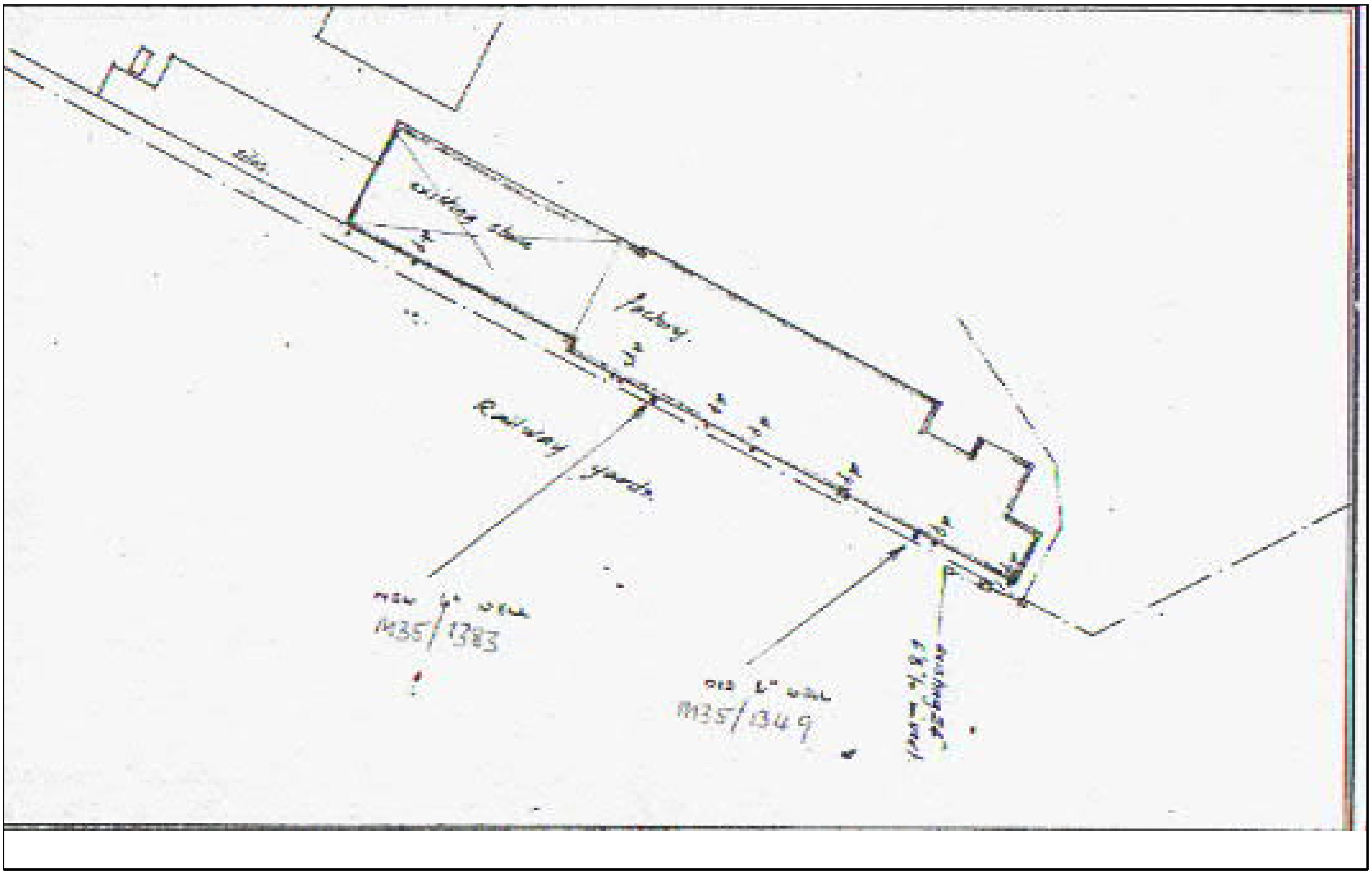
Aquifer Type: Unknown
Aquifer Name:

Water Level Count: 0
Strata Layers: 0
Aquifer Tests: 0
Isotope Data: 0
Yield/Drawdown Tests: 0

Highest GW Level:
Lowest GW Level:
First Reading:
Last Reading:
Calc. Min. GWL: -2.50m -MP
Last Updated: 21 Sep 2006
Last Field Check: 02 Jul 1998

Screens:
Screen Type:
Top GL:
Bottom GL:

Date	Comments
02 Jul 1998	This is the well to the south of M35/1349, and is used the most currently.

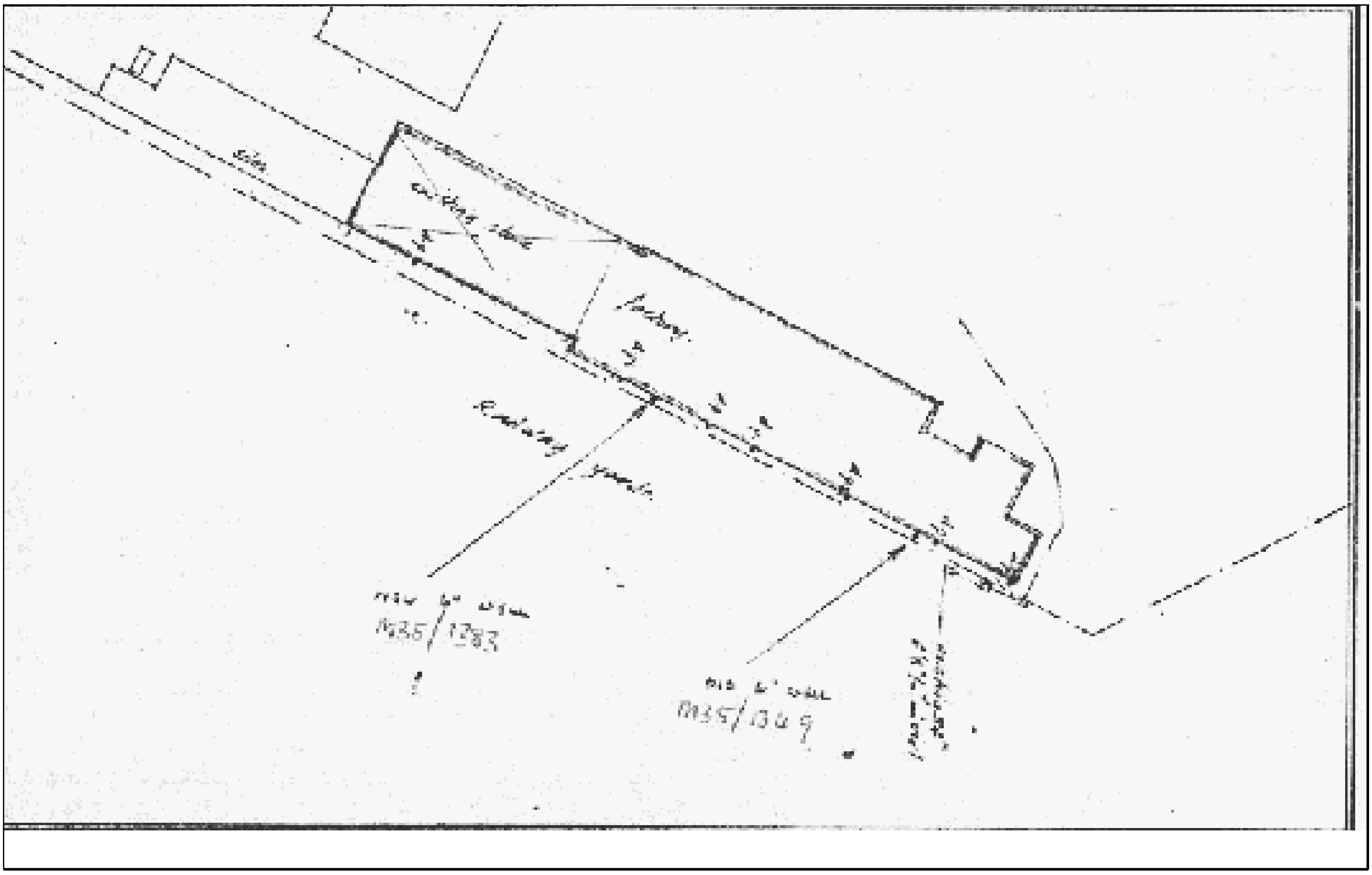

etc.
existing store
factory
Railway yards
new 6" well
M35/1383
old 6" well
M35/1349

Bore or Well No: M35/1349
Well Name: Sanitarium North Well
Owner: New Zealand Health Associated Limited

Street of Well:	HAREWOOD RD	**File No:**	CO6C/01735
Locality:	PAPANUI	**Allocation Zone:**	Christchurch/West Melton
NZGM Grid Reference:	M35:7809-4585 QAR 3		
NZGM X-Y:	2478090 - 5745850		
Location Description:		**Uses:**	Commercial / Industrial
ECan Monitoring:			
Well Status:	Active (exist, present)		

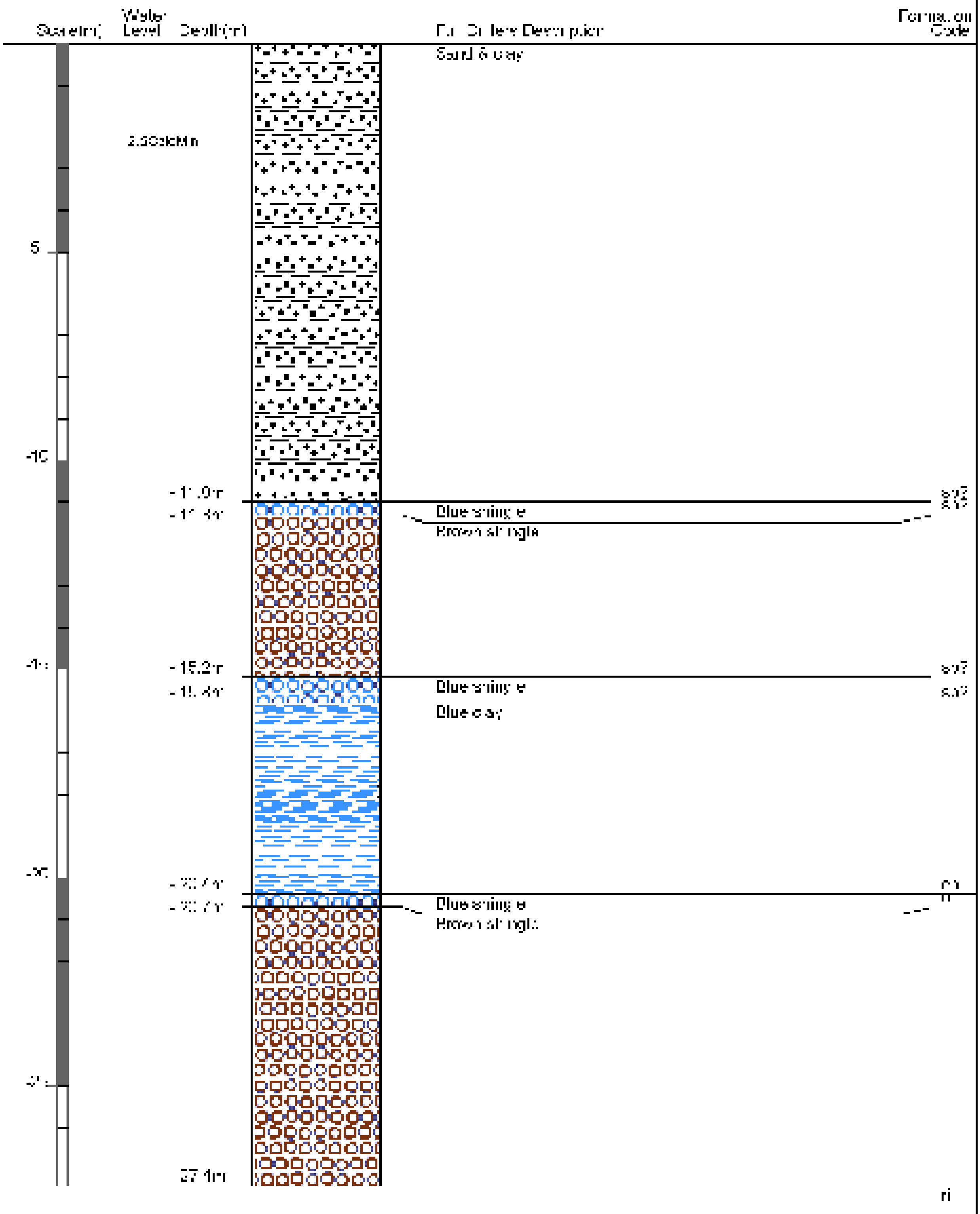
Drill Date:	09 Dec 1943	**Water Level Count:**	0
Well Depth:	27.40m -GL	**Strata Layers:**	7
Initial Water Depth:	-1.50m -MP	**Aquifer Tests:**	0
Diameter:	152mm	**Isotope Data:**	0
		Yield/Drawdown Tests:	1
Measuring Point Alt:	14.10m MSD QAR 2	**Highest GW Level:**	
GL Around Well:	0.00m -MP	**Lowest GW Level:**	
MP Description:		**First Reading:**	
		Last Reading:	
Driller:	Job Osborne (& Co/Ltd)	**Calc. Min. GWL:**	-2.50m -MP
Drilling Method:	Driven Pipe	**Last Updated:**	08 Nov 2013
Casing Material:		**Last Field Check:**	02 Jul 1998
Pump Type:	Centrifugal (Surface)		
Yield:	13 l/s	**Screens:**	
Drawdown:	0 m	**Screen Type:**	
Specific Capacity:	31.25 l/s/m	**Top GL:**	
		Bottom GL:	
Aquifer Type:	Non-Flowing Artesian		
Aquifer Name:	Riccarton Gravel		

Date	**Comments**
02 Jul 1998	ALSO M35/1383. The flow is not known, but estimated from a chart for the pump type (Browns Bros Model 4030). No interference from other wells


existing shed
factory
Railway yards
new 6" wall
M35/1283
M35/1349

Borelog for well M35/1349

Gridref: M35 7506 4505 Accuracy : 3 (1=high, 5=low)
Ground Level Altitude : 14.1 +MSD
Driller : Job Osborne (& Co Ltd)
Drill Method : Driven Pipe
Drill Depth : -27.4m Drill Date : 9/12/1949



Appendix C

CRC Boresearch

Sanitarium

Data sourced from our Canterbury Map Partners at

N

- ● Wells
- ● Community Supply Wells
- — Piezometric Contours
- Population center and locality labels
- Hydrographic feature labels
- Parks, forests, and reserves labels
- Road labels
- ☐ Regional Boundaries
- 🟥 Territorial Authority Boundaries
- ☐ Land Parcels
- — State highways outside Canterbury

0 0.2 0.4 Kilometres

Scale: 1:6,000

Map Created by GO on 2:23:59 p.m.


M35/13840
M35/13837
M35/13824
M35/13838
M35/1383
M35/1383
M35/1349
M35/1349
M35/13839
M35/1678
M35/13834
M35/13833
M35/15234
M35/15233
M35/13832
M35/15758
M35/13854
Chapel
Scale 1:2,000

Appendix D

Resource Consents

CHRISTCHURCH CITY COUNCIL

FORM OF APPLICATION UNDER THE TRADE WASTES BYLAW

For Flows Exceeding 5000 Litres/Day

RECEIVED
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BUILDING CONSENTS

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The Waste Manager
Christchurch City Council
City Water and Waste Unit
P O Box 237
CHRISTCHURCH

1. I/We Australasian Conference Association
Trading as Sanitarium Health Food Company
being the owner / occupiers of trade premises at 54-64 Harewood Road
request the consent of the Council to the discharge of trade wastes to the Council's sewers in accordance with the terms of your Trade Wastes Bylaw.

This request relates to:

☐ An already existing discharge

☐ Proposed change of wastes discharged

☑ A proposed new discharge

☑ Proposed change in volume

2. The proposed new discharge, or change will commence from: (date) 1/2/2002

3. Term of consent sought: ☐ 1 year ☐ 2 year ☐ 3 year ☐ 4 year ☐ 5 year ☑ 10 year

4. Number of "PROCESS" sheets attached (1)

NOTE: Please complete a separate "PROCESS" sheet for each individual process which discharges to the Council's sewers from the same premises.

5. The source of water used in the premises is: eg Christchurch City Council reticulation/wells
☐ from Wells m³/working day 1,000
☐ from CCC reticulation m³/working day 36

6. **Postal Address for Accounts:**

Address: P.O. Box 5011
Papanui
Christchurch

7. **Contact for Enquiries:**

Name: Warren Ashby
Address: P.O. Box 5011
Papanui
Phone: (03) 3529104 Ext 847
Fax: (03) 3525405

8. Number of discharge days per annum: 320

9. Volume of trade wastes
Total volume per annum: 3200
Average daily: 10
Average 8 am to 4pm: 5
Average 4pm to 8am: 5
Maximum daily volume: 20
Maximum flow: 5 l/sec
Seasonal fluctuation (range):

CLIENT COPY

CHRISTCHURCH CITY COUNCIL
CONSENT DOCUMENT
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PTO

T.W.L 61

If batch discharges:

Quantity: ____ m³

Frequency: ____ (specify eg. 2 per day, 3 per week)

Rate of discharge: ____ l/sec

11. The wastes do/do not, contain condensing water or storm water and the layout of drains on the premises is/are such as to reasonably exclude the possibility of this becoming mixed with trade wastes.

12. It is/is not proposed that a mixture of domestic and trade waste should be discharged prior to any sampling point.

13. The proposed method for flow measuring is:

(a) a permanent installation of suitable flow measuring equipment: [✓ Yes]/No

(b) based on water usage as measured by meter: Yes/No

(c) other (specify): ____

14. List any substances contained in Schedule 1 and 2 of the Bylaw which are stored, used, or generated on the premises: N/A

Describe mitigation measures employed to prevent accidental spillages of these substances from entering the public sewer or surface water system:

N/A

15. An independent waste audit of the premises has/has not been carried out by:

16. A Discharge Management Plan is attached/will be provided:

17. The following steps have been/will be taken to improve the trade process as part of a strategy of cleaner production: Installation of Data loggers for Trade waste

Review of Trade waste procedures

Date of improvements: 2/2002

COUNCIL COPY

18. Activities undertaken on these premises require a MAF licence. Yes ☐ No ☒

APPLICANT:

Sanitarium Health Food Company ( )

( )

(W.S. Ashley)

((Eng Manager))

(Full Names Of Applicant)

DATE: 23/11/2001

NOTE:

Where the applicant is a partnership application must be signed by all partners

Where the applicant is trading as a Limited Company, the application must be signed by the Limited Company.

CHRISTCHURCH CITY COUNCIL

CONSENT DOCUMENT

11 DEC 2001

... comply with the New Zealand Building Code notwithstanding any inconsistencies which may occur in the drawings and specifications.

CHRISTCHURCH CITY COUNCIL
FORM OF APPLICATION UNDER THE TRADE WASTES BYLAW
For Flows Exceeding 5000 Litres Per Day

PROCESS SHEET NO: 3 (Existing)
(Use a separate page for each process)

(a) If process is generated by other than Applicant please state:

Name of business: Sanitarium Health Food Company
Type of business: Food Processing
Address: 54-64 Harewood Road
Papanui

(b) Process name and description:
Yeast extract processing & associated concentration

(c) Type of product processed: Yeast Extract.

(d) Number of discharge days per annum: 320

(e) **Volume of trade wastes:**
Total volume per annum: 22400 m³
Average daily volume: 70 m³
Average volume 8am to 4pm: 35 m³
Average 4pm to 8am: 35 m³
Maximum daily volume: 100 m³
Maximum flow: 20 l/s

If batch discharges:
Quantity: 8 m³ (per batch)
Frequency: 1 per day (specify e.g. 2 per day, 3 per week)
Rate of discharge: 10 l/sec

(f) **General characteristics of trade wastes:**

	TYPICAL RANGE	
Temperature (C):	15	30
BOD$_5$ (g/m^3):	~~150~~ 2100 average	
COD (g/m^3):		
Suspended solids (g/m^3):	190 average	
pH:	5.8	9
Oil and greases (g/m^3):	Minimal	

COUNCIL COPY

(g) The trade wastes contain the following characteristics which when mixed with other trade wastes and discharged from the premises, are near or in excess of the limits stipulated in Schedule 1 of the Bylaw.

VALUE OR CONCENTRATION Characteristic / Metal	From Process (Typical)	(Max)	At Point of Discharge (Typical)	(Max)
	N/A			

CHRISTCHURCH CITY COUNCIL
CONSENT DOCUMENT
11 DEC 2001
All building work shall comply with the New Zealand Building Code notwithstanding any inconsistencies which may exist in the drawings and specifications.

(h) The wastes are presently discharged with/without pre-treatment.

Pre-treatment facility is: N/A

T.W.B 6E

CHRISTCHURCH CITY COUNCIL
FORM OF APPLICATION UNDER THE TRADE WASTES BYLAW
For Flows Exceeding 5000 Litres Per Day

PROCESS SHEET NO: 2 (Existing.)

(Use a separate page for each process)

(a) If process is generated by other than Applicant please state:

Name of business: Sanitarium Health Food Company

Type of business: Food Processing

Address: 57-64 Harewood Road
Papanui

(b) Process stage and description:
Boiler Water Blow Down

(c) Type of product processed: Boiler Water

(d) Number of discharge days per annum: 260

(e) Volume of trade wastes:

Total volume per annum: .... m³
Average daily volume: 0.5 m³
Average volume 8am to 4pm: 0.5 m³
Average 4pm to 8am: 0 m³
Maximum daily volume: 1.0 m³
Maximum flow: 25 l/s

If batch discharges:
Quantity: 0.5 m³ (per batch)
Frequency: 1 per Day (specify e.g. 2 per day, 3 per week)
Rate of discharge: 25 l/sec

(f) General characteristics of trade wastes:

COUNCIL COPY

	TYPICAL RANGE	
Temperature (C):	40°C	60°C
BOD5 (g/m³):	N/A	
COD (g/m³):		
Suspended solids (g/m³):	N/A	(1500 ppm)
pH:	10	12
Oil and greases (g/m³):	0	

(g) The trade wastes contain the following characteristics which when mixed with other trade wastes and discharged from the premises, are near or in excess of the limits stipulated in Schedule 1 of the Bylaw.

VALUE OR CONCENTRATION Characteristic /Metal	From Process (Typical)	(Max)	At Point of Discharge (Typical)	(Max)

CHRISTCHURCH CITY COUNCIL
CONSENT DOCUMENT
11 DEC 2001
All building work shall comply with the New Zealand Building Code together with any alterations which may occur in the drawings and specifications.

(h) The wastes are presently discharged with/without pre-treatment.

Pre-treatment facility is: 160 litre settling tank & dilutions

T.W.L 62

CHRISTCHURCH CITY COUNCIL
FORM OF APPLICATION UNDER THE TRADE WASTES BYLAW
For Flows Exceeding 5000 Litres Per Day

NEW

PROCESS SHEET NO: 1
(Use a separate page for each process)

(a) If process is generated by other than Applicant please state:

Name of business: Sandersium Health Food Company
Type of business: Food Processing
Address: 56-64 Harewood Road
Papanui

(b) Process name and description:
Water + Water/Juice Bottling Plant floor waste.

(c) Type of product processed: Water + Water/Juice Drinks.

(d) Number of discharge days per annum: 320

(e) **Volume of trade wastes:**

Total volume per annum:	3200	m³
Average daily volume:	10	m³
Average volume 6am to 6pm:	5	m³
Average 6pm to 6am:	5	m³
Maximum daily volume:	30	m³
Maximum flow:	5	l/s

If batch discharges:

Quantity:	4	m³ (per batch)
Frequency:	1	(specify e.g. 2 per day, 3 per week)
Rate of discharge:	5	l/sec

(f) **General characteristics of trade wastes:**

	TYPICAL RANGE	
Temperature (C):	15	30
BOD$_5$ (g/m^3):		
COD (g/m^3):		
Suspended solids (g/m^3):		
pH:	6	7
Oil and greases (g/m^3):	NIL	NIL

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(g) The trade wastes contain the following characteristics which when mixed with other trade wastes and discharged from the premises, are near or in excess of the limits stipulated in Schedule 1 of the Bylaw.

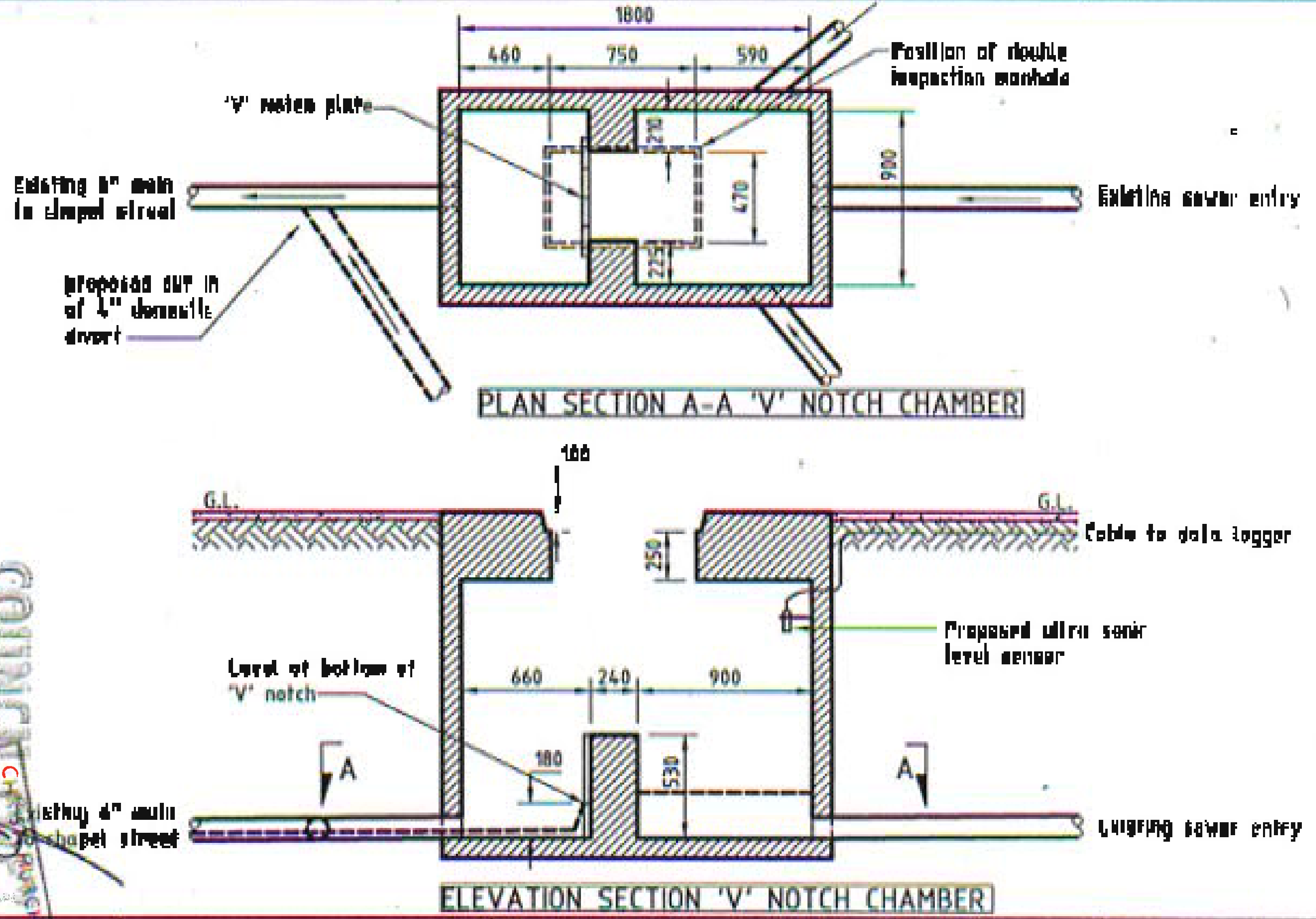
MAXIMUM CONCENTRATION	From Process		At Point of Discharge	
Constituent / Metal	(Typical)	(Max)	(Typical)	(Max)
		N/A		

CHRISTCHURCH CITY COUNCIL
CONSENT DOCUMENT
11 DEC 2001
All building work shall comply with the New Zealand Building Code notwithstanding any inconsistencies which may occur in the drawings and specifications.

(h) The wastes are presently discharged with/without pre-treatment.

Pre-treatment facility is: N/A

T.W.L.63



DO NOT SCALE
3RD ANGLE PROJECTION
ALL DIMENSIONS IN mm
UNLESS SHOWN OTHERWISE

GENERAL	TOLERANCES
x ± 0.5	mm ± 0.01
.x ± 0.2	ANGULAR ± 0.1

SANITARIUM CHRISTCHURCH FACTORY

PROPOSED DOMESTIC SEWER DIVERSION AROUND
EXTG 'V' NOTCH FLOW MEASURING CHAMBER
- WATER FILLING STATION

SCALE	N.T.S.
DRAWN	T.E.T
DATE	30/11/01
CHECKED	W. Ashby

A4

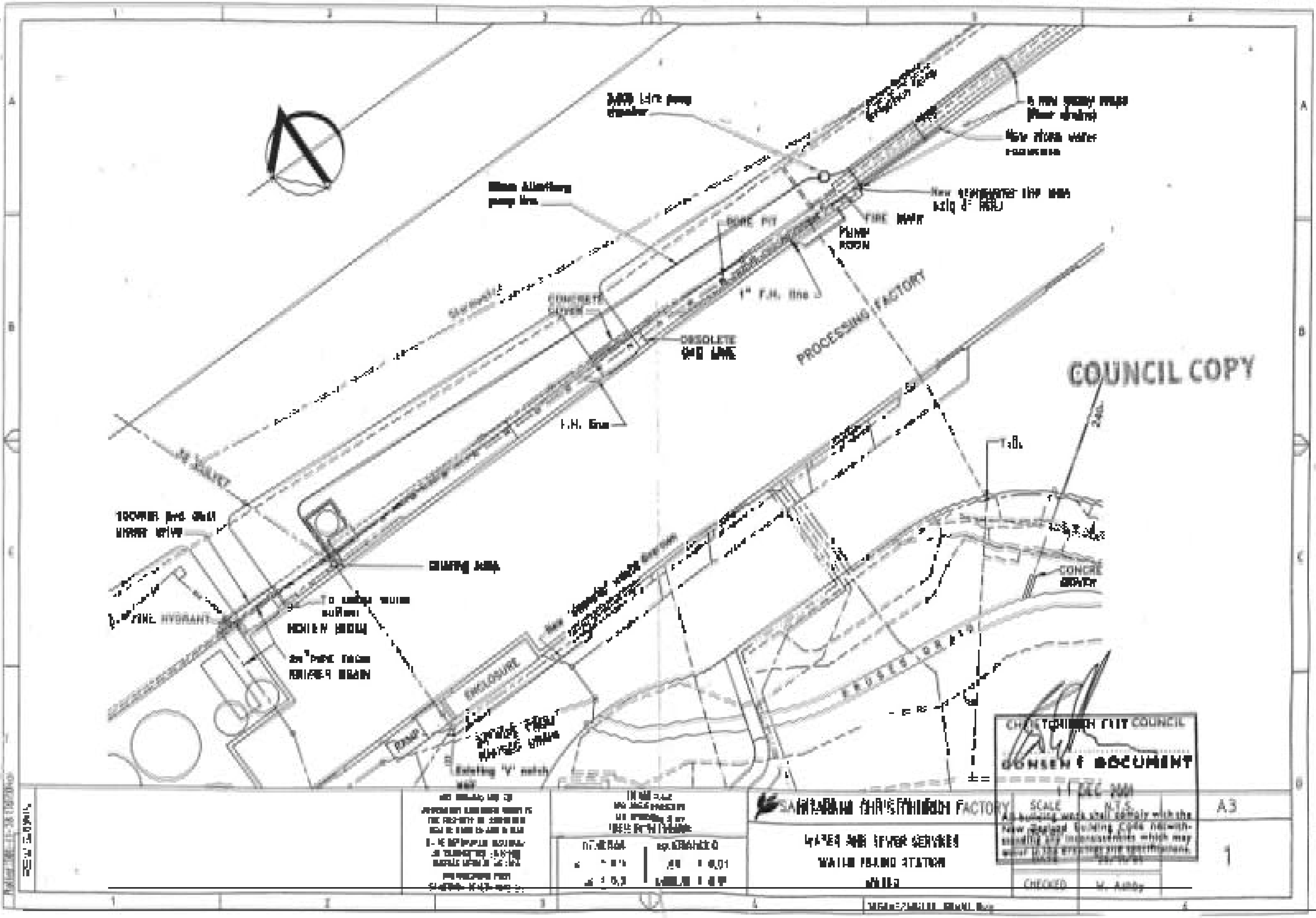
1

THIS DRAWING AND THE INFORMATION CONTAINED HEREIN IS THE PROPERTY OF SANITARIUM HEALTH FOOD CO
AND IS NOT TO BE REPRODUCED, RELEASED OR TRANSMITTED TO OTHER PARTIES WITHOUT WRITTEN AUTHORISATION

WATER/V notch.dwg

REVISIONS

CHRISTCHURCH CITY COUNCIL
CONSENT DOCUMENT
11 DEC 2001



CHRISTCHURCH CITY COUNCIL
CONSENT DOCUMENT
11 DEC 2001
All building work shall comply with the New Zealand Building Code notwithstanding any inconsistencies which may occur in the drawings and specifications.

Record Summary

Generated 06-May-2014

Record Number CRC012078
Record Type Renewal
Permit Type Water Permit
Record Holder New Zealand Health Associated Limited
Record Status Issued - Active

Location 54-64 Harewood Road, PAPANUI
Description to take and use groundwater.
Trim File No CO6C/29809

Commencement Date 02 Nov 2001
Given Effect To 31 Oct 2003
Lapses 02 Nov 2006
Expires 31 Aug 2035

Cond No	Text
1	The rate at which water is taken from bore M35/1383, 152 millimetres diameter and 27.4 metres deep, at or about map reference NZMS 260 M35:7809-4585; and bore M35/1349, 152 millimetres diameter and 27.4 metres deep, at or about map reference NZMS 260 M35:7809-4585, shall not exceed 24 litres per second, with a combined volume not exceeding 9,500 cubic metres in any period of seven consecutive days.
2	An investigation of the efficiency of water use arising from the exercise of this consent shall be carried out over a period of one year commencing 1 December 2001. The consent holder shall provide a copy of the investigation results to the Canterbury Regional Council by 1 February 2003.The investigation shall: i) monitor total water use; and ii) identify any potential water conservation measures.
3	The consent holder shall take all practicable steps to:(a) ensure that the volume of water used for irrigation does not exceed that required for the soil to reach field capacity; and(b) avoid leakage from pipes and structures; and(c) avoid the use of water onto non-productive land such as impermeable surfaces and river or stream riparian strips.
4	The hours and rate at which water is taken shall be measured to within an accuracy of 10 percent and recorded daily in a log kept for that purpose, and a copy of the records provided to the Canterbury Regional Council before 31 May each year.
5	The Canterbury Regional Council may, on any of the last five working days of June each year, serve notice of its intention to review the conditions of this consent for the purpose of dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage.

Record Number CRC093663
Record Type New Consent
Permit Type Land Use Consent
Record Holder New Zealand Health Associated Limited
Record Status Issued - Inactive

Location 54-64 Harewood Road, PAPANUI
Description To use land for contaminant storage.
Trim File No CO6C/29809

Commencement Date 06 Oct 2009
Lapses 06 Oct 2014

Cond No	Text
	Scope
1	The land use shall be for the use and storage of light fuel oil in an above ground container at 54-64 Harewood Road, Papanui, Christchurch, at map reference NZMS 260 M35:7806-4581 as shown on plan CRC093663A which forms part of this consent.
	Design
2	The container shall be located as labelled “Position of New Tank” on plan CRC093663B which forms part of this consent.
3	The container shall have a total capacity not exceeding 18,000 litres.
4	The container shall have a secondary containment system in the form of a double skin.
5	All outlets from the container and associated ancillaries shall be padlocked or similar to prevent unauthorised use.
6	All pipe work associated with the container that carries or contains light fuel oil shall be placed above ground.
7	The fill point for the container shall be fitted with a drip tray of not less than ten litres capacity.
8	The fill line shall be fitted with a dry break coupling.
9	The container shall be fitted with: (a) an overfill protection device; (b) a fill level indicator; (c) an independent overfill alarm; and (d) anti siphon protection.
10	All connections to the container shall be top mounted.
11	The container shall be located on an impervious surface that drains to a stormwater collection sump with a submersed outlet.
12	The stormwater collection sump shall discharge to the site stormwater system that connects to Kruses Drain.
13	The discharge from Kruses Drain from the site shall be fitted with a fast acting isolating valve that will enable any spill or leak into the stormwater system to be rapidly isolated.
14	The holder of this consent shall keep as built drawings of the above ground container and installation.
	Site Management
15	The holder of this consent shall carry out the following checks and inspections not less than once every month: (a) inspection of the above ground container for leaks including interstitial space and general condition; (b) inspection of the pipe work for leaks and general condition; and (c) inspection of Kruses Drain and the site stormwater system for evidence of hydrocarbons.
16	The holder of this consent shall carry out a light fuel oil inventory reconciliation at least once every three months.
17	The holder of this consent shall keep records of all inspections and maintenance carried out under conditions (15) and (16) of this consent and make these available to the Canterbury Regional Council on request.

18	The consent holder shall use the best practicable options to contain spills or leaks of any hazardous substance including light fuel oil from being discharged via the stormwater system. These shall include, but not be limited to the following: (a) Using a tank filling procedure to prevent spillage during any fuel delivery; (b) making spill kits available to contain or absorb any spills or leakage; (c) maintaining signs to identify the location of the spill kits; and (d) maintaining written procedures in clearly visible locations that are to be undertaken to contain, remove and dispose of any spilled light fuel oil.
19	The consent holder shall notify the Canterbury Regional Council immediately in the event of a spill, identification of a leak, evidence of hydrocarbons in the stormwater system or Kruses drain, or a discrepancy of greater than 0.5% in the volume of light fuel oil stored.
	Administration
20	The Canterbury Regional Council may annually, on the last working day of May or September, serve notice of its intention to review the conditions of this consent for the purposes of; (a) dealing with any adverse effect on the environment which may arise from the exercise of this consent and which is appropriate to deal with at a later stage; or (b) requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or (c) complying with the requirements of a relevant rule in an operative regional plan.

Record Number CRC921751

Record Type New Consent

Permit Type Discharge Permit

Record Holder New Zealand Health Associated Limited

Record Status Issued - Active

Location 40-64 Harewood Road, CHRISTCHURCH

Description to discharge contaminants to air, at or about map reference M35:781-458, from the processes associated with the handling of grain, including use of grain elevators, cooking processes, and from the operation of a 2.45MW oil-fired boiler and kerosene burner.

Trim File No CO6C/29809

Commencement Date 07 Sep 1994

Given Effect To 04 Sep 1996

Lapses 07 Sep 1996

Expires 31 Aug 2029

Cond No	Text
1	The opacity of smoke emissions from the boiler shall be less than 10% except;(i) in the case of a cold start, for a period not exceeding thirty minutes in the first hour of operation, or;(ii) for a period not exceeding a total of four minutes each succeeding hour of operation.
2	The amount of particulate matter in the discharges to air from all cyclone filters and the baghouse filter, shall not exceed 125 mg/m^3 of air adjusted to 0 degrees Celcius, 12% carbon dioxide on a dry gas basis.
3	The height of the boiler stack shall be not less than 25m above the ground surface.
4	The sulphur content of a representative sample of the fuel oil used shall not exceed 2% by weight.
5	The extraction system above the grain delivery area shall be operating at all times during grain delivery.
6	Processes shall be operated, supervised and maintained by the consent holder using either the dust and particulate control mechanisms in place at the time of the application for this consent, as described in the application, or using processes which provide at least an equivalent level of control.
7	The consent holder shall maintain a record of complaints relating to odour emissions from the site. Each record, where practicable, shall include;(a) Location of complainant when odour detected;(b) Date and time of odour complaint;(c) A description of wind speed and wind direction when complaint occurred;(d) Weather conditions at time of complaint;(e) Any possible cause of odour complained of;(f) Any corrective action undertaken by the consent holder to reduce the emission of the odour that caused the complaint.This record shall be made available to the Canterbury Regional Council upon request.
8	Charges, set in accordance with section 36(2) of the Resource Management Act 1991, shall be paid to the Regional Council for the carrying out of its functions in relation to the administration, monitoring and supervision of resource consents and for the carrying out of its functions under section 35 of the Act.
9	The Canterbury Regional Council may annually, on the last working day of August each year, serve notice of its intention to review the conditions of this consent for the purposes of:(i) dealing with any adverse effect on the environment which may arise from the exercise of the consent;(ii) requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or(iii) complying with the requirements of a regional plan.

Record Number	NCY780959
Record Type	Existing Use of Water
Permit Type	Water Permit
Record Holder	Sanitarium Health Food Company
Record Status	Terminated - Expired
Location	54-64 Harewood Rd
Description	TAKE WATER FROM A BORE FOR FACTORY USE INCLUDING COOLING.
Trim File No	CO6C/01735
Issued Date	14 Feb 1969
Expires	01 Oct 2001
Termination Date	02 Nov 2001

Cond No	Text

RESOURCE CONSENT CRC093663

Pursuant to Section 104 of the Resource Management Act 1991

The Canterbury Regional Council (known as Environment Canterbury)

GRANTS TO:	New Zealand Health Associated Limited
A LAND USE CONSENT:	To use land for contaminant storage.
DATE DECISION:	6 October 2009
EXPIRY DATE:	Unlimited
LOCATION:	54-64 Harewood Road, PAPANUI

SUBJECT TO THE FOLLOWING CONDITIONS:

SCOPE

1) The land use shall be for the use and storage of light fuel oil in an above ground container at 54-64 Harewood Road, Papanui, Christchurch, at map reference NZMS 260 M35:7806-4581 as shown on plan CRC093663A which forms part of this consent.

DESIGN

2) The container shall be located as labelled "Position of New Tank" on plan CRC093663B which forms part of this consent.

3) The container shall have a total capacity not exceeding 18,000 litres.

4) The container shall have a secondary containment system in the form of a double skin.

5) All outlets from the container and associated ancillaries shall be padlocked or similar to prevent unauthorised use.

6) All pipe work associated with the container that carries or contains light fuel oil shall be placed above ground.

7) The fill point for the container shall be fitted with a drip tray of not less than ten litres capacity.

8) The fill line shall be fitted with a dry break coupling.

9) The container shall be fitted with:
   (a) an overfill protection device;
   (b) a fill level indicator;
   (c) an independent overfill alarm; and
   (d) anti siphon protection.

10) All connections to the container shall be top mounted.

11) The container shall be located on an impervious surface that drains to a stormwater collection sump with a submersed outlet.

12) The stormwater collection sump shall discharge to the site stormwater system that connects to Kruses Drain.

13) The discharge from Kruses Drain from the site shall be fitted with a fast acting isolating valve that will enable any spill or leak into the stormwater system to be rapidly isolated.

14) The holder of this consent shall keep as built drawings of the above ground container and installation.

SITE MANAGEMENT

15) The holder of this consent shall carry out the following checks and inspections not less than once every month:
   (a) inspection of the above ground container for leaks including interstitial space and general condition;
   (b) inspection of the pipe work for leaks and general condition; and
   (c) inspection of Kruses Drain and the site stormwater system for evidence of hydrocarbons.

16) The holder of this consent shall carry out a light fuel oil inventory reconciliation at least once every three months.

17) The holder of this consent shall keep records of all inspections and maintenance carried out under conditions (15) and (16) of this consent and make these available to the Canterbury Regional Council on request.

18) The consent holder shall use the best practicable options to contain spills or leaks of any hazardous substance including light fuel oil from being discharged via the stormwater system. These shall include, but not be limited to the following:
   (a) Using a tank filling procedure to prevent spillage during any fuel delivery;
   (b) making spill kits available to contain or absorb any spills or leakage;
   (c) maintaining signs to identify the location of the spill kits; and
   (d) maintaining written procedures in clearly visible locations that are to be undertaken to contain, remove and dispose of any spilled light fuel oil.

19) The consent holder shall notify the Canterbury Regional Council immediately in the event of a spill, identification of a leak, evidence of hydrocarbons in the stormwater system or Kruses drain, or a discrepancy of greater than 0.5% in the volume of light fuel oil stored.

ADMINISTRATION

20) The Canterbury Regional Council may annually, on the last working day of May or September, serve notice of its intention to review the conditions of this consent for the purposes of;
   (a) dealing with any adverse effect on the environment which may arise from the exercise of this consent and which is appropriate to deal with at a later stage; or
   (b) requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or
   (c) complying with the requirements of a relevant rule in an operative regional plan.

Issued at Christchurch on 6 October 2009

Carly Steers
TEAM LEADER CONSENTS OPERATIONS on behalf of the Canterbury Regional Council

Environment Canterbury is the promotional name of the Canterbury Regional Council

Plan CRC093663A

22/04/09

ROADS

[illegible]

Road Centreline

RIVERS MAIN

LANDPARCELS

[illegible]

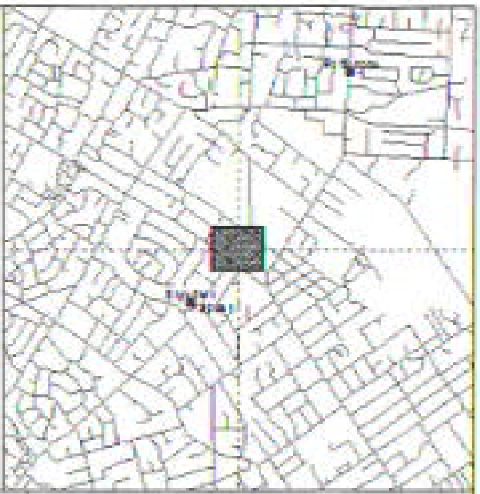
Parcel

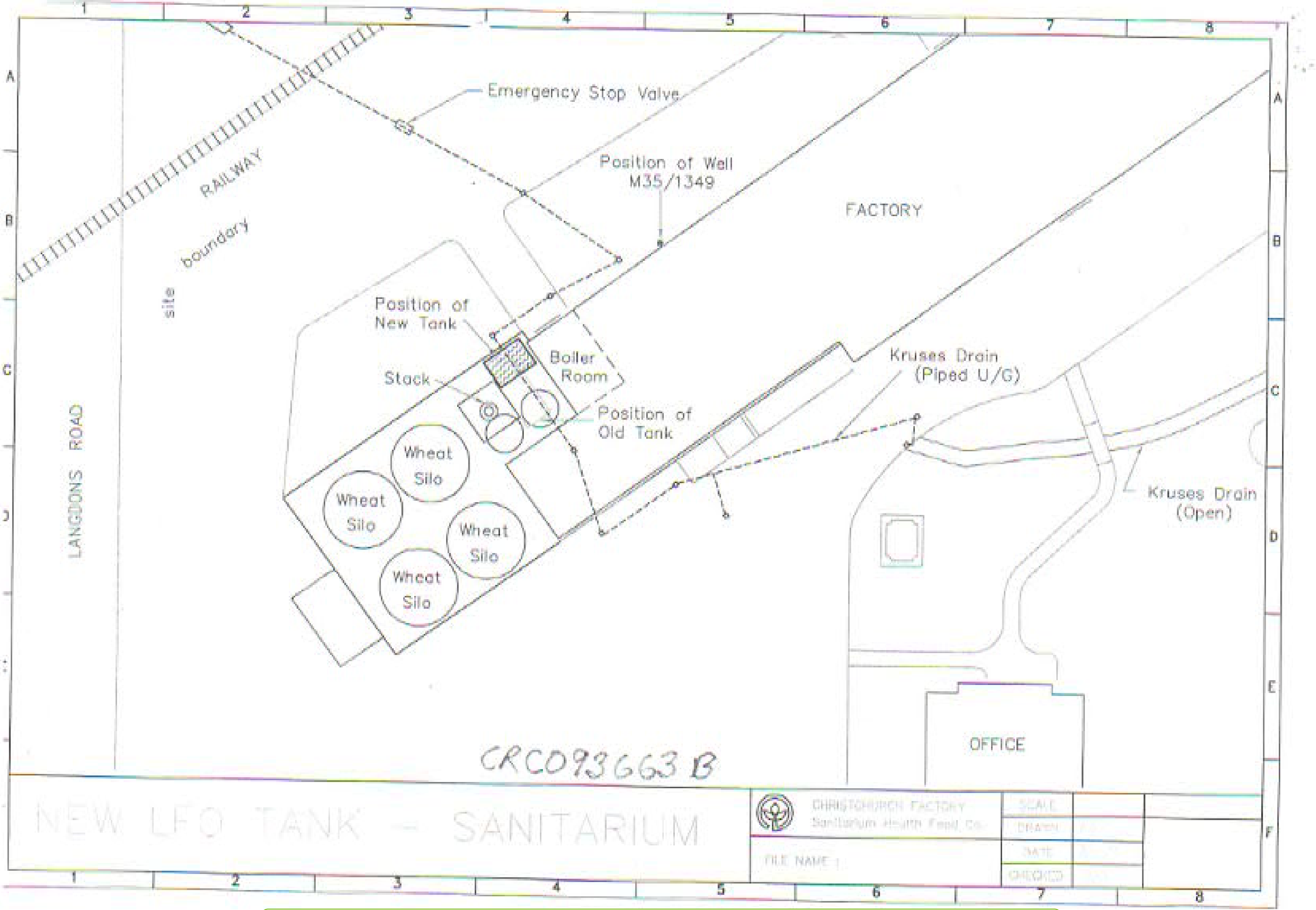
TA BOUNDARIES

Produced by: [illegible]
Date: 23/04/2009 [illegible] a.m.

Environment Canterbury
58 Kilmore Street
PO Box 345
Christchurch
Ph (03) 365 3828
Fax (03) 365 3194

This plot was created using information from Environment Canterbury's records. It is supplied in good faith and every effort has been made to ensure the accuracy of the information shown. However its accuracy and completeness is not guaranteed. If the information shown is relied on in support of a resource consent application it should be verified independently.




Emergency Stop Valve
Position of Well M35/1349
FACTORY
RAILWAY
site boundary
LANGDONS ROAD
Position of New Tank
Boiler Room
Stack
Position of Old Tank
Wheat Silo
Wheat Silo
Wheat Silo
Wheat Silo
Kruses Drain (Piped U/G)
Kruses Drain (Open)
OFFICE
NEW LFO TANK – SANITARIUM
CHRISTCHURCH FACTORY
Sanitarium Health Food Co.
FILE NAME :
SCALE
DRAWN
DATE
CHECKED
1
2
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F

CRC093663 B

COPY

CANTERBURY REGIONAL COUNCIL

NOTICE OF DECISION OF RESOURCE CONSENT APPLICATION

Name of Applicant SANITARIUM HEALTH FOOD CO

DISCHARGE PERMIT CRC921758

To grant SANITARIUM HEALTH FOOD CO a DISCHARGE PERMIT to discharge contaminants to air, at or about map reference M35:787-458, from the processes associated with the handling of grain, including use of grain cleaners, cooking processes, and from the operation of a 1.45MW oil-fired boiler and kerosene burner.

IN CONNECTION WITH THE FOLLOWING PROPERTY

LOCATION 40-64 HAREWOOD ROAD, CHRISTCHURCH

LEGAL DESCRIPTION PT LOT 1 DP 394 LOT 2 DP 5585 LOT 1-8 10 12 PT
9715 BLK VII CHRISTCHURCH SD

REASONS FOR DECISION

1) The effects on the environment of the discharge of contaminants into the air from Sanitarium will be minor.

CONDITIONS TO WHICH THE CONSENT IS SUBJECT

1) The opacity of smoke emissions from the boiler shall be less than 10% except,

   (a) in the case of a cold start, for a period not exceeding thirty minutes in the first hour of operation, or;
   (b) for a period not exceeding a total of four minutes each succeeding hour of operation.

2) The amount of particulate matter in the discharges to air from all cyclone filters and the baghouse filter, shall not exceed 125 mg/m^3 of air adjusted to 0 degrees Celsius, 12% carbon dioxide on a dry gas basis.

3) The height of the boiler stack shall be not less than 25m above the ground surface.

4) The sulphur content of a representative sample of the fuel oil used shall not exceed 2% by weight.

5) The extraction system above the grain delivery area shall be operating at all times during grain delivery.

6) Processes shall be operated, supervised and maintained by the consent holder using either the dust and particulate control mechanisms in place at the time of the application for this consent, as described in the application, or using processes which provide at least an equivalent level of control.

7) The consent holder shall maintain a record of complaints relating to odour emissions from the site. Each record, where practicable, shall include:

(a) Location of complainant when odour detected;
(b) Date and time of odour complaint;
(c) A description of wind speed and wind direction when complaint occurred;
(d) Weather conditions at time of complaint;
(e) Any possible cause of odour complaint;
(f) Any corrective action undertaken by the consent holder to reduce the emission of the odour that caused the complaint. This record shall be made available to the Canterbury Regional Council upon request.

8) Charges, set in accordance with section 36(2) of the Resource Management Act 1991, shall be paid to the Regional Council for the carrying out of its functions in relation to the administration, monitoring and supervision of resource consents and for the carrying out of its functions under section 35 of the Act.

9) The Canterbury Regional Council may annually, on the last working day of August each year, serve notice of its intention to review the conditions of this consent for the purposes of:

(i) dealing with any adverse effect on the environment which may arise from the exercise of the consent;
(ii) requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or
(iii) complying with the requirements of a regional plan.

Date Granted: 31-AUG-1994

Expiry Date: 31-AUG-2029

RESOURCE CONSENT CRC012082.1

Pursuant to Section 104 of the Resource Management Act 1991

The Canterbury Regional Council (known as Environment Canterbury)

GRANTS TO:	New Zealand Health Associated Limited
A DISCHARGE PERMIT:	To discharge of contaminants and water into Kruses Drain.
REVIEW TAKES EFFECT:	4 April 2011
EXPIRY DATE:	20 July 2036
LOCATION:	54-64 Harewood Road, PAPANUI

SUBJECT TO THE FOLLOWING CONDITIONS:

1) The discharge shall only be cooling water used at the Sanitarium Health Food Company site and groundwater, from Lots 2-8, 10 and Pt Lots 1, 9, 12 DP 9715; RS 4107; Pt Lot 1 DP 204; Lot 1 DP 59153, 54 - 64 Harewood Road, as shown on Plan CRC012082.1, which forms part of this consent.

2) Cooling water shall only be discharged into an enclosed section of Kruses Drain at or about map reference NZMS 260 M35:781-458.

3) Water used for cooling shall only be groundwater.

4) Cooling water shall only be used in plant cooling processes such as air conditioning and refrigeration, evaporator vapour condensing; and the cooling of vats and the milling roller.

5) Cooling water may only travel through pipes and heat exchangers and may come into contact with surfaces made out of copper, steel, stainless steel, cast iron and PVC.

6) Groundwater shall be discharged into Kruses Drain upstream of the cooling water discharge to maintain flows within an open section of the drain that flows through the site.

7) The discharge of groundwater and cooling water into Kruses Drain shall not exceed 450 cubic metres per day, at a rate not exceeding 10 litres per second.

8) The discharge shall not result in the temperature of the water exiting the enclosed section of Kruses Drain at or about map reference NZMS 260 M35:7842-4614 as shown on Plan CRC012082.1, exceeding 25 degrees Celsius.

9) The discharge of cooling water into Kruses Drain shall cease in the event of all incidents that result in cooling water coming into contact with contaminants. This may include structural failure of heat exchangers, vats, the milling roller, copper, steel, stainless steel, cast iron or PVC pipes. The Canterbury Regional Council shall be notified within 24 hours of the incident occurring.

10) The Canterbury Regional Council may, on any of the last five working days of June each year, serve notice of its intention to review the conditions of this consent for the purposes of:
    (a) dealing with any adverse effect on the environment which may arise from the exercise of this consent and which it is appropriate to deal with at a later stage; or
    (b) requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment.

Issued at Christchurch on 4 April 2011

Canterbury Regional Council

Environment Canterbury is the promotional name of the Canterbury Regional Council

CRC01[illegible]

RESOURCE CONSENT

Pursuant to Section 105 of the Resource Management Act 1991

The Canterbury Regional Council (known as Environment Canterbury)

GRANTED TO: SANITARIUM HEALTH FOOD CO

A WATER PERMIT: to take and use groundwater.

DATE GRANTED: 01-NOV-2001 ***EXPIRY DATE:*** 31-AUG-2035

IN CONNECTION WITH THE FOLLOWING PROPERTY:

LOCATION: 54-64 HAREWOOD ROAD, PAPANUI

LEGAL DESCRIPTION: LOTS 2 3 4 5 6 7 8 10 AND PT LOTS 1 9 AND 12 DP 9715 LOT 2 DP 6865 PT LOT 1 DP 204 LOT 1 DP 59163

SUBJECT TO THE FOLLOWING CONDITIONS:

1) The rate at which water is taken from bore M35/1353, 152 millimetres diameter and 27.4 metres deep, at or about map reference NZMS 260 M35:[illegible]; and bore M35/[illegible], 152 millimetres diameter and 27.4 metres deep, at or about map reference NZMS 260 M35:[illegible], shall not exceed 24 litres per second, with a combined volume not exceeding [illegible] cubic metres in any period of seven consecutive days.

2) An investigation of the efficiency of water use arising from the exercise of this consent shall be carried out over a period of one year commencing 1 December 2001. The consent holder shall provide a copy of the investigation results to the Canterbury Regional Council by 1 February 2003.

The investigation shall:
(i) monitor total water use; and
(ii) identify any potential water conservation measures.

3) The consent holder shall take all practicable steps to:
(a) ensure that the volume of water used for irrigation does not exceed that required for the soil to reach field capacity; and
(b) avoid leakage from pipes and structures; and
(c) avoid the use of water onto non-productive land such as impermeable surfaces and river or stream riparian strips.

4) The volume and rate at which water is taken shall be measured to within an accuracy of 10 percent and recorded daily in a log kept for that purpose, and a copy of the records provided to the Canterbury Regional Council before 31 May each year.

5) The Canterbury Regional Council may, on any of the last five working days of June each year, serve notice of its intention to review the conditions of this consent for the purpose of dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage.

Environment Canterbury is the promotional name of the Canterbury Regional Council

ISSUED AT CHRISTCHURCH ON 1 NOVEMBER 2001

Tania Harris
TEAM LEADER CONSENTS ADMINISTRATION
on behalf of the Canterbury Regional Council

Appendix E

CCC Property File

COPY

Box File

RESOURCE MANAGEMENT ACT 1991
BUILDING ACT 1991

CHRISTCHURCH CITY COUNCIL

HAZARD DATA INFORMATION

CHRISTCHURCH
THE GARDEN CITY

WARD: PAPANUI STREET: HAREWOOD RD NUMBER: 54

LEGAL DESCRIPTION: DATE RECORDED: 29/9/98

HAZARD INFORMATION: [GIVE DETAILS,EQUIPMENT HISTORY, GROUND CONDITIONS]

REMOVAL - 1 x 9100 L 3B U/G TANK
& PIPEWORK.
TANK IN GOOD CONDITION
PIT TO 3M IN DEPTH
CLAY | SHINGLE STRATA
WATER TRACE AT 2.5M
SOIL SAMPLES TAKEN

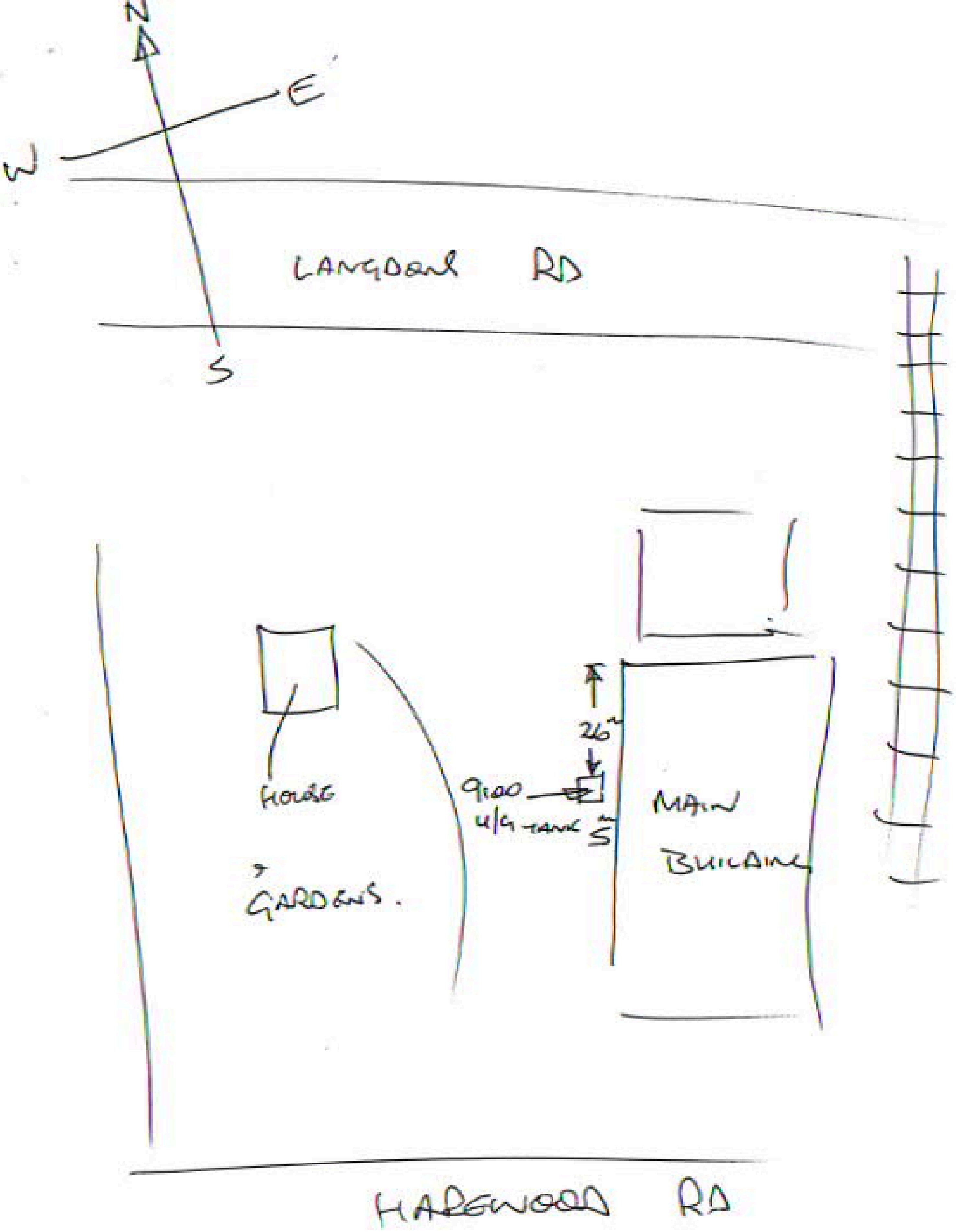
CONTRACTOR — PETRO TEC
OIL CO — SHELL

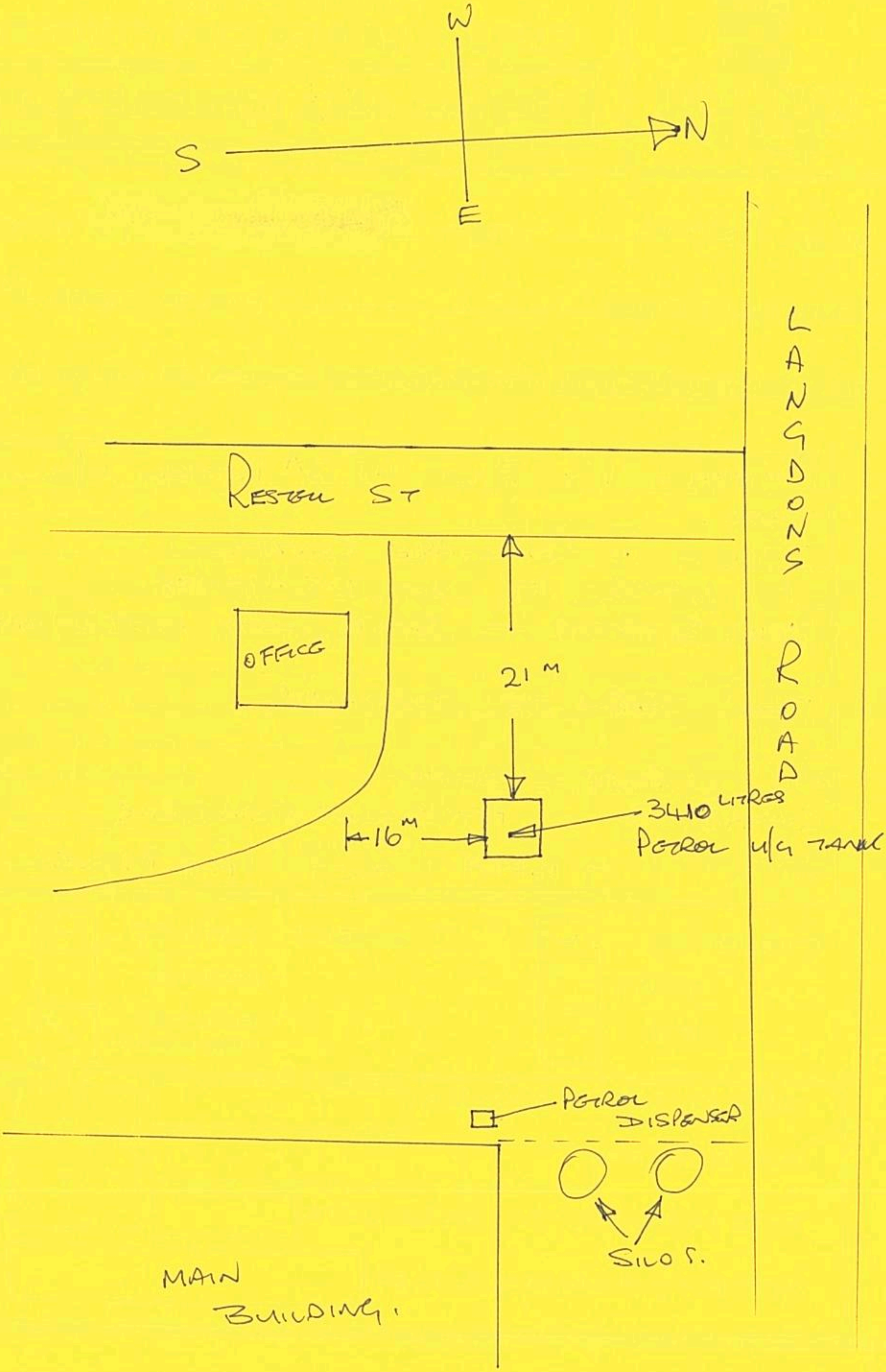
INFORMATION SOURCE: H DATA
RECORDED BY: DCI R.A.MILNER

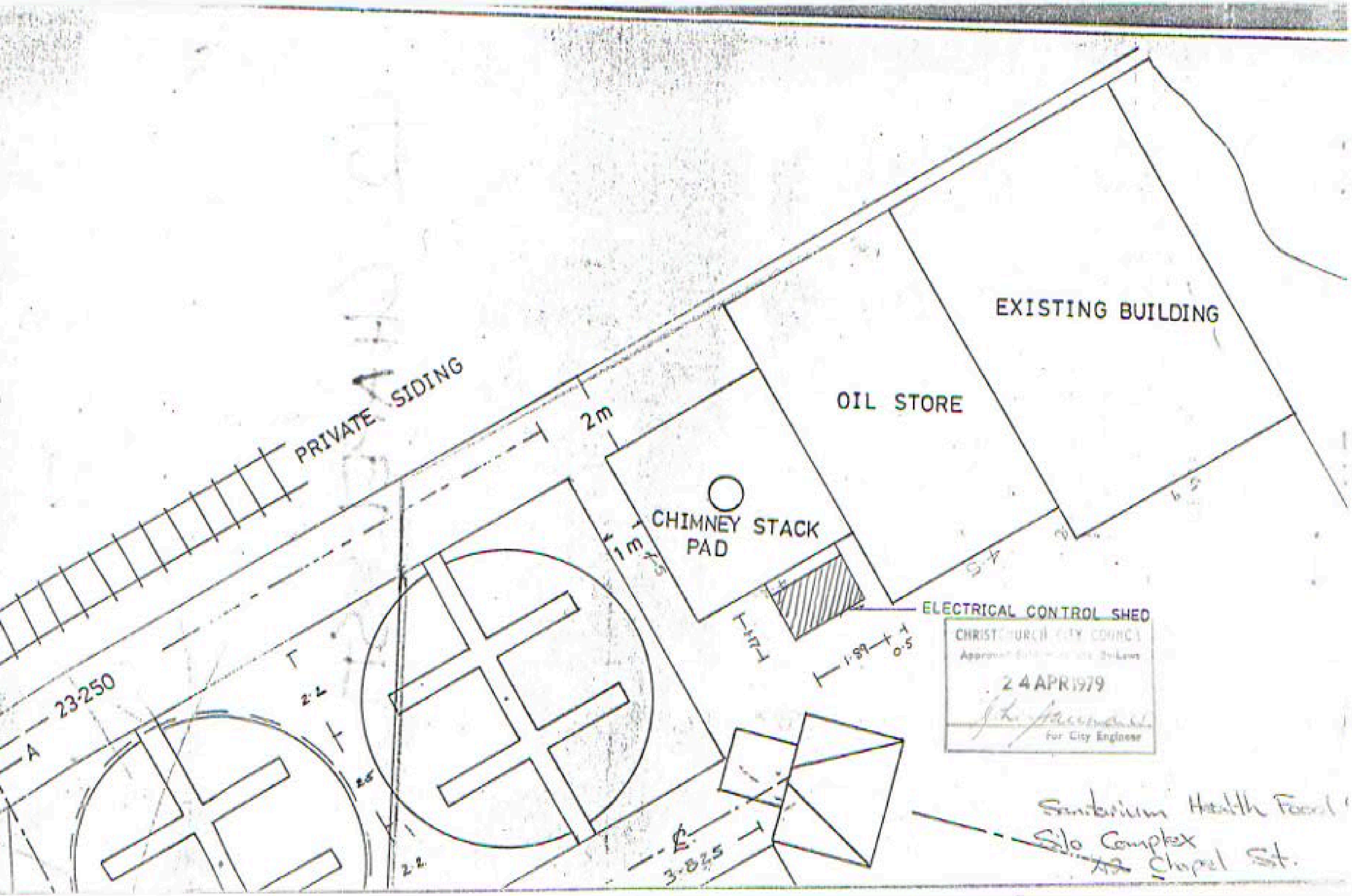
SEVERITY:
LOW ☑
MEDIUM ☐
HIGH ☐

ACCURACY:
CONFIRMED ☑
UNKNOWN: ☐
PERSONAL OBSERVATION ☑

DATE ENTERED IN REGISTER:
RECORDED BY:
DATE FORWARDED TO CENTRAL DATA:
RECORDED IN CENTRAL DATA BY:

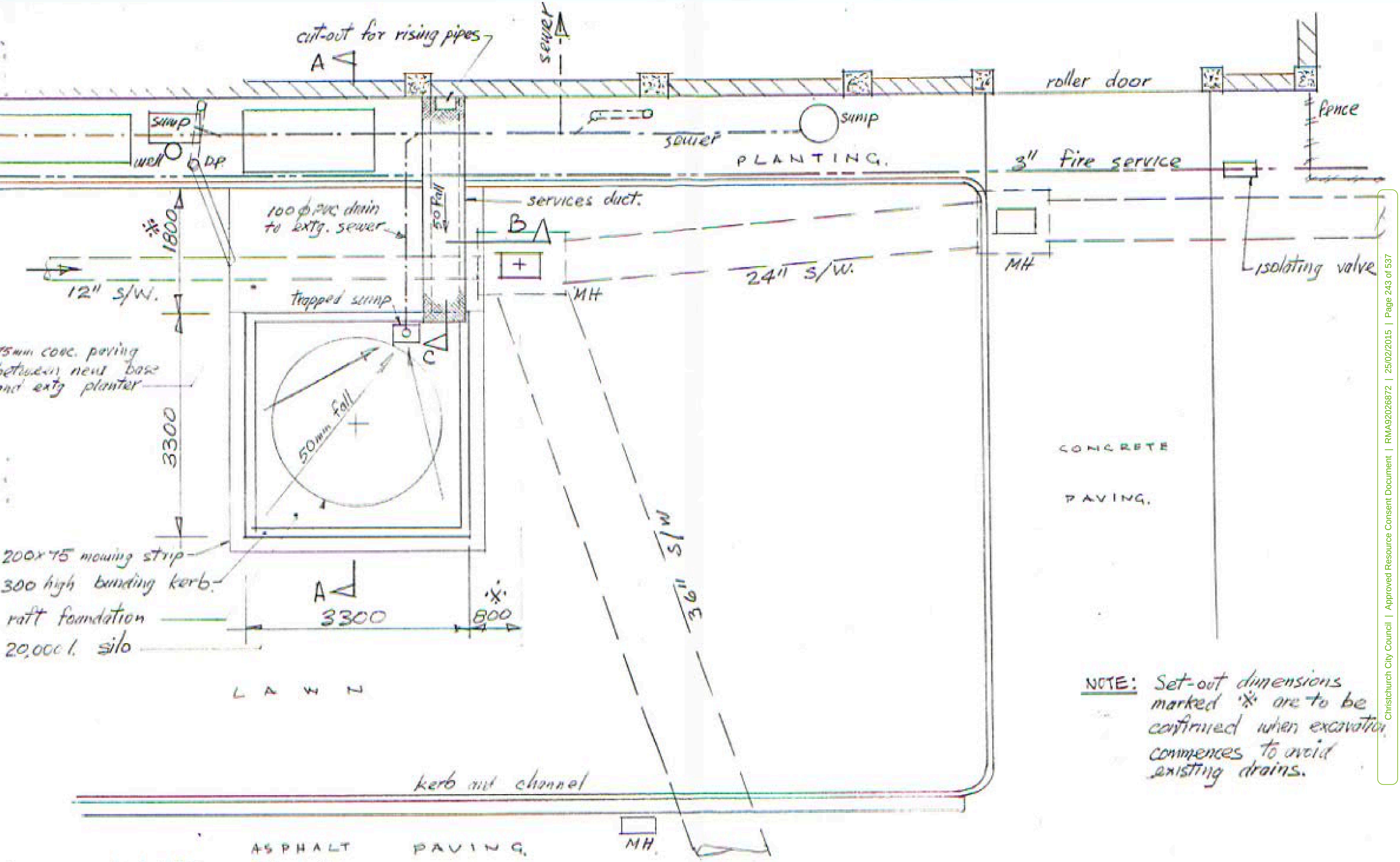

N
W
E
S
LANGDONS RD
HOUSE
& GARDENS.
26m
9100
U/G TANK
5m
MAIN BUILDING
HAREWOOD RD


W
S
N
E
LANGDONS ROAD
RESTELL ST
OFFICE
21 M
16 M
3410 LITRES
PETROL U/G TANK
PETROL DISPENSER
SILOS.
MAIN BUILDING.



CHRISTCHURCH CITY COUNCIL
Approved [illegible] Bylaws
24 APR 1979
For City Engineer

Sanitarium Health Food
Silo Complex
~~A2~~ Chapel St.

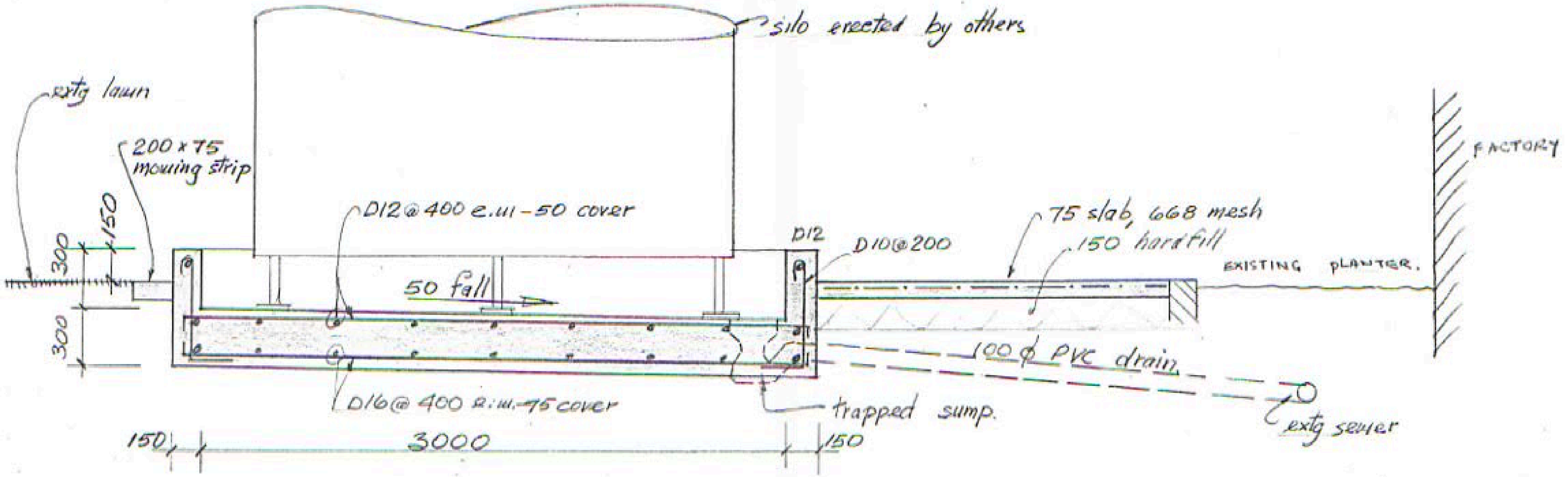


NOTE: Set-out dimensions marked ✻ are to be confirmed when excavation commences to avoid existing drains.

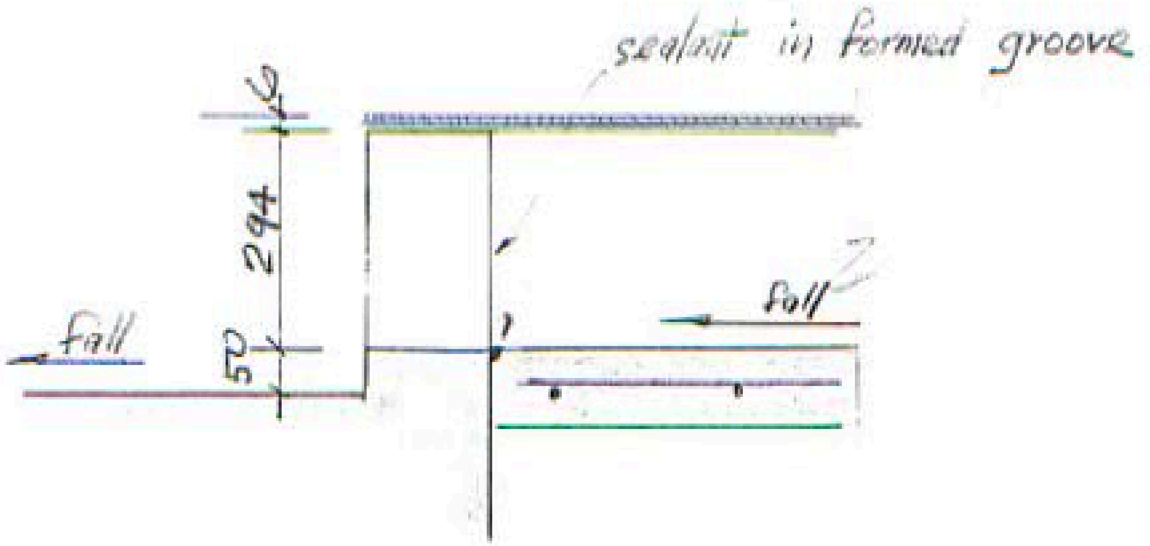
SITE PLAN

SILO INSTALLATION FOR SANITARIUM HEALTH FOOD Co

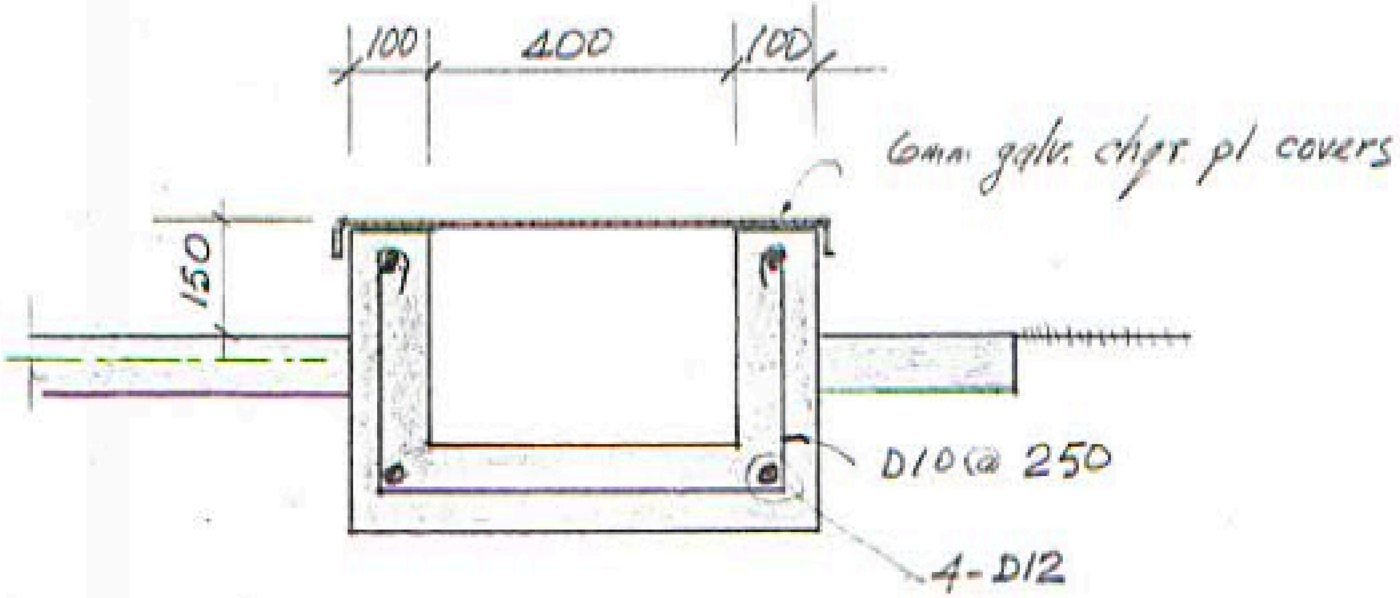
CONSULTING ENGINEERS	CAMPBELL HAMANN AND PARTNERS 383 BARBADOES ST, CHRISTCHURCH 1 Tel & Fax: 03/ 366 5536 15 DALY ST, PO BOX 30176, LOWER HUTT Tel & Fax: 04/ 569 7922	SCALE: 1:50 DATE: MAR. 95	REF: 3512 Sht 2



SECTION A-A.



SECTION C.



SECTION B

SILO INSTALLATION FOR SANITARIUM HEALTH FOOD C°

CONSULTING ENGINEERS

CAMPBELL HAMANN AND PARTNERS

383 BARBADOES ST, CHRISTCHURCH 1 Tel & Fax: 03/ 366 5536
15 DALY ST, PO BOX 30176, LOWER HUTT Tel & Fax: 04/ 569 7922

SCALE: 1:20, 1:10
DATE: MAR 95

REF: 3512
Sht 3

SEARCH COPY 27 MAR 1995

Land and Deeds 69

No. 36A/232

References
Prior C/T GN 718338/1, 997947/1, PROC 301

Transfer No.
N/C. Order No. 997947/3

REGISTER

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT

This Certificate dated the 9th day of June one thousand nine hundred and ninety-two under the seal of the District Land Registrar of the Land Registration District of CANTERBURY

WITNESSETH that HER MAJESTY THE QUEEN for Railway Purposes ---

is seised of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial underwritten or endorsed hereon) in the land hereinafter described, delineated with bold black lines on the plan hereon, be the several admeasurements a little more or less, that is to say: All that parcel of land containing 5206 square metres or thereabouts being Lot 1 Deposited Plan 59153 ---

DISTRICT LAND REGISTRAR

ASSISTANT LAND REGISTRAR

Transfer 997947/5 granting a right to drain water in gross over part herein in favour of the Christchurch City Council - 9.6.1992 at 9.17am

A.L.R.

The easement granted by Transfer 997947/5 is subject to Section 309(1)(a) Local Government Act 1974

A.L.R.

Transfer A3578/1 to Australasian Conference Association Limited at Auckland (Fencing Provision) - 9.7.1992 at 10.46am

A.L.R.

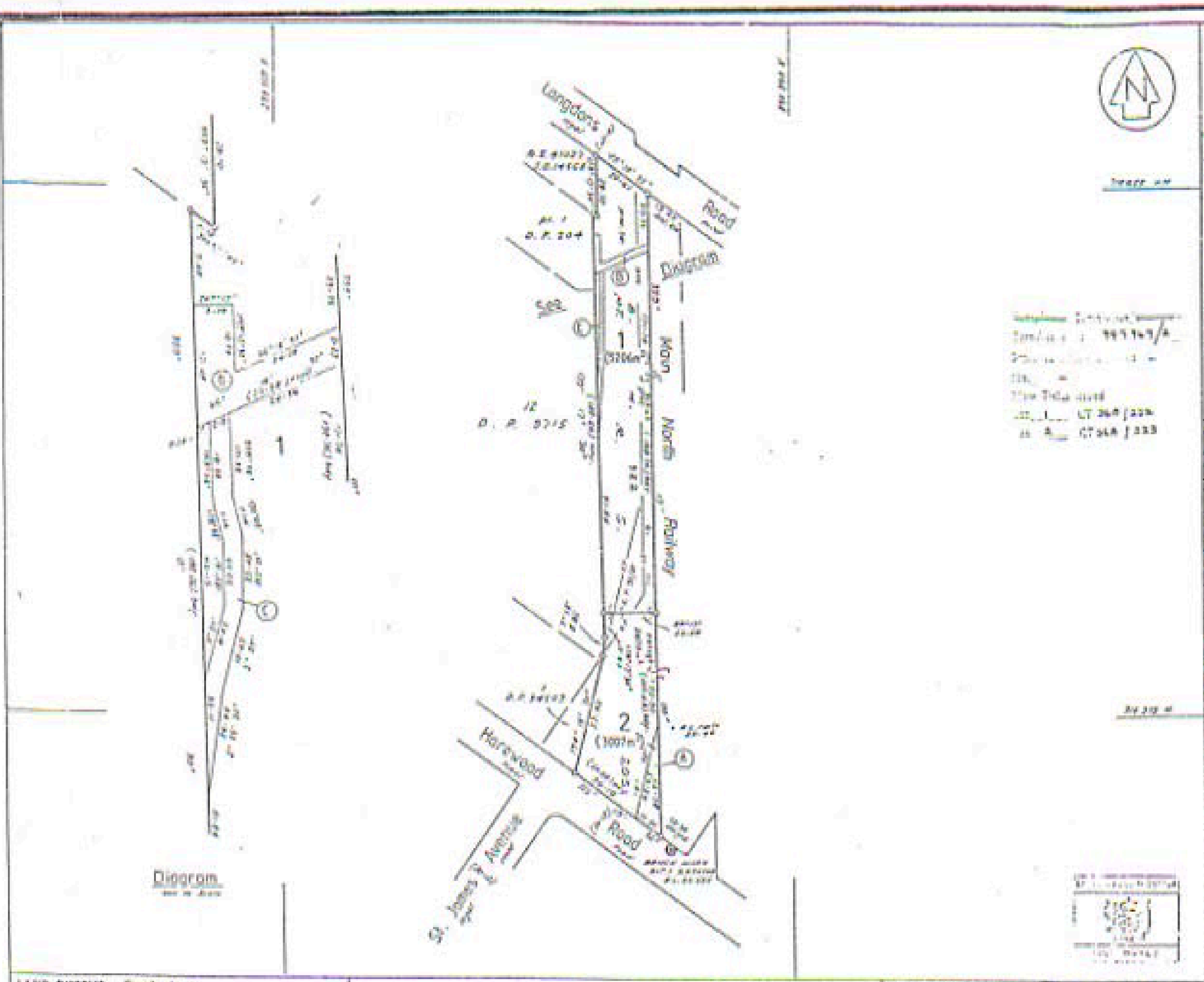
Subject to Part IVA Conservation Act 1987

Subject to Section 11 Crown Minerals Act 1991

A.L.R.

No. 36A/232

Measurements are Metric



Approvals

The New Zealand Railways Corporation

Manager Technical Branch

For and on behalf of the Minister for Crown pursuant to Section ... New Zealand Railways Corporation Act 1981.

Pursuant to a resolution under Section 305 Local Government Act, 1974 passed ... day of ... 19 ... The Christchurch City Council has approved this plan of subdivision subject to the granting and/or reserving of the easements shown on the [illegible]

[illegible] that the plan is in accordance with the [illegible] THE COMMON SEAL of the CHRISTCHURCH CITY COUNCIL was affixed hereto in the presence of

Mayor/Councillor

Administration Manager

Total Area 8213 m²

Comprised in C. T. 92/81, Pt proc. 301 & Pt.G.N. 718338/1

Approved as to Survey 15/10/91 Deputy Chief Surveyor

Deposited this 9th day of June 1992

District Land Registrar

Received 19-7-91

DP59153

LAND DISTRICT Canterbury SURVEY BLK. & DIST. VII Christchurch NZMS 261 SHT M35 RECORD MAP 1000/57-33	LOTS 1 & 2 BEING SUBDIVISION OF PTS. R. S. 203
TERRITORIAL AUTHORITY Christchurch City Surveyed by Davie, Lovell-Smith & Partners Scale 1 : 1250 Date March - April 1991	

SEARCH COPY 27 MAR 1995

References
Prior C/T 204/1202

Transfer No.
N/C. Order No. A73672/8

Land and Deeds 69

REGISTER

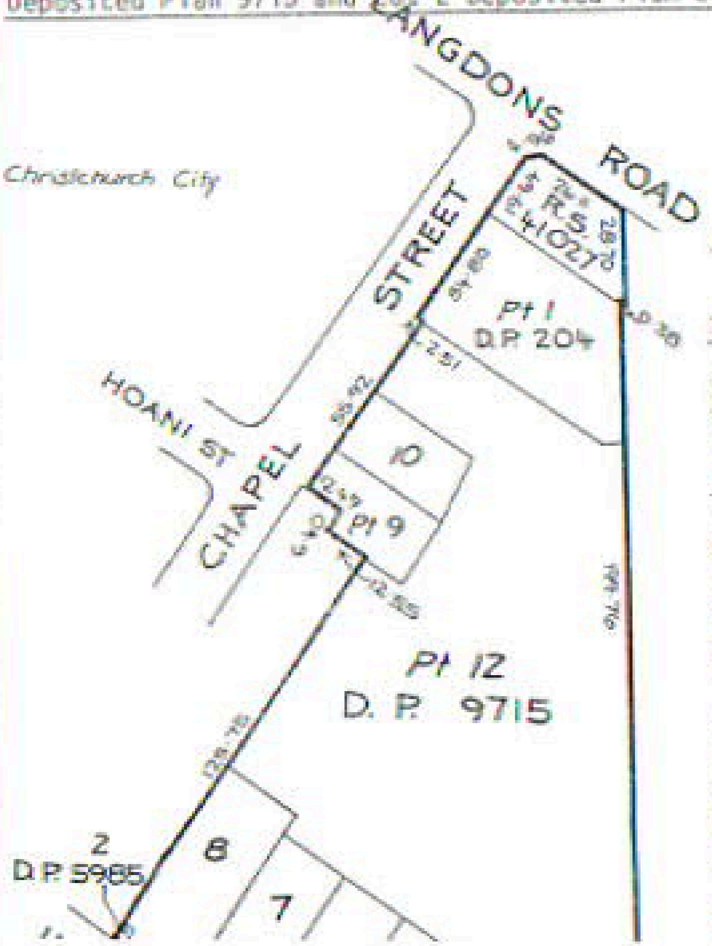
No. 37C/1080

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT

This Certificate dated the 29th day of September one thousand nine hundred and ninety-three under the seal of the District Land Registrar of the Land Registration District of CANTERBURY

WITNESSETH that AUSTRALASIAN CONFERENCE ASSOCIATION LIMITED at Auckland ---

is seised of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial underwritten or endorsed hereon) in the land hereinafter described, delineated with bold black lines on the plan hereon, be the several admeasurements a little more or less, that is to say: All that parcel of land containing 2.4335 hectares or thereabouts being Rural Section 41027 and Lots 2,3,4,5,6,7,8,10 and Part Lots 1, 9 & 12 Deposited Plan 9715 and Lot 2 Deposited Plan 5985 and Part Lot 1 Deposited Plan 204 ---



DISTRICT LAND REGISTRAR

ASSISTANT LAND REGISTRAR

Subject to:

Section 168A Coal Mines Act 1925 and Section 8 Coal Mines Amendment Act 1950 (affects the part formerly contained in CT 19A/296)

A pipeline easement in gross over part herein in favour of the Christchurch City Council granted by Transfer 178385 (affects the part formerly contained in CT 600/28)

A stormwater easement in gross over part herein in favour of the (now) Christchurch City Council granted by Transfer 514282 (affects the part formerly contained in CT 600/28)

A right to convey and drain water in gross over part herein in favour of the (now)

CAMPBELL HAMANN AND PARTNERS – CONSULTING ENGINEERS

J. R. MORROW BE, C ENG, MICE, F I STRUCT E, MIPENZ
W. G. DRAPER BE, C ENG, MICE, FIPENZ, FCI Arb.

383 BARBADOES STREET
CHRISTCHURCH 1
TELEPHONE 366-5536
FAX 366-5536
AND AT
LOWER HUTT

18th April 1995.

Public Health and Safety Manager,
Christchurch City Council,
P. Box 237,
CHRISTCHURCH.

Dear Sir,

re: Application for Building Consent
Project No. 95002420
Silo Foundation - 54 Harewood Road, Christchurch.

We respond to your letter of 7 April as follows:-

Items 1 and 4

We enclose a design statement from the manufacturers of the silo, Mercer Stainless Ltd The silo is 4·95m high and 2·34m diameter with an all up mass of 24,500Kg when full.

The maximum pressure applied to the soils under the foundation is 68KPa which occurs under seismic conditions. Because of other parameters governing the size of the foundation, this pressure is very much less than the design bearing capacity which we assess at 150 KPa following our subsoil investigation. A previous test bore on the property reveals sand and clay to 11metres overlying gravels to 16metres with no indication of peat. In past years there has been extensive surface reformation over the area of the site and our investigations reveal 100mm of topsoil overlying very firm hardfill. However as this may vary over even the small area of this site, we have specified that the contractor report any suspect ground and our inspection and further instructions will follow.

Our Producer Statement, Design has been endorsed to include the above information and a copy is attached.

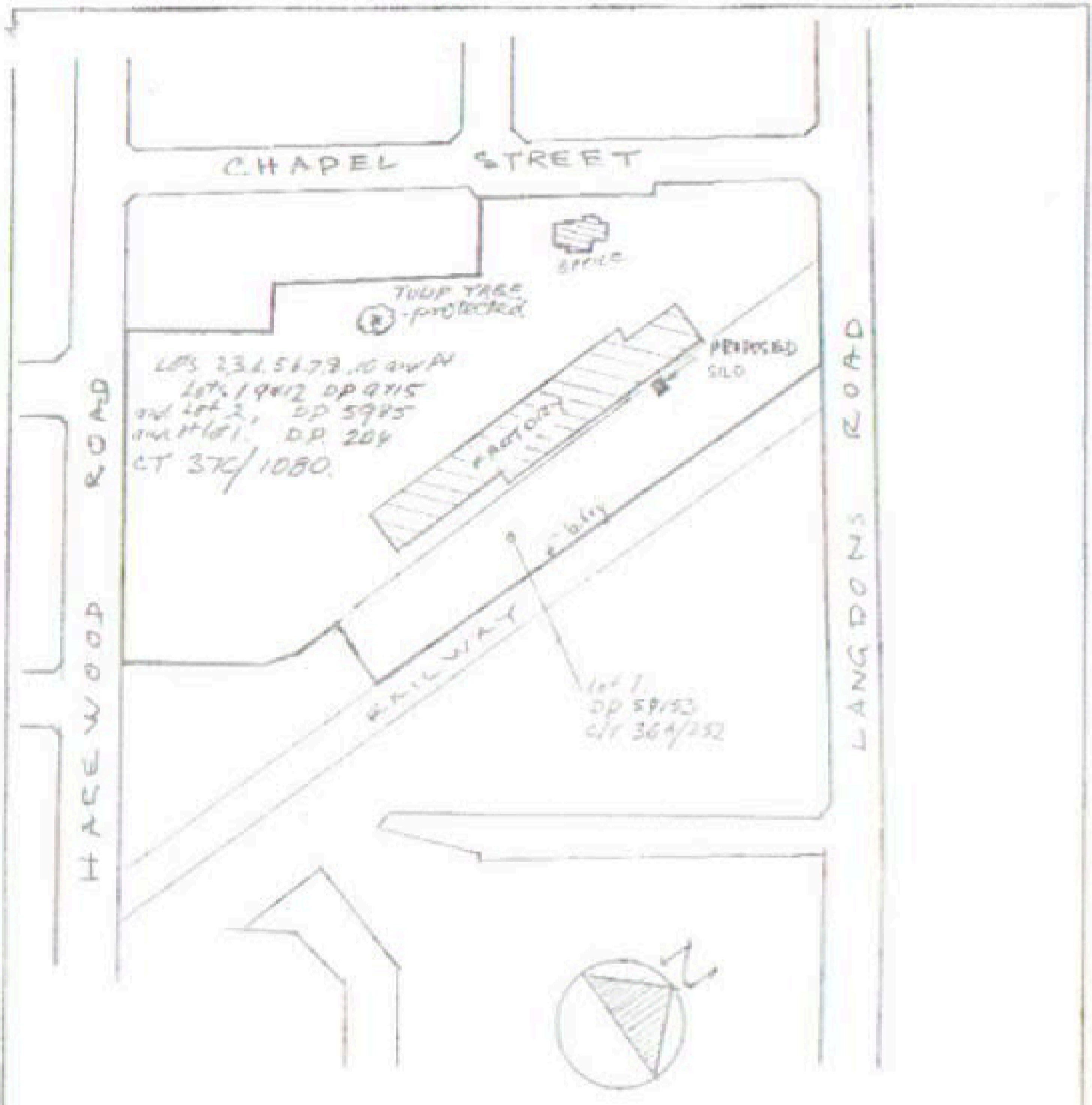
Item 2

The following inspections of the work will be carried out:-

- opening up of ground work
- prior pouring of concrete
- project completion

Item 3

The sealant referred to for concrete joints shall be an elastomeric sealant Colpor 200 by Fosroc or equal which is resistant to yeasts.



LOCALITY PLAN

SILO INSTALLATION FOR SANITARIUM HEALTH FOOD Co

CONSULTING ENGINEERS	CAMPBELL HAMANN AND PARTNERS 303 BARBADOES ST, CHRISTCHURCH 1 Tel & Fax: [illegible] 15 DALY ST, PO BOX 30176, LOWER HUTT Tel & Fax: [illegible]	SCALE 1:2000 DATE MAR '95	REF 3512 Sht 1

CHRISTCHURCH
THE GARDEN CITY
the city that shines

CHRISTCHURCH CITY COUNCIL

4 April 1995

CAMPBELL HAMANN & PTNRS
383 BARBADOES ST
CHRISTCHURCH

Dear Sir/Madam

APPLICATION FOR PROJECT INFORMATION MEMORANDUM
PROJECT NO. 95002420

I refer to your application for a Project Information Memorandum for the proposed erection of SILO FOUNDATION
at 54 HAREWOOD RD

To enable the Council to consider your application you are requested to supply the following further information:

1. A tulip tree (Liriodendron tulipfera) on the site is a notable tree protected by the District Plan. Please identify the location of this tree and the siting of the proposed development on a site plan.

In accordance with Section 5 of the Building Regulations 1992, the Project Information Memorandum will be issued within 10 working days of the receipt of the above requested information.

Please quote the above Project No. in all communication with the Council.

Yours faithfully

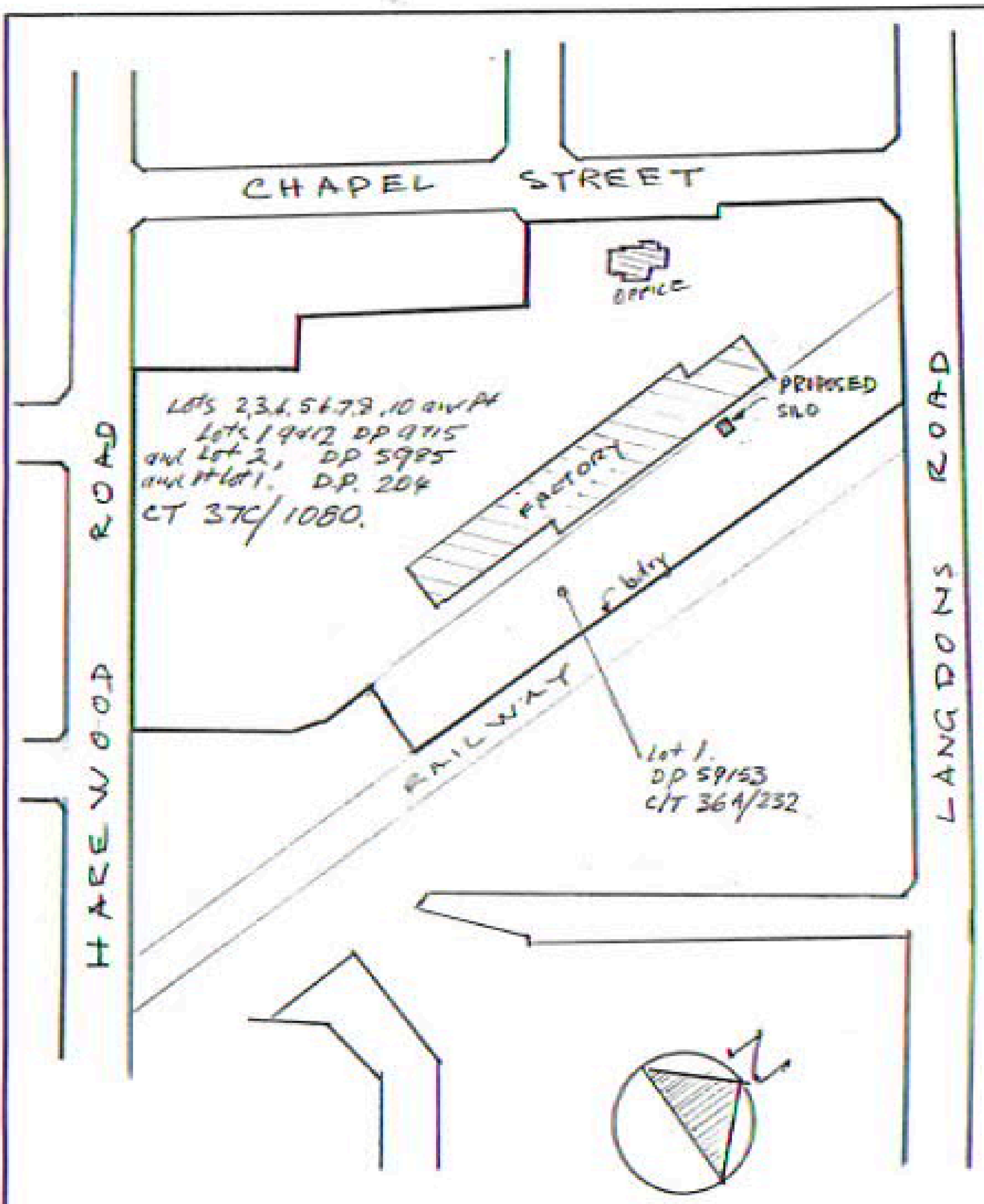
C. V. Hughes

for
AREA DEVELOPMENT OFFICER/
SENIOR BUILDING INFORMATION OFFICER

DISTRIBUTION: PROPERTY FILE (1)
COMPUTER ENTER (1)

CONTACT FILE

FENDALTON SERVICE CENTRE CNR JEFFREYS ROAD AND CLYDE ROAD
P O BOX 29-183 CHRISTCHURCH TELEPHONE (03) 351-7109 FAX (03) 351-7780



LOCALITY PLAN

SILO INSTALLATION FOR SANITARIUM HEALTH FOOD CO

CONSULTING ENGINEERS	**CAMPBELL HAMANN AND PARTNERS** 383 BARBADOES ST, CHRISTCHURCH 1 Tel & Fax: 03/ 366 5536 15 DALY ST, PO BOX 30176, LOWER HUTT Tel & Fax: 04/ 569 7922	**SCALE:** 1:2000 **DATE:** MAR 95	**REF:** 3512 sht 1

CHRISTCHURCH
THE GARDEN CITY

Resource Management Act 1991/Building Act 1991

Christchurch City Council

Hazards

Street: Harewood Road **Number:** 54

Legal Description:

Hazard: (Give details eg age, history of premises)

2 underground tanks - 12,510 L
of flammable liquid
1 above ground tank, gas cylinders
and containers of flammable liquid
also on site

Severity: Potential

Accuracy:

LOCATION OF INFORMATION:

Service Centre: Civic 2nd floor

File No or Source of Information: Dangerous Goods Database

Other: Environmental Health Unit

CHRISTCHURCH CITY COUNCIL FOUNDATION RECORD BU / 40 / 96 / 54-64

SITE PLAN SCALE:

INVESTIGATION BY:

Sanitarium Health food Co.

STREET : Harewood Rd NO : 54-64

D.P. : LOT NO :

DATE : 1943

NATURE OF FOUNDATION INVESTIGATION (✓)

POSTHOLE ☐ EXCAVATION ☐

BOREHOLE ☑ SCALA PENETROMETER ☐

OTHER (SPECIFY) ☐

DEPTH OF INVESTIGATION 90′ (M.)

CONDITIONS ENCOUNTERED (e.g. FILL, WATER TABLE)

1′-36′ sand & clay.

COMMENTS :

See "Subsurface bores in Ch-Ch" by D.J. Alley - for borehole log refer to T. 681

ENGINEER (e.g. CONSULTING)

NAME: Taylors log book, now in

INVOLVEMENT: possesion of S. W. Geddes 98 Sullivan ave.

BORE LOG PROFILE, SCALA PENETROMETER, SOILS TEST RESULTS.

CHRISTCHURCH CITY COUNCIL

FORM OF APPLICATION UNDER THE TRADE WASTES BYLAW

For Flows Exceeding 5000 Litres/Day

RECEIVED
29 NOV 2001
BUILDING CONSENTS

CO[illegible] COPY

The Waste Manager
Christchurch City Council
City Water and Waste Unit
P O Box 237
CHRISTCHURCH

1. I/We Australasian Conference Association
Trading as Sanitarium Health Food Company
being the owner / occupiers of trade premises at 54-64 Harewood Road
request the consent of the Council to the discharge of trade wastes to the Council's sewers in accordance with the terms of your Trade Wastes Bylaw.

This request relates to:
☐ An already existing discharge
☑ A proposed new discharge
☐ Proposed change of wastes discharged
☑ Proposed change in volume

2. **The proposed new discharge, or change will commence from:** (date) 1/2/2002

3. **Term of consent sought:** ☐ 1year ☐ 2year ☐ 3year ☐ 4year ☐ 5year ☑ 10 year

4. **Number of "PROCESS" sheets attached:** (1)

NOTE: Please complete a separate **"PROCESS"** sheet for each individual process which discharges to the Council's sewers from the same premises.

5. **The source of water used in the premises is:** eg Christchurch City Council reticulation/wells
☐ from Wells m³/working day 1,000
☐ from CCC reticulation m³/working day 20

6. **Postal Address for Accounts:**

Address: P.O Box 5011
Papanui
Christchurch

7. **Contact for Enquiries:**

Name: Warren Ashby
Address: P.O. Box 5011
Papanui
Phone: (03) 3529104 Ext 847
Fax: (03) 3525405

8. **Number of discharge days per annum:** 320

9. **Volume of trade wastes**
Total volume per annum: 3200 m³
Average daily: 10 m³
Average 8 am to 4pm: 5 m³
Average 4pm to 8am: 5 m³
Maximum daily volume: 20 m³
Maximum flow: 5 l/sec
Seasonal fluctuation (range):

CHRISTCHURCH CITY COUNCIL
CONSENT DOCUMENT
11 DEC 2001
All building work shall comply with the New Zealand Building Code notwithstanding any inconsistencies which may occur in the drawings and specifications.

T.W.I. 61

PTO

If batch discharges:

Quantity: 4 m³

Frequency: 1 (specify eg. 2per day, 3per week)

Rate of discharge: 5 l/sec

11. The wastes ~~do~~/do not, contain condensing water or storm water and the layout of drains on the premises is/~~is not~~, such as to reasonably exclude the possibility of this becoming mixed with trade wastes.

12. It ~~is~~/is not proposed that a mixture of domestic and trade waste should be discharged prior to any sampling point.

13. **The proposed method for flow measuring is:**

(a) a permanent installation of suitable flow measuring equipment: Installed by 3/2002 [✓ Yes]/No

(b) based on water usage as measured by meter: Yes/No

(c) other (specify):

14. List any substances contained in Schedule 1 and 2 of the Bylaw which are stored, used, or generated on the premises:

N/A

Describe mitigation measures employed to prevent accidental spillages of these substances from entering the public sewer or surface water system:

N/A

15. An independent waste audit of the premises ~~has~~/has not been carried out by:

16. A Discharge Management Plan is ~~attached~~/will be provided:

17. The following steps ~~have been~~/will be taken to improve the trade process as part of a strategy of cleaner production: Installation of Data logger for Trade waste

Review of Trade waste procedures

Date of improvements: 2/2002

COUNCIL COPY

18. Activities undertaken on these premises require a MAF licence. Yes ☐ No ☐

APPLICANT:

Sanitarium Health Food Company

W.S. Ashley

(Eng Manager)

(Full Names Of Applicants)

DATE: 28/11/2001

CHRISTCHURCH CITY COUNCIL

CONSENT DOCUMENT

11 DEC 2001

All building work shall comply with the New Zealand Building Code notwithstanding any inconsistencies which may occur in the drawings and specifications.

NOTE:

Where the applicant is a partnership application must be signed by all partners

Where the applicant is trading as a Limited Company, the application must be signed by the Limited Company.

CHRISTCHURCH CITY COUNCIL
FORM OF APPLICATION UNDER THE TRADE WASTES BYLAW
For Flows Exceeding 5000 Litres Per Day

PROCESS SHEET NO: 3 (Existing)
(Use a separate page for each process)

(a) If process is generated by other than Applicant please state:

Name of business: Sanitarium Health Food Company
Type of business: Food Processing
Address: 54-64 Harewood Road
Papanui

(b) Process name and description:
Yeast extract processing & evaporative concentration

(c) Type of product processed: Yeast Extract

(d) Number of discharge days per annum: 320

(e) **Volume of trade wastes:**

Total volume per annum:	22400	m³
Average daily volume:	70	m³
Average volume 8am to 4pm:	35	m³
Average 4pm to 8am	35	m³
Maximum daily volume:	100	m³
Maximum flow:	20	l/s

If batch discharges:

Quantity:	8	m³ (per batch)
Frequency:	1 per day	(specify e.g. 2 per day, 3 per week)
Rate of discharge:	10	l/sec

(f) **General characteristics of trade wastes:**

	TYPICAL RANGE	
Temperature (C):	15	30
BOD$_5$ (g/m³):	2100 average	
COD (g/m³):		
Suspended solids (g/m³):	190 average	
pH:	5-8	9
Oil and greases (g/m³):	Minimal	

COUNCIL COPY

(g) The trade wastes contain the following characteristics which when mixed with other trade wastes and discharged from the premises, are near or in excess of the limits stipulated in Schedule 1 of the Bylaw.

VALUE OR CONCENTRATION	From Process		At Point of Discharge	
Characteristic / Metal	(Typical)	(Max)	(Typical)	(Max)
	N/A			

CHRISTCHURCH CITY COUNCIL
CONSENT DOCUMENT
11 DEC 2001
All building work shall comply with the New Zealand Building Code notwithstanding any inconsistencies which may occur in the drawings and specifications.

(h) The wastes are presently discharged ~~with~~/without pre-treatment.

Pre-treatment facility is: N/A

T.W.I. 62

CHRISTCHURCH CITY COUNCIL
FORM OF APPLICATION UNDER THE TRADE WASTES BYLAW
For Flows Exceeding 5000 Litres Per Day

PROCESS SHEET NO: 2 (Existing.)
(Use a separate page for each process)

(a) If process is generated by other than Applicant please state:

Name of business: Sanitarium Health Food Company

Type of business: Food Processing

Address: 56-64 Harewood Road.
Papanui

(b) Process name and description:
Boiler Water Blow Down.

(c) Type of product processed: Boiler Water

(d) Number of discharge days per annum: 260

(e) **Volume of trade wastes:**

Total volume per annum:		m³
Average daily volume:	0.5	m³
Average volume 8am to 4pm:	0.5	m³
Average 4pm to 8am	0	m³
Maximum daily volume:	1.0	m³
Maximum flow:	25	l/s

If batch discharges:

Quantity:	0.5	m³ (per batch)
Frequency:	1 per Day	(specify e.g. 2 per day, 3 per week)
Rate of discharge:	25	l/sec

(f) **General characteristics of trade wastes:**

	TYPICAL RANGE	
Temperature (C):	40°C	60°C
BOD$_5$ (g/m^3):	N/A	
COD (g/m^3):		
Suspended solids (g/m^3):	N/A	(1800 ppm)
pH:	10	12
Oil and greases (g/m^3):	0	

COUNCIL COPY

(g) The trade wastes contain the following characteristics which when mixed with other trade wastes and discharged from the premises, are near or in excess of the limits stipulated in Schedule 1 of the Bylaw.

VALUE OR CONCENTRATION Characteristic / Metal	From Process (Typical)	(Max)	At Point of Discharge. (Typical)	(Max)

CHRISTCHURCH CITY COUNCIL
CONSENT DOCUMENT
17 DEC 2001
All building work shall comply with the New Zealand Building Code notwithstanding any discrepancies which may occur in the drawings and specifications.

(h) The wastes are presently discharged with/~~without~~ pre-treatment.

Pre-treatment facility is: 160 litre settling tank & dilution

T.W.I. 62

CHRISTCHURCH CITY COUNCIL

FORM OF APPLICATION UNDER THE TRADE WASTES BYLAW

For Flows Exceeding 5000 Litres Per Day

PROCESS SHEET NO: 1

(Use a separate page for each process)

NEW

(a) If process is generated by other than Applicant please state:

Name of business: Sanitarium Health Food Company

Type of business: Food Processing

Address: 56-64 Harewood Road
Papanui

(b) Process name and description:
Water & Water/Juice Bottling Plant floor waste.

(c) Type of product processed: Water & Water/Juice Drinks.

(d) Number of discharge days per annum: 320

(e) **Volume of trade wastes:**

Total volume per annum:	3200	m³
Average daily volume:	10	m³
Average volume 8am to 4pm:	5	m³
Average 4pm to 8am	5	m³
Maximum daily volume:	20	m³
Maximum flow:	5	l/s

If batch discharges:

Quantity:	4	m³ (per batch)
Frequency:	1	(specify e.g. 2 per day, 3 per week)
Rate of discharge:	5	l/sec

(f) **General characteristics of trade wastes:**

	TYPICAL RANGE	
Temperature (C):	15	30
BOD_5 (g/m³):	?	
COD (g/m³):	?	
Suspended solids (g/m³):	?	
pH:	6	8
Oil and greases (g/m³):	N.I	N.I

COUNCIL COPY

(g) The trade wastes contain the following characteristics which when mixed with other trade wastes and discharged from the premises, are near or in excess of the limits stipulated in Schedule 1 of the Bylaw.

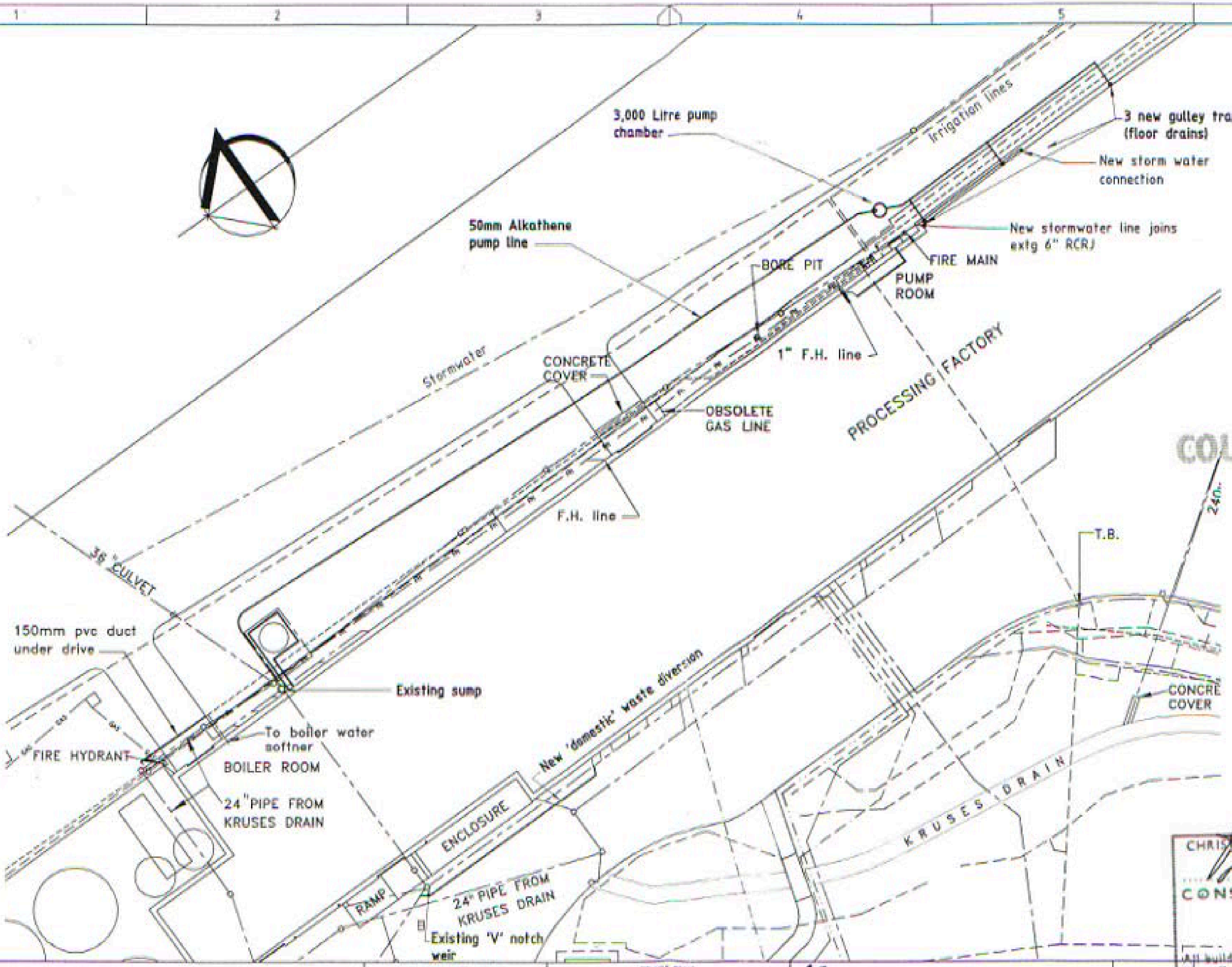
VALUE OR CONCENTRATION	**From Process**		**At Point of Discharge.**	
Characteristic / Metal	(Typical)	(Max)	(Typical)	(Max)
		N/A		

CHRISTCHURCH CITY COUNCIL
CONSENT DOCUMENT
14 DEC 2001
All building work shall comply with the New Zealand Building Code notwithstanding any inconsistencies which may occur in the drawings and specifications.

(h) The wastes are presently discharged with/without pre-treatment.

Pre-treatment facility is: N.I

T.W.I. 62



COUNCIL COPY

B. WATKINS
Building Consent Officer

CHRISTCHURCH CITY COUNCIL
CONSENT DOCUMENT
11 DEC 2001
All building work shall comply with the New Zealand Building Code notwithstanding any inconsistencies which may occur in the drawings and specifications.

Plotted: 2001-11-28 17:07:00

REVISIONS

THIS DRAWING AND THE INFORMATION CONTAINED HEREIN IS THE PROPERTY OF SANITARIUM HEALTH FOOD CO AND IS NOT TO BE REPRODUCED, DISCLOSED, OR TRANSMITTED TO OTHER PARTIES WITHOUT WRITTEN AUTHORISATION FROM SANITARIUM HEALTH FOOD CO.

DO NOT SCALE
3RD ANGLE PROJECTION
ALL DIMENSIONS IN MM
UNLESS SHOWN OTHERWISE

GENERAL	TOLERANCES
x ± 0.5	.0x ± 0.01
.x ± 0.2	ANGULAR ± 0.1°

SANITARIUM CHRISTCHURCH FACTORY

WATER AND SEWER SERVICES
WATER FILLING STATION
WATER

SCALE	
DRAWN	T.E.T
DATE	28/11/01
CHECKED	W. Ashby

1

Water/water-sewer.dwg

J.M. STIFFE & ASSOCIATES ARCHITECTS

Albert Street, Whangarei, N.Z.
Phone 82-453. P.O. Box 477

12 December 1969

10199

RECEIVED
15DEC1969
Ack.
Answd.

The Town Clerk
Christchurch City Council
P.O. Box 237
CHRISTCHURCH.

Dear Sir,

re Proposed Buildings for the Sanitarium Health Food Company

Please find enclosed sketch drawings of the building proposals as outlined below: -

(a) Additions to the Warehouse:

It is proposed to remove the Packing Room, Cool Room, Toilets, Large Folding door etc. in this building. The building in of rooms indicated using 6" hollow concrete blockwork reinforced as required and provided with timber ceiling at 8'0", with flooring over for a Mezzanine storage floor.

Two new electric roller shutter doors will be fixed to the front wall with a small 6'6" high x 2'6" wide side door opening out alongside.

The addition as indicated at the end of the building will be constructed as for the existing building with cavity brick walls, patent glazing above, steel portal frames and an end feature wall in fairface concrete. Is this building required to have a ceiling?

Note that a small exit door at the rear of the existing building remains for egress.

Stormwater and Soil drainage will discharge into drainage already near this building.

(b) **Proposed Retail Packing Store:**

A new building is to be erected in the position shown on the site plan.

This building will be constructed with reinforced concrete frame or encased steel portal legs, with cavity brick and blockwork (brick to outside 16 x 8 x 4 block to inside) and patent aluminium glazing system above walls.

Interior walls will be 6" concrete blockwork, reinforced as required with timber framed ceiling over at 8'6". A timber floor will be fixed over the Ground Floor rooms and this area used as a Mezzanine floor with timber stairs leading up to it.

An electric Roller Shutter will be fixed to the front wall with a small 6'6" x 3'0" wide door alongside opening out. Near the rear of the building a 6'6" x 3'0" wide door opening out has been provided for egress.

Stormwater drainage will discharge into the Road Stormwater channel and Soil Drainage into the main sewer drain which is out from the building. Would you please indicate the position of this drain from the side boundary.

C.D.B.

This building will have a Pinex Softboard ceiling throughout, cut between the portal frames.

On behalf of our clients we ask for Town Planning approval to the scheme and for Council approval to the building as described.

Yours faithfully,
J.M.STIFFE & ASSOCIATES

W.R.Wilkinson.

Enclosures

WRW:FMcG

ACKNOWLEDGEMENT FORM A/S SENT		INIT	DATE
MR R Britchley	A ✓		16/12

Appendix F

CRC LLUR Statement

29.05.2014
11139.000.000/001/01

Environment
Canterbury
Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Dear Sir/Madam

Thank you for submitting your property enquiry in regards to our Listed Land Use Register (LLUR) which holds information about sites that have been used, or are currently used for activities which have the potential to have caused contamination.

The LLUR statement provided indicates the location of the land parcel(s) you enquired about and provides information regarding any LLUR sites within a radius specified in the statement of this land.

Please note that if a property is not currently entered on the LLUR, it does not mean that an activity with the potential to cause contamination has never occurred, or is not currently occurring there. The LLUR is not complete, and new sites are regularly being added as we receive information and conduct our own investigations into current and historic land uses.

The LLUR only contains information held by Environment Canterbury in relation to contaminated or potentially contaminated land; other information relevant to potential contamination may be held in other files (for example consent and enforcement files).

If your enquiry relates to a farm property, please note that many current and past activities undertaken on farms may not be listed on the LLUR. Activities such as the storage, formulation and disposal of pesticides, offal pits, foot rot troughs, animal dips and underground or above ground fuel tanks have the potential to cause contamination.

Please contact and Environment Canterbury Contaminated Sites Officer if you wish to discuss the contents of the LLUR statement, or if you require additional information.
For any other information regarding this land please contact Environment Canterbury Customer Services.

Yours sincerely

Contaminated Sites Team

Property Statement
from the Listed Land Use Register

Visit www.ecan.govt.nz/HAIL for more information about land uses.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Date:	23 May 2014	
Land Parcels:	Part Lot 12 DP 9715	Valuation No(s): 2218200400

Summary of sites:

Site ID	Site Name	Location	HAIL Activity(s)	Category
864	Bridgestone Firestone NZ Ltd	84 Langdons Road, Christchurch	A17 - Storage tanks or drums for fuel, chemicals or liquid waste;A10 - Persistent pesticide bulk storage or use;	Review in Progress
1367	Sanitarium Health Foods Ltd	54-64 Harewood Road, Christchurch	A17 - Storage tanks or drums for fuel, chemicals or liquid waste;	Partially Investigated
1795	Briscoes NZ Ltd.	11 Langdons Road	A17 - Storage tanks or drums for fuel, chemicals or liquid waste;	Not Investigated
2804	Glengarry Metals	24 Winston Avenue, Papanui, Christchurch	D3 - Metal treatment or coating;A17 - Storage tanks or drums for fuel, chemicals	Not Investigated

Our Ref: ENQ52842

			or liquid waste;G4 - Scrap yards;F4 - Motor vehicle workshops;	
25164	25164	30 HAREWOOD ROAD	A17 - Storage tanks or drums for fuel, chemicals or liquid waste;	Not Investigated
26055	26055	22 WINSTON AVENUE	D3 - Metal treatment or coating;A17 - Storage tanks or drums for fuel, chemicals or liquid waste;G4 - Scrap yards;F4 - Motor vehicle workshops;	Not Investigated

Please note that the above table represents a summary of sites and HAILs intersecting the area of enquiry within a 100m buffer.

Information held about the sites on the Listed Land Use Register

Site 864: Bridgestone Firestone NZ Ltd (Within 100m of enquiry area.)

Site Address:	84 Langdons Road, Christchurch
Legal Description(s):	Lot 1 DP 13176,Lot 2 DP 2073,Lot 3 DP 2073,Part Lot 1 DP 13545,Pt Lot 1 DP 13545,Pt Lot 1 DP 2073,Pt Lot 4 DP 2073,Pt RS 40256

Site Category:	Review in Progress
Definition:	Investigation reports have been received and are currently being reviewed to determine the most appropriate site category.

Land Uses (from HAIL):

Period From	Period To	HAIL land use
?	Current	Storage tanks or drums for fuel, chemicals or liquid waste
?	c. 1960s	Persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glass houses or spray sheds

Notes:

30 Mar 1999 1993: three USTs 3(a) total capacity of 38,000 L. There may also be ASTs containing flammable liquids on the site. The engineering manager rang (13/4/99) and said that these three USTs were removed in Jan 1996 and that Woodward-Clyde took soil samples. A further phone call 14/4/99 suggested that the soil had been dug out from around the tank and that it was contaminated with hydrocarbons. This soil was left on the property so the hydrocarbons would evaporate from it. The engineering manager said that the CRC was present at the time of tank removal. However, no files can be found on this.

30 Mar 1999 Engineering manager rang 13/4/99. Site used as a tyre factory.

18 Aug 2009 Site has following HSNO Stationary Container System Certificates:

106494 - AST 20 000L Class 3.1B substance

108493 - AST 10 000L Class 9 (ecotoxic) substance

108494 - AST 10 000L Class 9 (ecotoxic) substance

108495 - AST 48 000L Class 9 (ecotoxic) substance

108496 - AST 8 000L Class 9.1B (aquatic ecotoxic) substance

Also held following certificates which expired in November 2007:

45220 - Class 4.1.1B up to 100,000kg

45223 - Class 4.1.1B up to 2,000kg

108497 - AST 8 000L Class 9.1B (aquatic ecotoxic) substance

108626 - AST 4 500L Diesel

108628 - AST 1 200L Diesel

HSNO Hazardous Substance Location Test Certificates

106493 - 20 000L of a Class 3.1B substance

95515 - up to 10 000L of Class 3.1B and or 3.1C substances in 250L containers

95517 - up to 4 000 kg of 4.1.1B substances in packaging

95518 - up to 100 000kg of 4.1.1B substance in packaging

Investigations:

1 Sep 1990	**INV 3067: Stage 1 Investigation - Langdons Road Site** Woodward Clyde Ltd.

Summary of investigation(s):

Report(s) have not yet been audited.

1 Jan 1991	**INV 3068: Stage 2 Investigation - Langdons Road Site** Woodward Clyde Ltd.

Summary of investigation(s):

Report(s) have not yet been audited.

1 Oct 1991	**INV 3065: Stage 3 Investigation - Langdons Road Site** Woodward Clyde Ltd.

Summary of investigation(s):

Report(s) have not yet been audited.

1 Oct 1994	**INV 3063: Installation of a Product Recovery System at 84 Langdons Road** Woodward Clyde Ltd.

Summary of investigation(s):

Report(s) have not yet been audited.

27 Jun 1996	**INV 3066: Draft Report - Firestone Site Remediation** Woodward Clyde Ltd.

Summary of investigation(s):

Report(s) have not yet been audited.

17 Dec 2009	**INV 3052: Bridgestone - 84 Langdons Road, Papanui, Christchurch - Preliminary Environmental Site Assessment** Aquaform ANZ Ltd.

Summary of investigation(s):

Report(s) have not yet been audited.

1 Jun 2010	**INV 8744: Phase II Environmental Site Assessment** Golder Associates

Summary of investigation(s):

Report(s) have not yet been audited.

1 Feb 2011	**INV 8741: Validation of Pegasol USS Removal, Waste Disposal Area and Mercury Hotspot** Golder Associates

Summary of investigation(s):

Report(s) have not yet been audited.

1 Feb 2011	**INV 8745: Phase II Environmental Site Assessment - Factory Assessment** Golder Associates

Summary of investigation(s):

Report(s) have not yet been audited.

Site 1367: Sanitarium Health Foods Ltd (Intersects enquiry area.)

Site Address:	54-64 Harewood Road, Christchurch
Legal Description(s):	Lot 1 DP 204; Lot 1 DP 59153; RS 41027; Lot 12 DP 9715

Site Category:	Partially Investigated
Definition:	Verified HAIL has been partially investigated.

Land Uses (from HAIL):

Period From	Period To	HAIL land use
?	present	Storage tanks or drums for fuel, chemicals or liquid waste

Notes:

5 May 1999 1993: Two underground storage tanks (USTs) on site. One UST, 3(a) product, capacity 3 400 litres. One UST, 3(b) product, capacity 9 100 litres. Also above ground storage tank on site, unknown product held or capacity.

26 Jan 2005 CCC Webmap (2004) indicates that both USTs were removed in 1998, condition at removal unspecified.

30 Oct 2006 ECan's Enforcement Team conducted a site visit on 13/7/06 following a report of 'oil in the stream at the back of the Northlands mall carpark'.

Diesel was traced back to the section of open drain in Langdons Road in the Noel Leeming car park.

The engineering manager at the Sanitarium factory was advised, and he undertook a check of possible locations within the factory where diesel may have discharged.

Further details are held on the Enforcement Database.

30 Oct 2006 MWH report (July 2006) indicates that one 15,000 litre above ground storage tank is located on the site. A leak from the fill line associated with this tank was investigated in July and August 2006.

2 Dec 2008 The information held on our files for this site was appraised on 26 February 2008 and the LLUR site category changed to partially investigated. Although we hold report information about the remediation of a LFO leak, at present there is no information about the other HAIL activities on site (i.e. continued bulk fuel storage and food processing).

Investigations:

1 Sep 2006 **INV 1745: Sanitarium Health Food Company Light Fuel Oil Investigation - July 2006**
Montgomery Watson Harza

Summary of investigation(s):

After a distinct hydrocarbon odour and rainbow sheen was detected in Kruses Drain at Northlands Mall, downstream of the Sanitarium factory, factory staff carried out a visual inspection of their site and noted staining on a concrete slab beneath which lies a subsurface remote fill line for an above ground LFO tank. Product was also discovered in the stormwater drainage system.

MWH was contracted to determine the presence of residual hydrocarbon contamination arising from the above ground LFO storage tank and the subsurface fill line, and to assess whether the reported sheen downstream of the site was arising from this potential source.

Other than the existing AGST, two petrol and one kerosene underground storage tanks were historically present, removed during the redevelopments in 1990s. Their ex-locations were outside the area investigated by MWH.

The underground LFO fill line was removed, and contaminants were observed to have migrated along the stormwater line to the nearby sump. Work was carried out to improve the containment of the stormwater drainage system in the vicinity of the LFO line. Approximately 48 m3 of spoil was excavated from the fill trench and the nearby sump area and delivered to Texco (ChCh), and 74,060L of impacted surface and ground water was removed by Chemwaste. 3,500L of free product was removed from the abandoned stormwater pipe beneath the site.

19 soil samples were taken from the soil remaining at the site, including one duplicate, and 1 sample was taken from the impacted soil removed from the site. Sampling was not carried out from beneath the factory building, but samples were taken on the opposite side of the factory, in the direction of inferred groundwater flow. The sampling plan was adequate to satisfy the objectives of the investigation.

As a precaution, four groundwater samples were taken from two onsite wells used for production purposes. Groundwater onsite encountered at depths of between 1.2 and 1.8 m bgl.

All samples were analysed for Total Petroleum Hydrocarbons. Tier 1 MfE(1999) soil acceptance criteria were used to assess soil sample results. All samples taken from soil remaining on the site reported concentrations below the relevant Commercial/Industrial All Pathways and Protection of Groundwater Quality soil criteria.
Some residual hydrocarbon contamination is present in the bedding material beneath and around the old LFO fill pipework and also extending south along the s/w pipe, dispersing around the s/w sump. It is likely that some residual contamination is present in the soil underlying the building through migration along the s/w pipelines. However no hydrocarbon contamination was detected in samples from the eastern side of the building. The report has recommended that Kruses Drain and both the active and disued stormwater systems be inspected regularly for LFO migration.

All four groundwater samples were below labaratory detection limits and within the MfE(1999) groundwater acceptance criteria.

During the excavation works, visual monitoring of the Kruses Drain was undertaken both upstream and dowstream of the site. No visual impact was noted immediately downstream of the site during the excavation. It is unlikely that the rainbow sheen observed in Kruses Drain by Northlands Mall is associated with the LFO leak at this site due to it being upstream and seperated by a weir.

No other sources of contamination potentially present at the site have been investigated.

1 Feb 2009 **INV 2827: The report on the removal of above ground light fuel oil tank at Sanitarium Health Foods Company, 54 - 64 Harewood Road, Papanui, Christchurch**
Envirochem

Summary of investigation(s):

The site is a commercial food production facility. The above ground tank removed during this investigation had a capacity of 19300L of light fuel oil and was used to fuel a boiler. In a previous investigation a leak from this fuel system had been identified and the system was removed and replaced with the current above ground tank.

The tank is to be replaced with an equivalent double-skinned AST. However the consent for the installation for the replacement tank has been placed on hold. USTs were historically present at the site, and were removed during site redevelopment works in the 1990s.

During the investigation on 6/2/09, the tank was removed and a sample collected of the sand within the containment bunker. The foundation beneath the bunker was removed and 3 samples of the underlying soils were collected. All soil samples were analysed for banded TPH.

The sample collected from the containment sand returned TPH concentrations above background, but below commercial / industrial soil acceptance values. The containment sand, approximately 6m3, was removed and sent to Texco Remediation. The remaining soil samples all returned TPH concentrations below the laboratory detection limit, and therefore below the relevant soil acceptance criteria.

An investigation carried out in 2006 identified the potential for hydrocarbon contamination to remain in the soils beneath the existing building.

Site 1795: Briscoes NZ Ltd. (Within 100m of enquiry area.)

Site Address:	11 Langdons Road
Legal Description(s):	Lot 2 DP 11604, 33516, 25738, 12183; PT lot 1-3 DP 2061; Pt Lot 1 DP 9566, Lot 7 DP 7221, Lot 1 DP 11615, Lot 3 DP 11615

Site Category:	Not Investigated
Definition:	Verified HAIL has not been investigated.

Land Uses (from HAIL):

Period From	Period To	HAIL land use
?	1994	Storage tanks or drums for fuel, chemicals or liquid waste

Notes:

21 Sep 1999 1993 DG licence: 2 underground storage tanks (USTs), containing 3c product, total capacity of 9,000 L.

1994 CCC information: as above, also; dangerous goods (?) licence cancelled (Vertex Continental Furniture), then renewed (Briscoes). Assume tanks are the original ones.

14 Feb 2005 CCC Webmap (2004) indicates that a 9,000 L UST was removed from the site in 2001.

Investigations:

There are no investigations associated with this site.

Site 2804: Glengarry Metals (Within 100m of enquiry area.)

Site Address:	24 Winston Avenue, Papanui, Christchurch
Legal Description(s):	Lot 1 DP 18948

Site Category:	Not Investigated
Definition:	Verified HAIL has not been investigated.

Land Uses (from HAIL):

Period From	Period To	HAIL land use
?	2003	Metal treatment or coating including polishing, anodising, galvanising, pickling, electroplating, or heat treatment or finishing using cyanide compounds
?	?	Storage tanks or drums for fuel, chemicals or liquid waste
?	?	Scrap yards including automotive dismantling, wrecking or scrap metal yards
Unknown	Unknown	Motor vehicle workshops

Notes:

26 Jan 2004 Information received from Compliance Monitoring regarding surrendering of consent CRC961893 (to discharge contaminants to air from a diesel oil-fired furnace and melting of metals).

Indicates storage of hazardous substances on site (diesel oil) and metal treatment activities undertaken on site.

30 Jan 2004 Site sold and purchased by neighbouring site owner. New site owner telephoned 30/01/04 and indicated that scrap metal business seased approximately 3 months ago when he purchased site. He plans to use site to store motor vehicles.

Investigations:

There are no investigations associated with this site.

Site 25164: 25164 (Within 100m of enquiry area.)

Site Address:	30 HAREWOOD ROAD
Legal Description(s):	Part Lot 2 DP 59153

Site Category:	Not Investigated
Definition:	Verified HAIL has not been investigated.

Land Uses (from HAIL):

Period From	Period To	HAIL land use
1991	Unknown	Storage tanks or drums for fuel, chemicals or liquid waste

---

Notes:

Investigations:

There are no investigations associated with this site.

Site 26055: 26055 (Within 100m of enquiry area.)

Site Address:	22 WINSTON AVENUE
Legal Description(s):	Lot 1 DP 13082,Lot 2 DP 18948

Site Category:	Not Investigated
Definition:	Verified HAIL has not been investigated.

Land Uses (from HAIL):

Period From	Period To	HAIL land use
?	2003	Metal treatment or coating including polishing, anodising, galvanising, pickling, electroplating, or heat treatment or finishing using cyanide compounds
?	?	Storage tanks or drums for fuel, chemicals or liquid waste
?	?	Scrap yards including automotive dismantling, wrecking or scrap metal yards
Unknown	Unknown	Motor vehicle workshops

Notes:

Investigations:

There are no investigations associated with this site.

Information held about other investigations on the Listed Land Use Register

There are no investigations associated with the area of enquiry.

For further information from Environment Canterbury, contact Customer Services and refer to enquiry number ENQ52842.

Disclaimer: ***The enclosed information is derived from Environment Canterbury's Listed Land Use Register and is made available to you under the Local Government Official Information and Meetings Act 1987 and Environment Canterbury's Contaminated Land Information Management Strategy (ECan 2009).***

The information contained in this report reflects the current records held by Environment Canterbury regarding the activities undertaken on the site, its possible contamination and based on that information, the categorisation of the site. Environment Canterbury has not verified the accuracy or completeness of this information. It is released only as a copy of Environment Canterbury's records and is not intended to provide a full, complete or totally accurate assessment of the site. It is provided on the basis that Environment Canterbury makes no warranty or representation regarding the reliability, accuracy or completeness of the information provided or the level of contamination (if any) at the relevant site or that the site is suitable or otherwise for any particular purpose. Environment Canterbury accepts no responsibility for any loss, cost, damage or expense any person may incur as a result of the use, reference to or reliance on the information contained in this report.

Any person receiving and using this information is bound by the provisions of the Privacy Act 1993.

Appendix G

Sanitarium Internal Documents

29.05.2014
11139.000.000/001/01

NOTIFICATION OF CONTAMINATED SITE INVESTIGATION

To

Contaminated Sites Officer
Environment Canterbury
PO Box 345
Christchurch

Attn Nathan Dougherty

Phone 03 365 3828
Fax 03 365 3194

Issued by	Name	Warren Ashby
	Organisation	Sanitarium Health Food
	Address	54-64 Harewood Road Papanui CHRISTCHURCH
	Phone	3520164 Ext 847
	Date	21/07/2006
Site identification	Name	As Above
	Address	" "

Legal Description / Valuation Number: Rural Section 41027 Lot 12 D.P 9715

LLUR site number (if known):

Type of investigation

- Preliminary site investigation ✓
- Detailed site investigation
- Groundwater investigation
- Groundwater monitoring
- Other monitoring

L.F.O. leakage into ground from underground feeding line

Date of investigation: 20/07/2006

Investigation report will be supplied to ECan by (date of investigation plus 2 months) ✓

Warren Ashby

From: Ken Baxter [Ken.Baxter@ecan.govt.nz]

Sent: Friday, 21 July 2006 1:45 p.m.

To: Warren Ashby

Subject: FW: Sanitarium Health Food Company Ltd LFO Discharge

Dear Sir

Alleged Unauthorised Discharge of Light Fuel Oil into the Christchurch City Council Stormwater System (Kruse's Drain), 15 July 2006

Thank you for meeting with me on site on 19 July 2006 and for your update today.

On 17 July 2006 you advised Environment Canterbury that Sanitarium Health Food Company Ltd was investigating the possibility that LFO from the premises was being discharged into the Christchurch City Council stormwater system. On 18/7/06 Sanitarium staff reported that LFO storage tank filling line had failed a pressure test.

I understand that Sanitarium has engaged the services of Shell NZ Ltd and [illegible] NZ Ltd to investigate the source and the extent of the discharge.

Please be aware that the unauthorised discharge of contaminants into the any water (whether passive or active) can be regarded as an offence under the provisions of the Resource Management Act (1991) and must cease. Sanitarium must take all steps necessary to avoid any further discharges.

This matter has been recorded on Environment Canterbury's files and I wish to be kept informed of the progress of your company's investigation into the matter.

Thank you for completing the Rule WQL33 notification document as requested and confirming that Shell and the consultants [illegible] NZ Ltd will continue conducting the investigation.

Once the initial investigation has been completed can you please provide Environment Canterbury with a full written incident report detailing the nature and extent of the discharge.

The report should include:

1. The cause of the discharge.
2. Your company's best estimate of the possible duration and volume of the discharge.
3. The specific actions taken by the company to rectify the cause of the discharge.
4. Details of mitigation measures and clean up undertaken by the company.

On receipt of the initial incident report a decision will be made as to whether it will be necessary for Sanitarium to apply Environment Canterbury for a resource consent to authorise a passive discharge at the site.

Your continued assistance in this matter would be greatly appreciated.
(Contact details are 365 3828 ext 7077, Cell 0274 467 537 Email ken.baxter@ecan.govt.nz)

Yours faithfully

Ken Baxter
Enforcement Officer

24/07/2006

Warren Ashby

From: Ken Baxter [Ken.Baxter@ecan.govt.nz]
Sent: Monday, 31 July 2006 10:38 a.m.
To: Warren Ashby
Subject: RE: Sanitarium - LFC spill update

Hi Warren
Thank you for the update. Could you please send MWH report to me once the investigation is complete.

Regards
Ken Baxter

-----Original Message-----
From: Warren Ashby [mailto:warren.ashby@sanitarium.co.nz]
Sent: Monday, 31 July 2006 8:50 a.m.
To: Ken Baxter
Subject: Sanitarium - LFC spill update

Hi Ken,
Just a note to keep you up to date.
We have engaged MWH (Alison Gill) to act as our consultants and give direction of this project. It has been confirmed that it is the LFC bulk tank fill line that has been the source of the leak. Gilbarco have also sealed off the overfill line. Petroleum Solutions have been doing the excavation and organising the cleanup. Texco have been scraping the contaminated soil and Chemwaste pumping out where necessary. The temporary interceptors we have installed in Russes Drain seem to be doing their work and we are confident there will be no contamination from downstream. You will receive a full report from MWH in due course.

Regards
Warren

Warren Ashby
ENGINEERING MANAGER
Sanitarium Health Food Company
54-66 Harewood Road
P O Box 5012
Papanui
CHRISTCHURCH 8005

Telephone: (03) 3525 104 Ext 147
Fax (03) 3525 105
Mobile (025) 414 564
e mail warren.ashby@sanitarium.co.nz

ENVIRONMENTAL INCIDENT REPORT

LIGHT FUEL OIL TANK

OVER-FLOW

DURING FILLING

September 10 - 2010

Warren Ashby

From: Lukas Davidson [Lukas.Davidson@greenstoneenergy.co.nz]
Sent: Tuesday, 12 October 2010 2:04 p.m.
To: Warren Ashby
Subject: Report
Attachments: Sanitarium and Taylors Spill Investigation Report.pdf

Hi Warren,

As requested please find attached the Investigation report. Any questions please let me know. I can be reached on 04 498 0394

Kind regards

Lukas Davidson
Account Manager

Greenstone Energy Limited
3 Queens Wharf | P O Box 2091 | Wellington 6140 | New Zealand
T +64 4 498 0394

Incident Investigation

Form 2
Incident Management Information System

To document a HSSE incident investigation, please complete applicable fields on this form and email it to Mark.Draper@greenstoneenergy.co.nz within the timeline set in the Requirements for Incident Reporting, Investigation, and Learning. Should you have any questions please contact your HSSE Focal Person. You may be contacted for further information if necessary.

Incident No. (IMIS Record)		**Site:**	Sanitarium Food and Taylors Group	**Date:**	10/09/2010	**Time:**	4:17 and 5:10
Short Description:	A double LFO spill due to meter failure resulting in the Loss of Containment of 200 lts						
Investigation Completed By:	Jamie Cross						
Investigation Team Members:	Jamie Cross, Lowe's Industries, Senior Drivers				**Date of Report:**	03/10/2010	

Risk Rating (please use Risk Assessment Matrix)

Actual Rating	People	0D	Asset	0D	Environment	0D	Reputation	2D	Overall Risk	1D
Potential RAM	People	1D	Asset	1D	Environment	4D	Reputation	3D	Overall Risk	3D

Description and Details of the Incident
A timeline of events prior to, during, and after the incident is should be described.
Include all relevant details.
If spill of product or contamination, indicate quantities.

The Driver:

- The driver was on his 4th dayshift out of his scheduled 5 shifts for the week.
- The Driver had worked 11.5 hrs on his first dayshift , 12 hrs on his second dayshift , 12 hrs on his 3rd dayshift , Total = 35.5 hrs.
- The Driver was on his first load of his scheduled 2 loads for the shift. His first load was a 4 drop LFO run Santarium, Taylors, South Pacific Meats, Meadowfresh.Cromwell (5 Hours).His second load was a full load of diesel to Ashurton Truckstop (5 hours).
- GPS shows that the driver had not recorded any over speeds for this shift and had followed the Journey Management Plan.
- Driver had followed the Journey Management plan which was completed and accurate.
- Driver Medical is current and expires 20/07/2011
- Driver had a random Drug and Alcohol Test completed on the 15/09/2010 (negative) and had random breath test carried out in both July and August 2010 (negative)
- Driver has had no incidents with Hooker Pacific over the last 10 months.
- Driver Competency Assessment (Incab) was completed on the 04/02/2010
- Driver has 100% attendance at our Monthly HSSE Forums.

Equipment:

- Due for annual meter re-calibration 22/10/2010

Environment:

- It was dark for both deliveries but with adequate site and truck lighting.
- Both sites were clear of distractions during the delivery as it was early and no public present.

Timeline:
10/09/2010

- 02:00 Driver starts shift (GPS/Timesheets)
- 02:34 Driver departs yard
- 03:53 Driver arrives at Santarium (GPS/Logbook)
- 04:05 approx, Driver starts his delivery of 2000lts to fill the tank to 16500 lts with a safe fill of 17000 lts.
- 04:06 driver noticed that the meter was moving slowly and that the pump also sounded to be pumping slow (thought this could be related to cold day affecting the viscosity of the LFO). The pump can discharge any were from 600 to 800 lts per minute depending on temperatures.
- 04:12 approx, driver hears the over fill alarm and initially thinks this has something to do with the factory, he then realised this could be to do with the tank and starts to stop the delivery.
- 04:13 approx, Driver stop delivery at the same time that the product starts flowing down the side of the tank. The meter register indicates 470 litres delivered, but we had delivered 5300 lts leaving the tank at 19800 litres with a Loss of Containment of 100 litres on to a concrete bunded area.
- 04:18 Driver contacts Hooker Centre to advise of the spill, He is advised to carry on with the rest of his deliveries as this was a tank pressure raising problem and that we would clean up the spill up later.
- 04:39 Driver departs Santarium Foods to deliver to Taylors Group.
- 04:45 Driver arrives at Taylors Group (GPS/Logbook)
- 05:00 approx, Driver starts his delivery of 5500lts to fill the tank to 19500 lts with a safe fill of 20000 lts.
- 05:01 once again driver noticed that the meter was moving slow and that the pump also sounded to be pumping slow.
- 05:10 approx Driver was watching the vent pipe on the roof of Taylors and saw product start to flow from it and shut the pump down straight away. The meter register indicates 860 litres delivered, but we had delivered 7300 lts leaving the tank at 21300 litres with a Loss of Containment of 100 litres on to the roof then into roof gutters then to street gutters then to street silt trap the product has not gone further that here.
- 05:20 Driver contacts Hooker Management this time and not the Call Centre. Management advise him to cancel all further deliveries. Contain the spill as best as possible and return to the yard. Driver talks with a staff member at Taylor to arrange ladder and rags to block the roof gutter down pipes. Their was no product in the street gutters when the driver left Taylors.
- 05:55 Driver departs for Hookers base to meet Hooker Management to assist in the cleanup of both spills.
- 06:13 Driver arrives at Hookers base and lockout tags placed on unit
- 06:20 Driver and Management depart Hooker base with spills trailer for Sanitarium Foods.

Incident Investigation

Form 2

Incident Management Information System

- 07:00 Hooker Management arrived at Sanitarium to find that the spill was much bigger than expected so the spill was contained with rags and oil dry, then management contact Gilbarco to assist in cleanup and Gilbarco despatched two teams the first to Taylors which arrived about 07:30 hrs and the second to Sanitarium which arrived about 9:00 hrs.
- 08:00 Hooker Management arrive at Taylor's from Sanitarium to co-ordinate the cleanup with Gilbarco.Taylors Management, Econ, Chem Waste and Anna Lukey from Greenstone.
- 09:25 Arrive back at Hookers yard and dip trailer to confirm volumes (dip reading 9200) still on board this was then delivered to Meadowfresh and confirmed by their tanks before and after dips. Trailer then taken to Lowe's Industries for repairs to the pump register.
- 13:00 Driver was interviewed and First Report completed

29/10/2010

- Trailer returns to service after the pump has been serviced and the register replaced

Consequences:
Describe involvement, impact, and severity of consequences to people, assets, environment, and company

- LOC of 200 litres LFO
- Two very messy and very expensive spill to clean up
- Not the image that Hooker want to display as a contractor or the image the Greenstone want to display to their customers

Immediate Actions Taken:
Described actions taken by persons and services involved to manage and mitigate the incident. For injuries, included detailed medical results.

- Driver gets site to shut down LFO pumps for both spill with in seconds of the over flow
- Driver contacts Hooker Pacific Call Centre and Management.
- Hooker Pacific arrange with contractors to have spill cleaned up at both sites.
- Greenstone Management/Scheduling and Stock Team and Hooker Call Centre were informed.
- Driver returned to the yard and was interviewed by Management and driver completes the required reports and statement
- Hooker management arranged to have the dropped loads picked up.
- Driver will be restricted to Bulk Petroleum loads only till the 15th October when he will have a Full in Cab Assessment completed by our Driver Trainer on the LFO unit.

Immediate Cause/s and Other Contributing Factors:

- The main Factor causing the spills at Taylor's Group and Sanitarium Foods was the failure of trailer number 2406 LFO register.

Underlying Cause/s and Learning:
List and describe the deficiencies or anomalies that create the preconditions that result in the immediate causes of the incident. Described learning that could be shared and recommended.

- Earthquake fatigue/stress: all drivers and management were suffering from post-traumatic stress in the week following the 7.1 earthquake. In the first week alone we had over 700 after shocks causing broken sleep patterns and raising stress levels.
- Driver Behaviour: This was not the standard that I would have expected from an experienced driver as he should have:
  1. Made the connection between a slow Resister reading and the spill at Sanitarium.
  2. Has under estimated the spill at Sanitarium.
  3. Was slow to react to the over fill alarm warning at Sanitarium. (approx 30 seconds to work out what it was).
  4. Once again has failed to make the connection between a slow Register reading at Taylors and he could have also checked what was going in by stopping and dipping the tank.

  (I believe the above is all connected to post-traumatic stress)
- Bad Judgement by Call Centre: The Hooker Call Centre should have stopped all further LFO deliveries after the spill at Sanitarium. Instead it has advised the driver to continue on to Taylor's Group. The Call Centre has not contacted Hooker Management. The person that took this call was a very experienced driver himself.....
- Equipment Familiarity: Driver had not operated this trailer for over 6 months as it had been situated Nelson.
- Task Familiarity: Driver is not the regular LFO driver and has not done LFO for a couple of months. But is signed off to deliver LFO and he has done a considerable amount of LFO discharges over the last 5 years.
- Equipment age: This register was very old (30 plus years)
- Poor Scheduling: Increasing our risk by going to sites to often.
  1. Sanitarium 20,000 lt tank (Safe fill 18450), Trip Summary (Safe fill 17000), with a before dip of 14500 lts which means the driver was **only going to deliver 2000 lts** leaving it 500 lts short of the Safe fill of 17000 lts.
  2. Taylor's 23000 lt tank.Trip Summary (Safe fill 20000), with a before dip of 14000 lts which means the driver was **only going to deliver 5500 lts** leaving it 500 lts short of the Safe fill of 20000 lts.

Resources and Costs:
List and describe and quantify the people, equipment, and other resources involved in the management of the incidents and estimate the associated costs.

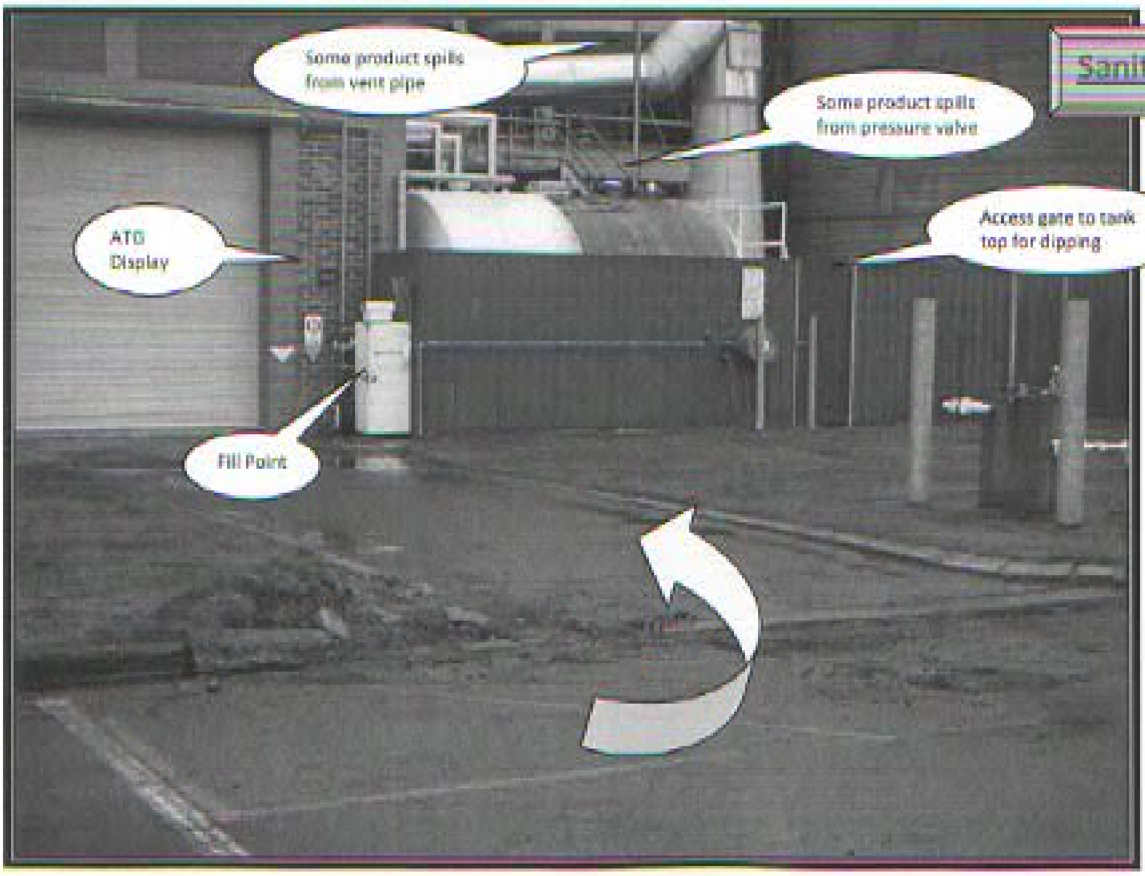
- Lowes, Industry = $3000 est
- Truck lost productivity = $1000
- Gilbarco cleanup cost = $5000 est
- Hooker management 20 hours = $1000
- Driver hours 12 hours = $300

Total Cost = $10500 approx

Incident Investigation

Form 2
Incident Management Information System

Photos and Relevant Evidence/Documents:



Incident Investigation

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Recommendations and Remedial Actions: (please insert additional rows for action items if necessary)

No.	Action Description	Action Party	Priority (H,M,L)	Date Due (DD/MM/YY)	Status (Open, Closed)
1	Trailer Regulator and Pump requires full investigation inspection.	Jamie Cross / Lowe's Industries	H	29/09/2010	Closed
2	The call centre to report all spills to management	Jamie Cross / Murray Young	H	13/09/2010	Closed
3	Driver to have a Full in Cab Assessment completed on LFO deliveries only before he can return to this task	David Philip	H	15/10/2010	Open
4	Scheduling to sites that do need a delivery	Greenstone	M	30/10/2010	Open
5	Learning's to be shared at September HSSE Forums with the following question included in the Monthly Coaching Topic like being aware of your surrounding, e.g how big is the spill and why has this happened!!!,	Jamie Cross	H	30/09/2010	Closed
6	Driver wellness / post-traumatic stress We placed too much stress on drivers and staff in the week following the earthquake!!	Greenstone / Hookers	M	30/10/2010	Open

Investigation Reviewed and Approved By:		**Date:**	

Incident Classification (Choose Applicable:

☐	Recordable Case	☐	Serious Harm (Notifiable)	☐	Non -Recordable
☐	First Aid Case	☐	Restricted Work Case	☐	Permanent Total Disability
☐	Medical Treatment Case	☐	Lost Workday Case	☐	Fatality

Classification Recommended By:		**Date:**	

Christchurch City Council

14 April 2011

Mr Warren Ashby
Sanitarium New Zealand Ltd
P O Box 5011
Christchurch 8542

Dear Mr Ashby

Re: Discharge of Process Water into Kruses Drain

Thank you for involving the Christchurch City Council in discussions with Environment Canterbury about discharges into Kruses Drain. I confirm that Sanitarium's process water discharges have been a major and much appreciated source of base flow in the waterway for many years. With the closure of the Firestone factory the Sanitarium discharge is now the only base flow in the waterway, and so is valued even more highly.

Since adopting its waterway enhancement programme in 1994 the Council has spent over $1.5 million on the naturalisation of Kruses Drain through the residential area, with contributions by Kay Developments (at Northwood Vale), and future development likely to exceed another $1 million. Pending development such as a community park beside the waterway and intensifying housing nearby are additional reasons for the Council's interest in retaining a base flow.

The Council would greatly appreciate the continuation of a permanent base flow at not less than the present levels. Our preference, for ecological and aesthetic reasons, is for the flow to be continuous and a slightly increased rate of flow would be preferable. As there are current costs such as pumping costs associated with continuous flow I am sure the Council would be willing to make a fair contribution, which we can discuss, if your Company is favourably disposed toward the idea.

Thank you for your kind consideration.

Yours sincerely

Paul Dickson
Drainage Engineer
Asset & Network Planning Unit
City Environment Group

Trim reference: 11/745396

Civic Offices, 53 Hereford Street, Christchurch 8011
PO Box 73014, Christchurch 8154
Phone: 03 941 8999 Facsimile: 03 941 8987
Email: paul.dickson@ccc.govt.nz
www.ccc.govt.nz

Warren Ashby

From: Warren Ashby
Sent: Thursday, 31 March 2011 8:17 a.m.
To: 'Robyn Newham'
Subject: RE: Review of water temperature condition CRC012082.1

Hi Robyn,
Its good to hear that you are OK and getting things sorted as far as office space is concerned.. You may even get to like your base at Lincoln and not want to move from there when the time comes. It has been eventful in the last weeks and my intended reply was lost in the sudden shift of focus.. We were fortunate as our works did not suffer too much damage this time and were happy to help out the emergency services where we could. At home all is also OK and hope the same is true for you.

I have re-read the proposal as outlined and I feel confident we can live within the maximum discharge temperature limit of 25 degrees measured at the Sanitarium end of the [illegible] enclosure. This of course will be conditional on us being able to maintain the present flow of cool water into the drain as the discussed [illegible] from the City Council. Please forward the amended
Consent conditions for sign off.

Regards,

Warren.
WARREN ASHBY
Environmental Officer - CHCH
P: +64 3 3455032 M: +64 27 4424585
E: warren.ashby@sanitarium.co.nz
W: www.sanitarium.co.nz

Sharing with our community health and [illegible] for a better life

Please consider the environment before printing this e-mail

From: Robyn Newham [mailto:Robyn.Newham@ecan.govt.nz]
Sent: Tuesday, 22 March 2011 3:53 p.m.
To: Warren Ashby
Subject: FW: Review of water temperature condition CRC012082.1

Hi there Warren

It feels like such a long time since we came and visited you on that sunny morning and discussed a combined approach to the cooling water discharge at your site at Sanitarium.
I hope you and your family are well, as well as all the staff at Sanitarium. I think I heard that the Sanitarium site was being used as a welfare centre and water distribution base in the aftermath of the earthquake? Hopefully this all ran well.

Environment Canterbury has not been able to return to our central city buildings since Feb 22nd and management have worked exceptionally hard to get hold of alternative office spaces for us all. We are now spread out over the place, but the consents section has managed to get a building that holds all of our 80 staff out at Lincoln, in the old Agresearch wool laboratory.
We have been fully operational with computers since last week and we have spent a lot of time trying to figure out where things were at the time of the earthquake (all our files and paperwork is still in the building) and how to proceed forward. I think we have managed to get a handle on everything and are now back to full consent processing functions, albeit with much more focus on electronic process rather than paper!

Now that I have had a chance to get everything back on track I came across the below email I sent to you just before the earthquake regarding the condition that we had agreed to in relation to the review of the cooling water discharge. We were so close to getting it sorted I thought I would send an email to see if how Sanitarium [illegible] in the earthquake whether this condition is still relevant and whether you are still happy to accept the condition and move forward?

It would be great to hear from you and how things are faring out at Sanitarium.

Kind Regards

Robyn

Robyn Newham
Consents Investigating Officer
As of March 2011
[illegible]

ENVIRONMENT CANTERBURY
PO Box 345
Christchurch 8140
New Zealand

[illegible]
email: [illegible]
web: [illegible]

From: Robyn Newham
Sent: Thursday, 17 February 2011 3:19 p.m.
To: 'Warren [illegible]'
Subject: Review of water temperature condition CRC012082.1

Good afternoon Warren,

I really enjoyed our meeting yesterday - it was great to get an "on the ground" perspective of the site and come away with great solutions to everyone's issues.

As discussed yesterday, I am happy to accept the wording of the condition that you proposed yesterday.

I have confirmed the map reference and would like to double check that you are happy with the final wording of the revised condition:

The discharge shall not result in the temperature of the water exiting the enclosed section of [illegible] Drain, at or about map reference NZMS 260 M35:7542-4514 as shown on Plan CRC012082.1, exceeding 25 degrees Celsius.

I have attached a copy of the plan for you to double check that you are happy with it as well.

If you are happy with this I will amend the consent conditions and send it through for sign off. You should receive the new consent documents with the new condition within a few days.

I appreciate you will be away tomorrow - so I look forward to hearing from you on Tuesday if you don't have time to get back to me today.

Kind Regards

Robyn

Robyn Newham

Consents Investigating Officer
Resource Team

Environment Canterbury
58 Kilmore Street
PO Box 345
Christchurch
Direct dial : (03) 372 [illegible]
Fax (03) 365 3194
www.ecan.govt.nz

THE HEALTH FOOD COMPANY
Sanitarium

SANITARIUM HEALTH FOOD COMPANY
Christchurch Manufacturing Unit
[illegible] Road
Papanui
Christchurch [illegible]
New Zealand

Postal Address
PO Box 5011
Papanui
Christchurch [illegible]
New Zealand

Telephone [illegible]

Facsimile [illegible]

Website: www.sanitarium.co.nz

[illegible]

[illegible]

18th April 2007

Christchurch City Council
P. O. Box 237
Christchurch

Sanitarium Health Food Co
P. O. Box 5011
Papanui

Attention: Owen Southam

Re Environment emergency drainage hold back valve

Dear Owen,

Please find enclosed our drawings of the hold back valve for Kruses drain as requested.

The valve has been installed in the location shown as per our drawings.

Construction drawings are also included for your information.

If you require any further information please don't hesitate to contact me.

Yours faithfully

Warner Ashby
Engineering manager

Appendix H

Previous Environmental Investigation Reports

THE REPORT ON THE REMOVAL OF ABOVE GROUND LIGHT FUEL OIL TANK AT SANITARIUM HEALTH FOODS COMPANY, 54-64 HAREWOOD ROAD, PAPANUI, CHRISTCHURCH

Confidential
Client Report

Prepared For
Fuelquip (NZ) Ltd

By

Dahya M Budhia
Environmental Scientist
Envirochem
February 2009

Envirochem, P O Box 28-108 Christchurch, 8242 Ph 027 2230-580
Email:Envirochem@xtra.co.nz

THE REPORT ON THE REMOVAL OF ABOVE GROUND LIGHT FUEL OIL TANK AT SANITARIUM HEALTH FOODS COMPANY, 54-64 HAREWOOD ROAD, PAPANUI, CHRISTCHURCH

Confidential Client
Report

Prepared for Fuelquip (NZ) Ltd
Christchurch

By

Dahya M Budhia
Environmental Scientist
Envirochem
February 2009

DISCLAIMER

The Report on the Removal of the above ground light fuel oil tank at Sanitarium Health Food Company, 54-64 Harewood Road, Papanui, Christchurch is prepared by Envirochem for the Fuelquip NZ Ltd. The document is provided on the basis that it is solely for the benefit and information of the Fuelquip NZ Ltd and no other person. No responsibility is accepted for use or reliance upon the document, in whole or in part, by any third party.

CONTENTS

1.0 INTRODUCTION.. 4
2.0 TANK DETAILS ………... 4
3.0 SAMPLING PROCEDURE.. 4
4.0 ANALYTICAL PROCEDURE.. 7
5.0 ANALYTICAL RESULTS.. 7
6.0 DISCUSSION.. 8
7.0 LIMITATIONS.. 10
8.0 APPENDICES... 10

Appendix A: Diagrams
Appendix B: Photographs of the Tank and Containment Bunker
Appendix C: Disposal Manifest
Appendix D: Hill Laboratories TPH Certificates of Analysis and CoC

1.0 INTRODUCTION

Envirochem was engaged by Fuelquip (NZ) Ltd on behalf of Sanitarium Health Foods Company, 54-64 Harewood Road, Papanui, Christchurch to determine the level of contamination associated with the removal of an above ground tank which was used for the storage of light fuel oil at the site. The tank was used to supply fuel to the boiler system at the Sanitarium Health Food Company Ltd factory. The tank was located beside the boiler and in a purpose built containment bunker that was filled with sand.

The Legal Description of the site where the tank was located is Pt Lot 1 DP204. The map in Diagram 1.0 in Appendix A shows the approximate location of the Sanitarium Health Food Company Ltd site within the Papanui District.

2.0 TANK DETAILS

The volume of the tank removed was estimated to be 19,300 litres. The tank was very old but was still to be in a reasonably good condition. Photographs of the tank and containment bunker are presented in Appendix B. The approximate location of the tank at the Sanitarium Health Food Company site is shown in Diagram 2.0 in Appendix A. The containment sand that was in the bunker was found to be contaminated and approximately 6m^3 of sand was removed and sent to Texco Remediation Ltd facility for treatment and disposal. A copy of the manifest associated with the transfer of the sand to Texco Remediation facility is presented in Appendix C.

3.0 SAMPLING PROCEDURE

(a) Containment Sand

Sampling of the containment sand that was in the bunker and removed to a treatment facility due to the level of contamination that was present was carried out by scooping the sand directly into a sampling jar that was supplied by the Laboratory.

(b) Soil Samples

Sampling of soil below the bunker foundation was done after the concrete bunker floor was broken with a concrete breaker and the concrete rubble and hardfill cover material removed.

After soil under the hardfill cover material was exposed a stainless steel hand trowel was used to dig out approximately 500g which was then placed into a sampling jar provided by the Laboratory. Following the collection of each soil sample the trowel was washed with potable water, decon detergent and deionised water. All samples were placed in a chilly bin after collection and delivered to Hill Laboratories Ltd for total petroleum hydrocarbon (TPH) analysis.

The soil samples were taken from the following positions:

- SF2: - taken from the middle of the west end of containment bunker at depth of 450mm.
- SF3: - taken from the centre of containment bunker at depth of 450mm.
- SF4: - taken from the middle of the east end of containment bunker at depth of 450mm.

The approximately positions of each sampling point is shown in Diagram 3.0 in Appendix A.

All 3 soils samples were comprised mainly of silty clay material.

4.0 ANALYTICAL PROCEDURE

The total petroleum hydrocarbons (TPHs) in the soil samples SF2, SF3 and SF4 were analysed by Gas Liquid Chromatography (GLC) using a flame ionisation detector. The method used is based on US EPA 8015B/NZ OIEWG.

5.0 ANALYTICAL RESULTS

The analytical TPH results for the containment sand SF1 and soil samples SF2, SF3 and SF4 are presented in Table 1.0 and 2.0. The TPH Certificate of Analysis produced by Hill Laboratories Ltd for analysis of the samples and chain of custody form is attached in Appendix D.

Table 1.0: Total Petroleum Hydrocarbon (TPH) Results for the Containment Sand

Sample No and Date	Sample Type and Depth(m)	Petroleum Hydrocarbon Range	Total Petroleum Hydrocarbon Level (mg/kg)
SF1 6/2/09	Bunker containment sand $6m^3$	C_7-C_9 C_{10}-C_{14} C_{15}-C_{36} **Total**	24 1200 5600 **6800**

Table 1.0: Total Petroleum Hydrocarbon (TPH) Results for the Soil Samples

Sample No and Date	Sample Type and Depth(m)	Petroleum Hydrocarbon Range	Total Petroleum Hydrocarbon Level (mg/kg)
SF2 9/2/09	Dark brown silty clay taken from depth of 450mm	C_7-C_9 C_{10}-C_{14} C_{15}-C_{36} **Total**	<8.0 <20 <30 **<60**
SF3 9/2/09	Dark brown silty clay taken from depth of 450mm	C_7-C_9 C_{10}-C_{14} C_{15}-C_{36} **Total**	<8.0 <20 <30 **<60**
G4 9/2/09	Dark brown silty clay taken from depth of 450mm	C_7-C_9 C_{10}-C_{14} C_{15}-C_{36} **Total**	<8.0 <20 <30 **<60**
*Guidelines Tier 1 Soil Screening Criteria	<1m depth of contamination for silty clay soils.	C_7-C_9 C_{10}-C_{14} C_{15}-C_{36} **Total**	8800 1900 NA **NA**

*1) * - Tier 1industrial site soil screening criteria guidelines-MfE publication*
(2) NA - denotes not applicable

6.0 DISCUSSION

The TPH results for sample SF1 show that bunker containment sand was contaminated with heavy hydrocarbon carbons in the C_{10}-C_{14} and C_{15}-C_{36} carbon band range and therefore the decision to removed to a treatment facility was appropriate.

The soil samples SF2, SF3 and SF4 taken from a depth of 450mm (ie below the concrete and hardfill cover) showed that no significant contamination. In fact the results are well within the Teir 1 soil acceptance criteria for an industrial site.

Therefore the overall indications from the soil petroleum hydrocarbon results is that no significant light fuel oil has seeped through the concrete and hardfill cover material to impact on the underlying soil.

7.0 LIMITATIONS

This report has been compiled on the basis of the TPH analysis of 1 contiament sand and 3 soil samples taken during the removal of the the above ground light fuel oil tank from the site at Sanitarium Health Foods Company, 54-64 Harewood Road, Papanui, Christchurch . Therefore any interpretation should take this limitation into consideration.

Envirochem does not assume any liability for items that are not visible during the excavation. Regulatory evaluation criteria are constantly changing, concentration of contaminants present and considered to be acceptable may in the future become subject to different regulatory standards that cause to be unacceptable.

Opinions and judgements expressed in this report are based on Envirochem's understanding and interpretation of current information.

8.0 APPENDICES

Appendix A: Diagrams

Appendix B: Photographs of the Tank and Containment Bunker

Appendix C: Disposal Manifest

Appendix D: Hill Laboratories TPH Certificates of Analysis and CoC

Appendix A

Diagrams

Diagram 1.0: Map of Sanitarium Health Food Company Site, Papanui, Christchurch

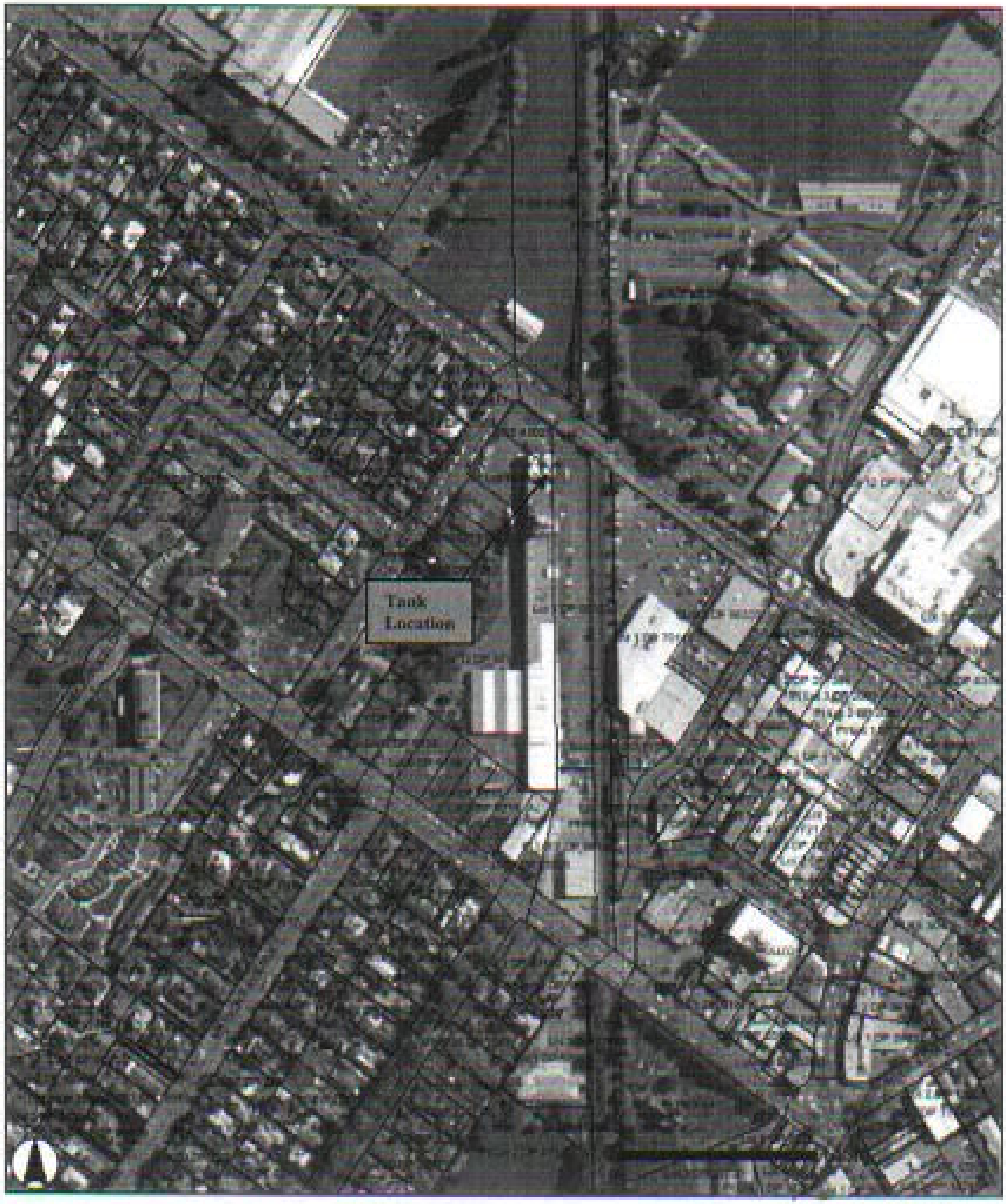
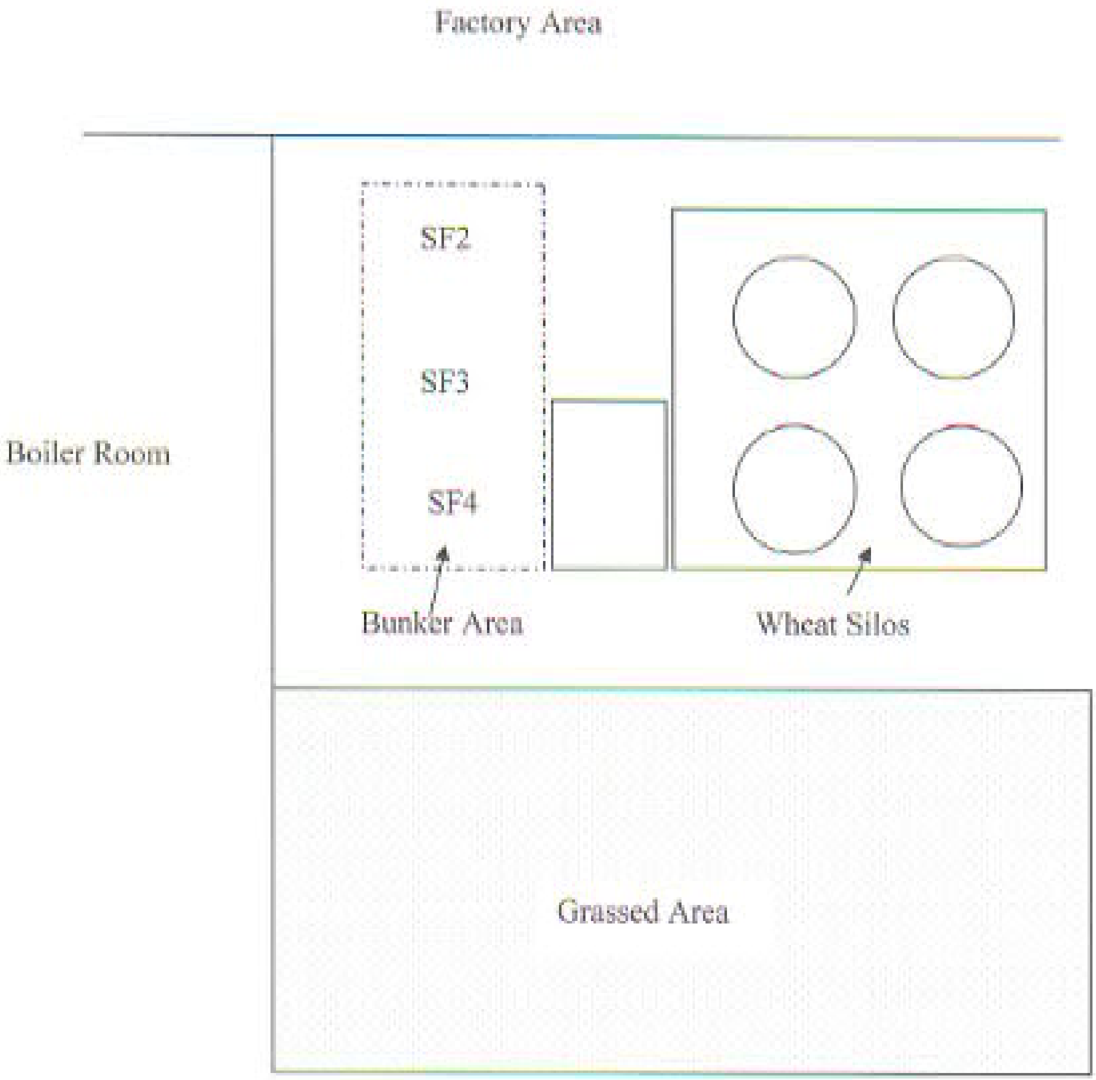


Diagram 2.0: Location of the Above Ground Light Fuel Oil Tank at Sanitarium Health Food Company Site, Papanui, Christchurch



Schematic Diagram Only
Size of Containment Bunker Area 7.5m x 2.5m
Note, all immediate area surrounding bunker covered in concrete

Diagram 3.0: Containment Bunker Soil Sampling Locations

Appendix B

Photographs of the Tank and Containment Bunker

Photographs of the Removed Light Fuel Oil Tank and Containment Bunker at Sanitarium Health Food Company

Appendix C

Disposal Manifest

Fuelquip

MANIFEST FOR MOVEMENT OF SOIL FROM UNDERGROUND TANK REMOVALS

Ref:

Site Information & Contamination Declaration

PRINCIPLE Fuel Quip CHCH .

SITE LOCATION Corner chapel and langdons st

Description of the area, where soil has been removed Papanui - from inside concrete Bund -

DECLARATION OF VOLUME OF CONTAMINATED SPOIL REMOVED FROM SITE BY FUELQUIP

Quantity Removed 6mts. (2 loads)

Units m³ Kg's (circle one)

Signed

Date 5-2-09

Declaration By Environmental Consultant

I approve the removal from site of the waste consignment described above.

Name D Budding

Signed D Budding

Date 5/2/09

Transporter Declaration

- Transpoter to acknowledge the receipt of the Waste consignment described above:

Quantity Transported

Units m³ Kg's (circle one)

Company

Signed

Date

Remediation Contractors Declaration

- Remediation Contractor to acknowledge the receipt of the Waste consignment described above:

Location **Texco Remediation Ltd** g.a.

Quantity Received 6m³. g.a.

Units [✓ 6 m³] Kg's (circle one)

Signed G. Andr

Date 5/1/09.

- Please Ensure This Docket is Returned to Fuelquip (NZ) Ltd Fax: 03 - 384 6720

Appendix D

Hill Laboratories Ltd TPH Certificate of Analysis and CoC

Hill Laboratories
BETTER TESTING BETTER RESULTS

R J Hill Laboratories Limited
1 Clyde Street
Private Bag 3205
Hamilton 3240, New Zealand

Tel +64 7 858 2000
Fax +64 7 858 2001
Email mail@hill-labs.co.nz
Web www.hill-labs.co.nz

ANALYSIS REPORT

Client: Envirochem
Contact: Budhia, Dahya (Mr)
C/- Envirochem
PO Box 28103
Beckenham
CHRISTCHURCH 8242

Lab No: 678636 SPv1
Date Registered: 09-Feb-2009
Date Reported: 17-Feb-2009
Quote No: 34990
Order No:
Client Reference: Soil TPH
Submitted By: Budhia, Dahya (Mr)

Sample Type: Soil

	Sample Name:	SF1 05-Feb-2009	SF2 09-Feb-2009	SF3 09-Feb-2009	SF4 09-Feb-2009	
	Lab Number:	678636.1	678636.2	678636.3	678636.4	
Individual Tests						
Dry Matter	g/100g as rcvd	92	86	84	83	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	24	< 8.0	< 8.0	< 8.0	-
C10 - C14	mg/kg dry wt	1,200	< 20	< 20	< 20	-
C15 - C36	mg/kg dry wt	5,600	< 30	< 30	< 30	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	6,800	< 60	< 60	< 60	-

Analyst's Comments

Appendix No.1 - Total Petroleum Hydrocarbon Chromatograms

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Samples
Total Petroleum Hydrocarbons in Soil	Sonication extraction, Silica cleanup, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines	-	1-4
Dry Matter (Env)	Dried at 103°C (removes 3-5% more water than air dry), gravimetry.	0.10 g/100g as rcvd	1-4

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

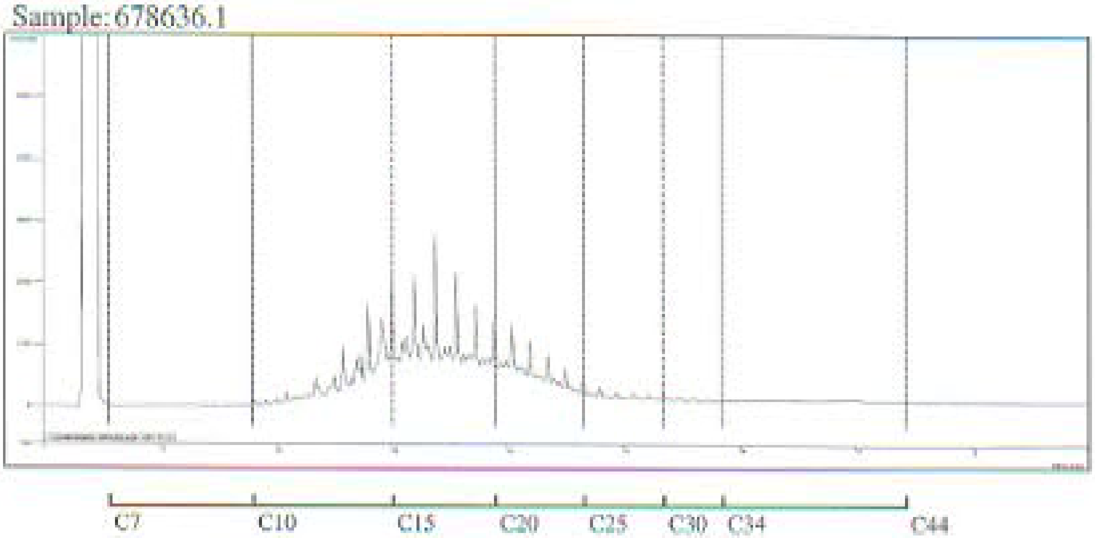
Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

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

Carole Rodgers-Carroll

Carole Rodgers-Carroll BA, NZCS
Client Services Manager - Environmental Division

This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised.
The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked *, which are not accredited.


Sample: 678636.1
C7
C10
C15
C20
C25
C30
C34
C44

678636

No of Samples: 0 No of Fractions: 0

Hill Laboratories

BETTER TESTING BETTER RESULTS

ANALYSIS R

R J Hill Laboratories Limited
1 Clyde Street,
Private Bag 3205
Hamilton, New Zealand

Phc
Fax
Em
Web: www.hill-labs.co.nz

Client

Name Envirochem 31223

Address PO Box 28103, Beckenham
CHRISTCHURCH 8242

Phone 03 337 0894 *Fax* 03 337 0894

Client Reference

Quote No 34990 *Order No*

Primary Contact Budhia, Dahya (Mr) 91205

Submitted By

Charge To Envirochem 31223

Results To ☐ *Mail Primary Contact* ☐ *Mail Submitter*

☐ *Fax Results*

☑ *Email Results*

Office use only: Job No:

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories

☑ *Please tick if you require COC to be faxed back*

Date & Time: 9/2/09

Name: D Budhia

Signature: D Budhia

Received at Hill Laboratories

Date & Time: 09 FEB 2009 1225

Name: Tamara

Signature:

Condition

☐ *Room Temp* ☐ *Chilled* ☐ *Frozen*

Temp: 14·8

☑ Sample & Analysis details checked

Signature:

ADDITIONAL INFORMATION

Priority

☐ Low ☐ Normal ☐ High

☐ Urgent (ASAP, extra charge applies, please contact lab first)

Requested Reporting Date:

Quoted Sample Types

Soil (Soil)

No.	*Sample Name*	*Sample Date/Time*	*Sample Type*	*Tests Required*
1	SF1	6/2/09	Soil/Sand	TPH ls
2	SF2	9/2/09	Soil	TPH ls
3	SF3	9/2/09	Soil	TPH ls
4	SF4	9/2/09	Soil.	TPH ls.
5				
6				
7				
8				
9				
10				

Hill Laboratories
BETTER TESTING **BETTER RESULTS**

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1 Clyde Street
Private Bag 3205
Hamilton 3240, New Zealand

Tel +64 7 858 2000
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Email mail@hill-labs.co.nz
Web www.hill-labs.co.nz

Job Information Summary

Page 1 of 1

Client: Envirochem
Contact: Budhia, Dahya (Mr)
C/- Envirochem
PO Box 28103
Beckenham
CHRISTCHURCH 8242

Lab No: 678636
Date Registered: 09-Feb-2009 1:29:33 pm
Priority: Normal
Quote No: 34990
Order No:
Client Reference: Soil TPH
Submitted By: Budhia, Dahya (Mr)
Charge To: Envirochem

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	SF1 09-Feb-2009	Soil	GSoil300	Total Petroleum Hydrocarbons in Soil
2	SF2 09-Feb-2009	Soil	GSoil300	Total Petroleum Hydrocarbons in Soil
3	SF3 09-Feb-2009	Soil	GSoil300	Total Petroleum Hydrocarbons in Soil
4	SF4 09-Feb-2009	Soil	GSoil300	Total Petroleum Hydrocarbons in Soil

TRANSMITTAL NOTICE

MWH

Tower 1, Deans Park
7 Deans Avenue
Addington
P O Box 13-249
Christchurch 8141
New Zealand
Tel: 64-3-366 7449
Fax: 64-3-341 5345
Website: www.mwhglobal.com/nz

To: Environment Canterbury
PO Box 345
Christchurch
Attention: Ken Baxter
Project: Sanitarium Light Fuel Oil Investigation

From: Alison C Gill
Date: 22/09/06
Reference: Z1412200

EC - CHCH
FILE REF: Env5C/1
DOCUMENT No. 76240
25 SEP 2006
ACTION
INFO
Mark

- ☐ We enclose
- ☒ We have sent you
- ☐ We acknowledge receipt of

- ☐ Prints
- ☐ Calculations
- ☐ Photocopies
- ☐ Drawings

- ☒ Reports
- ☐ Specifications
- ☐ Disks
- ☐ Other

Quantity	Reference	Description
1	Z1412200	LFO Report

These items are sent:

- ☐ At your request
- ☐ For your approval
- ☑ For your review

- ☐ For your action
- ☐ For your files
- ☐ For your information

- ☐ Other (specify)

General Remarks:

Hi Ken

Please find enclosed the Light Fuel Oil report outlining the site investigation undertaken at the Sanitarium Health Food Company site in Harewood Road, Christchurch.

If you have any questions, please do not hesitate to contact me for clarification.

Kind regards
Alison

Alison Gill

pp MWH New Zealand Limited

☐ Acknowledgement of Receipt Required

Sent by:

- ☒ Mail
- ☐ Airfreight
- ☐ Bus

- ☐ Courier
- ☐ Messenger
- ☐

Copies to:

- ☑ Client
- ☐ Contractor
- ☑ File

- ☐ Supplier
- ☐ Architect
- ☐ Other (specify)

T_ECAN 220906.doc

SGS

MWH

Meeting the challenge

Sanitarium Health Food Company

Light Fuel Oil Investigation – July 2006

September 2006

This document has been prepared for the benefit of Sanitarium Health Foods Company. No liability is accepted by this company or any employee or sub-consultant of this company with respect to its use by any other person.

This disclaimer shall apply notwithstanding that the report may be made available to other persons for an application for permission or approval to fulfil a legal requirement.

Quality Assurance Statement	
MWH New Zealand Ltd Tower 1, Deans Park 7 Deans Avenue Addington P O Box 13-249 Christchurch 8141 New Zealand Phone : 64-3-366 7449 Fax : 64-3-341 5345	**Project Manager:** Alison Gill
	Prepared by: Simon Smith
	Reviewed by: Catherine Daniels
	Approved for issue by: Alison Gill

Sanitarium Health Foods Company
Light Fuel Oil (LFO) Site Investigation, Sanitarium, Christchurch

Executive Summary

- On or about 24th July 2006, members of the public had observed a distinct odour and rainbow sheen downstream of the Sanitarium site at Northlands Mall.
- Sanitarium Health Foods Company contacted MWH requesting assistance with determining the presence and extent of any light fuel oil (LFO) contamination at their site on Harewood Road, Christchurch.
- During the investigation, the underground LFO fill system was removed and replaced with a new above ground system.
- Approximately 48m^3 of impacted soil and 74,060kg of impacted surface and groundwater were removed from the site.
- Twenty soil samples and four water samples were collected and analysed for Total Petroleum Hydrocarbons (TPH) during this investigation.
- All samples representing the soil remaining onsite and from the potable onsite wells complied with the relevant Ministry for the Environment (MfE) Guideline criteria for industrial/commercial land use.
- It is recommended that regular visual inspections of the stormwater sumps at the site are carried out to ensure any residual contamination is identified.

1 Introduction

MWH New Zealand Limited (MWH) was commissioned by the Sanitarium Health Foods Company to conduct a soil and water investigation following the discovery of a fuel odour and sheen at Northlands Mall by the general public, downgradient of the Sanitarium Health Food Company site on Harewood Road.

The purpose of the investigation was to:

- determine the presence of any residual petroleum hydrocarbon contamination at the site arising from the on site above ground LFO storage tank and the subsurface fill line; and
- provide information to enable the assessment of whether this potential contamination source was the cause of the noted contamination within Kruses Drain.

The site investigation and subsequent assessment was conducted in accordance with the Ministry for the Environment (MfE) "Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand" (MfE Guidelines).

2 Background

On the 24th of July 2006, MWH was requested to assist Sanitarium Health Foods Company with determining the presence and extent of any LFO contamination at their site on Harewood Road, Christchurch.

Members of the public had observed a distinct odour and rainbow sheen in the small stream flowing downstream from the Sanitarium site at Northlands Mall. The stream is known as Kruses Drain at the Sanitarium site but is not listed by this name on Environment Canterbury records.

Site staff at Sanitarium conducted an initial investigation of the Sanitarium property to determine if their operations were the source of the odour and sheen. A visual inspection of the site indicated surface staining on the concrete beneath the LFO remote fill point on the western side of the factory building. Further inspection of the nearby stormwater system established that a leak in the underground LFO pipeline had occurred. Sanitarium Health Foods Company commissioned MWH as independent consultants to oversee further investigations and necessary remediation.

3 Site Description

3.1 Location and Legal Description

Sanitarium Health Foods Company (from herein 'the site') is located on Harewood Road to the north west of Christchurch City Centre as shown in Figure 1. The site is made up of many land parcels as listed below:

Lots 1 – 8, Pt Lot 9, Lots 10 & 12 DP9715
Lot 1 DP59153
Lot 1 DP204

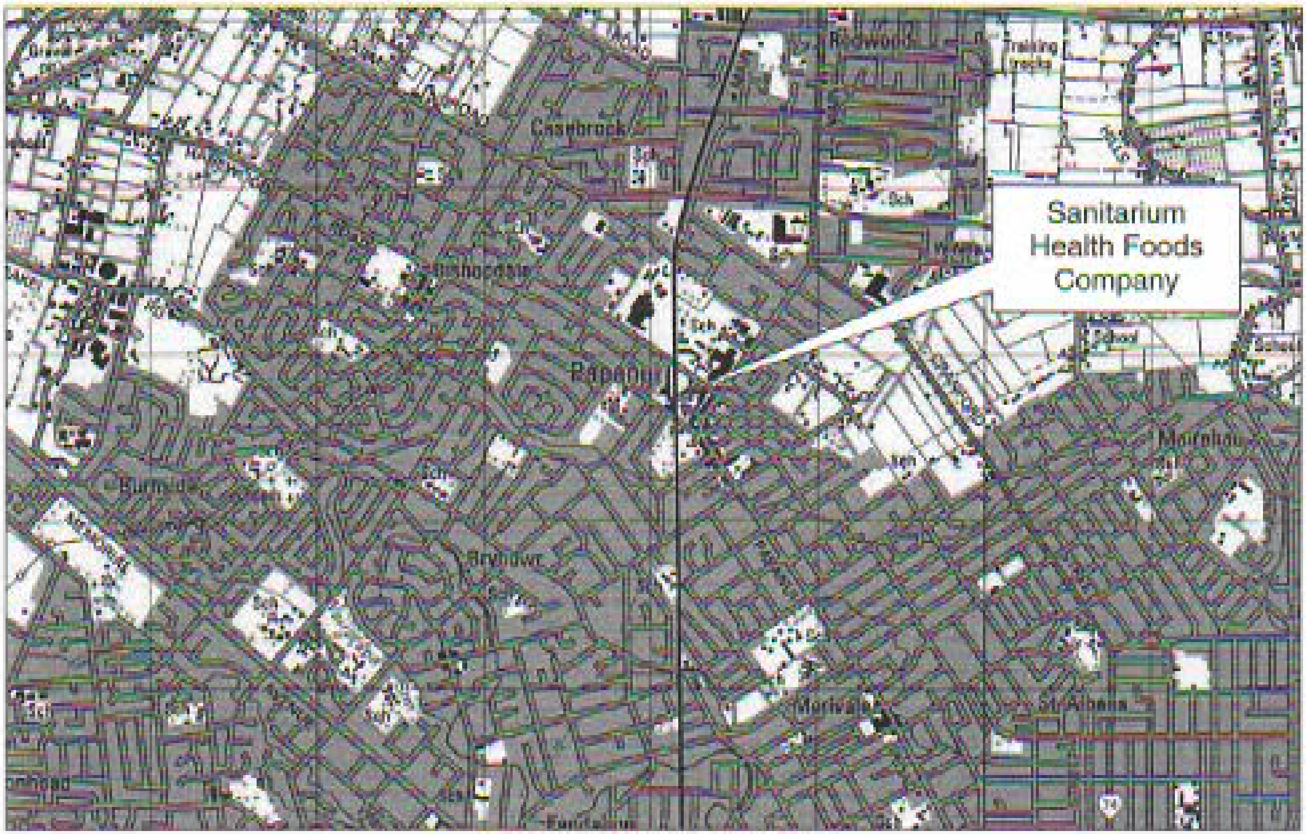


Figure 1: Site Location Plan

3.2 Site History

From discussions with Warren Ashby (on site Sanitarium Chief Engineer) during the investigation, the production factory building has been in operation since the 1940's with the northern end of the building added as an extension around 1985.

At approximately the same time, two underground petroleum storage tanks were removed from an area west of the building near the site entrance along Chapel Street, and an underground kerosene tank was also removed from the western side of the site opposite the garden area. No details were available for the tank dimensions or removal operations.

Evidence of surface staining was apparent on the concrete pad, beneath which lay the LFO underground fill line. This was investigated by Sanitarium staff after the initial notification of noticeable contamination down stream. No other surface staining was visible at the site during the investigation.

3.3 Site Conditions and Surrounding Environment

The site consists of the main production factory, material storage silos, offices and a smaller site office adjacent to the entrance gate along Chapel Street to the west.

Ground surface coverings consist of asphalt along the entrance driveway and car parking areas to the east and west of the factory building and a concrete pad located in front of two retracting access doors at the northern end of the eastern side. The LFO underground fill pipe and two sumps belonging to the stormwater drainage system were located immediately outside the retracting access doors.

A large part of the western side of the site between the access driveway and the boundary of Chapel Street are manicured gardens and grassed areas. A small culverted stream known as Kruses Drain flows in a south-westerly to north-easterly direction from the far south western corner of the site. This stream flows underground when it reaches the access driveway, beneath the factory, and does not become visible again until beyond the site boundary in the north-east.

The site layout is depicted in the attached Figure 2 and photographs of the site are appended.

The Sanitarium Health Foods Company on Harewood Road in Christchurch is industrial/commercial in nature and zoned as land use B4 (Suburban Industrial) by the Christchurch City Council City. Properties immediately surrounding the site include:

- Residential neighbourhood on the opposite side of Chapel Street on the western boundary;
- Railway line and industrial/commercial properties (Noel Leeming) to the east;
- Firestone automotive workshop, Papanui High School grounds and Langdons Road to the north; and
- Harewood Road and residential neighbourhoods to the south.

The site is relatively flat with a gentle upwards slope towards the northern boundary and Langdons Road. The topography of the surrounding land is also generally flat, accommodating the adjacent railway line to the east and industrial/commercial and residential properties surrounding the site.

3.4 Geology

The Harewood/Papanui region of Christchurch is underlain by postglacial alluvium consisting of fluvial sands and silts of the Holocene period. The alluvial deposits overlie deeper gravel deposits of the Tertiary period with volcanic bedrock likely to lie at a depth of hundreds of metres.

The LFO pipeline excavations revealed that beneath the site, the soils consist predominantly of sandy clay. The general soil sequence exposed in the excavations is summarised in Table 1 and Table 2.

Table 1: Soil Sequence in the northern section of the LFO Pipe Trench

Depth (m)	Description
0 – 0.2	Reinforced Concrete
0.2 – 0.8	Light greyish brown, sandy, coarse, loose and dry gravel.
0.8 – 1.0	Light yellowish brown sandy clay with minor medium gravel. Moist to saturated and loose.

Table 2: Soil Sequence in the southern section of the LFO Pipe Trench

Depth (m)	Description
0 – 0.2	Reinforced Concrete
0.2 – 0.8	Light greyish brown sandy, coarse, loose and dry gravel.
0.8 – 2.3	Light greyish brown sandy clay. Moist to saturated and firm.

3.5 Permeability

The permeability of the soils at the site are likely to be moderate at shallow depth due to the presence of loose sandy gravel, with permeability reducing at a depth of 1 metre and below where the firm sandy clay is found.

3.6 Hydrogeology

The Christchurch groundwater system is a multi-layer, unconfined to semi-confined aquifer system. The aquifers are composed of coarse sandy gravel sheets deposited during successive glacial and interglacial periods.

Shallow groundwater is inferred to flow in an east to south-easterly direction for the Christchurch region within the alluvial groundwater system of the Springston formation. However, in the Harewood region of Christchurch where the site is located, groundwater flows in a north to north-easterly direction due to the influence of the Waimakariri River.

At the Sanitarium site, the depth to groundwater was found to be shallow. From hand auger investigation on the eastern side of the site and from the trench excavations, groundwater was deemed to be between 1.2 and 1.8mbgl. A search of Environment Canterbury online records recorded wells within a 500m radius of the site displaying groundwater levels of 1.2 metres below ground level (mbgl).

3.6.1 Groundwater Use

A bore search of the Environment Canterbury (Ecan) database was conducted within a 500m radius of the site to assess groundwater use in the area. It is noted that Environment Canterbury records may be incomplete, however the bore search identified 30 wells within 500m of the site.

Seven of these wells have been infilled or are no longer in use so they have not been considered further in this assessment. A further eight wells were installed for foundation investigations and two were installed for observation and geological research. As such, these have also not been included in the assessment for groundwater use. The wells identified in Table 3 are those where the use of groundwater has been identified.

Table 3: Bores within a 500m radius of the site.

Bore ID	Owner	Use	Depth (m)	Approx. distance (m) and direction from site
M35/3723	Rowe	Unknown	10.5	500, SE
M35/1482	Methodist Orphanage	Unknown	25.6	100, SW
M35/1471	Cool Stores	Unknown	28.7	100, S
M35/1344	Firestone Tyre Co.	Industrial	25	200, NW
M35/6482	Firestone Rubber Ltd	Industrial	25	200, NW
M35/1351	Firestone Tyre Co.	Unknown	24.4	250, NW
M35/1383	Sanitarium Health Foods	Commercial	27.4	Onsite
M35/1349	Sanitarium Health Foods	Commercial	27.4	Onsite
M35/1478	W. Cooke	Unknown	21.3	500, N
M35/4207	Papanui High School	Domestic / Irrigation	25	100, N
M35/7394	Phoenix Hotel	Unknown	108.5	400, NE
M35/3413	Methodist Central Mission	Unknown	24	100, W
M35/1640	Ryan	Unknown	22.9	200, E

From the information obtained, groundwater in the area appears to be sourced from deeper aquifers than those supplying groundwater encountered during excavations. The onsite wells at Sanitarium (M35/1383 and M35/1349) have been sampled as part of the investigation and are for use in manufacturing processes.

As the Sanitarium site lies within a residential and commercial district of Christchurch City, potable water is supplied to the area via a reticulated town supply. Due to the presence of a reticulated supply in the area and the absence of shallow wells in the area, it is unlikely the shallow subsurface aquifer is used for potable supply.

3.7 Aquifer Sensitivity

The shallow aquifer beneath the site is:

- non artesian;
- less than 10m below the source of contamination and;
- of a quality appropriate for use;
- can yield water at a useful rate; and
- is in an area where extraction and use of groundwater may be reasonably foreseen.

Therefore the aquifer beneath the site is considered to be sensitive as defined by section 5.2.3 of the MfE Guidelines 1999.

3.8 Nearest Surface Water Body

The nearest surface water body to the site is Kruses Drain which flows through the site from the south-western corner to the north-western edge of the garden area. Here, the creek continues its flow beneath the processing factory and does not resurface again until beyond the eastern site boundary. Also, the Dudley Creek is within 500m of the site, lying approximately 450m to the south.

4 Site Investigation and Sampling

The site investigation work conducted by MWH New Zealand Ltd was carried out between the 25th July and the 30th of August 2006. The investigation consisted of visual inspections of the site and Kruses Drain; excavation and soil sampling of the area adjacent to the LFO underground fuel line; hand auger and soil sampling investigations at the rear of the site on the eastern side of the building, and the sampling of groundwater used for site production purposes.

Table 4: Site Infrastructure Details

Tank Reference	Status	Capacity (litres)	Contents	Located above or below ground	Date of Installation	Containment	Construction	Condition
1	Remains	15,000	LFO	Above	~ 1950's	~3m Wall and Sand Bunding	Steel	Good
2	Removed	Unknown	Petrol	Below	Unknown	Unknown	Unknown	Unknown
3	Removed	Unknown	Petrol	Below	Unknown	Unknown	Unknown	Unknown
4	Removed	Unknown	Kerosene	Below	Unknown	Unknown	Unknown	Unknown
Pipes								
Fill	Removed	-	LFO	Below	Unknown	None	Steel	Poor
Fill	Remains	-	LFO	Above	July 2006	None	Galvanised Steel	New

The focus of this investigation was the presence of LFO contamination in soils on the western side of the factory building, along the fill pipeline for the above ground tank located on the eastern side of the building. It was determined through onsite discussions and observations that the previously removed underground storage tanks were not located in the vicinity of the contamination. Therefore, the contamination observed on site was identified as LFO and its source pinpointed to the fill line.

The installation of the new above ground LFO fill system on the eastern side of the factory was undertaken by Gilbarco Limited. A photo of the completed system is appended.

The LFO fill line was excavated along its extent on the western side of the factory. During this work, the adjacent stormwater pipe was uncovered and LFO was seen to be tracking along the stormwater pipeline. Impacted soil was removed from around the stormwater pipe and the joints of the pipe were resealed to prevent contaminant migration into the stormwater system. As a precaution, the old brick sump adjacent to the access ramp was replaced with a pre-cast concrete one, as its old brick construction was allowing LFO migration into the stormwater system. The stormwater flow from Kruses Drain was sandbagged and diverted via a pump around the section to be excavated to the northern sump. Upon removal of the brick sump, a soil sample was taken of the bedding material upon which the new sump was placed.

Subsequent periods of heavy rainfall halted excavation work and formed ponds within the excavation trench. Chemwaste were contracted to pump out the impacted groundwater and ponded rainwater on a daily basis.

Once excavations continued, two abandoned stormwater pipes were located adjacent to the southern sump underneath the building foundation. It was evident that the building had been constructed on top of the pipes as they were flattened off and partially backfilled with concrete. However, it was apparent that one of the pipes was intercepting the migrating LFO and Chemwaste pumped approximately 3,500L of free product from this pipe after a 1.3m exposed section of the pipe was removed. A pre cast concrete sump was installed at this location to seal up the two abandoned pipes and trap any residual LFO that may be contained within them. An access point on the concrete sump was installed to allow for future access and visual inspection of the sump.

The excavation and removal of the underground LFO fill line and subsequent work on the stormwater system located adjacent to the fill line was supervised by Petroleum Solutions Ltd, and undertaken by themselves and Isaac Construction Ltd.

Throughout the investigation, the quality of the water in Kruses Drain within the site, and downstream across the railway line to the east of the site and at Northlands mall where the initial fuel odour and sheen was observed was visually inspected. A blue globular sheen was noted in Kruses Drain, upstream of the LFO investigation area. No sheen was visible on the creek immediately after the railway line downstream and to the east of the site. A thick rainbow sheen and some black globular liquid was identified in the section of the creek adjacent to The Warehouse at Northlands Mall. Photographs of the visual observations are appended.

4.1 Spoil Removal

Approximately 48m^3 of impacted soil was excavated from the trench and sump area adjacent to the LFO underground fuel line and removed from the site. The spoil was disposed of at Texco Remediation Services in Bromley, Christchurch. In addition, Chemwaste removed 74,060kg of impacted surface and groundwater from the site during the investigation.

4.2 Sample Collection

To eliminate the risk of cross contamination, soil samples were collected from the centre of the excavator bucket (or from the hand auger) using clean disposable gloves for each sample. All samples were immediately transferred into the appropriate sample jars as supplied by the laboratory. All samples were placed inside a chilly bin and packed with ice.

A total of 20 soil samples (including 1 duplicate sample for quality control purposes) were collected from the site and sent to Hill Laboratories in Hamilton for analysis. Sampling was designed to provide representative results of the general condition of the material remaining at the site.

Samples were collected from bedding material above and to the east and west of the LFO pipeline. A sample was collected from the material beneath the location of the underground LFO pipeline after the contaminated material had been excavated. Samples were also taken from beneath the removed sump and the walls of the trench in the southern end of the excavations. A sample of the contaminated spoil removed from site was also obtained.

The hand auger investigation on the eastern side of the factory was undertaken to determine if contaminants were migrating downgradient from the source. Samples were collected at a shallow depth (0.5m) and at the inferred groundwater level (1.8m).

As a precaution, water samples were also collected from the potable groundwater bores on the eastern side of the factory that are used for production purposes. A first flush sample was taken as well as a second sample after a 5 minute flow from each of the taps at these bores.

The location of the samples collected are shown on the attached Figure 3.

5 Laboratory Analysis Results

All 20 soil samples and 4 groundwater samples collected during the investigation were dispatched to Hill Laboratories in Hamilton and analysed for total petroleum hydrocarbons (TPH). The results are summarised in Tables 5 to 8 together with the MfE Guideline acceptance criteria for All Pathways and Protection of Groundwater Quality. Results that exceed the guidelines are shown in bold. The laboratory report, chromatograms, and sample chain of custody forms are appended.

Table 5: Laboratory Analysis Results for Soil Samples <1m Contamination Depth

Laboratory Analysis Results (Sand, <1m)												
Sample Reference	TP1 0.5	TP2 0.5	TP3 0.5	TP4 0.5	TP5 0.5	TP2X	Trench1 _0.4	Trench2_0.4	Trench3_0.4	TB8	**Commercial / Industrial All Pathways**	**Protection of Groundwater Quality (2m)**
Represents soil	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining	Removed	Remaining	Remaining		
Sample Location	Eastern side of building	Eastern side of building	Eastern side of building	Eastern side of building	Eastern side of building	Duplicate of TP2 0.5	Trench bedding – northern end	Trench bedding – northern end	Trench bedding – northern end	Bedding around stormwater pipe		
Sample Depth (m)	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.5		
Soil type	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand	Sandy Gravel	Sandy Gravel	Sand	Sand
Parameters	**Results in mg/kg dry weight**										**(mg/kg)**	**(mg/kg)**
TPH												
$C_7 - C_9$	<8	<7	<8	<8	<8	<7	<8	100	<7	<8	120	NA^2
$C_{10} - C_{14}$	<20	<10	<20	<20	<20	<10	<20	**4330**	<10	50	**(1,500)**	NA^2
$C_{15} - C_{36}$	<40	<30	<30	<40	<30	<30	<40	**14800**	<30	290	NA^1	NA^2

Note: Reference MfE Guidelines Tables 4.10 – 4.15 and 4.20
Site environmental criteria used are: Commercial/Industrial Land Use, Sand / Gravel Soil, <1 m Contamination Depth, 2m Groundwater Depth.
NA^1 indicates estimated criterion exceeds 20,000mg/kg. At 20,000mg/kg residual separate phase is expected to have formed in the soil matrix. Some aesthetic impact may be noted.
NA^2 indicates contaminant not limiting as estimated health-based criterion is significantly higher than that likely to be encountered on site.
NA^2 indicates contaminant not limiting as estimated health-based criterion is significantly higher than that likely to be encountered on site (i.e. 20,000mg/kg for TPH, 10,000mg/kg for other contaminants).
Brackets denote values exceed threshold likely to correspond to formation of residual separate phase hydrocarbons.

Table 6: Laboratory Analysis Results for Soil Samples 1-4 m Contamination Depth

Laboratory Analysis Results (Sand, 1m – 4m)							
Sample Reference	TP1 1.8	TP2 1.8	TP3 1.8	TP4 1.8	TP5 1.8	Commercial / Industrial All Pathways	Protection of Groundwater Quality (4m)
Represents soil	Remaining	Remaining	Remaining	Remaining	Remaining		
Sample Location	Eastern side of building	Eastern side of building	Eastern side of building	Eastern side of building	Eastern side of building		
Sample Depth (m)	1.8	1.8	1.8	1.8	1.8		
Soil type	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand	Clayey Sand	Sand	Sand
Parameters	**Results in mg/kg dry weight**					**(mg/kg)**	**(mg/kg)**
TPH							
$C_7 - C_9$	<8	<8	<9	<8	<9	120	NA^2
$C_{10} - C_{14}$	<20	<20	<20	<20	<20	(1,900)	NA^2
$C_{15} - C_{36}$	<40	<40	<40	<40	<40	NA^1	NA^2

Note: Reference MfE Guidelines Tables 4.10 – 4.15 and 4.20

Site environmental criteria used are: Commercial/Industrial Land Use, Sand / Gravel Soil, 1- 4 m Contamination Depth, 4 m Groundwater Depth.

NA^1 indicates estimated criterion exceeds 20,000mg/kg. At 20,000mg/kg residual separate phase is expected to have formed in the soil matrix. Some aesthetic impact may be noted.

NA^2 indicates contaminant not limiting as estimated health-based criterion is significantly higher than that likely to be encountered on site.

NA^3 indicates contaminant not limiting as estimated health-based criterion is significantly higher than that likely to be encountered on site (i.e. 20,000mg/kg for TPH, 10,000mg/kg for other contaminants).

Brackets denote values exceed threshold likely to correspond to formation of residual separate phase hydrocarbons.

Table 7: Laboratory Analysis Results for Soil Samples 1-4 m Contamination Depth

Laboratory Analysis Results (Clay Soil 1 – 4m)								
Sample Reference	TB1	TB2	TB3	TB4	TB5	TB7	**Commercial / Industrial All Pathways**	**Protection of Groundwater Quality (4m)**
Represents soil	Remaining	Remaining	Remaining	Remaining	Remaining	Remaining		
Sample Location	West of stormwater pipe	West of stormwater pipe	Bedding beneath removed LFO pipe	South east corner of excavations	South west corner of excavations	Bedding under replaced sump		
Sample Depth (m)	1.5	1.5	1.75	1.2	1.0	1.8		
Soil type	Sandy Clay	Sandy Clay	Sandy Clay	Sandy Clay	Sandy Clay	Clayey Sand		
Parameters	**Results in mg/kg dry weight**						**(mg/kg)**	**(mg/kg)**
TPH								
$C_7 - C_9$	<9	<9	<9	<8	<8	<9	NA[1]	NA[2]
$C_{10} - C_{14}$	<20	20	160	<20	<20	<20	(9,700)	NA[2]
$C_{15} - C_{36}$	<40	100	560	<40	<30	<40	NA[1]	NA[2]

Note: Reference MfE Guidelines Tables 4.10 – 4.15 and 4.20
Site environmental criteria used are: Commercial/Industrial Land Use, Clay Soil, 1 - 4 m Contamination Depth, 4 m Groundwater Depth.
NA[1] indicates estimated criterion exceeds 20,000mg/kg. At 20,000mg/kg residual separate phase is expected to have formed in the soil matrix. Some aesthetic impact may be noted.
NA[2] indicates contaminant not limiting as estimated health-based criterion is significantly higher than that likely to be encountered on site.
NA[3] indicates contaminant not limiting as estimated health-based criterion is significantly higher than that likely to be encountered on site (i.e. 20,000mg/kg for TPH, 10,000mg/kg for other contaminants).
Brackets denote values exceed threshold likely to correspond to formation of residual separate phase hydrocarbons.

Table 8: Laboratory Analysis Results for Groundwater Samples

Laboratory Analysis Results – Groundwater								
Sample Reference	PW1 a	PW1 b	PW2 a	PW2 b	MfE Groundwater Acceptance Criteria			
Sample Location	Northern well – first flush	Northern well – after 5 mins	Southern well – first flush	Southern well – after 5 mins	Inhalation Pathway		Potable Water Supply	Irrigation Water Supply
Product ID	-	-	-	-	Indoor air	Outdoor air		
Soil Type	Sandy Clay	Sandy Clay	Sandy Clay	Sandy Clay				
Sample Date	25/07/06	25/07/06	25/07/06	25/07/06	Commercial, Clay, 2m groundwater depth			
Parameter	Results in mg/L				mg/L			
TPH								
$C_7 - C_9$	<0.03	<0.03	<0.05	<0.05	S	S	18.0*	>S
$C_{10} - C_{14}$	<0.05	<0.05	<0.1	<0.1	S	S	>S	>S
$C_{15} - C_{36}$	<0.1	<0.1	<0.3	<0.3	S	S	>S	>S

Note: Reference MfE Contaminated Land Guidelines Tables 5.10 to 5.12.
C_7 - C_9 criteria based on health effects associated with aliphatic component only.
Values in brackets exceed solubility limit for compound in water when present as part of a typical gasoline mixture.
S denotes water criteria exceeds solubility limit for pure compound in water.
>S denotes calculated limit exceeds solubility limit given TPH criteria based on aliphatic component only. Separate consideration is given to the aromatic component.
* exceeds solubility limit for aliphatic components; aromatic components will be limited by criteria for BTEX compounds. Therefore comparison of measured concentrations with criteria for BTEX, will also be protective against adverse effects associated with aliphatic component.

6 Discussion

All of the samples collected from the site during this investigation were dispatched to Hill Laboratories in Hamilton. All of these samples were analysed for Total Petroleum Hydrocarbons (TPH), as outlined in the MfE Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand.

The site is used for the manufacture and production of Sanitarium goods and will remain as such a site after this investigation. Therefore, the appropriate guideline values to compare the laboratory analysis results to are those for an industrial/commercial land use. The laboratory analysis results show:

- Of the 20 soil samples collected during the investigation, one sample (Trench Spoil 2) exceeds the MfE Guideline criteria for TPH constituents for the All Pathways and the Protection of Groundwater Quality for industrial/commercial land use.
- TPH concentrations in sample Trench Spoil 2 represents the LFO impacted soil that has been removed from the site and is therefore no longer considered a potential source of contamination.
- All other soil samples representing bedding and fill material that will remain on site in the area of investigation complied with the relevant MfE Guidelines.
- All four water samples taken from the two onsite wells used in the Sanitarium production processes comply with the MfE Guidelines for the Protection of Groundwater Quality.

7 Tier 1 Risk Assessment

The analytical results and site observations from this investigation indicate no significant levels of residual petroleum hydrocarbon contamination within soils in the vicinity of the excavated LFO fuel line and stormwater pipe at the site. Accordingly a Tier 1 risk assessment has not been performed.

8 Conclusions and Recommendations

The investigation into LFO contamination was carried out at the Sanitarium site on Harewood Road, Christchurch, between 24th July and 30th August 2006.

The underground LFO fill pipeline was removed from the site and a new above ground fill system installed. Approximately 48m^3 of impacted soil and 74,060kg of impacted surface and groundwater was removed from the site during the excavation and remediation of the impacted area.

The laboratory analysis of the soil samples collected during the investigation to represent the material remaining on the site show that there are some concentrations of TPH constituents remaining in the soil, but not in concentrations that exceed the MfE Guidelines for an industrial/commercial site. From the volume of the spoil (including impacted water and free flowing LFO product) removed from site, it is considered that the source of residual contamination has been removed and/or reduced. The results of the samples collected from the hand auger investigation to the east of the site show no contaminant migration in the direction of inferred groundwater flow (east to south-east).

The groundwater samples taken from the on site wells used for production purposes show no elevated TPH concentrations.

Residual contamination from sections of underground LFO fill lines and abandoned stormwater pipes beneath the building cannot be discounted. However, pumping of both of these pipelines was undertaken and leaked LFO was removed. Contamination soil underlying the building is considered to be a possibility.

The observations of Kruses Drain at various locations both on and off site throughout the investigation show varying degrees of contaminant sheen. It is unlikely the blue globular sheen observed up stream of the site is a result of the LFO leak. A weir is located between the LFO investigation area and the contaminant observation point that would prevent a backflow of contamination. LFO, when observed on the groundwater in the excavations, typically left black, brownish black, globular film on the surface. No such sheen was observed immediately downstream of the site across the railway to the east, suggesting that the migration of LFO in the stormwater system at Sanitarium had not extended to the downstream of the site. The contamination observed in the stream at Northlands Mall was predominantly a rainbow sheen, suggesting the contaminant is more likely to be a petrol or diesel substance.

It is concluded that the contamination observed by the public at the start of this investigation is unlikely to have resulted from the LFO fuel leak at Sanitarium.

It is believed that the source of LFO contamination has been removed via the removal of the underground fill system and installation of the new above ground fill pipe. Removal of impacted soil and groundwater and the resealing and sump replacement along the stormwater pipe has halted the potential migration of LFO contamination. Regular visual inspections of Kruses Drain and the onsite stormwater system by Sanitarium staff are recommended to ensure the early identification of any residual LFO migration.

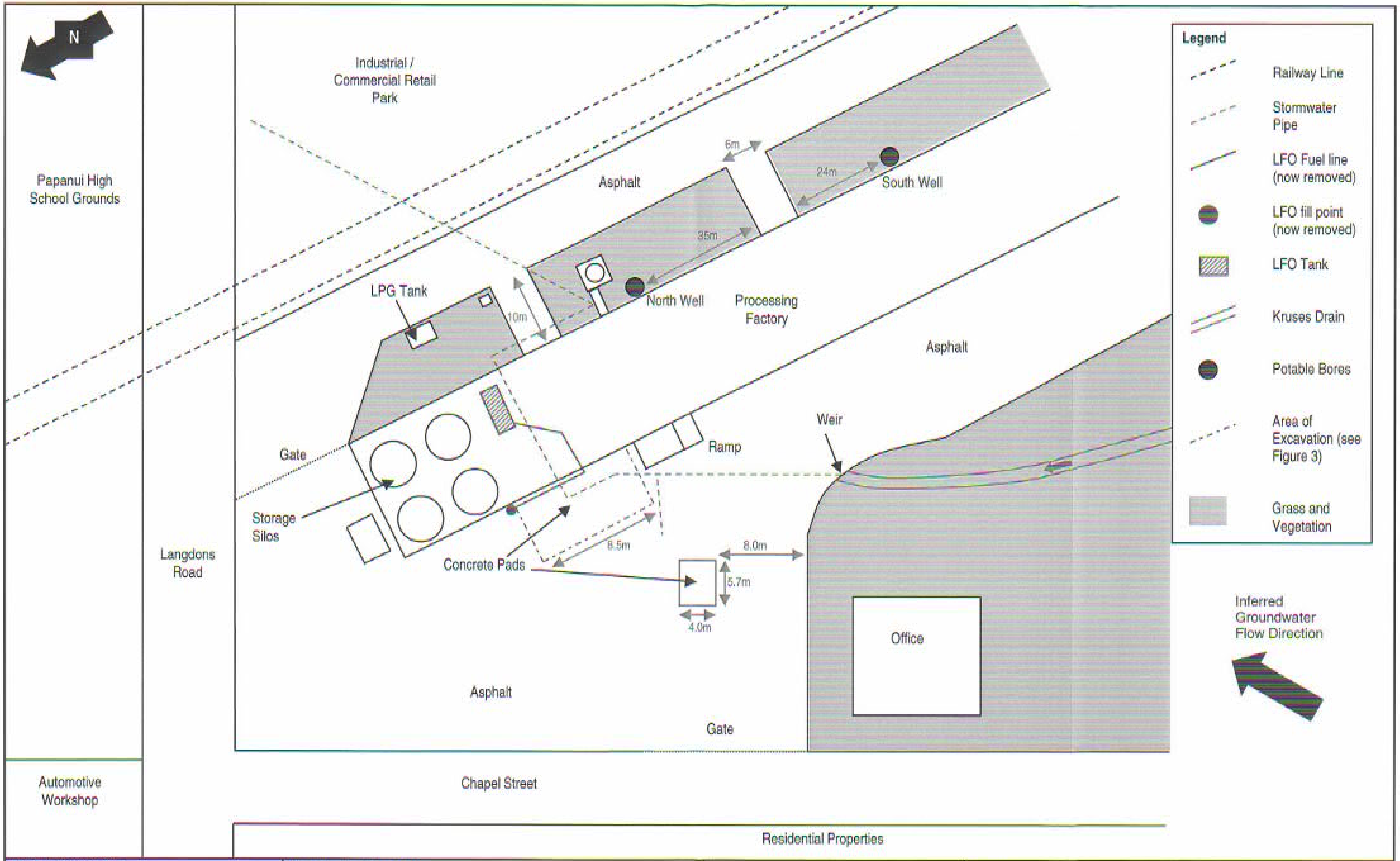
9 Limitations

This investigation can not discount the presence of contamination beneath the factory building and the extent of any such contamination was unable to be delineated. Further investigation would be warranted in this area should the building foundations be exposed in the future.

10 References

1. Ministry for the Environment. 1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand.
2. New Zealand Geological Survey and Department of Scientific Research. 1973. Geological Map of New Zealand, Sheet 21 1:250,000.
3. Institute of Geological and Nuclear Sciences (Brown, L.J and Weeber, J.H). 1992. Geology of the Christchurch Urban Area.

Appendix A - Site Plan with Sample Location & Analysis Results



SCALE: As Indicated on Plan		
	INIT	DATE
DESIGNED	SS	09/06
DRAWN	SS	09/06
CHECKED	CO	09/06
APPROVED	AG	09/06

Sanitarium Health Foods Co.
Light Fuel Oil Investigation

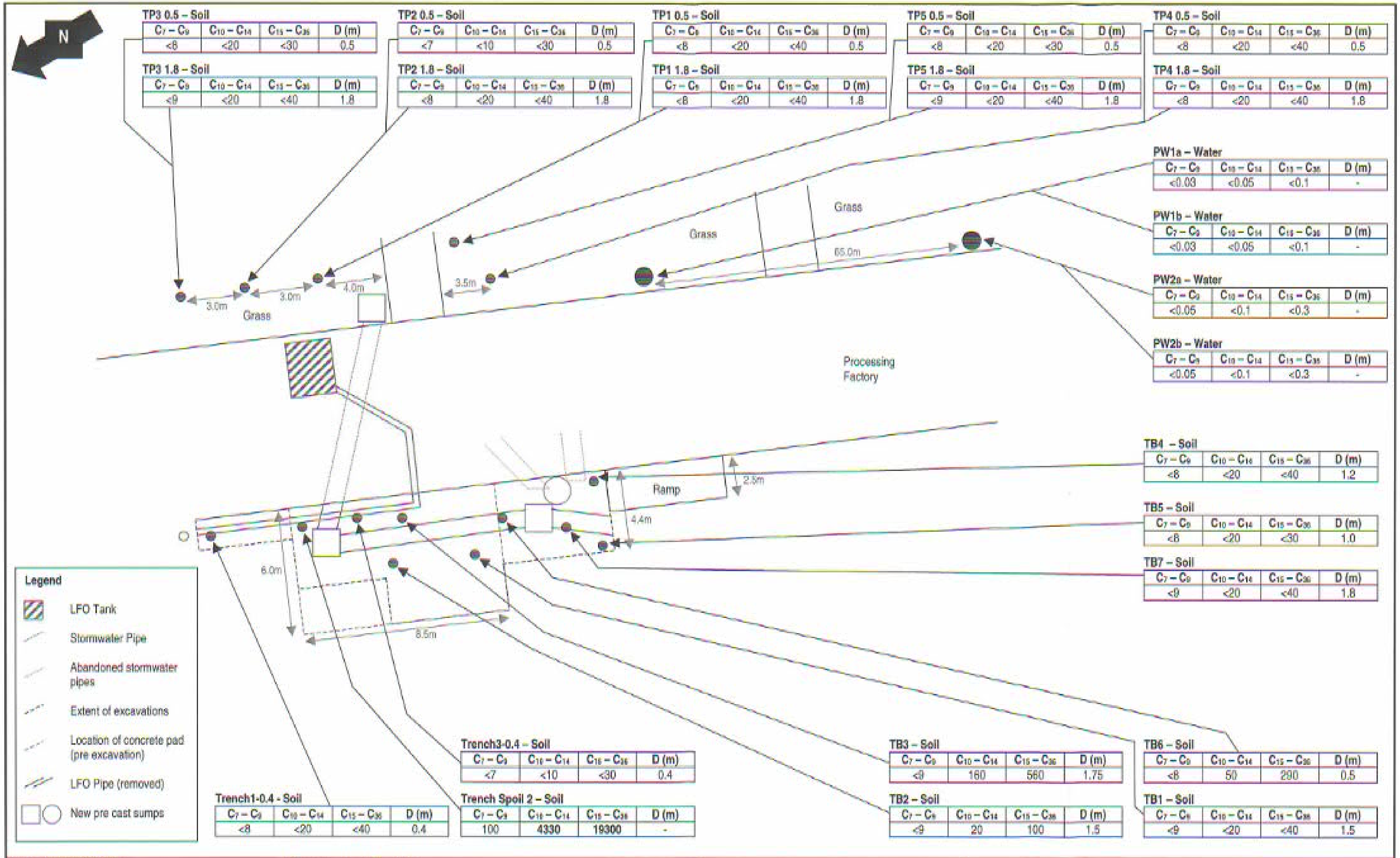
FIGURE 2: Sanitarium Health Foods Co. – Site Layout Plan (Northern end of site)

MWH

Status: Final

Date: September 2006

Job No.	Sheet No.	Rev.
Z1412200	Sheet No. 01	A



TP3 0.5 – Soil

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<8	<20	<30	0.5

TP3 1.8 – Soil

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<9	<20	<40	1.8

TP2 0.5 – Soil

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<7	<10	<30	0.5

TP2 1.8 – Soil

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<8	<20	<40	1.8

TP1 0.5 – Soil

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<8	<20	<40	0.5

TP1 1.8 – Soil

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<8	<20	<40	1.8

TP5 0.5 – Soil

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<8	<20	<30	0.5

TP5 1.8 – Soil

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<9	<20	<40	1.8

TP4 0.5 – Soil

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<8	<20	<40	0.5

TP4 1.8 – Soil

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<8	<20	<40	1.8

PW1a – Water

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<0.03	<0.05	<0.1	-

PW1b – Water

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<0.03	<0.05	<0.1	-

PW2a – Water

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<0.05	<0.1	<0.3	-

PW2b – Water

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<0.05	<0.1	<0.3	-

TB4 – Soil

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<8	<20	<40	1.2

TB5 – Soil

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<8	<20	<30	1.0

TB7 – Soil

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<9	<20	<40	1.8

Legend

▨	LFO Tank
	Stormwater Pipe
	Abandoned stormwater pipes
	Extent of excavations
	Location of concrete pad (pre excavation)
	LFO Pipe (removed)
□ ○	New pre cast sumps

Trench3-0.4 – Soil

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<7	<10	<30	0.4

Trench1-0.4 - Soil

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<8	<20	<40	0.4

Trench Spoil 2 – Soil

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
100	**4330**	**19300**	-

TB3 – Soil

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<9	160	560	1.75

TB2 – Soil

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<9	20	100	1.5

TB6 – Soil

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<8	50	290	0.5

TB1 – Soil

$C_7 - C_9$	$C_{10} - C_{14}$	$C_{15} - C_{36}$	D (m)
<9	<20	<40	1.5

SCALE: As Indicated on Plan

	INIT	DATE
DESIGNED	SS	09/06
DRAWN	SS	09/06
CHECKED	CD	09/06
APPROVED	AG	09/06

Sanitarium Health Foods Co.
Light Fuel Oil Investigation

FIGURE 3: Sanitarium Health Foods Co. – Sampling locations and analytical results

MWH

Status: Final

Date: September 2006

Job No.	Sheet No.	Rev.
Z1412200	01	A

Appendix B – Site Photos

Photo 1 – View of the Site

Photo 2 – View Looking North

Photo 3 –View Looking East

Photo 4 –View Looking South

Photo 5 – View Looking West

Photo 6 - Initial Contamination Identified by Sanitarium Staff

Photo 7 - Excavating the Pipeline Trench

Photo 8 - Free Product Flowing into Trench from Under Stormwater Pipe

Photo 9 - Removing the Old LFO Fill Line

Photo 10 - Pumping out the Free Flowing LFO and Impacted Groundwater

Photo 11 - Abandoned Stormwater Pipes Discovered in Southern end of Excavations

Photo 12 - Removed Section of Abandoned Stormwater Pipe

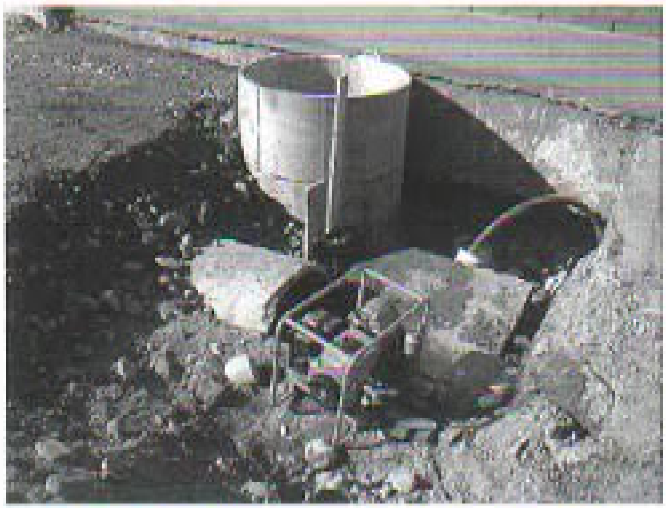


Photo 13 - New Sump to Block up Abandoned Pipes and Trap any Residual LFO from Migrating

Photo 14 - Removing the Old Brick Sump to be Replaced with a New Pre-Cast one

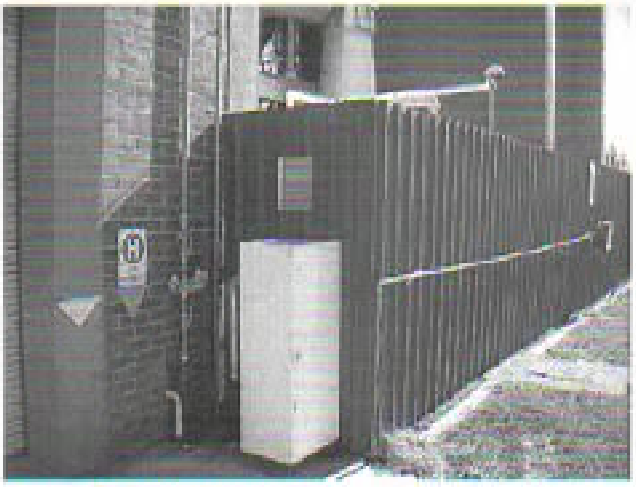


Photo 15 - New Above Ground LFO Fill Line with Control Box and Viewing Window

Photo 16 - Non-impacted Material from the Auger Investigation on the Eastern Side of the Site

Photo 17 - Blue Sheen Visible on Kruse Creek, Upstream of the Contaminated Soil

Photo 18 - Kruse Creek Immediately Downstream of Site to the East. No Sheen or Odour.

Photo 19 - Rainbow Sheen Visible Adjacent to Northlands Warehouse Store. Site of Initial Complaint.

Photo 20 - Brownish Black LFO Sheen on Ponded Trench Water

Appendix C - Laboratory Analysis Results

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- 7 AUG 2006
MWH NZ LTD

Client: MWH New Zealand Limited
Address: P O Box 13249,
CHRISTCHURCH
Contact: Alison Gill

Laboratory No: 426725
Date Registered: 29/07/2006
Date Completed: 1/08/2006
Page Number: 1 of 3

Client's Reference: Sanitarium Z1412200

The results for the analyses you requested are as follows:

Sample Type: Environmental Solids, Soil

Sample Name	Lab No	Dry Matter (g/100g as rcvd)
Trench 1-0.4 26/07/06	426725/1	89.7
Trench 3-0.4 26/07/06	426725/2	98.6
Trench Spoil 2 27/07/06	426725/3	74.7
TP4 -0.5 26/07/06	426725/4	84.3
TP4 -1.8 26/07/06	426725/5	76.1
TP5 -0.5 27/07/06	426725/6	85.4
TP5 -1.8 27/07/06	426725/7	82.6

Total Hydrocarbons by GC-FID [OIEWG carbon bands]

Sample Name	Trench 1-0.4 26/07/06	Trench 3-0.4 26/07/06	Trench Spoil 2 27/07/06	TP4 -0.5 26/07/06	TP4 -1.8 26/07/06
Lab No	426725/1	426725/2	426725/3	426725/4	426725/5
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
C7-C9	< 8	< 7	100	< 8	< 8
C10-C14	< 20	< 10	4330	< 20	< 20
C15-C36	< 40	< 30	14800	< 40	< 40
TOTAL	< 60	< 50	19300	< 60	< 60

Total Hydrocarbons by GC-FID [OIEWG carbon bands]

Sample Name	TP5 -0.5 27/07/06	TP5 -1.8 27/07/06
Lab No	426725/6	426725/7
Units	(mg/kg dry wt)	(mg/kg dry wt)
C7-C9	< 8	< 9
C10-C14	< 20	< 20
C15-C36	< 30	< 40
TOTAL	< 60	< 70

This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised.
The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked *, which are not accredited.

Sample Containers

The following table shows the sample containers that were associated with this job.

Container Description	Container Size (mL)	Number of Containers
Glass Jar (Soils)	300	7

Details of sample bottle preparation procedures are available upon request.

Summary of Methods Used and Detection Limits

The following table(s) gives a brief description of the methods used to conduct the analyses for this job.
The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Substance Type: Environmental Solids

Parameter	Method Used	Detection Limit
Dry Matter	Dried at 103°C, gravimetric (removes 3-5% more water than air drying at 35°C)	0.1 g/100g as rcvd
Total Hydrocarbons by GC-FID [OIEWG carbon bands]	ASE or Sonication Extraction, GC-FID Quantitation US EPA 8015B/NZ OIEWG	N/A

Analyst's Comments:

These samples were collected by yourselves and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the submitter.

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Terry Cooney MSc (Hons), PhD, MNZIC
Divisional Manager - Environmental

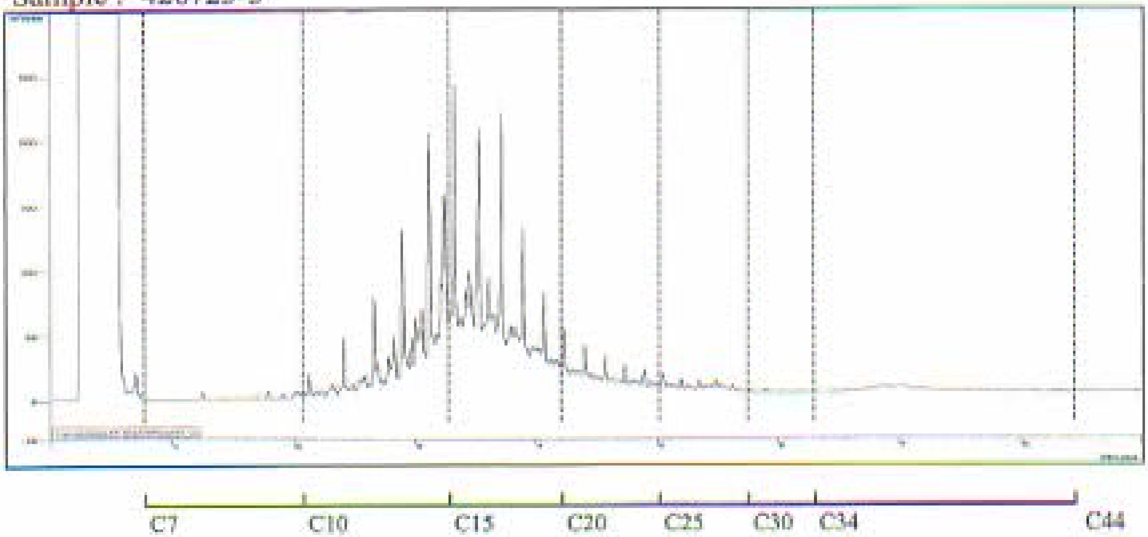
Peter Robinson MSc (Hons), PhD, FNZIC
Client Services Manager - Environmental Division

Hill Laboratories, Hamilton, NZ

Total Petroleum Hydrocarbon Chromatograms

Appendix

Sample : 426725-3



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Contact: Alison Gill

Laboratory No: 426475
Date Registered: 27/07/2006
Date Completed: 3/08/2006
Page Number: 1 of 2

Client's Reference: Z13227XX Sanitarium LFO Investigation

The results for the analyses you requested are as follows:

Sample Type: Environmental Solids, Soil

Sample Name	Lab No	Dry Matter (g/100g as rcvd)
TP1 0.5 25/7/06	426475/5	84.3
TP1 1.8 25/7/06	426475/6	79.1
TP2 0.5 25/7/06	426475/7	87.3
TP2 1.8 25/7/06	426475/8	81.1
TP3 0.5 25/7/06	426475/9	83.3
TP3 1.8 25/7/06	426475/10	77.5
TP2 X 25/7/06	426475/11	87.2

Total Hydrocarbons by GC-FID [OIEWG carbon bands]

Sample Name	TP1 0.5 25/7/06	TP1 1.8 25/7/06	TP2 0.5 25/7/06	TP2 1.8 25/7/06	TP3 0.5 25/7/06
Lab No	426475/5	426475/6	426475/7	426475/8	426475/9
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
C7-C9	< 8	< 8	< 7	< 8	< 8
C10-C14	< 20	< 20	< 10	< 20	< 20
C15-C36	< 40	< 40	< 30	< 40	< 30
TOTAL	< 60	< 60	< 60	< 60	< 60

Total Hydrocarbons by GC-FID [OIEWG carbon bands]

Sample Name	TP3 1.8 25/7/06	TP2 X 25/7/06
Lab No	426475/10	426475/11
Units	(mg/kg dry wt)	(mg/kg dry wt)
C7-C9	< 9	< 7
C10-C14	< 20	< 10
C15-C36	< 40	< 30
TOTAL	< 60	< 50

365

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The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked *, which are not accredited.

Sample Type: Water,

Total Hydrocarbons by GC-FID [OIEWG carbon bands]

Sample Name	**PW1a 25/7/06**	**PW1b 25/7/06**	**PW2a 25/7/06**	**PW2b 25/7/06**
Lab No	**426475/1**	**426475/2**	**426475/3**	**426475/4**
Units	(g.m-3)	(g.m-3)	(g.m-3)	(g.m-3)
C7-C9	< 0.03	< 0.03	< 0.05	< 0.05
C10-C14	< 0.05	< 0.05	< 0.1	< 0.1
C15-C36	< 0.1	< 0.1	< 0.3	< 0.3
TOTAL	< 0.2	< 0.2	< 0.4	< 0.4

Sample Containers

The following table shows the sample containers that were associated with this job.

Container Description	**Container Size (mL)**	**Number of Containers**
Glass for TPH (250 or 500 mL)	250	4
Glass Jar (Soils)	300	7

Details of sample bottle preparation procedures are available upon request.

Summary of Methods Used and Detection Limits

The following table(s) gives a brief description of the methods used to conduct the analyses for this job.
The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Substance Type: Environmental Solids

Parameter	**Method Used**	**Detection Limit**
Dry Matter	Dried at 103°C, gravimetric (removes 3-5% more water than air drying at 35°C)	0.1 g/100g as rcvd
Total Hydrocarbons by GC-FID [OIEWG carbon bands]	ASE or Sonication Extraction, GC-FID Quantitation US EPA 8015B/NZ OIEWG	N/A

Substance Type: Water

Parameter	**Method Used**	**Detection Limit**
Total Hydrocarbons by GC-FID [OIEWG carbon bands]	Solvent (hexane) extraction, GC-FID US EPA 8015B/NZ OIEWG	N/A

Analyst's Comments:

These samples were collected by yourselves and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the submitter.

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

Terry Cooney MSc (Hons), PhD, MNZIC
Divisional Manager - Environmental

Peter Robinson MSc (Hons), PhD, FNZIC
Client Services Manager - Environmental Division

Hill Laboratories

R J Hill Laboratories Limited

11 SEP 2006

Address:
1 Clyde Street,
Private Bag 3205,
Hamilton, New Zealand

Telephone:
+64 (7) 858-2000
Facsimile:
+64 (7) 858-2001

Email:
mail@hill-labs.co.nz
Internet:
www.hill-labs.co.nz

Client: MWH New Zealand Limited
Address: P O Box 13249,
CHRISTCHURCH
Contact: Alison Gill

Laboratory No: 430122
Date Registered: 31/08/2006
Date Completed: 5/09/2006
Page Number: 1 of 3

Client's Reference: Sanitarium Z1412200

The results for the analyses you requested are as follows:

Sample Type: Environmental Solids, Soil

Sample Name	Lab No	Dry Matter (g/100g as rcvd)
TB1 29/08/06	430122/1	75.4
TB2 29/08/06	430122/2	77.3
TB3 29/08/06	430122/3	77.6
TB4 29/08/06	430122/4	79.9
TB5 29/08/06	430122/5	81.9
TB6 29/08/06	430122/6	88.9
TB7 30/08/06	430122/7	76.0

Total Hydrocarbons by GC-FID [OIEWG carbon bands]

Sample Name	TB1 29/08/06	TB2 29/08/06	TB3 29/08/06	TB4 29/08/06	TB5 29/08/06
Lab No	430122/1	430122/2	430122/3	430122/4	430122/5
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
C7-C9	< 9	< 9	< 9	< 8	< 8
C10-C14	< 20	20	160	< 20	< 20
C15-C36	< 40	100	560	< 40	< 30
TOTAL	< 70	120	720	< 60	< 60

Total Hydrocarbons by GC-FID [OIEWG carbon bands]

Sample Name	TB6 29/08/06	TB7 30/08/06
Lab No	430122/6	430122/7
Units	(mg/kg dry wt)	(mg/kg dry wt)
C7-C9	< 8	< 9
C10-C14	50	< 20
C15-C36	290	< 40
TOTAL	340	< 70

Sample Containers

The following table shows the sample containers that were associated with this job.

Container Description	Container Size (mL)	Number of Containers
Glass Jar (Soils)	300	7

Details of sample bottle preparation procedures are available upon request.

of Methods Used and Detection Limits

The following table(s) gives a brief description of the methods used to conduct the analyses for this job.
The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Substance Type: Environmental Solids

Parameter	Method Used	Detection Limit
Dry Matter	Dried at 103°C, gravimetric (removes 3-5% more water than air drying at 35°C)	0.1 g/100g as rcvd
Total Hydrocarbons by GC-FID [OIEWG carbon bands]	ASE or Sonication Extraction, GC-FID Quantitation US EPA 8015B/NZ OIEWG	N/A

Analyst's Comments:

These samples were collected by yourselves and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the submitter.

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

Terry Cooney MSc (Hons), PhD, MNZIC
Divisional Manager - Environmental

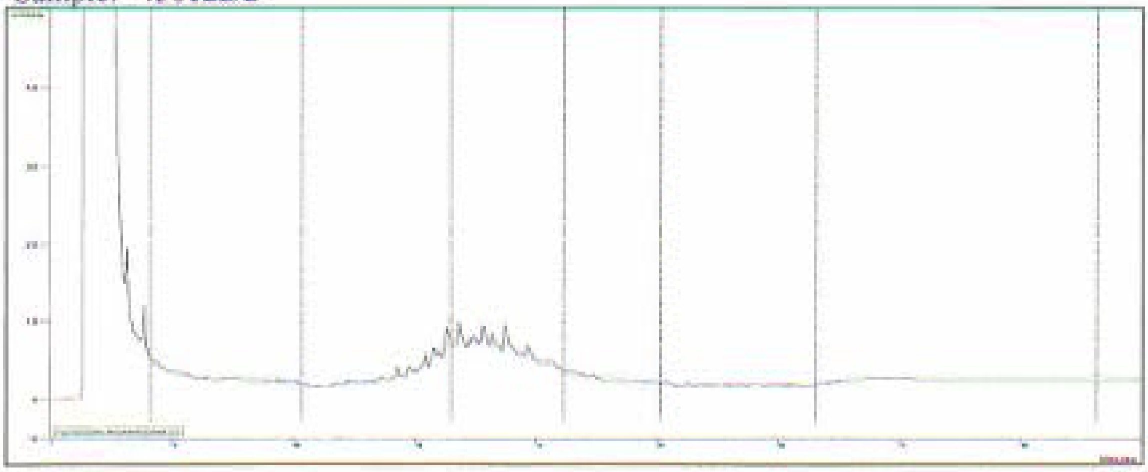
Peter Robinson MSc (Hons), PhD, FNZIC
Client Services Manager - Environmental Division

Hill Laboratories, Hamilton, NZ

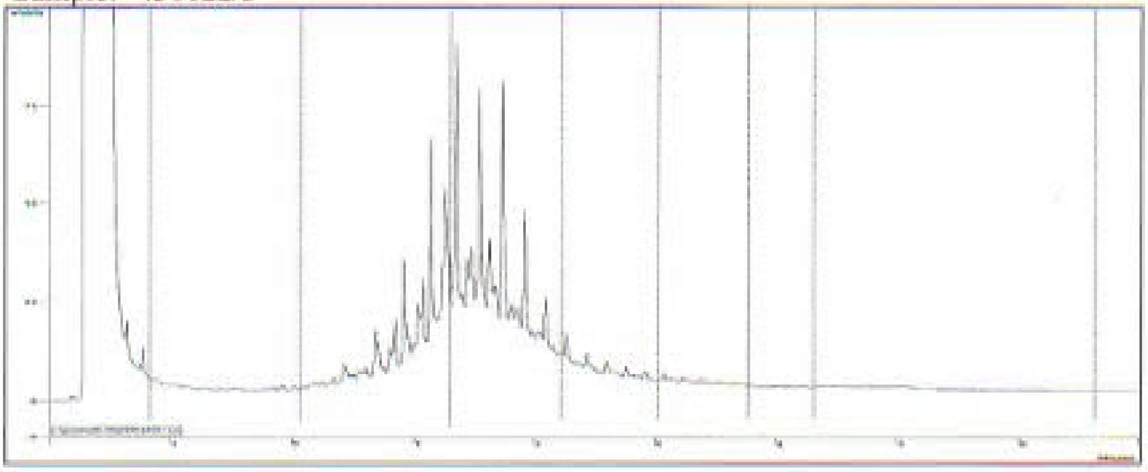
Total Petroleum Hydrocarbon Chromatograms

Appendix **Page A.1**

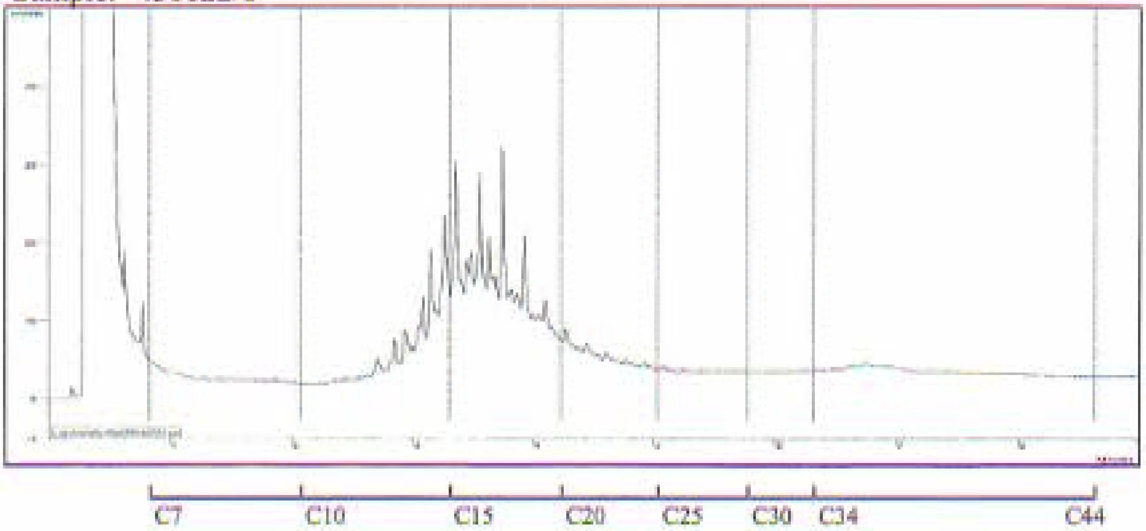
Sample: 430122/2



Sample: 430122/3



Sample: 430122/6



Appendix D - Sample Chain of Custody Forms

MWH

Quality Manual
Form 2.03.2

Chain of Custody Record

Page 1 of 1
Issue 9, December 2003
Issued by Jim Park
Status – final

426475

Project Name: Sanitarium LFO Investigation

Project Number: Z13227XX | Page 1 of 1

To:
Hill Laboratories
1 Clyde Street
Private Bag 3205
HAMILTON

From:
Tower 2, Deans Park, 7 Deans Avenue
P O Box 13 249
Christchurch, NZ
Tel: 64-3-366 7449
Fax: 64-3-366 7780

Sampled by: *Name* Simon Smith *Signature* pp
Name *Signature*

Sample No	*Container*	*Date*	*Time*	*Sample Location*	*Comments*
PW1a	Water	25/07/06		Potable well 1 first	Please analyse both soil and
PW1b	Water	25/07/06		Potable well 1 last	water for TPH
PW2a	Water	25/07/06		Potable well 2 first	
PW2b	Water	25/07/06		Potable well 2 last	Please analyse water samples
TP1 0.5	Soil	25/07/06		Auger Hole 1	URGENTLY if possible
TP1 1.8	Soil	25/07/06		Auger Hole 1	
TP2 0.5	Soil	25/07/06		Auger Hole 2	
TP2 1.8	Soil	25/07/06		Auger Hole 2	
TP3 0.5	Soil	25/07/06		Auger Hole 3	
TP3 1.8	Soil	25/07/06		Auger Hole 3	
TP2 X	Soil	25/07/06		Auger Hole 2	

Temperature On Arrival
5.2 °C
Temperature was measured on one or more arbitrarily chosen samples in this batch.

Relinquished by: Alison Gill
Signature:
Received by:
Signature:

Transfer Details
Carrier: Courierpost
Date: 26/07/06
Time: 4.00pm

Remarks:
Please send results to
alison.c.gill@mwhglobal.com

Note: Lab is to acknowledge receipt by return fax. Please hold samples pending analysis request.

MWH

Quality Manual
Form 2.03.2

Chain of Custody Record

Page 1 of 1
Issue 9, December 2003
Issued by Jim Park
Status – final

426725

Project Name: Sanitarium
Project Number: Z1412200

Page 1 of 1

To:
Hill Laboratories
1 Clyde Street
Private Bag 3205
HAMILTON

From:
Tower 2, Deans Park, 7 Deans Avenue
P O Box 13 249
Christchurch, NZ
Tel: 64-3-366 7449
Fax: 64-3-366 7780

Sampled by: *Name* Simon Smith *Signature*
Name *Signature*

Sample No.	*Container*	*Date*	*Time*	*Sample Location*	*Comments*
Trench1_0.4	JAR	26/07/06		Trench	Please analyse for TPH.
Trench3_0.4	JAR	26/07/06		Trench	Thanks.
Trench_Spoil2	JAR	27/07/06		Trench	
TP4_0.5	JAR	26/07/06		East of Factory	
TP4_1.8	JAR	26/07/06		″	
TP5_0.5	JAR	27/07/06		″	
T5_1.8	JAR	27/07/06		″	

Temperature On Arrival
10.4 °C
Temperature was measured on one or more arbitrarily chosen samples in this batch.

Relinquished by: Simon Smith
Signature:
Received by: T. Simpson
Signature:

Transfer Details
Carrier:
Date: 28/07/06
Time:

Remarks:
Please send results to alison.c.gill@mwhglobal.com

Note: Lab is to acknowledge receipt by return fax. Please hold samples pending analysis request.

MWH

Quality Manual
Form 2.03.2

Chain of Custody Record

Page 1 of 1
Issue 9, December 2003
Issued by Jim Park
Status – final

Project Name: Sanitarium - Ref: Quote 19985

Project Number: Z1412200

Page ____1__ of ____1_

To:
Hill Laboratories
1 Clyde Street
Private Bag 3205
HAMILTON

From:
Tower 2, Deans Park, 7 Deans Avenue
P O Box 13 249
Christchurch, NZ
Tel: 64-3-366 7449
Fax: 64-3-366 7780

Sampled by: *Name* Simon Smith *Signature*

Name *Signature*

Sample No	*Container*	*Date*	*Time*	*Sample Location*	*Comments*
TB1	Glass Jar	29/08/06		Pipe line excavation	Please analyse all samples for
TB2	Glass Jar	29/08/06		Pipe line excavation	TPH. Thankyou.
TB3	Glass Jar	29/08/06		Pipe line excavation	
TB4	Glass Jar	29/08/06		Pipe line excavation	
TB5	Glass Jar	29/08/06		Pipe line excavation	
TB6	Glass Jar	29/08/06		Pipe line excavation	
TB7	Glass Jar	30/08/06		Pipe line excavation	

Relinquished by: Simon Smith
Signature:
Received by:
Signature:

Transfer Details
Carrier: Courierpost
Date: 30/08/06
Time:

Remarks:
Please send results to alison.c.gill@mwhglobal.com

Note: Lab is to acknowledge receipt by return fax. Please hold samples pending analysis request.

Appendix I

Sanitarium Hazardous Substances Register

Appendix J

HSNO Certificates

29.05.2014

11139.000.000/001/01

THE HEALTH FOOD COMPANY

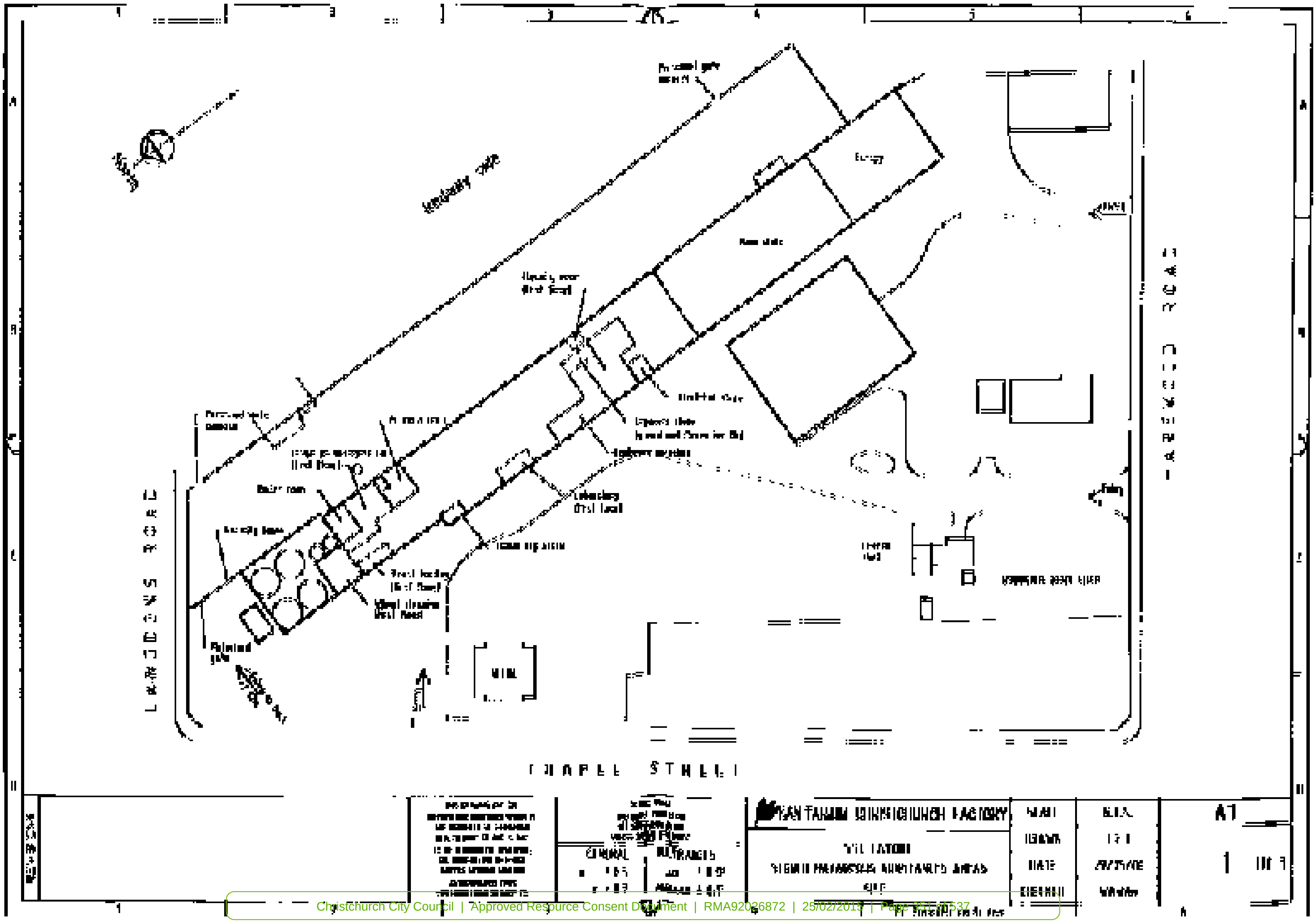
Sanitarium

56 – 64 Harewood Road, Papanui, Christchurch 5

DETAILS OF HAZARDOUS SUBSTANCES STORED OR USED ON SITE

(during full Production capacity)

Name of Substance	Maximum quantity stored on site (ie in total)	Area of storage
Antifoam – White Paraffin Oil	205 kgs	Wheat Cleaning
Ban 480L (Amylase)	75 litres	Store / Yeast Spreads Evaporator Room
Calcium Chloride	1600 kgs	Main Store
Calcium Hydroxide	500 kgs	Main Store
Caustic Soda	1 tonne	Yeast Loading
Contact Cleaner	6 – 10 cans (400mls)	Electrical Store
[illegible] 5	40 litres	Boiler Room
[illegible] DP 851	60 litres	Boiler Room
[illegible]	40 litres	Boiler Room
[illegible]	40 litres	Boiler Room
Hydrochloric Acid	125 litres	Boiler Room / Wheat Cleaning
[illegible] 23	40 litres	Cleaning Room
Image Coder Additive 5[illegible]	48 bottles	Safe/Dry Store
Image Coder Cleaner 5100-5	12 bottles	Safe/Dry Store
Image Coder Ink [illegible]	12 bottles	Safe/Dry Store
Image Crayon Cleaner	24 bottles	Safe/Dry Store
Image Flush	24 bottles	Safe/Dry Store
Lectra Clean	6 – 10 cans (400mls)	Electrical Store
Marker Cleaner	24 bottles	Safe/Dry Store
Marker Ink	24 bottles	Safe/Dry Store
Methanol	25 litres	Laboratory
Metabisulfite	100 kgs	Dry Store
Organophosphorus Insecticides	2 litres (liquid) – 2kg (powder)	Garden shed (locked cabinet)
PAINT Black Oxide	40 litres	Dangerous Goods Store
PAINT Light Grey	100 litres	Dangerous Goods Store
PAINT Red Oxide	40 litres	Dangerous Goods Store
PAINT Thinners	60 litres	Dangerous Goods Store
Paint - Acrylic	40 litres	Dangerous Goods Store
Paint - Enamel	100 litres	Dangerous Goods Store
Papain	30 litres	Store / Fridge YS Analysis Room
[illegible]	40 litres	Cleaning Room
Phosphoric Acid	700 kgs	Main Store
[illegible]	4 litres	Engineering Workshop / Store
Potassium Chloride	25,000 kgs	Store / Yeast Loading
[illegible]	6 litres	Garden Shed (locked cabinet)
Protease	50 litres	Store / Fridge YS Dryer Room
[illegible]	1 Gal	Engineering Workshop / Store
Riboflavin	25 kgs	Dry Store
Riboflavin Vitamin Mix	35 kgs	Dry Store
Rigid PVC Jointing Cement	2 litres	Engineering Workshop / Store
Silicone Grease	1 litres	Engineering Workshop / Store
Sulfuric Acid	5 litres	Boiler Room / Laboratory
Sunflower oil	27,000 kgs	Store / Canopy
Thiamin Hydrochloride	25 kgs	Dry Store
Yeast Dried	64,000 kgs	Store
Yeast Roller Dried US	20,000 kgs	Store
Yellow Phosphate Reagent	1 litre	Boiler Room


CHAPEL STREET
Laboratory
first level
SANITARIUM CHRISTCHURCH FACTORY
SITE LAYOUT
SCALE
DRAWN
DATE
CHECKED
A1

[redacted]

Email: [illegible]
PO Box [illegible]
[illegible], Christchurch
Phone 027 [illegible]

Approved Handler Test Certificate

Issued pursuant to Section 82 of the
Hazardous Substances and New Organisms Act 1996

Handler: Jason Paul James

Certificate No: 200034-3247

Residential Contact Details:
115 [illegible] Street
Kaiapoi

03 327 5773

Work Contact Details:
Sanitarium Health Food Company
54-56 Harewood Road
Christchurch
03 352 9724

This certificate is issued in accordance with Regulation 4 & 5 of the Hazardous Substances and New Organisms (Personnel Qualifications) Regulations 2001. This certifies that the handler has met the relevant qualification requirements for the substances and lifecycles specified below:

Substance:	***Lifecycle:***
Class 2.1.1A Flammable Gases: LPG, Acetylene	Storage, Use
Class 3.1A, B & C Flammable liquids: Paint, Thinners, Solvents	Storage, Use
Class 6.1B, 6.3A, 6.7A, 8.2B, 8.3A, 9.1D Toxic substances: PPS Stainless Steel Pickling Paste	Storage, Use
Class 6.1B, 6.3A, 6.7A, 8.2B, 8.3A, 9.1D; 9.3A Toxic substances: Hydrofluoric Acid < 10%	Storage, Use

Conditions:

- Unless surrendered or revoked beforehand this certificate shall remain in force until the expiry date stated or until such time it may be renewed by an authorised Test Certifier.
- Limited to Sanitarium Health Food Company operations.
- This certificate must be produced at the request of an Enforcement Officer appointed under the HSNO Act 1996.

Trevor McQuaid
Test Certifier Registration No: 200034

Date Issued: 29 May 2009
Expiry Date: 29 May 2014

Certificate No: [illegible]

TEST CERTIFICATE

Stationary Container System

Issued pursuant to Section 82 of the Hazardous Substances and New Organisms Act 1996

This certificate is issued to: Sanitarium Health Food Co Limited

Expiry Date:
15 March 2014

Contact details:
PO Box 5011

Christchurch

Telephone (03) [illegible]

Street address:
64 Harewood Road
Christchurch

This certificate is issued in accordance with Clause 92 of the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004

This Certificate is issued in accordance with Clause 18 of the Site and Storage Conditions for Class 3.1 Flammable Liquids

This certifies that the relevant requirements have been met for the substances and stationary container systems specified below at the maximum capacity identified

---

Location: Boiler Room

Tank ID:	**Substance:**	**Quantity:**	**Type:**	**Design Standard:**	**Manufactured:**
[illegible]	Diesel	15,450	A/g	SWTU 05 03	11/2000

Ancillary ID:	**Substance:**	**Ancillary Equipment:**
[illegible]	Diesel	Burner

Conditions:

1. The substances specified above must be under the control of an approved handler where the relevant threshold quantities specified in the Hazardous Substances (Classes 1 to 5 Controls) Regulations 2001 are exceeded.
2. Unless surrendered or revoked beforehand, this certificate shall remain in force until 15 March 2014 and may be renewed thereafter by an authorised Test Certifier.
3. This certificate must be produced at the request of an Enforcement Officer appointed under HSNO Act 1996.
4. Special Conditions: None.

Lyn [illegible]
Test Certifier Registration No. [illegible]

Issued: 10 March 2011

TRIM: [illegible]

Christchurch City Council

Certificate No: [illegible]

TEST CERTIFICATE

Hazardous Substances Location

Issued pursuant to Section 82 of the Hazardous Substances and New Organisms Act 1996

This certificate is issued to:
Australasian Conference Association – Sanitarium Health Food Company Limited

Expiry Date:
18 February 2015

Contact details:
PO Box [illegible]
Christchurch

Street address:
54 Harewood Road
Christchurch

Telephone: (03) 352 9104

This certificate is issued in accordance with Regulation 81 of the Hazardous Substances (Classes 1 to 6 Controls) Regulations 2001

This Certificate is issued in accordance with Clause 28 of the Site and Storage Conditions for Compressed Gases

This certifies that the relevant requirements have been met for the locations and substances specified below.

Location: Cylinder cage **Substance:** LPG **Quantity:** 300 kg

Conditions:

1 The substances specified above must be under the control of an approved handler where the relevant threshold quantities specified in the Hazardous Substances (Classes 1 to 6 Controls) Regulations 2001 are exceeded.

2 Unless surrendered or revoked beforehand, this certificate shall remain in force until 18 February 2015 and may be renewed thereafter by a Test Certifier who is approved by ERMA New Zealand to issue Hazardous Substances Location Certificates.

3 This certificate must be produced at the request of an Enforcement Officer appointed under HSNO Act 1996

4 Special Conditions: None

[illegible]
Test Certifier Registration No: [illegible]

Issued: 14 February 2012

TRIM [illegible]

Approved Handler

TEST CERTIFICATE

[illegible]

This is to certify that

WARREN ASHBY

of 10 Emerson Crescent, Church Bay, RD1 Lyttelton, Christchurch (03) 329 4054 employed by Sanitarium Health Food Company, 54 – 84 Harewood Road, Papanui, Christchurch (03) 352 8104 has satisfied the requirements as an Approved Handler of hazardous substances over the lifecycle stages and for the classes and substances set out below:

Substances/Classes	***Substance Name***	***Lifecycle***
Class 2.1.1A Flammable Gases	LPG	Store & Use
Class 2.1.1A Flammable Gases	Acetylene	Store & Use
Class 3.1A Flammable Liquid	Petrol	Store & Use
Class 3.1B Flammable Liquid	Ethanol	Store & Use
Class 3.1B Flammable Liquid	Acetone	Store & Use
Class 3.1B Flammable Liquid	Methyl Butyl Ketone	Store & Use
Class 6.1B Acutely Toxic	Chromic Acid	Store & Use

Conditions and Endorsements

1. Unless surrendered or revoked beforehand, this certificate shall remain in force until the 20/06/2011. Thereafter a test certificate issued in accordance with Regulation 5 by an authorised test certifier is required.
2. This certificate must be produced on request of an enforcement officer appointed under the HSNO Act 1996.
3. This certificate is issued in accordance with Regulation 5 of the Hazardous Substances and New Organisms (Personnel Qualifications) Regulations 2001.

Test Certificate No. [illegible]

S - Moses

Simone Moses
Test Certifier Registration No: TC000119

Issued 20 June 2006
Expiry Date 20 June 20[illegible]

impac solutions

Impac Solutions Limited
PO Box 8[illegible]7
Grafton
Auckland

Appendix K

Sanitarium Transformer Maintenance Documents

29.05.2014
11139.000.000/001/01

Yearly Maintenance

for the

High Voltage Equipment

at

Sanitarium

(MAR 2014)

SUBSTATION BUILDING

Site ID: Sanitarium	**Equipment Location**	West side of Sanitarium building
Sanitarium Sub	**Equipment Description:**	*Substation Building*

		0	1	2	3	Notes
1. Building Inspection						
Water seepage		✓				
Roof		✓				
Walls		✓				
Door		✓				
Floor		✓				
Vermin Infestation		✓				
Lighting		✓				
Heating		✓				
Ventilation		✓				
Security		✓				
Access		✓				
2. General Equipment						
Fire Extinguishers		✓				
Equipment cleanliness		✓				
Building cleanliness		✓				
Spares		✓				

0 = Acceptable 1 = Maintenance Required 2 = URGENT Maintenance Required 3 = N/A

Inspected By: C.A	**Inspection Date:** 17/03/14	**Initial**		**Periodic**	✓

NOTES:

In new tin shelter – No need for induction as Jason James (021 999 058) will accompany site visit

TRANSFORMER - OIL INSULATED

Site ID: Sanitarium	**Equipment Location**	Sanitarium Sub KEY NUMBER 12
Equipment ID: T1	**Equipment Description:**	*Transformer*

Name Plate Details	
Manufacturer	Tyree Power Construction
Serial Number	17920
Rating (kVA)	1000
Type	ONAN (Orion Transformer Category Code: BCSCC)
Vector Group	DY 11
Quantity of Oil	1250 litres
Tap Ratios	
1	11275
2	11000
3	10725
4	10450
5	10175
6	N/A
Set On	Tap 2
Impedance (%)	5.18
Year of Manufacture	1978

	4mth	**4yrly**		**0**	**1**	**2**	**3**	**Notes**
Checks								
Rust				✓				
Oil Leaks				✓				
Oil Level				✓				
Temperature			37°C at time of visit	✓				
Breather				✓				
Earth Connections				✓				
Tests								
Earth Resistance								
Oil								
Dielectric Strength								
Moisture Content								
Acidity								

0 = Acceptable 1 = Maintenance Required 2 = URGENT Maintenance Required 3 = N/A

Inspected By: C.A.	**Inspection Date:** 17/03/14	**Initial**		**Periodic**	✓

NOTES:

A) Minor weep around the tap changer and drain valve. Will monitor next round.

connetics

High Voltage Installation Test Report

for the

Four Yearly Examination and Preventative Maintenance

of

High Voltage Equipment

at

Sanitarium

SUBSTATION BUILDING

Site ID: Sanitarium	**Equipment Location:**	**West side of Sanitarium building**
Sanitarium Sub	**Equipment Description:**	***Substation Building***

		0	1	2	3	Notes
1. Building Inspection						A
Water seepage		✓				
Roof		✓				
Walls		✓				
Door		✓				
Floor		✓				
Vermin Infestation		✓				
Lighting		✓				
Heating					✓	
Ventilation		✓				
Security		✓				
Access		✓				
2. General Equipment						
Fire Extinguishers		✓				
Equipment cleanliness		✓				
Building cleanliness		✓				
Spares					✓	

0 = Acceptable 1 = Maintenance Required 2 = URGENT Maintenance Required 3 = N/A

Inspected By: D.H.	**Inspection Date: 02/09/2012**	**Initial**		**Periodic**	

NOTES:

A) On-going construction works around building.

TRANSFORMER - OIL INSULATED

Site ID: Sanitarium	**Equipment Location:**	**Sanitarium Sub**	
Equipment ID: T1	**Equipment Description:**	***Transformer***	

Name Plate Details	
Manufacturer	**Tyree power construction**
Serial Number	**17920**
Rating (kVA)	**1000**
Type	**ONAN**
Vector Group	**DY11**
Quantity of Oil	**1250 litres**
Tap Ratios	
1	**11275**
2	**11000**
3	**10725**
4	**10450**
5	**10175**
6	**NA**
Set On	**Tap 2**
Impedance (%)	**5.18**
Yr of Manufacture	**1978**

	4mth	**4yrly**		**0**	**1**	**2**	**3**	**Notes**
Checks								
Rust	▨	▨		✓				
Oil Leaks	▨	▨		✓				
Oil Level	▨	▨		✓				A
Temperature	▨	▨	13°C at time of visit	✓				
Breather	▨	▨		✓				
Earth Connections	▨	▨		✓				
Tests		▨						
Earth Resistance		▨		✓				
Oil		▨		✓				1
Dielectric		▨		✓				1
Moisture		▨		✓				1
Acidity		▨		✓				1

0 = Acceptable 1 = Maintenance Required 2 = URGENT Maintenance Required 3 = N/A

Inspected By: D.H.	**Inspection Date: 03/09/2012**	**Initial**		**Periodic**	

NOTES:

A) Unable to sight oil in conservator tank. Added 20 litres of oil.

Earth Test Record

Site No: ____________

Address: Sanitorium

Plant Type: Sub Station

Date: 07/09/12

Instrument Information:

Make: Megger

Model: DET4TD

Calibration date: 20/04/12

Serial No: 070307/1968

Consumer Type: Domestic / Commercial / [✓ Industrial] / Irrigation / Farm

Resistance Readings:

Earth Electrode Type		**Measured Resistance (Ω)**
Site Earth	Electrode 1	23.0 Ω
	Electrode 2	22.1 Ω
Overall Earth *(Site earths plus MENs, LV neutrals, etc.)*		0.31 Ω

Touch and Step Voltages:

(Touch and step voltages are measured on the overall earthing system)

Max. Touch Resistance = ____ (Ω) x Earth Fault Current = ____ V (Loaded Touch Voltage)

Max. Step Resistance = ____ (Ω) x Earth Fault Current = ____ V (Loaded Step Voltage)

Comments: *(Give a brief description of location and earth site. Also, give reasons for exceeding 10 ohms for MEN system)*

Diagram: *(Draw a neat detailed diagram of the earth site, including dimensions, electrodes and cable sizes, type, etc.)*

Name of Contractor: Connetics

PLEASE RETURN TO ORION ON COMPLETION

CN55.04.46
Date: 03/06/2008
Report No.:______

connetics

CABLE TEST REPORT

CUSTOMER: Sanitarium **REF No.** 3033

LOCATION: Off Chapel St **SITE No.** ______

From - Chapel St Unit 24 To - Sanitorium Tx

From - ______ To - ______

From - ______ To - ______

From - ______ To - ______

From - ______ To - ______

CABLE TYPE:
PILC ☑
XLPE ☑
OIL / GAS FILLED ☐

OPERATING VOLTAGE 11 kV

TEST PROCEDURE:

In accordance with Orion specification – NW72.23.24

TEST RESULTS:

CONNECTION	LEAKAGE CURRENT	MΩ	TEST VOLTAGE
R – YB – E			
B – RY – E			
R – E			
Y – E			
B – E			
RYB – E	935nA		2.5Kv Dc
Screen – E			

NOTES:

Tx still connected.

TESTED BY: S Duggan **DATE:** 07/09/12

CHECKED BY: C Richardson **DATE:** 10-9-12

connetics

EARTH SITE TEST RECORD

Site No: T.B.A Date: 05-09-12
Plant type: Building Site B

Address: Sanitarium Weet-Bix
Harewood Rd 54-64
Papanui.

RESISTANCE READINGS:

Site Earth: 5 ohms
(Combined Resistance of All Electrodes)

MEN: ______ ohms
(Site Earth plus HV sheath plus Neutral connected together)

TVR: ______ ohms
(Touch Voltage Resistance of Site Earths)

SVR: ______ ohms
(Step Voltage Resistance of Site Earths)

40 mm diameter Solid Steel Rods

Rods	1	2	3
2.7 m			
5.4 m			
8.1 m			
10.8 m			
13.5 m			
16.2 m			

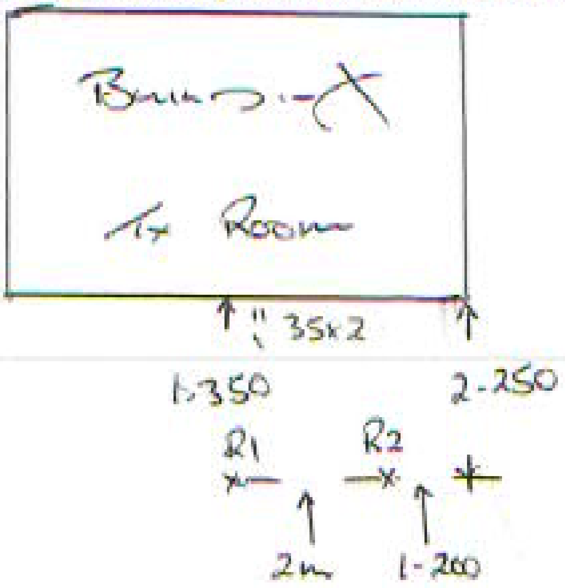
14 mm diameter Copper Clad Rods

Rods	1	2	3
1.8 m	5	5	
3.6 m			
5.4 m			
7.2 m			
9.0 m			
10.8 m			

Consumer Type: (please tick) Domestic ☐ Commercial ☐ Industrial ☑ Irrigation ☐ Farm ☐

Comments: (*Give brief description of location and earth site*) Tx Room

Diagram: (*Please show a neatly detailed diagram (including dimensions, electrodes and cable sizes, type etc) of the above Earth Site*)



Tested by:

Design Printing Services—7600

CUSTOMER COPY – WHITE CO-ORDINATOR COPY – BLUE BOOK COPY – YELLOW

connetics

EARTH SITE TEST RECORD

Site No: T.B.A Date: 05-09-12

Plant type: Meter Room

Address: Sanitarium Weet Bix
Harewood Rd 54 - 64
Papanui

RESISTANCE READINGS:

Site Earth: 3.52 ohms
(Combined Resistance of All Electrodes)

MEN: ______ ohms
(Site Earth plus HV sheath plus Neutral connected together)

TVR: ______ ohms
(Touch Voltage Resistance of Site Earths)

SVR: ______ ohms
(Step Voltage Resistance of Site Earths)

40 mm diameter Solid Steel Rods

Rods	1	2	3
2.7 m			
5.4 m			
8.1 m			
10.8 m			
13.5 m			
16.2 m			

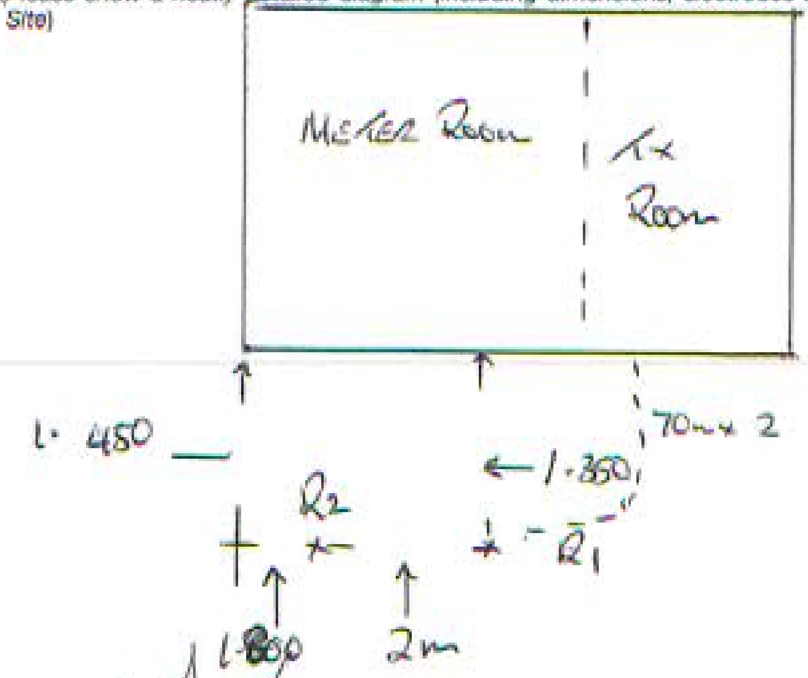
14 mm diameter Copper Clad Rods

Rods	1	2	3
1.8 m	5	12	
3.6 m			
5.4 m			
7.2 m			
9.0 m			
10.8 m			

Consumer Type: *(please tick)* Domestic ☐ Commercial ☐ Industrial ☑ Irrigation ☐ Farm ☐

Comments: *(Give brief description of location and earth site)* Meter Room

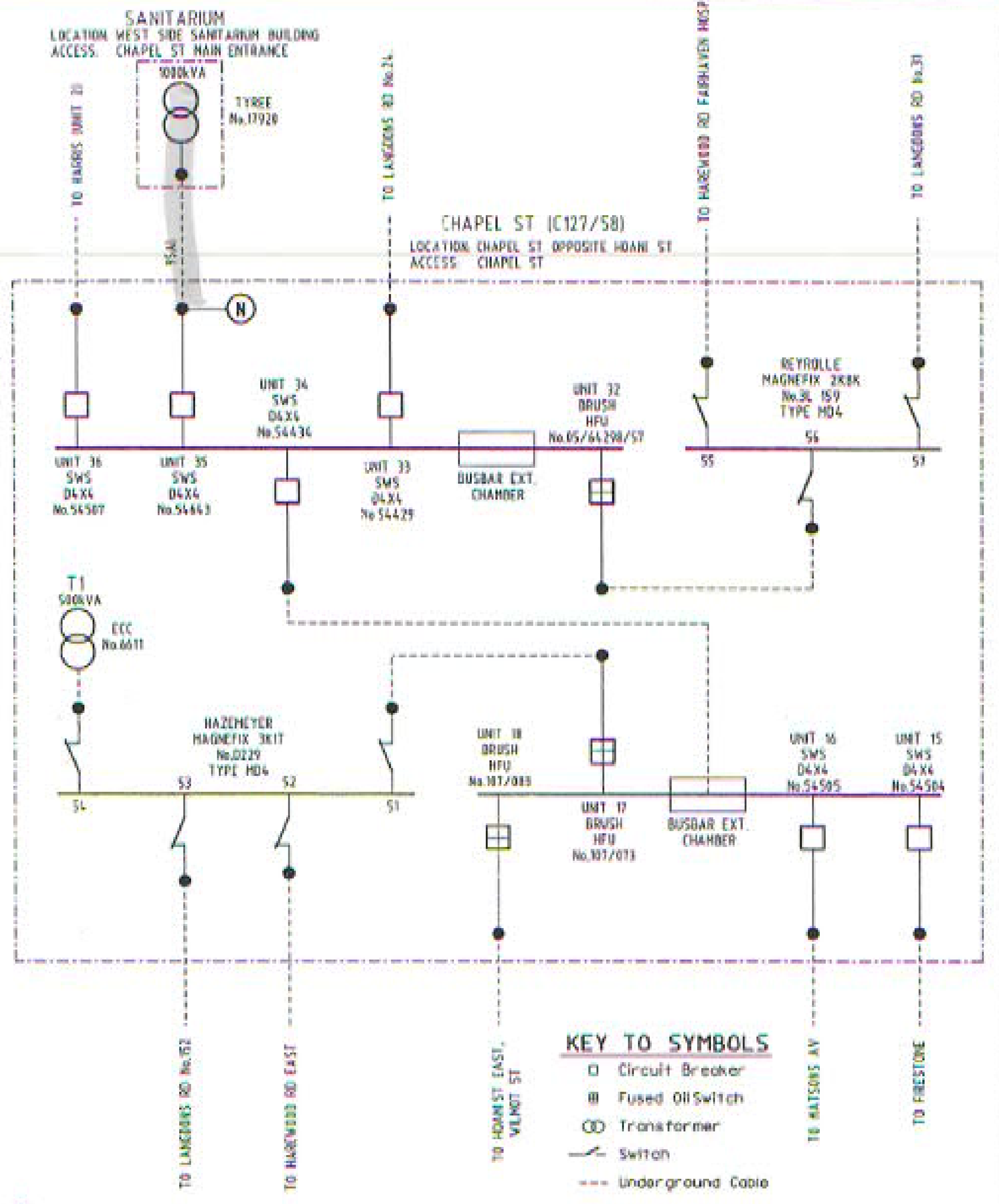
Diagram: *(Please show a neatly detailed diagram (including dimensions, electrodes and cable sizes, type etc) of the above Earth Site)*



Tested by:

CUSTOMER COPY - WHITE CO-ORDINATOR COPY - BLUE BOOK COPY - YELLOW

Design Printing Services—7655



Ⓝ NETWORK CONNECTION POINT
(Defines the point where ownership changes)

CONTACT: PH. 352-9186 (W. ASHBY)

FILE 11/4/115

SCALE :

DATE PLOTTED :

PRINT DIST	ISS	DATE	AMENDMENTS	DRN	APD
	A	2.10.91	ORIGINAL ISSUE		
	B	30.11.92	NETWORK CONNECTION POINT ADDED.	W.D.	
	C	15.5.96	NETWORK CONNECTION POINT CHANGED	W.D.	
	D	23.09.99	UNIT 33 ALTERATION	FBA	

ORIGIN	J. C.
DRAWN	R. D.
D.O. CKD.	J. L.
ENG. CKD.	
APD.	

Orion
P.O. BOX 13896 CHRISTCHURCH

SANITARIUM HEALTH FOOD CO.
HAREWOOD RD
SINGLE LINE DIAGRAM

A4 11622

SHEET 1/1

Transformer Condition Assessment TCA ™

Mahanga Holdings Ltd

Unit B, 24 William Pickering Drive
Albany Auckland

Location: Sanitarium Sub
Bank & Phase: TX 1
Serial Number: 17920
Manufacturer: Tyree
Date Mfgd: 1978
Voltage Ratio (kV): 11/0.415
Rating (MVA): 1

Date: 18/09/12
Report Number: **6080030**
Order Number:
Fluid volume: 1250 L
Fluid type: Mineral Oil
Breathing:
Cooling: ONAN
Core & coil wt: 1880

		Sample Receipt Date:	11/09/12
		Sample Date:	03/09/12
		Laboratory No.:	6080030
		Container No.	
		Temperature:	13
ASTM D3612-PartA			
H2	Hydrogen	(ppm):	
CH4	Methane	(ppm):	
C2H6	Ethane	(ppm):	
C2H4	Ethylene	(ppm):	
C2H2	Acetylene	(ppm):	
CO	Carbon monoxide	(ppm):	
CO2	Carbon dioxide	(ppm):	
N2	Nitrogen	(ppm):	
O2	Oxygen	(ppm):	
		Total (ppm):	
		TDCG (ppm):	
		SHL (%):	
		ETCG (% in blanket):	
Particles(Counts/100mL)		5 to 15 um:	
Particles(Counts/100mL)		15 to 25 um:	
Particles(Counts/100mL)		25 to 50 um:	
Particles(Counts/100mL)		50 to 100 um:	
Particles(Counts/100mL)		>100 um:	
D1533	Moisture	(ppm):	**9**
IEC 156	Dielectric BV	(kV):	**77**
D974	Acid Number	(mg KOH/g):	**0.07**
D971	Interfacial Tension	(mN/m):	
D1500	Color Number	:	
IEC 247	Dielectric Dissipation Factor	(% at 25C):	
D2668	Oxidation Inhibitor	(%w/w):	
5 HMF	5 hydroxymethyl-2-furaldehyde	(ppm):	
2 FAL	2 furaldehyde	(ppm):	
2 ACF	2-acetylfuran	(ppm):	
5 MEF	5 methyl-2-furaldehyde	(ppm):	
2 FOL	2 furfurol	(ppm):	
	Estimated Ave. Degree of Polymerization	:	
TCA Assessment			1

Transformer Condition Assessment Diagnostic Evaluation

TCA Assessment: 1
Sampling Interval: Retest in one year. Establish trends.
Operating Procedure:
Comments:
Field Comments: Fluid condition is within acceptable in-service parameters.

Authorised by: Frank Catela

TJ|H2b Analytical Services Pty Ltd, Wilson Road, PO Box 5, Glen Waverley, VIC 3150
Samples have been analysed as received

Ph: (613) 9574 9467
Fax: (613) 9574 7079

Appendix L

Sanitarium Environmental Incident Reports

Confidential

ENVIRONMENTAL INCIDENT REPORT

All major environmental incidents are to be recorded, using this form, to Corporate Technical the day the incident occurs. Please ensure that the form is signed and dated by the Site Manufacturing Manager.

TO: DAVID DREW
(Corporate Technical)

FAX: 09 [illegible] 4345 7788

FROM: WARREN BAILEY (Site Environmental Co-ord)

SITE/BRANCH: CHRISTCHURCH

DATE OF INCIDENT: 3 / 6 / [illegible] TIME OF INCIDENT: [illegible] am / pm

NATURE OF INCIDENT: (tick one) Actual Event ☑ Near Miss ☐

INVOLVING: (tick one) Water ☐ Air ☐ Dust ☐

Noise ☐ Soil ☐ Odour ☐

Other (specify) Spill to asphalt

DETAILS OF INCIDENT Stone [illegible] hydraulic hose splits and hydraulic oil is spilt onto the concrete floor and asphalt seal.
* See Guidance Notes

ACTION TAKEN: Site staff contain and clean up spill using equipment from site spill kit – No contamination of storm water system.

Signed: [illegible] Bailey
(Site Manufacturing Manager) for S [illegible]

Date: 3 / 6 / [illegible]

Environmental Incident Reporting: Guidance Notes

1. If you are in any doubt as to whether something should be reported please telephone Corporate Technical for assistance on 03 4343 7777
2. Generally speaking, all spills (whether bulk or solid) should be reported. Likewise all atmospheric emissions (windborne excessive noise, dust, gas or odours) should be reported.
3. When completing the section "DETAILS OF INCIDENT" it is only necessary to describe the facts. It is not necessary or helpful for you to speculate about the possible causes of the incident – this is a matter for further investigation as required.

Supply Chain Standard
Environmental Incident Report

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Confidential
ENVIRONMENTAL INCIDENT REPORT

All major environmental incidents are to be reported using this form to Corporate Technical the day the incident occurs. Please ensure that the form is signed and dated by the Site Manufacturing Manager.

TO: David Drew
(Corporate Technical)

FAX: 00612 43492755

FROM: Warren Ashby (Site Environmental Officer)

SITE/BRANCH: Christchurch

DATE OF INCIDENT: 15 / 09 / 10 **TIME OF INCIDENT:** 4.06 am/pm

NATURE OF INCIDENT: (tick one) Actual Event ☑ Near Miss ☐

INVOLVING: (tick one) Water ☐ Air ☐ Dust ☐
Noise ☐ Soil ☐ Odour ☐
Other (specify) Spill on Concrete

DETAILS OF INCIDENT: Delivery tanker driver over fills the Boiler Light Fuel Oil (L.F.O.) tank and a quantity of oil runs onto concrete pad.
*See Guidance Notes

ACTION TAKEN: Oil company contractors contain spill and clean up without any contamination of soil or storm water system.

Signed: for G Davis
(Site Manufacturing Manager)

Date 16 . 9 . 10

Environmental Incident Reporting: Guidance Notes

1. If you are in any doubt as to whether something should be reported, please telephone Corporate Technical for assistance on 02 4349 [illegible]
2. Generally speaking, all spills (whether liquid or solid) should be reported. Likewise all atmospheric emissions (evidence of excessive noise, dust, gas or odour) should be reported.
3. When completing the section "DETAILS OF INCIDENT" it is only necessary to describe the facts. It is not necessary or helpful for you to speculate about the possible causes of the incident – this is a matter for further investigation, as required.

Supply Chain Standard

Environmental Management Standard

27

[illegible]

Confidential

ENVIRONMENTAL INCIDENT REPORT

All major environmental incidents are to be reported, using this form, to Corporate Technical the day the incident occurs. Please ensure that the form is signed and dated by the Site Manufacturing Manager.

TO: GREG SAMBELL
(Corporate Technical)

FAX: 00612 43437789

FROM: WARREN BENBY (ENG MANAGER)

SITE/BRANCH: CHRISTCHURCH FACTORY

DATE OF INCIDENT: 12 . 07 . 06 TIME OF INCIDENT: ...... am / pm

NATURE OF INCIDENT: (tick one) Actual Event ☑ Near Miss ☐

INVOLVING: (tick one) Water ☑ Air ☐ Dust ☐
Noise ☐ Soil ☑ Odour ☐
Other (specify):

DETAILS OF INCIDENT: Discovery of LFO leakage into soil from buried delivery line (partly under building). Traces of contamination in nearby storm water drain.
* See Guidance Notes

ACTION TAKEN: Temporary interceptors installed. Environment Canterbury notified. Oil company consultants engaged. Site safety underway. Ground water sampled for testing.

Signed: W. Benby for G. Davis
(Site Manufacturing Manager)

Date: 24 . 07 . 2006

Environmental Incident Reporting: Guidance Notes

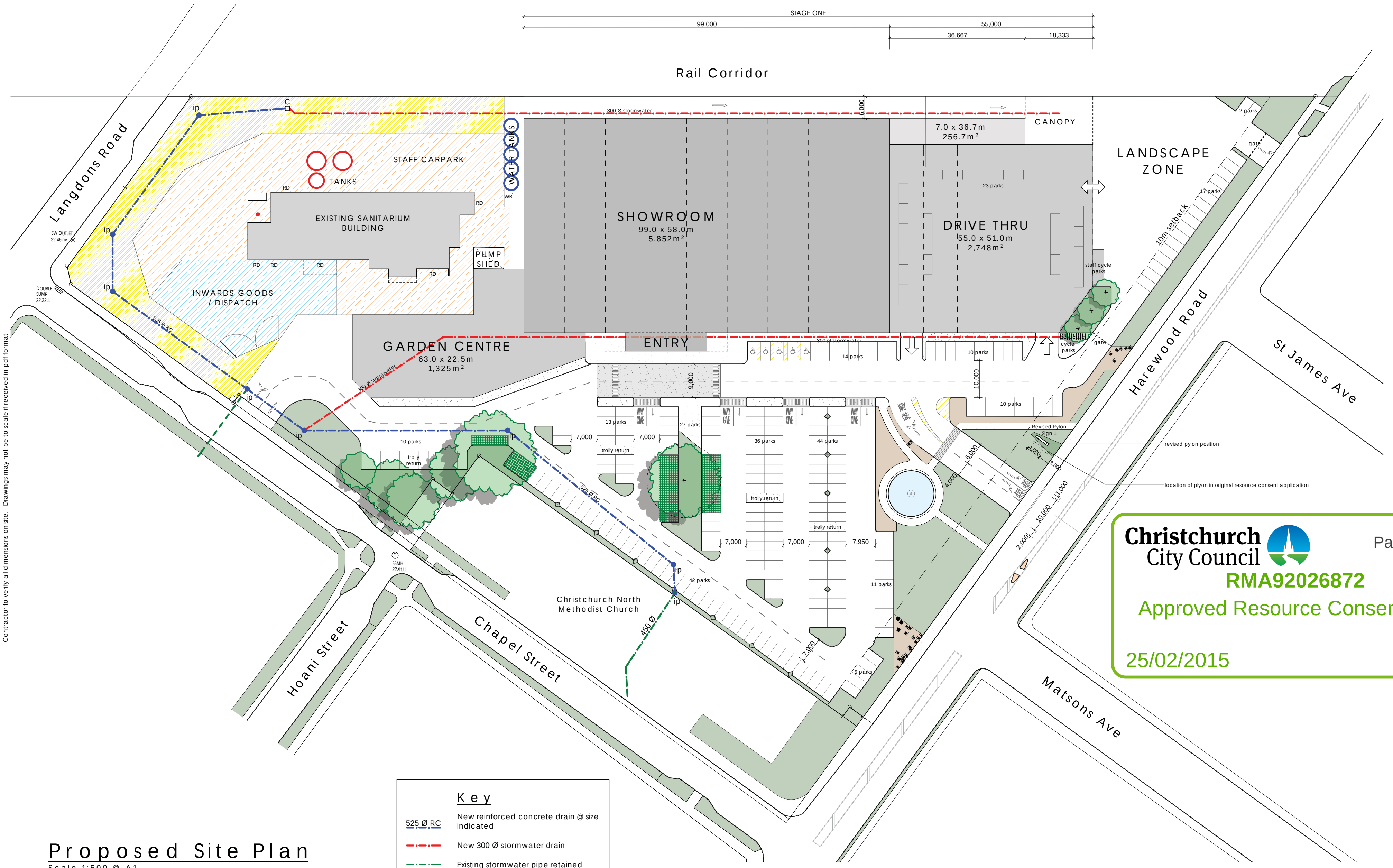
1. If you are in any doubt as to whether something should be reported, please telephone the Corporate Technical for assistance.
2. Generally speaking, all spills (whether liquid or solid) should be reported. Likewise, all atmospheric emissions whether of excessive smoke, dust, gas or odour, should be reported.
3. When completing the section "DETAILS OF INCIDENT" it is only necessary to describe the facts. It is not necessary or helpful for you to speculate about the possible causes of the incident – this is a matter for further investigation, as required.

ANNEXURE C: NZTA REPORTED CRASHES

ID / LOCATION	DATE / TIME	MOVEMENT	CAUSES	CONDITIONS	INJURY
201372516 CHAPEL ST (at Langdons Rd)	Friday 20 Sep 2013 8:17am	CAR1 NBD on LANGDONS ROAD lost control turning left, CAR1 hit Fence	CAR1 lost control when turning, new driver showed inexperience	Road: Dry Light: Overcast Weather: Fine	Nil
201173236 HAREWOOD ROAD (15m east of Chapel St)	Tuesday 25 Oct 2011 4:25pm	SUV1 EBD on HAREWOOD ROAD hit parked veh, SUV1 hit Parked Vehicle, CAR2 hit Parked Vehicle	SUV1 too far left/right, illness with no warning (eg heart attack)	Road: Dry Light: Bright sun Weather: Fine	Nil
201072902 HAREWOOD ROAD (50m east of Chapel St)	Sunday 22 Aug 2010 12:58pm	SUV1 WBD on HAREWOOD ROAD lost control; went off road to right, SUV1 hit Fence, Tree	SUV1 illness with no warning (eg heart attack)	Road: Dry Light: Bright sun Weather: Fine	Nil
201223503 HAREWOOD ROAD (20m west of Chapel St)	Sunday 11 Nov 2012 5:45am	CAR1 EBD on HAREWOOD ROAD lost control; went off road to left, CAR1 hit Fence, Tree	CAR1 alcohol test above limit or test refused, too fast on straight, emotionally upset/road rage	Road: Dry Light: Dark Weather: Fine	Minor (1)
2971837 HAREWOOD ROAD (at Chapel St)	Tuesday 2 Jun 2009 9:00am	CAR1 SBD on HAREWOOD ROAD hit CAR2 manoeuvring	CAR1 didnt see/look behind when reversing/manoeuvering	Road: Dry Light: Bright sun Weather: Fine	Nil
201171257 HAREWOOD ROAD (at Chapel St)	Friday 20 May 2011 10:50am	CAR1 EBD on HAREWOOD ROAD hit CAR2 turning right onto HAREWOOD ROAD from the left	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when visibility obstructed by other vehicles	Road: Dry Light: Bright sun Weather: Fine	Nil
201122415 HAREWOOD ROAD (at Chapel St)	Wednesday 24 Aug 2011 5:22pm	CYCLIST1 (Age 13)EBD on HAREWOOD ROAD sideswiped by CAR2 turning left	CAR2 didnt see/look behind when changing lanes, position or direction	Road: Dry Light: Bright sun Weather: Fine	Minor (1)
201414466 HAREWOOD ROAD (150m west of Main North Rd)	Friday 4 Jul 2014 1:33pm	CAR1 WBD on HAREWOOD ROAD hit VAN2 merging from the right	VAN2 failed to give way at driveway ENV: entering or leaving other commercial	Road: Dry Light: Overcast Weather: Fine	Minor (1)
2923568 HAREWOOD ROAD (at Matsons Ave)	Tuesday 24 Nov 2009 3:40pm	CAR2 turning right hit by oncoming MOTOR CYCLE1 WBD on HAREWOOD ROAD	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction	Road: Dry Light: Bright sun Weather: Fine	Serious (1)
201222773 HAREWOOD ROAD (at Matsons Ave)	Thursday 4 Oct 2012 10:00pm	CAR2 turning right hit by oncoming MOTOR CYCLE1 WBD on HAREWOOD ROAD	CAR2 failed to give way when turning to non-turning traffic	Road: Dry Light: Dark Weather: Fine	Minor (1)
2971179 HAREWOOD ROAD (at Matsons Ave)	Monday 12 Jan 2009 1:40pm	CAR1 EBD on HAREWOOD ROAD hit CAR2 merging from the right	CAR2 failed to give way at give way sign	Road: Dry Light: Bright sun Weather: Fine	Nil
201070069 HAREWOOD ROAD (15m east of Restell St)	Sunday 3 Jan 2010 3:27pm	CAR1 EBD on HAREWOOD ROAD hit CAR2 U-turning from same direction of travel	CAR2 didnt see/look behind when changing lanes, position or direction, new driver showed inexperience	Road: Dry Light: Overcast Weather: Fine	Nil
201372097 HAREWOOD ROAD (at Restell St)	Sunday 30 Jun 2013 6:10am	CAR1 SBD on HAREWOOD ROAD lost control but did not leave the road, CAR1 hit Traffic Island, Traffic Sign	CAR1 alcohol test above limit or test refused, lost control	Road: Dry Light: Dark Weather: Fine	Nil
201122955 HAREWOOD ROAD (50m east of ST James Ave)	Friday 28 Oct 2011 2:13pm	MOPED1 EBD on HAREWOOD ROAD hit rear end of CAR2 stop/slow for queue	MOPED1 following too closely, failed to notice car slowing	Road: Dry Light: Overcast Weather: Fine	Serious (1)
201173662 LANGDONS ROAD (at Chapel St)	Monday 5 Dec 2011 10:00am	CAR1 WBD on LANGDONS ROAD hit rear of left turning CAR2	CAR1 following too closely	Road: Dry Light: Overcast Weather: Fine	Nil
201371226 LANGDONS ROAD (at Chapel St)	Monday 27 May 2013 8:23pm	CAR2 turning right hit by oncoming SUV1 WBD on LANGDONS ROAD	CAR2 failed to give way when turning to non-turning traffic	Road: Wet Light: Dark Weather: Heavy rain	Nil
201370859 LANGDONS ROAD (25m north of Restell St)	Tuesday 26 Mar 2013 3:05pm	CAR1 SBD on LANGDONS ROAD hit BUS2 parking/unparking	BUS2 inattentive, didnt see/look behind when pulling out from parked position	Road: Dry Light: Bright sun Weather: Fine	Nil
201074097 RESTELL ST (at Winston Ave)	Wednesday 1 Dec 2010 2:07pm	CAR1 WBD on WINSTON AVENUE hit CAR2 manoeuvring	CAR1 misjudged speed of own vehicle CAR2 didnt see/look behind when reversing/manoeuvering	Road: Dry Light: Overcast Weather: Fine	Nil
201072358 WINSTON AVENUE (70m east of Restell St)	Thursday 8 Jul 2010 11:30am	CAR1 EBD on WINSTON AVENUE swinging wide hit CAR2 head on	CAR1 too far left/right, attention diverted	Road: Dry Light: Overcast Weather: Fine	Nil

ANNEXURE D: PROPOSED DEVELOPMENT PLANS

ANNEXURE E: LANDSCAPE PLANS & LANDSCAPE ASSESSMENT



Contractor to verify all dimensions on site.   Drawings may not be to scale if received in pdf format

Stage One - 292 Car Parks

Proposed Site Plan

Scale 1:500 @ A1
Scale 1:1000 @ A3

Key

525 Ø RC	New reinforced concrete drain @ size indicated
—·—	New 300 Ø stormwater drain
—·—	Existing stormwater pipe retained
IP	New inspection point
☐ C	Existing stormwater chamber retained
▨	Common access area
▨	Area retained by tenant
▨	Inwards goods / Dispatch
RD	Existing roller door
WB	Existing water bore

BERNARD
JOHNSTON
ARCHITECT LTD

P.O. BOX 22726
CHRISTCHURCH 8142
PH : (03) 379-9525
bernard@intrados.co.nz

PROJECT STATUS:

Resource Consent
9-7-2014

Revision 1
22-9-2014

revision 2
31-10-2014

revision 3
19-02-2015

PROPOSED
SITE PLAN
STAGE 1

NEW
DEVELOPMENT
FOR

R & H
INVESTMENTS

SCALE : 1:500
PRINTED : 19/02/15
JOB NO : 1279
DRAWN : GARETH

SHEET

A1.02

Christchurch City Council
RMA92026872
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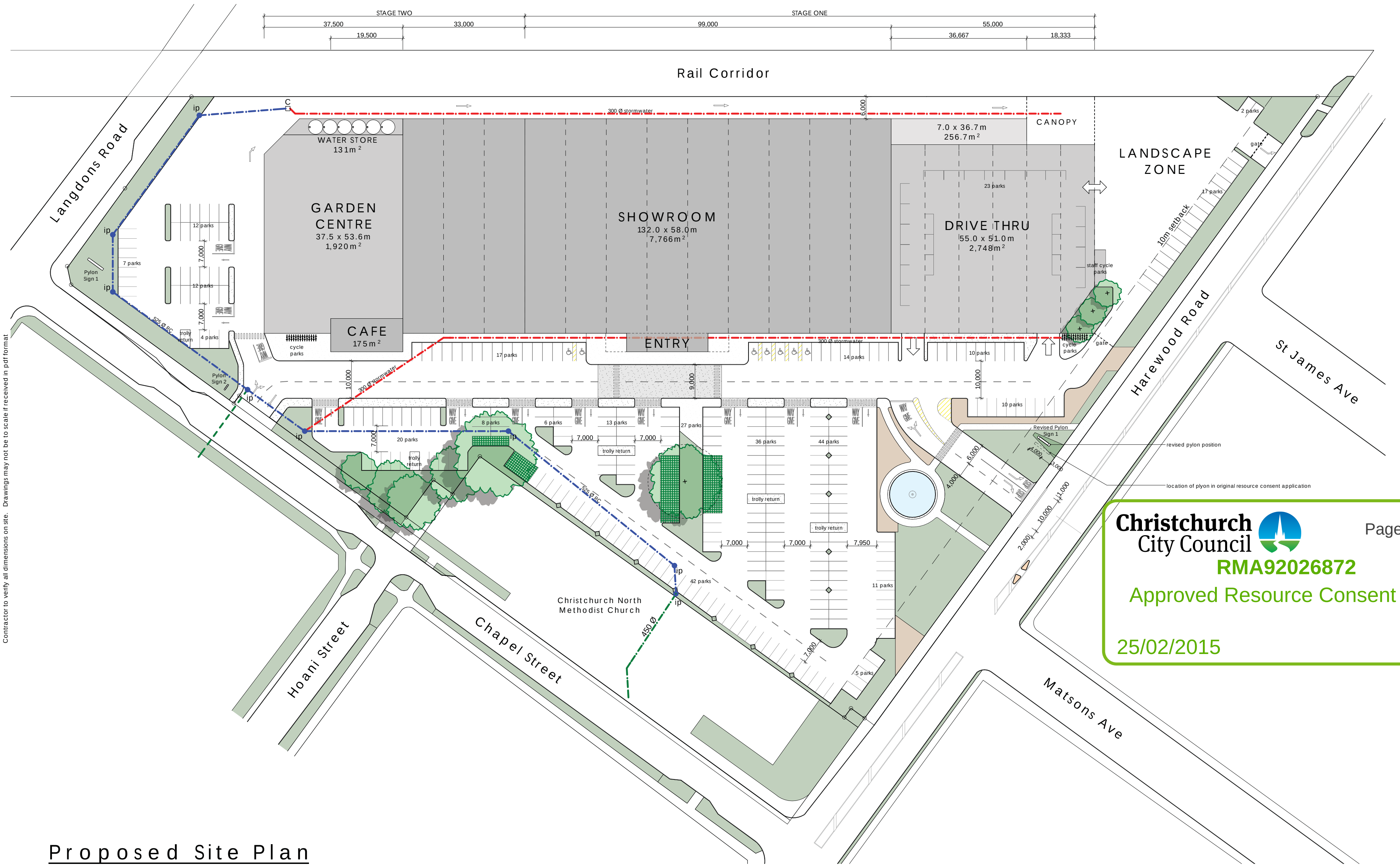
25/02/2015
Page 1 of 21

Contractor to verify all dimensions on site. Drawings may not be scale if received in pdf format



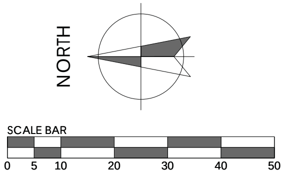
Proposed Site Plan

Scale 1:500 @ A1
Scale 1:1000 @ A3

Key

525 Ø RC	New reinforced concrete drain @ size indicated
🟥	New 300 Ø stormwater drain
🟩	Existing stormwater pipe retained
IP	New inspection point
☐ C	Existing stormwater chamber retained

Stage One	-	294 Car Parks
Stage Two	-	46 Car Parks
Total	-	340 Car Parks



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PROJECT STATUS:

Resource Consent
9-7-2014

Revision 1
22-9-2014

revision 2
31-10-2014

revision 3
19-02-2015

PROPOSED
SITE PLAN
STAGE 2

NEW
DEVELOPMENT
FOR

R & H
INVESTMENTS

SCALE : 1:500
PRINTED : 19/02/15
JOB NO : 1279
DRAWN : GARETH

SHEET

A1.03

Christchurch City Council

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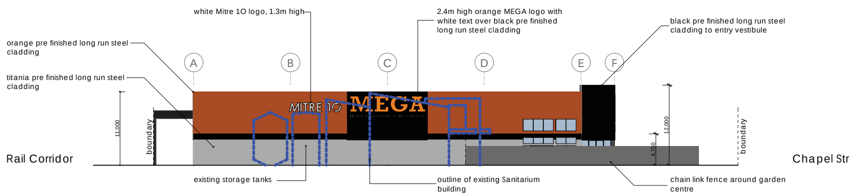
RMA92026872

Approved Resource Consent Plan

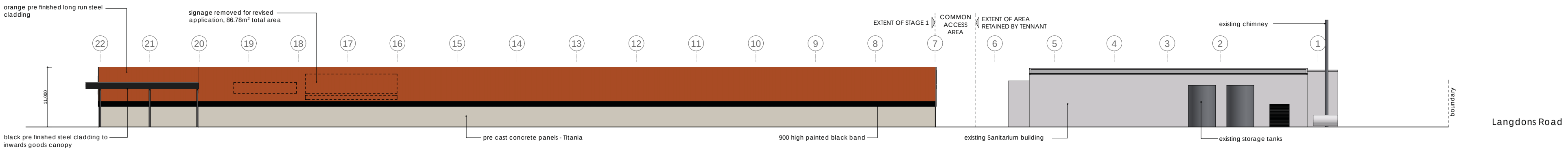
25/02/2015

Contractor to verify all dimensions on site. Drawings may not be to scale if received in pdf format



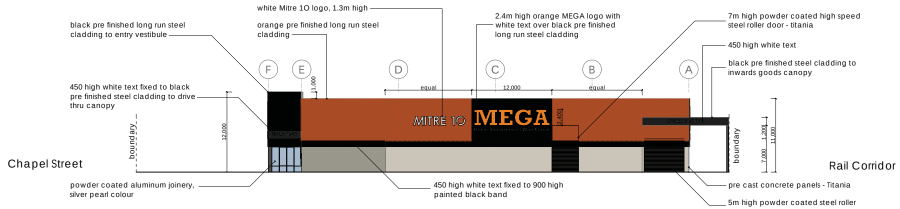
North Elevation (Langdons Road)

Scale 1:400 @ A1
Scale 1:800 @ A3



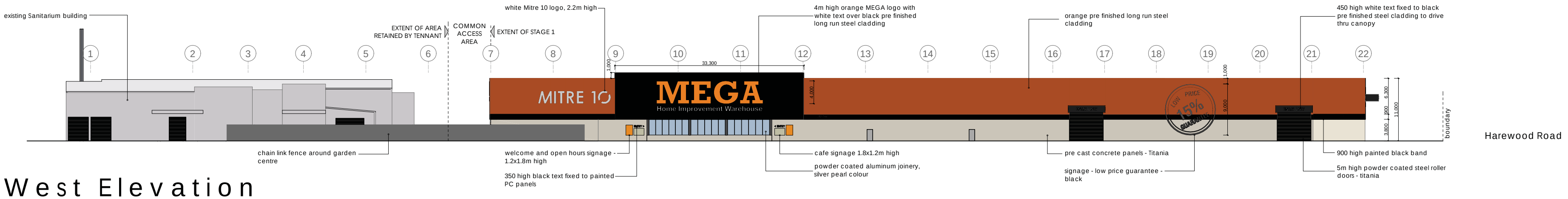
East Elevation

Scale 1:400 @ A1
Scale 1:800 @ A3



South Elevation (Harewood Road)

Scale 1:400 @ A1
Scale 1:800 @ A3



West Elevation

Scale 1:400 @ A1
Scale 1:800 @ A3

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ARCHITECT LTD

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CHRISTCHURCH 8142
PH : (03) 379-9525
bernard@intrados.co.nz

PROJECT STATUS:

Resource Consent
9-7-2014

Revision 1
22-9-2014

revision 2
31-10-2014

revision 3
19-02-2015

ELEVATIONS
(STAGE 1)

NEW
DEVELOPMENT
FOR

R & H
INVESTMENTS

SCALE : 1:400
PRINTED : 19/02/15
JOB NO : 1279
DRAWN : GARETH

SHEET

A3.01

Christchurch City Council

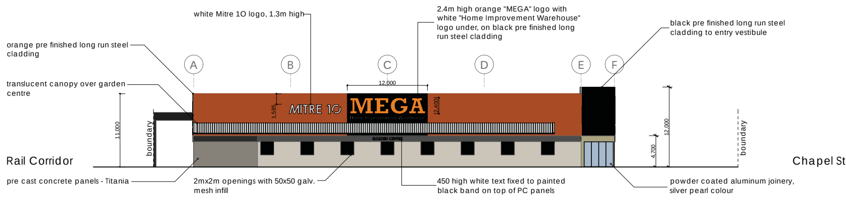
Page 4 of 21

RMA92026872

Approved Resource Consent Plan

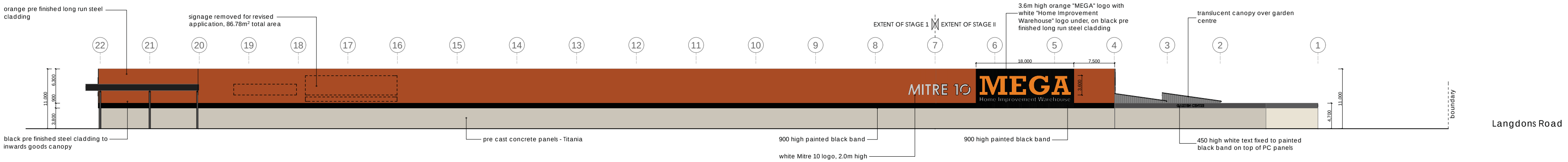
25/02/2015

Contractor to verify all dimensions on site. Drawings may not be to scale if received in pdf format



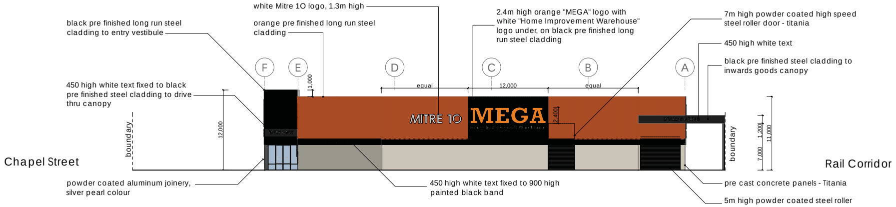
North Elevation (Langdons Road)

Scale 1:400 @ A1
Scale 1:800 @ A3



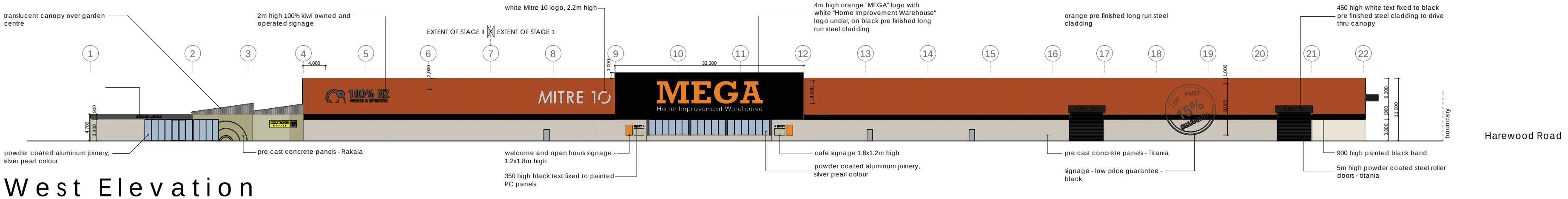
East Elevation

Scale 1:400 @ A1
Scale 1:800 @ A3



South Elevation (Harewood Road)

Scale 1:400 @ A1
Scale 1:800 @ A3



West Elevation

Scale 1:400 @ A1
Scale 1:800 @ A3

BERNARD
JOHNSTON
ARCHITECT LTD

P.O. BOX 22726
CHRISTCHURCH 8142
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PROJECT STATUS:

Resource Consent
9-7-2014

Revision 1
22-9-2014

revision 2
31-10-2014

revision 3
19-02-2015

ELEVATIONS
(STAGE 2)

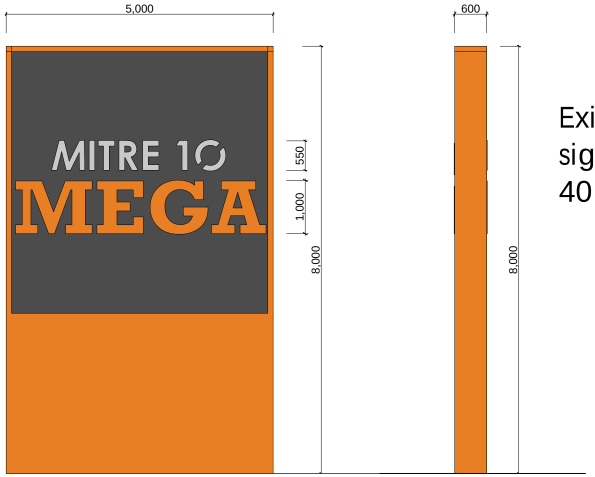
NEW
DEVELOPMENT
FOR

R & H
INVESTMENTS

SCALE : 1:400
PRINTED : 24/02/15
JOB NO : 1279
DRAWN : GARETH

SHEET

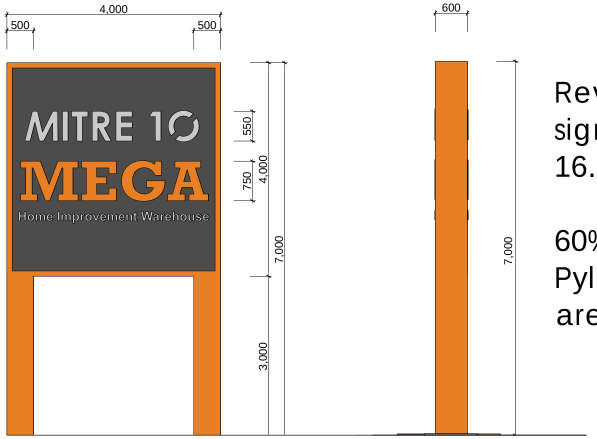
A3.02



Existing Pylon 1
signage area
40.0m^2 per side

Existing Pylon Sign 1 (not used)

Scale 1:50 @ A1
Scale 1:100 @ A3

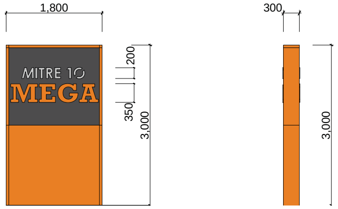


Revised Pylon 1
signage area
16.0m^2 per side

60% reduction in
Pylon 1 signage
area

Revised Pylon Sign 1

Scale 1:100 @ A1
Scale 1:200 @ A3



Existing Pylon 2
signage area
5.4m2 per side

Pylon Sign 2

Scale 1:50 @ A1
Scale 1:100 @ A3

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PROJECT STATUS:

Resource Consent
9-7-2014

Revision 1
22-9-2014

revision 2
31-10-2014

revision 3
19-02-2015

PYLON
ELEVATIONS

NEW
DEVELOPMENT
FOR

R & H
INVESTMENTS

SCALE : 1:50
PRINTED : 19/02/15
JOB NO : 1279
DRAWN : GARETH

SHEET

A3.03

Existing Signage Pylon 1 (viewed from Harewood Road East)

Revised Signage Pylon 1 (viewed from Harewood Road East)

Existing Signage Pylon 1 (viewed from Harewood Road West)

Revised Signage Pylon 1 (viewed from Harewood Road West)

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22-9-2014

revision 2
31-10-2014

revision 3
19-02-2015

SIGNAGE
IMAGES

NEW
DEVELOPMENT
FOR

R & H
INVESTMENTS

SCALE : 1:0.5254
PRINTED : 19/02/15
JOB NO : 1279
DRAWN : GARETH

SHEET

Contractor to verify all dimensions on site. Drawings may not be to scale if received in pdf format

Existing Signage on Building (viewed from Harewood Road East)

Revised Signage on Building (viewed from Harewood Road East)

PROPOSED SIGNAGE SCHEDULE

revision 1 - 18/2/2014

LOCATION	Elevation	SIGN CODE	DESCRIPTION	SIZE (m)		AREA (m²)		NO. OF SIGNS
				W	H	Advertising	Directional	
	North		Mitre 10	7.90	1.30	10.27		1.00
			Mega	10.30	2.40	24.72		1.00
			Home Improvement Warehous	10.30	0.50	5.15		
			Garden Centre	5.30	0.45	2.39		1.00
			Entry Only	3.60	0.45		1.62	1.00
			Exit Only	3.00	0.45		1.35	1.00
	East		Mitre 10	11.90	2.00	23.80		1.00
			Mega	15.55	3.60	55.98		1.00
			Home Improvement Warehous	15.55	0.45	7.00		
			Garden Centre	5.30	0.45	2.39		1.00
	South		Mega	10.30	2.40	24.72		1.00
			Home Improvement Warehous	10.30	0.50	5.15		
			Mitre 10	7.90	1.30	10.27		1.00
			Entry Only	3.60	0.45		1.62	1.00
			Exit Only	3.00	0.45		1.35	1.00
			Inwards Goods	5.55	0.45	2.50		1.00
	South West		Building Supplies	5.50	0.45	2.475		1.00
	West		Garden Centre	5.30	0.45	2.39		1.00
			Columbus Coffee	4.80	1.20	5.76		1.00
			100% NZ Owned	9.30	2.00	18.60		1.00
			Mitre 10	13.25	2.20	29.15		1.00
			Mega	17.50	4.00	70.00		1.00
			Home Improvement Warehous	17.50	0.85	14.88		
			Low Price 15%			63.20		1.00
			Café	1.80	1.20	2.16		1.00
			Café	1.80	1.20	2.16		1.00
			Hours of Operation	1.20	1.80	2.16		1.00
			Hours of Operation	1.20	1.80	2.16		1.00
			Entry	2.00	0.35		0.70	1.00
			Entry	2.00	0.35		0.70	1.00
			Entry Only	3.30	0.45		1.49	1.00
			Exit Only	2.70	0.45		1.22	1.00
			Smiths	2.00	0.45	0.90		1.00
	Pylon 1	Harewood Road		5.00	8.00	40.00		1.00
		Langdons Road		5.00	8.00	40.00		1.00
	Pylon 2	Chapel Street		1.80	3.00	5.40		1.00
						475.71	**10.04**	**32.00**
Revised Pylon	Pylon 1	Harewood Road		4.00	4.00	16.00		1.00
		Langdons Road		4.00	4.00	16.00		1.00
	Pylon 2	Chapel Street		1.80	3.00	5.40		1.00
						427.71	**10.04**	**35.00**

Christchurch City Council

Page 7 of 21

RMA92026872

Approved Resource Consent Plan

25/02/2015

BERNARD
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revision 2
31-10-2014

revision 3
19-02-2015

SIGNAGE
IMAGES

NEW
DEVELOPMENT
FOR

R & H
INVESTMENTS

SCALE : 1:0.5254, 1:0.499
PRINTED : 19/02/15
JOB NO : 1279
DRAWN : GARETH

SHEET

Stapleton, Kathryn

From: Stapleton, Kathryn
Sent: Tuesday, 2 December 2014 4:24 p.m.
To: Stapleton, Kathryn
Subject: FW: RMA92026872 - Mitre 10

From: Lance Roozenburg [mailto:lance@earthwork.co.nz]
Sent: Friday, 28 November 2014 11:36 a.m.
To: Damienne Donaldson; Stapleton, Kathryn
Subject: RE: RMA92026872 - Mitre 10

Hi Kathryn,

Please find a summary of the changes below:

Revised Entry layout
We are satisfied that the amendments of the footpath won't affect the overall design intent and that pedestrian accessibility to the bus stop on the west side of Harewood Road has increased.

Planting framework
The revised plan removes the median strip containing planting, however a small area of additional planting will be replaced on the east and west side of the proposed entry crossing adjacent to the water feature. The intent of this planting is to reduce the possibility of desire lines occurring and direct pedestrians to the crossing point. These plants will be low feature planting to ensure sight lines are achieved.

The planting directly behind the existing water feature will require amendment however the total area of planting and type outlined in the plan will be similar to the original consent application

Any further planting will be in keeping with the proposal and most likely be feature planting to assist in framing the water feature and create a pleasant entry point for the development

Existing wall
To facilitate the proposed pathway some of the existing wall may need to be removed. The ends of the cut wall will be remediated in keeping with the existing style and end columns will be constructed.

Hopefully this is an acceptable explanation of the changes required and is sufficient to progress the consent. Let me know if you require any further clarification.

Regards,

Lance Roozenburg
Earthwork Landscape Architects
1091 Ferry Road, Christchurch
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Assessment of Landscape Effects:

Mitre 10 Mega – Harewood Road

Prepared by:
Lance Roozenburg, Landscape Architect (gradNZILA)

Prepared 13th August 2014

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1. Introduction

1.1 Earthwork Landscape Architects

My name is Lance Roozenburg, I am a Senior Landscape Architect at Earthwork Landscape Architects with a Bachelor of Landscape Architecture (hons). I have been practicing across a broad range of the profession since 2004

Earthwork Landscape Architects is a mid-sized practice, specialising in design led projects, concentrating on site planning and landscape identity. The company has a long history of successful landscape projects, mainly around the South Island of New Zealand

Earthwork landscape Architects were engaged to provide a landscape design and assessment of landscape effects for the proposed development outlined below;

1.2 Development Proposal

This proposal is to create a new (13,518m2) building for Mitre 10 Mega replacing the existing Sanitarium Health Food Company and adjacent buildings **(Refer to Appendix Sheet 2).** The new Mitre 10 Mega building has a larger footprint than the old Sanitarium Building. The use of the proposed building is predominantly retail/trade based as opposed to the existing use which is production and office based.

The proposal also sets out retention of existing amenity spaces, public landscape connections and landscape development adjacent to the road frontages. These connections will link the road, adjacent car park and Mitre 10 Mega. The landscape development will provide public spaces around the building as well as addressing existing site character, amenity, storm water and site-works issues.

1.3 Assessment Context

This assessment discusses the effects of the chosen design on the existing landscape character and public amenity values of the site and its surrounds.

A visit to the site and its surroundings was undertaken on the 7th of July 2014 to determine the potential for adverse effects resulting from the proposal. Representative photos have been included. **(Refer Appendix Sheets 2-4).**

An additional site visit to audit all notable tree and plant stock was completed on the 29th July 2014

Site planning diagrams and a landscape proposal were presented to Jennifer Dray of the CCC as part of the pre-application meeting process. Subsequently a developed design was prepared based on this feedback.

2. Existing Landscape and Character

2.1 Site Location

The proposed site is located at the Sanitarium Health Food site at, 54 Harewood Road, Papanui. The proposal also occupies adjacent sites 30, 36 and 64 Harewood Road, 22 Chapel Street and 41 Langdon's Road. The site is situated on the Northern side of the road where Harewood Road intersects with the Railway Line. **(Refer to Appendix Sheet 2).**

To the west of the site is Chapel Street, a predominantly typical urban living environment made up of low to medium building densities and, on the corner of Chapel Street and Harewood Road is a residential care facility 'Albarosa Rest Home'. To the east of the site is the railway corridor, it backs immediately onto a commercial focused business area (B2 zone) catering for larger scale commercial buildings, the primary purpose and functions of these facilities is to provide amenities to the surrounding living environment. The south side of the site along Harewood Road is a mix of low density living dwellings and a noteworthy amenity area (St James Park) characterized by mature trees, long grass berms and well vegetated surrounds.

2.2 General Site Character

The site sits at a point between residential living environments and large scale retail facilities aimed at catering for the surrounding communities. This creates a transition between low to medium residential dwelling and dense highly developed hardscapes of big box retail.

Notable characteristics of the site include the proportion of open spaced dedicated to ensuring a merging of the public street frontage and the existing Sanitarium building. A large fountain creates a central feature and landmark to the area, the fountain has values of heritage and identity to both the site and surrounding environment. The open space lends itself to public life and contributes positively to the aesthetics of Harewood Road.

A large portion of the site is dedicated to a factory garden forming smooth curvaceous gardens focused between an open drain and the western perimeter of the site. The gardenesque style planting is reflective of the heritage, existing sense of stewardship and commitment to healthy living that is prevalent in the principles of Sanitarium. The existing gardens are a remnant of the original factory garden designed by on of Christchurch's first Landscape Architect, Edgar Taylor. Camellias, Rhodendrons and Hydrangeas are present along with other established exotic varieties

Three commercial buildings are situated in the South-East corner of the site. Two of which are vacant creating a low quality, inactive street frontage. The third building houses the Christchurch Security Centre, a key cutting based outlet. The active street frontage this provides has little effect when standing isolated from other activities.

Other frontages of the site along Chapel Street and Langdon's road are typical of commercial and industrial areas with varied fencing types. Framing Chapel Street boundary and Langdon's road frontages is a maroon, corrugated iron fence.

2.3 Landform, Topography and Soils

The Sanitarium site is generally flat with a low flow open drain meandering through the site **(Refer to Appendix Sheet 5).** All sites have been progressively modified over time and include large swathes of hard surfacing. The existing stream provides little visual amenity to the public due to its location within the existing private commercial area and its screening by the Methodist church on the corner of Chapel and Harewood Roads.

Where existing soils are present they are: Kaiapoi Silty loam which is moderately free draining and favourable for plant growth. *Source: Landcare Research S-map Soil report ref: Kaia_1a.1 retrieved 13-August 2014,from http://smap.landcareresearch.co.nz*

2.4 Water & Ecology

The existing open drain that runs through the site appears to be of low flow with little native vegetation and steep exposed faces. A report on the ecological value of the Open drain has been discussed by Boffa Miskell: **(Refer to Kruses Drain – Ecological Assessment).**

2.5 Vegetation

The vegetation of the site is a combination of gardenesque character amenity planting and native screen planting. While there is an area of extensive vegetation on the site the bulk of this is located out of the public's view or around the periphery of the site.

There are a number of large trees on site including a Heritage/Notable Liriodendron tulipifera. Other notable trees include Cedars and Birches -. **(Refer to Appendix Sheet 5).**

2.6 Existing Building and Public Infrastructure

The existing Sanitarium Health Foods building is a large format warehouse comprised of two distinct characters.
The first of which faces Harewood Road which is comprised of a cluster of warehouse buildings and loading bay in the foreground. Secondly, a more modern instalment which faces Langdon Road and Chapel Street is present with features of blue and grey. At the rear of the building are a series of highly visible silos previously used for storage and processing.

Currently the factory is closed and relatively underutilized with little amenity contribution to the surrounding community.

The remaining land parcels which make up the site are:

- 30, 36 and 64 Harewood Road, which are typical of the style of modern buildings found within the Business B4 zone, mostly constructed of concrete tilt slab block work. Both 30 and 36 Harewood Road properties are currently vacant.

- 22 Chapel Street also forms part of the existing Sanitarium site and is a residential scale building surrounded by the factory garden.

3. Existing Visibility and Views

3.1 Langdon's Road

Langdon's Road is a mix of corrugated iron and mesh fencing which enables permeability into a large concrete area functioning as a car park. The existing boundary treatments are poorly integrated into the surroundings, the existing factory buildings are highly visible due to the permeable fencing and have limited amenity planting.

Image Reference: Appendix Sheet 2 Image 2.1

3.2 Chapel Street from Hoani intersection North

This area is predominantly screened with a 1.8m solid corrugated iron fence, the factory buildings can be seen over this, there is no evidence of landscape buffering resulting in a hard industrial presence. There is a section of sparse council owned amenity planting in front of the fencing which contributes to the perception that this area has been neglected.

Image Reference: Appendix Sheet 3 Image 3.1 & 3.2

3.3 Chapel Street from Hoani intersection South

The Christchurch Methodist church and adjacent property provide active screening of the existing Sanitarium Factory from Chapel street south and the Albarosa rest home. The factory buildings are additionally screened by the extensive garden and mature trees behind the Methodist church and dwelling

Image Reference: Appendix Sheet 3 Image 3.1 & 3.2

3.4 Harewood Road – From the Methodist Church East

The factory buildings are situated well back from the road and partially screened by native vegetation, its presence is harmonious within the site, and the foreground landscape adjacent to Harewood Road is given hierarchy over the building. Further east towards the railway line the other commercial buildings are typical of Business fringe zones and have little landscape value with secure fences dominating the street frontage,

Image Reference: Appendix Sheet 4 Image 4.2 & 4.3

4. Planning Context

The proposed activity itself is considered to be a 'trade supplier' as per the definition of the City Plan which is an anticipated activity in the Business 4 zone. The application is required to be assessed as a non-complying activity owing to a breach of a critical standard relating to content of fill. The proposal otherwise requires consent as a discretionary activity noting other non-compliances.

4.1 Landscape Provisions:

5.2.3 Street scene

The minimum building setback from road boundaries shall be: Business 4: 6m
EXCEPT THAT for sites with more than one road boundary, the setback from one road boundary may be reduced to 1.5m.

The minimum building setback from road boundaries opposite a living zone shall be: Business 4 Zone
Where the separating road has more than two lanes or is an arterial road: 6m
Where the separating road has only two lanes and is not classified as an arterial road 10m

5.2.4 Separation from neighbours

The minimum building setback from the boundary with a living zone shall be: Business 4 Zones: 3m

5.2.7 Landscaped areas

Landscaped areas-Business 4 Zone -10%

Trees:
(i) Sites with road frontages of at least 10 metres shall be planted with a minimum of one tree, plus one additional tree for every 10 metres of road frontage (e.g. 10 metres frontage - 2 trees, 20 metres frontage - 3 trees, etc.).
(ii) Where three or more trees are required these trees shall be planted no more than 15 metres apart, or closer than 5 metres apart.
(iii) Any trees required shall be planted along the road frontage and in front of any buildings on thesite.
(iv) In addition to (i) - (iii) above, one tree shall be planted for every 5 parking spaces required on the site. Trees shall be planted within or adjacent to the carparking area
(vi) Any trees required by this rule shall be of a species capable of reaching a minimum height atmaturity of 8 metres and shall be not less than 1.5 metres high at the time of planting.

2.2.1 Parking

Retail activities and commercial services

Generally: Residents/visitors - If GLFA less that 750m 2 then 4 spaces/100m 2 GLFA, otherwise:
- 4.6 spaces/100m 2 GLFA for the first 20000m 2 GLFA,
- 3.3 spaces/100m 2 GLFA for the next 10000m 2 GLFA,
- 3.0 spaces/100m 2 thereafter
- 3 spaces/100m 2 of any gross leasable outdoor display area

Staff 0.5 spaces/100m 2 GLFA

Bike: 1 space/200m 2 GLFA

Loading/ Unloading - 1 HGV bay/1600m 2 GLFA for the first 6400m 2 GLFA
1 HGV bay/5000m 2 GLFA thereafter

4.2 Landscape Proposal/Planning Requirement comparison

Site Information:	Reqd	Proposed
Site Area:	N/A	33,100m2
Road Frontage	N/A	375lm
Carparks:	591	340 (incl drive thru)
Consent Requirements:	Reqd	Proposed
Carpark Trees:	68	-
Boundary Trees:	39	-
Existing trees	-	5
Total	107	84
Landscape Areas:	3310m2 (10%)	3832m2 (11.5%)

5. Proposal Description

5.1 Building Placement and Scale

The placement of the Mitre 10 building is situated as close to the rail corridor as practically possible with a 6m access strip between the corridor and the building to allow for goods delivery. The height of the proposed building varies with the low profile garden center to the north and higher showroom and drive through areas to the south. The corner of the building at the southern end has been chamfered to allow for an increased setback from Harewood Road for screening and the addition of screen planting.

The building design, graphics, and colors are typical of those found within Business Zones around Christchurch. The building consists of a large box development with relief of the facade modulated through the construction of canopies, entranceways, and glass. The proposed building will complement the existing commercial and industrial buildings found throughout the local area.

5.2 Landscape Design and Materials

The landscape design aims to create a functional space that serves the primary purpose of the site as a commercial retail /trade outlet while complimenting public amenity. Where possible existing unique features have been retained, the water fountain and existing open space along Harewood Road will be retained and modified to allow for the required traffic movements. The existing Sanitarium boundary wall will be retained where possible and extended. **(Refer to Appendix Sheet 9).**

The landscape style utilises components of Gardenesque amenity and feature planting to pay homage to the sites cultural heritage while re-interpreting it to suit the scale of the building.

The existing open space character of Harewood road has been retained. Specimen Trees of *Prunus Yedoensis* border the pedestrian access ways into the site, past the heritage fountain. Hedging provides separation between the car park and open space.

The existing open visual appearance of Harewood road has been applied to the Chapel and Langdon's Road frontages and increases visibility and amenity value from the street. The proposed open landscape frontage containing lawn, planting and specimen trees creates increased sightlines and addresses the existing CPTED issues, the addition of boundary trees in the positions shown will reduce the perceived scale of the building from the surrounding landscape.

Fencing will be kept to a minimum. Where secure fencing is required it shall be open style palisade or mesh fencing. The fencing positions shall be set back from any road frontage by a minimum of 4m to allow for generous tree and shrub planting between the fence and the road, generally these will be planted in a gardenesque style to pay homage to the existing factory garden.

The existing crazy paving will be utilized to enhance the area around the water feature and increase the scale of paving to suit the proposed development.

5.3 Vehicular Access

Access to the site shall be gained from Chapel Street and Harewood Road. A Traffic Impact Assessment has been prepared separately

5.4 Pedestrian Access

Generous access around the building has been allowed including the allocation for a raised pedestrian area at the point of entry into the building to reduce traffic speeds. A new pathway linking Harewood Road and Chapel Street will be installed through the car park with priority given to pedestrian movement.

5.5 Planting

Gardenesque style screen planting will be planted at the northern and southern boundaries adjacent to the building, some existing plants from the site will be utilized here in addition to low plantings towards the footpaths. *Magnolia Kobus* will be planted in the positions shown to provide filtered screening of the building.

Low Feature planting at the entranceways and key pedestrian areas will be textural and mass planted on a scale relative to the building

Amenity planting in the form of lawn and specimen trees will continue the existing open theme. Low Hedging (500-750mm high) has been positioned to create a transition between the gardenesque planting and more modern feature planting described above . The hedging positions also act to diffuse any possibility of nuisance from headlights.

Tree planting will be in the form of *Magnolia Kobus* and *Prunus Yedoensis* linking the new proposal to the sites previous gardenesque heritage. The flowering species will be at a height of 2.0m at the time of planting,

A detailed plant list and grades are shown in Appendix Sheet 11

5.6 Storm water

The existing open drain will be piped through the site and connected into the existing piped system at either end of the site.

6. Assessment of Effects

6.1 Building Placement and Scale

The building placement and scale is the most significant effect of the proposal. The proposed building is typical of large box developments and larger and taller than the current series of buildings scattered over the site. The careful positioning of the building as close to the rail corridor as practical and the allocation of sufficient green space around the periphery assist in diminishing the bulk of the structure.

The Architect has employed additional measures to assist in the mitigation of the adverse effects pertaining to the increased GLFA:

- An increased setback along Harewood Road the through chamfering the southernmost corner of the building, resulting in a minimum 18m setback This Chamfered area allows for the incorporation of additional planting/screening along this wall
- Garden Center height reduced to approximately 5m to add variety to the building profile
- A modulated façade with canopies and varied materials

6.2 Landscape Design and Materials

Where possible existing unique features have been retained, the water fountain, open space style and the concrete wall along Harewood Road will be modified to accommodate the new entry and open spaces linking to the sites previous character.

All existing high enclosed fencing will be removed and replaced with open palisade style fencing or similar. This fencing will be set back from the property boundaries to ensure the effects of any additional fencing are mitigated through the use of planting

6.3 Site Circulation and Public Access

Site Circulation, public access and visibility will be affected positively with the inclusion of a dedicated pedestrian pathway linking Chapel Street and Harewood Road. The retention of the existing open lawn area along Harewood Road retains the public open space refuge on Harewood Road.

The northernmost corner will be more visible with the removal of the existing enclosed fence and replacement with grass, low planting and trees. The site will provide the public with increased site lines, visibility and security along Chapel Street.

6.4 Site Works

The proposed car park will require work within the 10m radius around the heritage/notable tree, permeable surfacing will be installed to allow for water penetration through the car park surface to the roots of the existing tree, a large area of soft landscaping around the tree will be provided as shown. **(Refer to Appendix Sheet 5).**

There will be an effect on the existing landscape character through the infill and piping of the existing open stream and removal of some vegetation and trees, Paving will be uplifted and utilized elsewhere on the site.

6.5 Natural Landscape

The site has little natural elements associated with it, where indicated native plants will be introduced to increase the ecological value of the site and where practical the existing vegetation will be replanted into the various communities outlined in the proposal.

Native planting will be introduced in the form of feature planting. The design focuses on the retention of some of the cultural and historical aspects of the site due to the highly modified nature of the site

6.6 Vehicular Access

While the size of the main Harewood Road entry has increased from what is existing, the amalgamation of all existing entries along this frontage into two points will have a positive effect on the pedestrian amenity of the streetscape. A Traffic Impact Assessment has been prepared separately

6.7 Signage

Signage has been covered extensively in other reports

7. Assessment of the proposal on Visibility and Views

The site and proposed building will affect the following views:

a. Langdon's Road

- Views from the east of Langdon's road will be partially screened by medium to high gardenesque plantings and large boundary trees
- The Langdon's Road/Chapel Street intersection will be open and visible with the removal of the existing fence. The building garden center will be low (5m high) from this view and partially screened by the proposed car park trees

b. Chapel Street - from Hoani Intersection North

- The site will be more visible with the removal of 22 Chapel Street and existing high fence however, the proposal of additional trees, shrub planting and hedging will assist in diminishing the bulk of the proposed building and car park. The retention of the existing cedars and under planting within the site opposite Hoani Street will positively contribute to the visual screening from this view

c. Chapel Street - from Hoani intersection South

- The Christchurch Methodist church and adjacent property will assist in the active screening from Chapel Street south and the Albarosa rest home.
- Screening from the Methodist church and dwelling on the east side of Chapel Street will be achieved over time with the planting of car park trees along the Western boundary within the car park. The retention of the existing large heritage trees will also reduce the visibility of the building from these areas

d. Harewood Road – From the Methodist Church East

- The proposed building will be more visible than the existing Sanitarium building from Harewood Road due to its closer proximity and height. Planting opposite St James Ave will provide screening by medium to high gardenesque plantings and large boundary trees. The retention of the existing water feature and open space adjacent to Harewood Road provides opportunities to partially screen the car park with trees and planting. The existing heritage tree will also reduce the scale of building further into the site.

The proposed building will be more visible than the existing cluster due to the increase in size and bulk size of the building. The retention of existing and notable trees in addition to those proposed will assist in diminishing the bulk of the building

8. Mitigation Measures

The placement of the building within the proposed site in combination with the proposed landscape measures described above achieves the objectives of enhancing the city's environment and Garden City image, and significantly softens the impact of the proposed increased built environment. The proposal generally meets the requirements of the City Plan and where appropriate retains key heritage components of the site.

9. Conclusion

The principle factors that have been discussed in this assessment are the effect of the development on the landscape character of its environment, its visibility from the public landscape and its effect on neighbours.

It is the conclusion of this assessment of landscape effects, that the obvious benefits of the proposal outweigh the negative impacts and that those impacts have been mitigated to the point where the proposal is appropriate to the location, the scale of the building can be absorbed into the location and that many positive amenity values described above will arise. The design is sympathetic to the cultural history of the site and contributes positively to an area which is largely unappreciated at present.

MITRE 10 MEGA

HAREWOOD ROAD

INTRADOS ARCHITECTURE

EARTHWORK landscape architects

MITRE 10 MEGA HAREWOOD ROAD

CONTEXT

KEY

⬛ SITE LOCATION

🟥 MINOR ARTERIAL- Road margins allow for on street parking. The landscape is marginalised with narrow grass strips and no street trees.

🟦 RAIL CORRIDOR- Margin of land set aside for the rail way, mostly a baron landscape framed by wire fencing.

🟩 CHAPEL STREET (North)- The Western street frontage accommodates residential properties. The Eastern street frontage consists of corrugated iron fencing with sparse council owned plantings adjacent to the fencing.

🟩 St JAMES PARK- (SAm16)One of a number of public parks framing the railway corridor.

🟫 COMMERCIAL- (B2 zone) Predominantly big box retail dominated by hard surfaces.

🟨 CHAPEL STREET (south)- (Living Zone 2) eastern street frontage accommodates Albarosa Rest Home, with a generous grass strip and street trees. The western side is consumed by the Methodist Church and carpark. The landscape is a lower quality, mostly hardscape with diminished garden beds.

🟧 COLLECTOR ROAD-Langdons Road, southern street frontage is predominantly residential properties. Northern frontages are a combination of private open green space,commercial and residential properties

🟦 INDUSTRIAL RETAIL- Largely privately owned open space with sporadic industry based retail spread along the road frontage.

LANGDONS ROAD

Image 2.1-Langdons Road Looking West: Existing amenity planting and iron fence bordering the site

CHAPEL STREET

Image 3.1-Corner of Langdons Road and Chapel Street Looking South: Existing site screened by corrugated iron fence

CHAPEL STREET

Image 3.2-Northern End of Chapel Street Looking East Existing site screened by corrugated iron fence

CHAPEL STREET

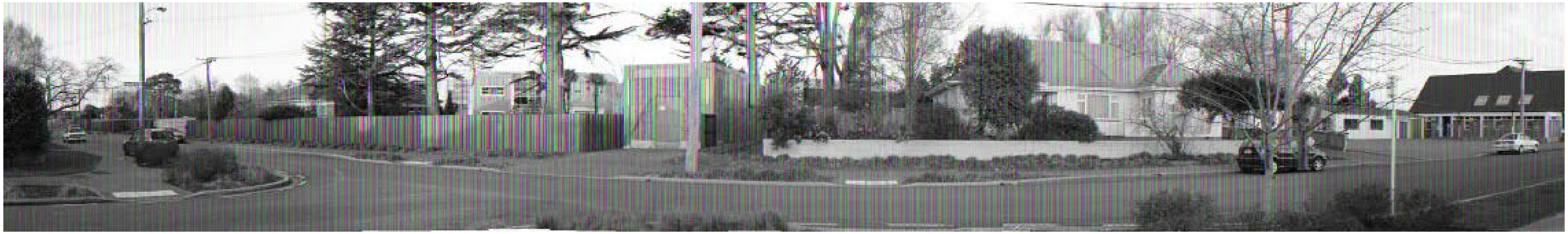


Image 3.3-Corner Hoani and Chapel Street Looking East Existing site screened by corrugated iron fence with council owned amenity planting in front

CHAPEL STREET

Image 4.1-Chapel Street Opposite Albarosa Rest Home: Existing site partially screened by methodist church and existing planting

HAREWOOD ROAD

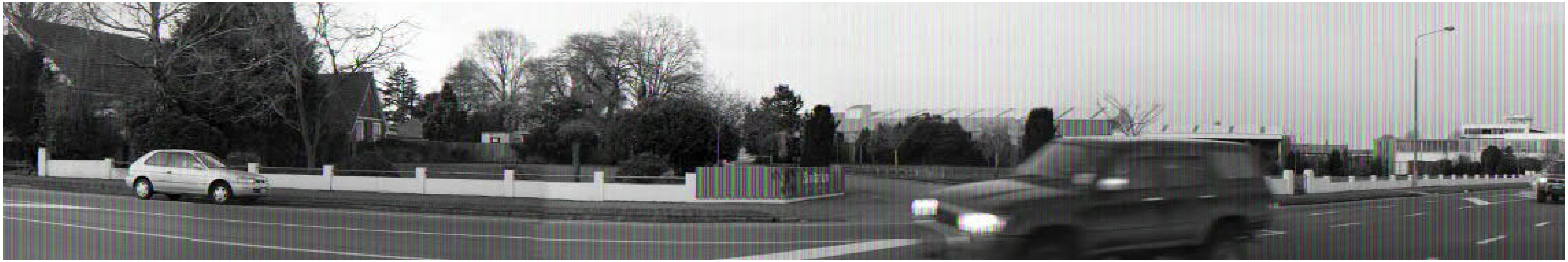


Image 4.2-Western End of Harewood Road Frontage: Showing existing open character and open landscape treatment with the factory in the background

HAREWOOD ROAD

Image 4.3-Eastern End of Harewood Road Frontage: Showing existing urban character with varied building structures, carparks and security fencing

EXISTING SITE CHARACTER

KEY

- ▨ EXISTING BUILDING FOOTPRINTS
- 🟪 PARKING - The site caters for a number of pocket parking lots. Each lot has no allowance for vegetation making hardscape dominant and visually unappealing.
- 🟩 GARDENESQUE- A large portion of the site is dedicated to a traditional gardenesque style planting. The plants provide the site with a strong character and identity.
- ▨ DELIVERY DEPOT - Although the depot is facing the road the amenity planting helps reduce visual effects by creating a screen
- 🟧 SHARED OPEN SPACE- The open space lends itself Harewood road and creates a softer road frontage, essentially providing a buffer between the building and the road side that increases the quality of the streetscape.
- ● WATER FOUNTAIN- A historic reference and attribute to the gardenesque character of the site. The fountain provides a visual landmark helping to identify the site. Refer to image 5.2
- ◎ NOTABLE TREES - Large historic trees that reflect the growth of the site and help to buffer the buildings.
- ||| Open Drain - Small stream (Kruses Drain) with low water flow divides the site.
- IIIIIIII CIRCULATION - Existing roadways throughout the site.
- ▬ AMENITY PLANTING- Used to create screens and define spaces.
- ◆ View

BUILDING AND CARPARK

Image 5.1 Vacant Wilderness Campervan site: Boundary surrounded by 2.0m high security fence

Image 6.1-Existing Amenity Area Adjacent to Harewood Road:

Image 6.2-Planting along Open Drain:

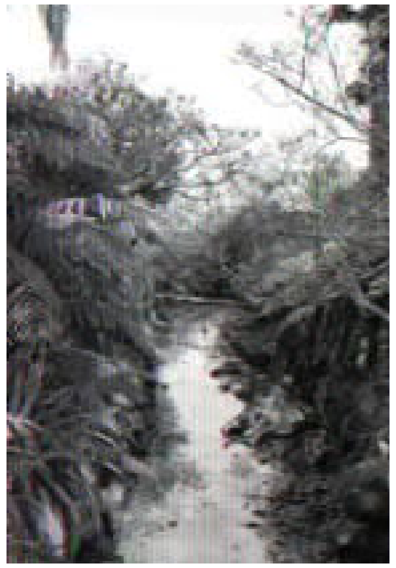


Image 6.3-Open Drain

Image 6.4-Notable Tree

Image 6.5-Gardenesque Planting

Image 6.6-Existing onsite offices:

Image 6.7-Existing Hardstand Behind Factory:

DESIGN BRIEF

Create a functional space that serves the primary purpose of the site as a commercial retail outlet while complimenting public amenity and the existing site character.

SITE PLANNING

- Emphasis on the integration between functional, amenity and pedestrian friendly spaces.
- Provide a safe and secure environment
- Provide sufficient screening to reduce the impacts of the proposed building.

UTILISING EXISTING CHARACTER

Retaining elements of the existing character help to provide a sense of place and characerise the site making it unique and memorable.

- Use the existing gardenesque plant character
- Retain the existing water feature
- Retain open space at Harewood road entrance.

PLANNING CONTEXT

2.2.1 PARKING

Retail activities and commercial services

Generally: Residents/visitors - If GLFA less that 750m 2 then 4 spaces/100m 2
GLFA, otherwise:
• 4.6 spaces/100m 2 GLFA for the first 20000m 2 GLFA,
• 3.3 spaces/100m 2 GLFA for the next 10000m 2 GLFA,
• 3.0 spaces/100m 2 thereafter
• 3 spaces/100m 2 of any gross leasable outdoor display area

Staff 0.5 spaces/100m 2 GLFA

Bike: 1 space/200m 2 GLFA

Loading/ Unloading - 1 HGV bay/1600m 2 GLFA for the first 6400m 2 GLFA
1 HGV bay/5000m 2 GLFA thereafter

BUSINESS ZONE 4 - Suburban Industrial Zone

The Business 4 (Suburban Industrial) Zone includes a number of light industrial and servicing areas in the city generally located within or adjoining suburban living areas. It also includes light industrial areas intended to serve as buffer zones between living zones and the Business 5 (General Industrial) Zone, and servicing areas adjoining some large suburban centres.

DEVELOPMENT STANDARDS[1]:

5.2.1 SITE DENSITY

- The maximum plot ratio per site shall be: 1.0
-

5.2.3 STREET SCENE

- The minimum building setback from road boundaries shall be: Business 4: 6m
- **EXCEPT THAT** for sites with more than one road boundary, the setback from one road boundary may be reduced to 1.5m.
- The minimum building setback from road boundaries opposite a living zone shall be: Business 4 Zone
- Where the separating road has more than two lanes or is an arterial road: 6m
- Where the separating road has only two lanes and is not classified as an arterial road 10m
- **5.2.4 Separation from neighbours-**The minimum building setback from the boundary with a living zone shall be: Business 4 Zones: 3m

5.2.7 LANDSCAPED AREAS

Landscaped areas-Business 4 Zone -10%

Trees:

(i) Sites with road frontages of at least 10 metres shall be planted with a minimum of one tree, plus one additional tree for every 10 metres of road frontage (e.g. 10 metres frontage - 2 trees, 20 metres frontage - 3 trees, etc.).
(ii) Where three or more trees are required these trees shall be planted no more than 15 metres apart, or closer than 5 metres apart.
(iii) Any trees required shall be planted along the road frontage and in front of any buildings on thesite.
(iv) In addition to (i) - (iii) above, one tree shall be planted for every 5 parking spaces required on the site. Trees shall be planted within or adjacent to the carparking area
(vi) Any trees required by this rule shall be of a species capable of reaching a minimum height at maturity of 8 metres and shall be not less than 1.5 metres high at the time of planting.

PROTECTION OF TREES AND LANDSCAPING

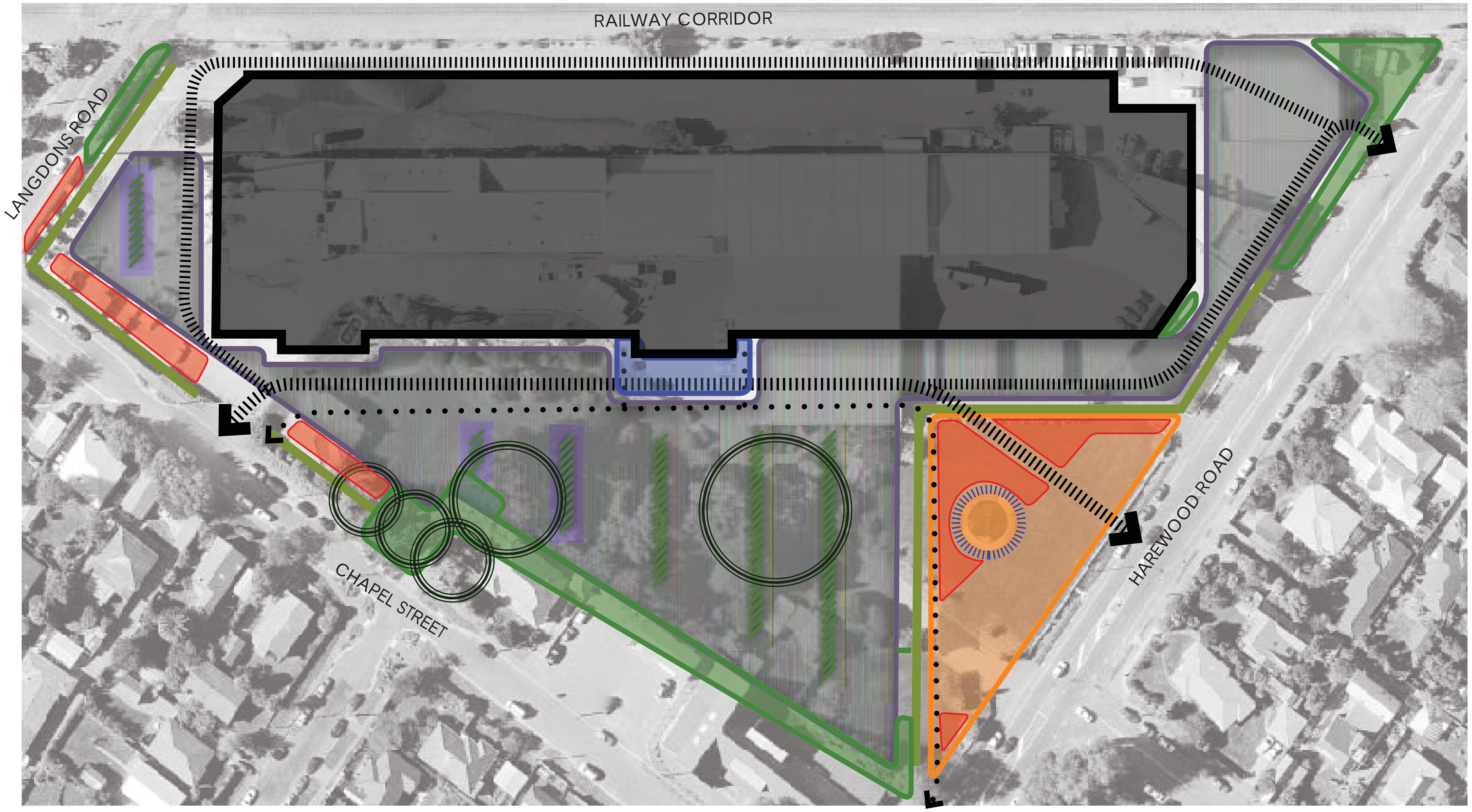
(i) Any trees required under Clause (b) above shall be located within a landscaping strip (see Clause (b)), or within a planting protection area around each tree, with a minimum dimension or diameter of 1.5 metres.
(ii) No more than 10% of any landscaping strip (see Clause (a) and planting protection area shall be covered with any impervious surfaces.
(iii) Landscaping strips or planting protection areas adjacent to a road boundary or adjacent to or within a carparking area shall be provided with wheel stop barriers to prevent damage from vehicles.
Such wheel stop barriers shall be located at least 1 metre from any tree.

1.Volume 3 : Part 3 Business Zones : 5.2 Development standards - Business 3, 3B, 4, 4P, 4T, 5, 6, 7 and 8 Zones

See also *Volume 3 : Part 3 Business Zones : 6.5 Business 3, 3B, 4, 4P, 4T, 5, including the Business 5 Zone at Sir James Wattie Drive), 6, 7 and 8 Zones*

MITRE 10 MEGA HAREWOOD ROAD

SPATIAL LAYOUT/ INSPIRATION

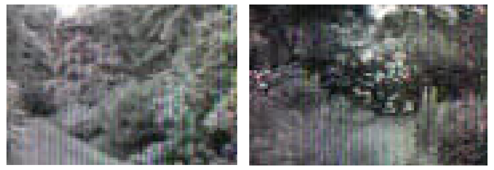


KEY

- 🟪 PARKING
- ▨ PARKING LOT VEGETATION
- 🟩 GARDENESQUE PLANTING
- 🟦 BUILDING ENTRANCE
- 🟧 SHARED AMENITY SPACE
- 🟥 FEATURE PLANTING
- ━ LOW HEDGING - Used to create screens and define spaces.
- ✺ WATER FOUNTAIN- A historic reference and attribute to the gardenesque character of the site. The fountain provides a visual landmark helping to identify the site.
- ◎ HISTORIC TREES - Large historic trees that reflect the growth of the site and buffer the buildings.
- IIIIIIII Proposed access ways throughout the site.
- • • • • Proposed pedestrian access ways.

INSPIRATIONAL IMAGES

GARDENESQUE PLANTING

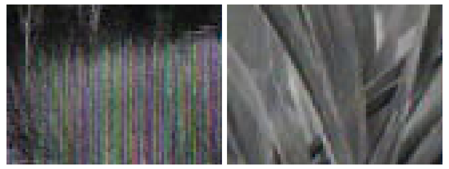


Traditional garden plantings based on transplanted mature shrubs from the site. Plants separated into low, medium and high depending on situation. Generally higher screening plants used at the ends of the road boundaries to provide screening to neighbours and reduce the impact of the proposed building.

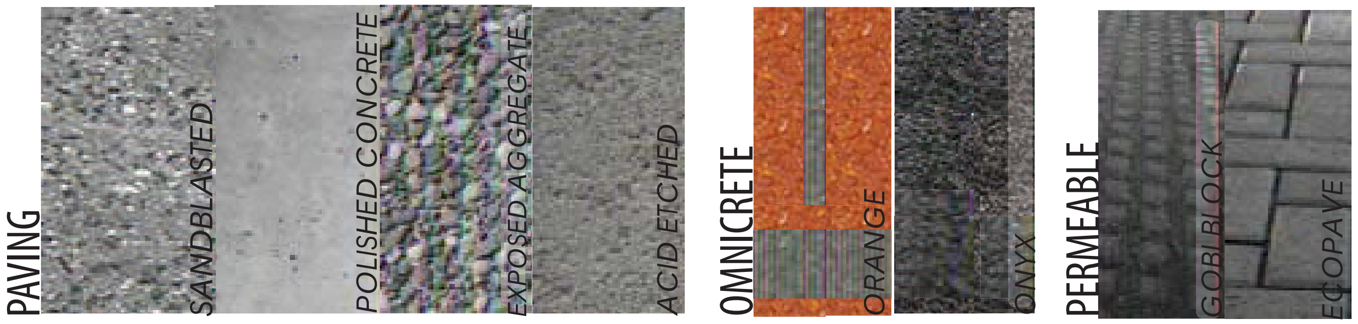
AMENITY PLANTING

A combination of lawned, open space, low hedges and tree planting. This carries the same characteristics from the existing site to the proposal. The low hedging will help define spaces, lessen the impact of the car park and decrease the impact of headlights from vehicles within the site on neighbours.

FEATURE PLANTING



Low, textural and colourful plantings used to provide visual interest to the site and link to the proposed buildings. Generally used at the entrances to the site to provide visual impact.



MITRE 10 MEGA

HAREWOOD ROAD

INTRADOS
ARCHITECTURE

EARTHWORK
landscape architects

MITRE 10 MEGA HAREWOOD ROAD

STAGE 2 - LANDSCAPE CONCEPT

Existing Fence to Remain: The existing high screen fencing shall be retained until the existing tenants transfer the site to Mitre 10 for redevelopment as per the overall landscape plan (between 1-5 years).

Raised Pedestrian Area : Raised concrete area to slow traffic. Refer to Architects site plan for details

Tall Plantings: To soften the southernmost edge of the building. Details to be confirmed

Extent of Existing Low Wall:

Existing Council Planting: remove existing tired plantings and replant council area to integrate area with new design style

Existing Water Fountain: With open lawn area. Additional feature paving around the water feature and low hedging defines the pedestrian space and partially screens Asphalt carpark

Old Sanitarium Entry To Be Retained : Existing wall to frame new pedestrian connection to Mitre 10 Building,

Christchurch City Council

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Approved Resource Consent Plan

25/02/2015

Hardscape Key

▬	**Proposed Concrete Paving :** Details to be confirmed
▭	**Permeable Paving :** Gobi blocks or similar installed to allow for water penetration through the carpark surface,
▨	**Crazy Paving:** Utilise existing Halswell stone in feature areas as shown
▥	**Resin Surfacing:** omnicrete or similar to define pedestrian areas

Furniture and Feature Key

▬	**Signage:** Refer to architects Plans for details, feature planting around base as shown
●	**Possible Seating:** Indicative only, details to be confirmed
┅	**Armourfence palisade fencing or similar :** Refer to architects plans for details
━	**Low Wall :** Existing wall to remain where possible and extended to accommodate new entranceways and path locations.

Softscape Shrub Key

🟩	**Gardenesque Shady Planting :** Utilise Existing Plantings such as astelia and renga renga lillies under existing trees to remain. Refer to Sheet 11
🟩	**Gardenesque Planting :** Utilise and expand on the existing medium - high plantings. Refer to Sheet 11
🟧	**Feature Planting :** Modern vibrant mass plantings in high profile areas, colours to compliment building. Refer to Sheet 11
━	**Proposed Hedging:** Lonicera nitida. To provide a break between the modern and gardenesque styles. Refer to Sheet 11

Softscape Tree Key

●	**Prunus Yedoensis**	Refer to Sheet 11
●	**Magnolia kobus:**	Refer to Sheet 11
⊙	**Existing Trees To Remain:**	

NORTH 1:1000 @ A3

2

Figure 1. Draft view from St James Ave looking north west into the site

Figure 2. Draft view from Matsons Ave looking north east into the site

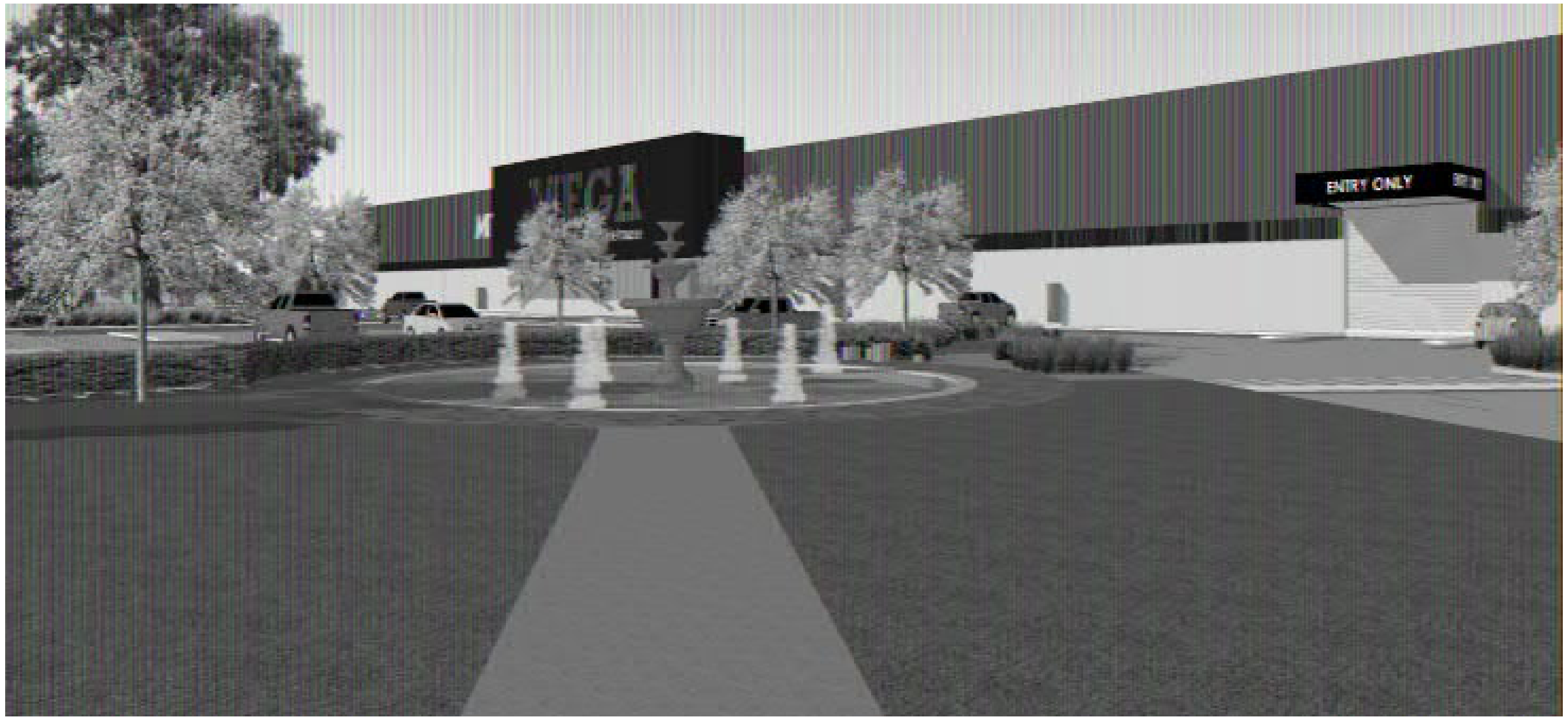

Figure 3. Pathway to water feature

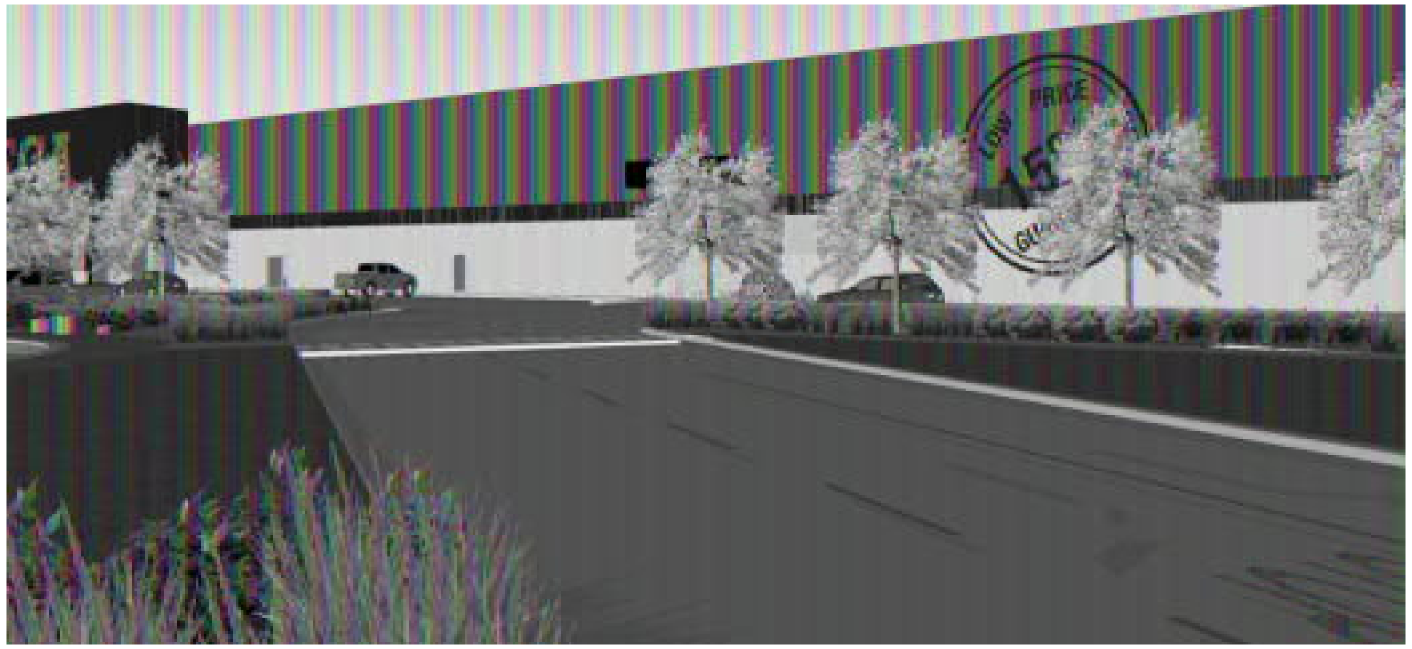

Figure 5. Harewood Road entry view 1

Figure 4. Harewood Road entry view 2

MITRE 10 MEGA HAREWOOD ROAD

SECTIONS

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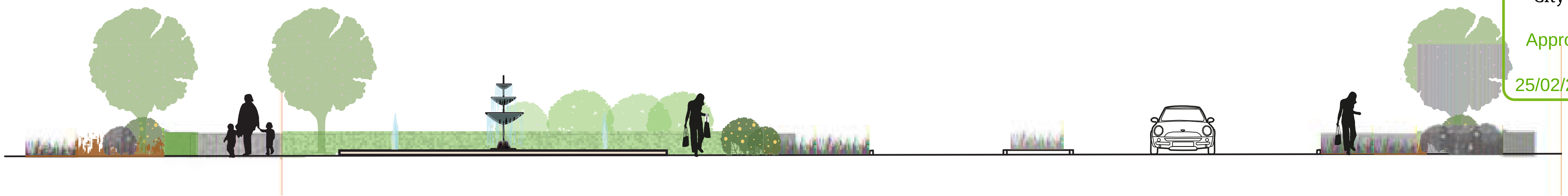
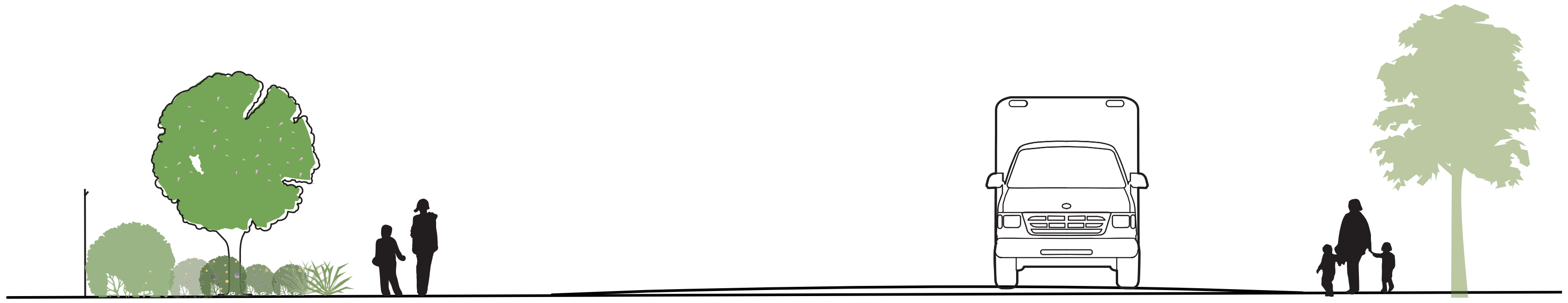
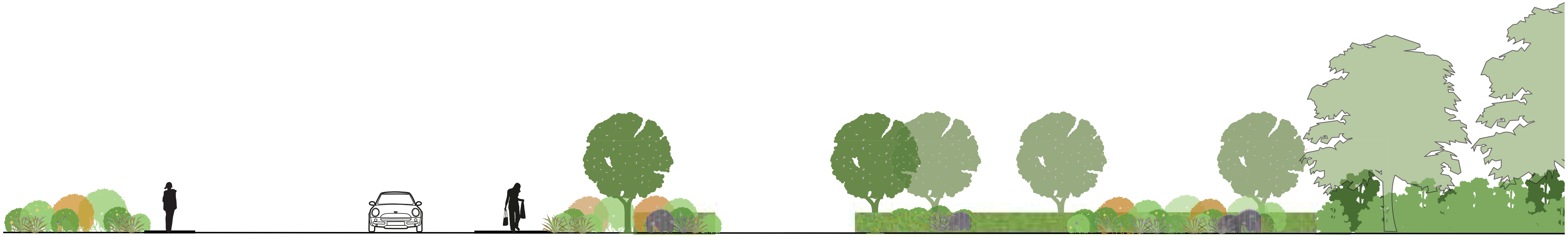


Section A-AA Harewood Road Entrance: Feature planting frames the entry and creates visual impact. The water fountain is complimented by gardenesque style amenity planting which will help to screen the carpark.



Section B-BB: Harewood Road boundary planting provides screening.

Section C-CC: Central Carpark garden bed provides protection around the existing tree.

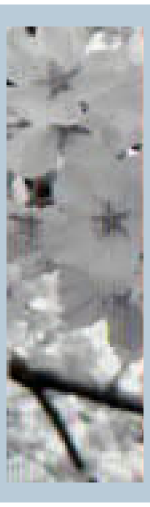


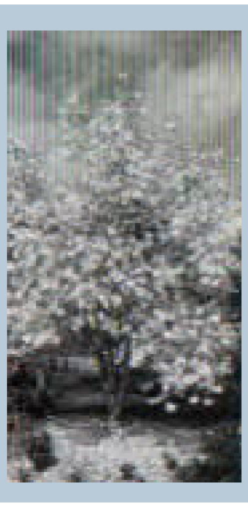
Section D-DD Chapel Street Entrance is highlighted by feature planting to create visual impact . The amenity planting including the hedges work to provide a visual buffer for surrounding residents and to stop car lights shining into neighbouring properties from within the carpark

Not To Scale

MITRE 10 MEGA HAREWOOD ROAD INDICATIVE PLANTING PROPOSAL

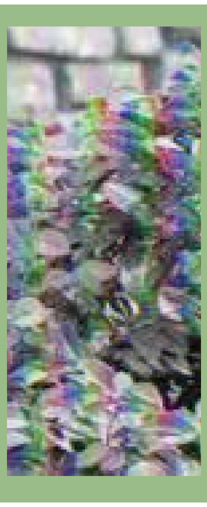
TREES

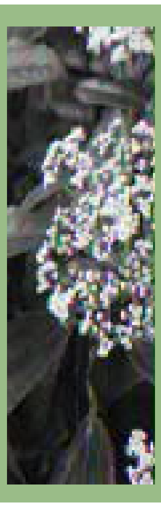

Prunus Yedoensis Grade: 2.0m
Mature Height: 4m


Magnolia Kobus Grade: 2.0m
Mature Height: 10m

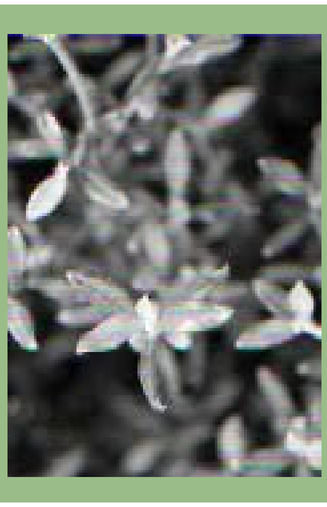
GARDENESQUE - HIGH

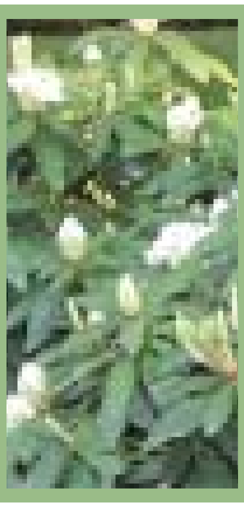

Fatsia Japonica Grade: PB5
Mature Height: 2.0m


Loropetalum 'China Pink' Grade: PB5
Mature Height: 1.5m

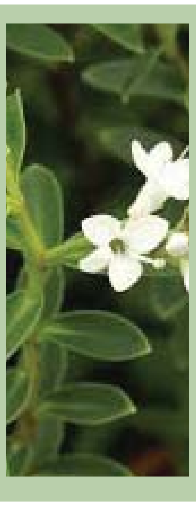

Viburnnum Davidii Grade: PB5
Mature Height: 1.5m

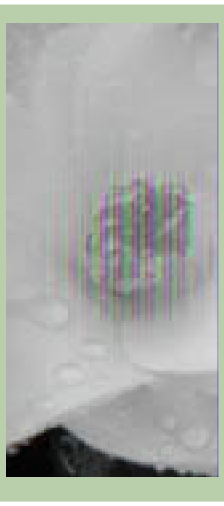

Camellia SPP Grade: PB5
Mature Height: Varies

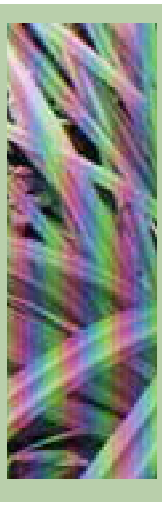

Corokia "Bronze King" Grade: PB5
Mature Height: Varies

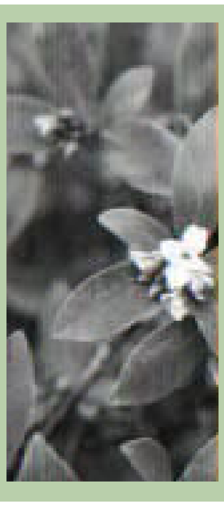

Rhododendron SPP Grade: PB5
Mature Height: Varies

GARDENESQUE - MED

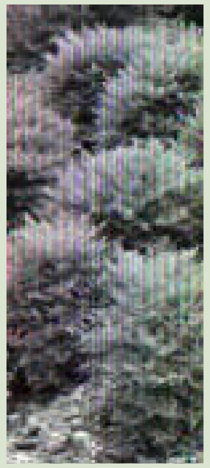

Hebe traversi Grade: PB5
Mature Height: 1.2m


Camellia "Dr Crisp Grade: PB5
Mature Height: 1.0

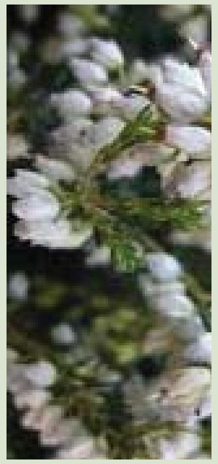

Astelia frgarans Grade: PB5
Mature Height: 1.2

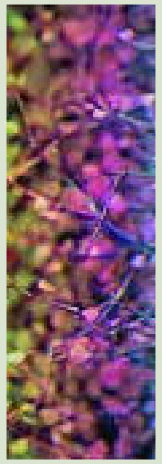

Daphne odora Grade: PB5
Mature Height: 1.0

GARDENESQUE -LOW


Nandina domestica " Gulf Stream" Grade: PB5
Mature Height: 0.6m


Phormium "Emerald Gem" Grade: PB5
Mature Height: 0.7m


Erica "Springwood White"G rade: PB5
Mature Height: 0.3m

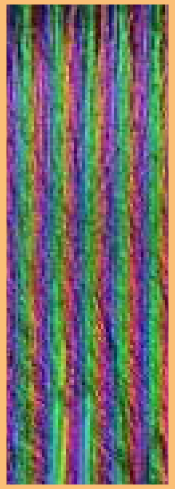

Muehlenbeckia astoinii Grade: PB5
Mature Height: 0.5m

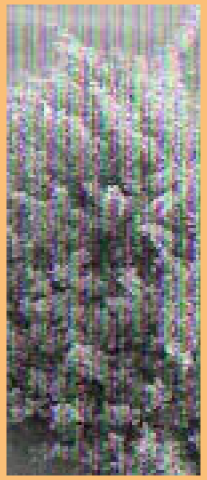

Poa cita Grade: PB5
Mature Height: 0.5m

HEDGING

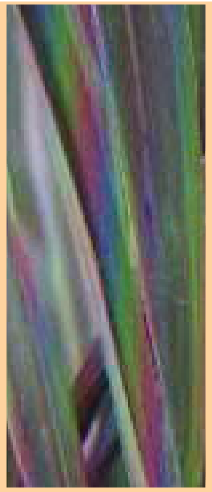

:Lonicera nitida Grade: PB5
Mature Height: 0.75m

FEATURE PLANTING - HIGH


Cornus alba Grade: PB40
Mature Height: 2.0m

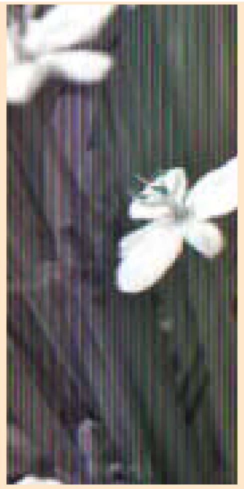

Coprosma "Rainbow" Grade: PB18
Mature Height: 1.5m

FEATURE PLANTING - MED


Phormium "Chocomint" Grade: PB5
Mature Height: 1.2m

FEATURE PLANTING - LOW


Hebe topiara Grade: PB5
Mature Height: 0.5m


Libertia "Taupo Sunset" Grade: PB3
Mature Height: 0.5m


Coprosma "Lobster" Grade: PB5
Mature Height: 0.6m

MITRE 10 MEGA HAREWOOD ROAD *Stage One Landscape Plan & Tree Locations*

MITRE 10 MEGA

HAREWOOD ROAD

INTRADOS
ARCHITECTURE

EARTHWORK
landscape architects

Date: 18th September 2014 | File E14016

MITRE 10 MEGA HAREWOOD ROAD

STAGE 1 - LANDSCAPE CONCEPT

Existing Fence to Remain: The existing high screen fencing shall be retained until the existing tenants transfer the site to Mitre 10 for redevelopment as per the overall landscape plan (between 1-5 years).

Raised Pedestrian Area : Raised concrete area to slow traffic. Refer to Architects site plan for details

Tall Plantings or Possible Green wall: To soften the southernmost edge of the building. Details to be confirmed

Extent of Existing Low Wall:

Existing Council Planting: remove existing tired plantings and replant council area to integrate area with new design style

Existing Water Fountain: With open lawn area. Additional feature paving around the water feature and low hedging defines the pedestrian space and partially screens Asphalt carpark

Stage 1 Plan Description : The proposed interim stage 1 plan allows for partial development of the site while the existing Sanitarium Office and service area is retained. This service area will be developed as part of the overall landscape plan once Sanitarium is completely disestablished from the site (within 1-5 Years)

During the Stage 1 the Northern end of Chapel Street and Langdons Road frontages will be maintained at the current standard.

The existing Sanitarium building will effectively diminish the bulk of the stage 1 proposal from Langdons Road and Chapel street north . The retention of the existing cedars along Chapel Street will mitigate the effects of the temporary garden centre from Chapel Street.

Old Sanitarium Entry To Be Retained : Existing wall to frame new pedestrian connection to Mitre 10 Building,

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Hardscape Key

▨ Proposed Concrete Paving : Details to be confirmed

▨ Permeable Paving : Gobi blocks or similar installed to allow for water penetration through the carpark surface,

▨ Crazy Paving: Utilise existing Halswell stone in feature areas as shown

▨ Resin Surfacing: omnicrete or similar to define pedestrian areas

Furniture and Feature Key

▬ Signage: Refer to architects Plans for details, feature planting around base as shown

● Possible Seating: Indicative only, details to be confirmed

--- Armourfence pallisade fencing or similar : Refer to architects plans for details

▬ Existing Low Wall to Remain :All existing pedestrian gates into lawn areas shall remain.

▬ Proposed New Sections of Low Wall: Existing wall shall be modified where required to accomodate new entranceways.

Softscape Shrub Key

▨ Gardenesque Shady Planting : Utilise Existing Plantings such as astelia and renga renga lillies under existing trees to remain. Refer to Sheet 11

▨ Gardenesque Planting : Utilise and expand on the existing medium - high plantings. Refer to Sheet 11

▨ Feature Planting : Modern vibrant mass plantings in high profile areas, colours to compliment building. Refer to Sheet 11

▬ Proposed Hedging: Lonicera nitida. To provide a break between the modern and gardenesque styles. Refer to Sheet 11

Softscape Tree Key

● Prunus Yedoensis Refer to Sheet 11

● Magnolia kobus: Refer to Sheet 11

○ Existing Trees To Remain:

← NORTH 1:1000 @ A3

2

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Date: 18th September 2014 | File E14016

MITRE 10 MEGA HAREWOOD ROAD EXISTING TREES TO BE REMOVED/RETAINED

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Note: The following tree list shows the extent of medium to large grade tree removal and retention.

Existing Trees		Notes
1	Taxus baccata	Remove
2	Taxus baccata	Remove
3	Flowering cherries	Remove and re-locate healthy specimens to locations shown if possible
4	Liquidambar	Retain if possible
5	Conifer	Remove
6	Cotoneaster	Remove
7	Rhododendron	Remove and re-locate if possible
8	Lophomyrtus spp	Remove
9	Conifer	Remove
10	Flowering cherry	Remove and re-locate healthy specimens to locations shown if possible
11	Prunus cerasifera	Remove
12	Fan palm	Remove
13	Fan palm	Remove
14	Unknown tree	Remove
15	Rhododendron Large	Remove
16	Rhododendron Large	Remove
17	Conifer	Remove
18	Conifer	Remove
19	Camellia	Remove
20	Elm Tree	To remain
21	Large conifer	Retain if possible
22	Large conifer	To Remain
23	Large conifer	To Remain
24	Large conifer	To Remain
25	Tulip tree	To Remain
26	Elm tree	Remove
27	Prunus cerasifera	Remove

Existing Trees		Notes
28	Kowhai	Remove
29	Silver Birch	Remove
30	Magnolia grandiflora	Remove
31	Conifer - Blue Spruce	Remove
32	Rhododendron - Large	Remove
33	Rhododendron - Large	Remove
33	Flowering cherry	Remove and re-locate healthy specimens to locations shown if possible
34	Camellia	Remove and re-locate healthy specimens to locations shown if possible
35	Gleditsia spp.	To Remain
36	Silver Birch	Remove
37	Large conifer	Remove
38	Unknown tree	Remove
39	Cabbage tree	Remove
40	Willow	Remove

ANNEXURE F: ECOLOGICAL REPORT

Kruses Drain

Ecological Assessment
Prepared for R & H Investments Ltd

20 June 2014

Boffa Miskell

Document Quality Assurance

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Cover photograph: Kruses Drain looking downstream, May 2014

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Appendices

Appendix 1: Ryder Consulting – Macroinvertebrate Processing

Figures

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Figure 2. The 130 m reach of Kruses Drain within the Sanitarium site from upstream (top left), mid (top right and bottom left) to downstream (bottom right). Note the negligible flow, high in-stream organic and sediment conditions and sparse exotic riparian plantings along much of the waterway. 12

Figure 3. Average macroinvertebrate community composition (%) calculated from the three kick-net samples taken along Kruses Drain, 27 May 2014. Annelida = oligochaete worms; Crustacea = seed shrimp ostracods; Diptera = chironomid midge fly larvae; Mollusca = snails and freshwater clams; and Platyhelminthes = freshwater flatworm. 14

Figure 4. Size distribution of shortfin eels (*Anguilla australis*) captured using electric-fishing techniques from a 130 m survey reach of Kruses Drain within the Sanitarium site. 14

Executive Summary

R & H Investments Ltd is considering developing the existing Sanitarium site in Papanui, Christchurch. As part of this potential commercial development, the 130 m reach of Kruses Drain that flows through the site may need to be piped. This reach is classified as an “environmental asset waterway” in the Christchurch City Plan and, as such, piping of this waterway is a discretionary activity.

R & H Investments Ltd commissioned Boffa Miskell Ltd to undertake an assessment of the freshwater ecology of this section of Kruses Drain. This study examines the exiting environmental condition and ecological values of Kruses Drain, identifies any potential environmental effects associated with piping the waterway, and makes recommendations of ways to mitigate these potential effects.

The health of Kruses Drain (within the Sanitarium site) can be considered very poor, with low DO, potentially fluctuating water temperatures, slow flowing and sometimes stagnant water, and high levels of deposited sediments with high concentrations of heavy metals. A Stream Ecological Valuation of the reach also indicated that there is very limited ecological function remaining. Furthermore, there was only one species of fish found, the shortfin eel, which is considered the most tolerant of freshwater fish species, while the macroinvertebrate community was depauperate and dominated by pollution-tolerant taxa. The MCI calculated for the reach was very low, indicating ‘poor’ water quality with probable severe enrichment.

It is anticipated that piping of Kruses Drain will result in the total loss of habitat, including that used by shortfin eel. However, given the current condition and ecological value of the waterway, and that this reach is essentially isolated due to the extensive piping immediately up- and downstream of the Sanitarium site, the significance of the effects is expected to be less than minor. We recommended that the shortfin eel population within Kruses Drain be captured and relocated to a suitable alternative waterway. Discussions between R & H Investments and the Christchurch City Council around some monetary compensation may also be warranted due to the loss of the Council’s environmental asset waterway.

1.0 Introduction

R & H Investments Ltd commissioned Boffa Miskell Ltd (Boffa Miskell) to undertake an assessment of the freshwater ecology of Kruses Drain, where it flows through the Sanitarium grounds in Papanui, Christchurch. R & H Investments Ltd is considering buying the Sanitarium site for a new commercial development, and therefore applying for a consent from the Christchurch City Council (CCC) to pipe the existing, above ground portion of Kruses Drain as part of this proposed land development project. This study examines the existing environmental condition and ecological values of this section of Kruses Drain, discusses any potential environmental effects of piping the waterway, and makes recommendations of ways to mitigate any potential adverse ecological effects. This report does not consider potential effects associated with other activities that may be required as part of the proposed land development (e.g. earthworks, stream diversion).

2.0 Scope

R & H Investments Ltd commissioned Boffa Miskell to conduct the ecological survey in May 2014, in order to:

- Describe the existing ecological values of Kruses Drain (where it flows through the Sanitarium site), with respect to in-stream and riparian physical habitat, macrophyte (aquatic plants) and periphyton (aquatic algae) cover, and fish and macroinvertebrate communities;
- Assess the potential effects of piping the waterway; and
- Make any recommendations to mitigate any potential adverse ecological effects of piping Kruses Drain.

3.0 Methods

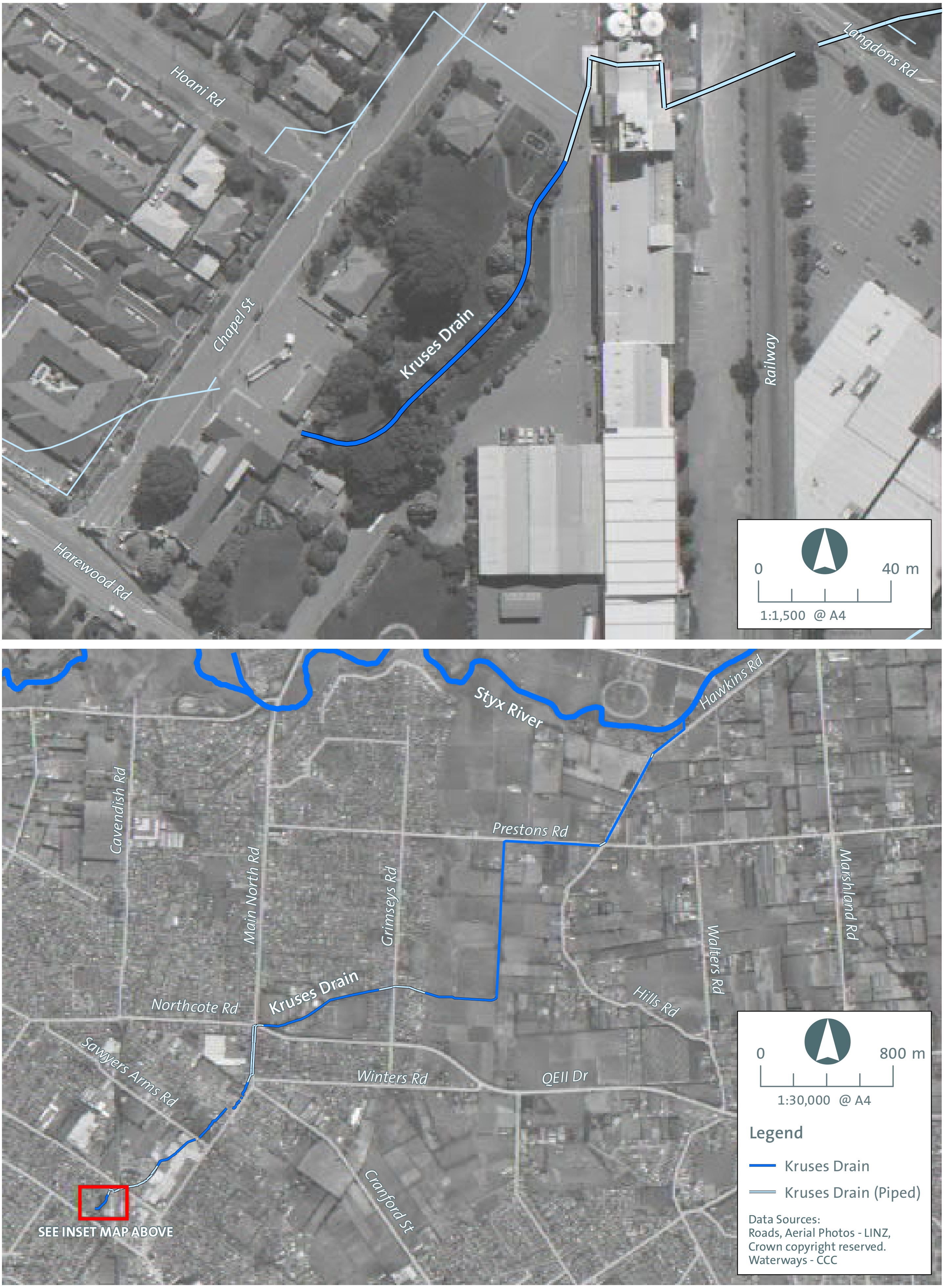
3.1 Site Location

Kruses Drain, a tributary of the Styx River, flows through a mix of residential, commercial and rural land (Figure 1). It originates in Papanui, northern Christchurch, largely fed by the piped stormwater network from the Chapel Street area. There is a 130 m open section that flows in a north-west direction through the Sanitarium site, before again being piped for some 500 m, under the railroad, Langdons Road, and along Sisson Drive before again flowing above ground around the eastern and northern perimeter of Northlands Mall. The waterway is then open (above ground) for much of its remaining path, except for approximately 370 m of piped section from the intersection of Cranford Street and Main North Road, and another 280 m section under Grimseys Road. Kruses Drain joins Horners Stream and then the Styx River (approximately 2.5 km downstream).

Under the Christchurch City Plan (CCC 2012), the majority of Kruses Drain is classified as a “utility waterway” (defined as “an artificial waterway without a natural floodplain but often having potential for enhancement”). However, the 130 m section within the Sanitarium site (and the section around the perimeter of Northlands Mall) is classified as an “environmental asset” waterway. Environmental asset waterways generally have some natural character with a high potential for restoration. Filling, excavation, or disturbance of soil within 7 m of any environmental asset waterway is a discretionary activity (CCC 2012).

Three sections (an upstream, mid and downstream section) of the 130 m reach of Kruses Drain (within the Sanitarium site) were surveyed for riparian and in-stream habitat conditions, and macroinvertebrate and fish communities on 27 May 2014 (Figure 1).

File Ref: C14066_001_Kruses_Drain.mxd



Data Sources:
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ECOLOGICAL ASSESSMENT
Kruses Drain

Date: 17 June 2014
Plan prepared for CCC by Boffa Miskell Limited
Project Manager: tanya.blakely@boffamiskell.co.nz | *Drawn:* GWh | *Checked:* CMu

Figure 1

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3.2 Water and Sediment Quality

Spot measures of pH, dissolved oxygen (DO, ppm and % saturation), specific conductivity (µS_{25} / cm) and water temperature (°C) were recorded at each site with a TPS WP82 Dissolved Oxygen meter s/n V1809 and a TPS WP81 pH / conductivity meter s/n T3579.

Three samples of deposited inorganic sediment were collected from the Kruses Drain survey reach (from upstream, mid, and downstream) and stored, separately, in PSoil250 plastic jars. These sediment samples were sent to the International Accreditation New Zealand (IANZ) accredited Hills Laboratories (Christchurch) and analysed for total recoverable arsenic, cadmium, chromium, copper, nickel, lead, and zinc using standard methods (US EPA 200.2).

3.3 Habitat Assessment

The in-stream and riparian habitat assessments were conducted in accordance with Protocol P2 of Harding et al. (2009). In summary, habitat at each site was assessed at two spatial scales: general habitat conditions were estimated at the reach scale; and more detailed habitat characteristics were measured across nine transects established along the 130 m survey reach.

- General habitat condition estimates were made along the entire survey reach:
  - The surrounding land use and type;
  - Amount of canopy cover over the stream surface;
  - The general materials covering the lower banks (e.g. grass, earth, corrugated iron, concrete posts and wooden sleepers);
  - Amount of bank erosion, and vegetation cover on the upper and lower banks.
  - Percentage of riffle, pool and run habitats;
  - The degree that coarse substrates were surrounded by fine sediments (i.e. embeddedness);
  - General substrate composition (i.e. percentage of stream bed comprised of bedrock, concrete / bricks, boulders (>256 mm), large cobbles (128-256 mm), small cobbles (64-128 mm), pebbles (4-6 mm), gravel (2-4 mm), sand (>0.01-2 mm), and mud / silt / clay (<0.01 mm)); and
  - Percent cover of submerged and emergent macrophytes, filamentous algae and algal mats.
- Detailed habitat characteristics were measured at nine of the ten Stream Ecological Valuation (SEV) cross sections (see Section 3.6 below for details on SEV):
  - Bank measurements, including angle (°), height (cm), and undercut (cm), as well as amount of overhanging (cm), floating (cm) and emergent (cm) vegetation was recorded on the left and right banks of each transect at each site. Total channel width and total wetted width at each of the three transects were also recorded; and
  - Soft sediment depth (mm) was measured with a 1 m metal ruler at distances 10%, 30%, 50%, 70%, and 90% across the channel at each cross section.

A substrate index (SI), modified from Jowett & Richardson (1990), was calculated for the survey reach using the formula:

- SI = (0.07% boulder) + (0.06% large cobble) + (0.05% small cobble) + (0.04% pebble) + (0.03% gravel) + (0.02% sand) + (0.01% silt) + (0.01% concrete / bedrock).

The calculated SI ranged between 1 and 7, where an SI of 1 indicated 100% silt and 7 indicated 100% boulders. That is, the larger the SI, the coarser the overall substrate.

Average wetted width, water depth, soft-sediment depth, and velocity were calculated from the multiple measures collected along the 130 m survey reach. Similarly, the multiple bank attributes (lower and upper bank height, bank undercut) measured along the reach were expressed as average values for a site.

3.4 Benthic Macroinvertebrate Community

Macroinvertebrates (e.g., insects, snails and worms that live on the stream bed) can be extremely abundant in streams and are an important part of aquatic food webs and stream functioning. Macroinvertebrates vary widely in their tolerances to both physical and chemical conditions, and are therefore used regularly in biomonitoring, providing a long-term picture of the health of a waterway.

The macroinvertebrate community was assessed at each of three equidistant locations (downstream, mid, and upstream) along the 130 m survey reach. A single and extensive composite kick-net (500 µm mesh) sample was collected from each location in accordance with protocols C1 and C2 of Stark et al (2001). Approximately 0.6 m^2 of stream bed was sampled at each of the three locations (i.e. each kick net sampled approximately 0.3 m x 2.0 m of stream bed), including sampling the variety of microhabitats present (e.g. stream margin, mid channel, undercut banks, and macrophytes where present) so as to maximise the likelihood of collecting all macroinvertebrate taxa present at a site, including rare and habitat-specific taxa.

Macroinvertebrate samples were preserved, separately, in 70% ethanol prior to sending to Ryder Consulting, Dunedin, for identification and counting in accordance with protocol P3 of Stark et al (2001) (see Appendix 1 for further details on processing methods).

The following macroinvertebrate metrics and indices were calculated, where the three kick-net samples collected from along Kruses Drain were treated as replicates (i.e. an average was calculated from these three samples), to provide an indication of stream health:

- **Total abundance** – the average number of individuals collected in three kick-net samples collected along Kruses Drain. Macroinvertebrate abundance can be a useful metric as it tends to increase in the presence of organic enrichment, particularly for pollution-tolerant taxa.

- **Taxonomic richness** – the average number of macroinvertebrate taxa recorded from three kick-net samples. Streams supporting high numbers of taxa generally indicate healthy communities, however, the pollution sensitivity / tolerance of each taxon needs to also be considered (e.g. Macroinvertebrate Community Index).

- **EPT taxonomic richness** – the average number of Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies) from three kick-net samples. These three insect orders (EPT) are generally sensitive to pollution and habitat degradation and therefore the numbers of these insects present provide a useful indicator of degradation. High EPT richness suggests high water quality, while low richness indicates low water or habitat quality.

- **EPT taxonomic richness (excl. hydroptilids)** – the average number of EPT taxa excluding caddisflies belonging to the family Hydroptilidae, which are generally more tolerant of degraded conditions than other EPT taxa.

- **%EPT richness** – the average percentage of macroinvertebrates that belong to the pollution-sensitive EPT orders found in the three kick-net samples, i.e. relative to the average richness of all macroinvertebrates collected from the survey reach. High %EPT richness suggests high water quality.

- **%EPT (excl. hydroptilids**) – the average percentage of EPT taxa, excluding the more pollution-tolerant hydroptilid caddisflies.
- **Macroinvertebrate Community Index (MCI-sb)** – this index is based on tolerance scores for individual macroinvertebrate taxa found in soft-bottomed streams (Stark and Maxted 2007). These tolerance scores, which indicate a taxon’s sensitivity to in-stream environmental conditions, are summed for the taxa present at a site, and multiplied by 20 to give MCI-sb values ranging from 0 – 200.
- **Quantitative Macroinvertebrate Community Index (QMCI-sb)** – this is a variant of the MCI-sb, which instead uses abundance data from quantitative macroinvertebrate sampling. The QMCI-sb provides information about the dominance of pollution-sensitive species at a site.

Table 1 provides a summary of how MCI-sb and QMCI-sb scores can be used to evaluate stream health.

Table 1. Interpretation of MCI-sb and QMCI-sb scores for soft- bottomed streams (Stark & Maxted 2007).

Stream health	Water quality descriptions	MCI	QMCI
Excellent	Clean water	>119	>5.99
Good	Doubtful quality or possible mild enrichment	100-119	5.00-5.90
Fair	Probable moderate enrichment	80-99	4.00-4.99
Poor	Probable severe enrichment	<80	<4.00

Note, the MCI and QMCI were developed primarily to assess the health of streams impacted by agricultural activities and should be interpreted with caution in relation to urban systems.

3.5 Fish Community

The fish community was surveyed along the entire 130 m reach of Kruses Drain using a single pass with a Kainga EFM300 backpack mounted electro-fishing machine (NIWA Instrument Systems, Christchurch). Fish were captured in a downstream push net or in a hand (dip) net and temporarily held in buckets. All fish were then identified, counted and measured (length, mm) before being returned alive to the stream.

The New Zealand Freshwater Fish Database (NZFFD) was also searched for previous fish records in Kruses Drain.

3.6 Stream Ecological Valuation – Ecological Function

A Stream Ecological Valuation (SEV) was conducted along the entire 130 m reach of Kruses Drain that flows through the Sanitarium site (Neale et al. 2011). The SEV system was originally developed for the Auckland Regional Council as a tool to quantify ecological functions and values of waterways and to develop an ‘exchange currency’ for ‘off-setting’ mitigation (e.g. when piping or modifying small streams during development) based on current and expected stream quality (Storey et al. 2011). The SEV system has been used, predominantly in the North Island, but is generally applicable to waterways across New Zealand.

In summary, the SEV involves the measurement of a range of parameters that are then entered into the ‘SEV calculator’ to assess the 14 functions and 4 broad functional types for the study reach:

- **Hydraulic functions** – natural flow regime, floodplain effectiveness, connectivity for natural species migrations, and natural connectivity to groundwater;
- **Biogeochemical functions** – water temperature control, dissolved oxygen levels maintained, organic matter input, in-stream particle retention, and decontamination of runoff of pollutants;
- **Habitat provision functions** – fish spawning habitat, aquatic fauna habitat; and
- **Biodiversity provision functions** – fish fauna intact, invertebrate fauna intact, riparian vegetation intact[1].

An overall SEV score, based on the following parameters, can be calculated for the site, where the SEV score is between 0 (no remaining ecological function) and 1 (intact ecological function). Refer to Neale et al. (2011) for a full description of the SEV methodology.

A formula can then be applied to generate an Environmental Compensation Ratio, which gives an indication of the relative amount of stream rehabilitation (or compensation) that might be required to replace the functional values that would be lost due to a proposed activity (e.g. piping).

The parameters measured for the SEV are conducted at both the reach scale and along ten cross sections established within the reach (Neale et al. 2011).

The ten cross sections were established along the entire 130 m reach of Kruses Drain within the Sanitarium site. The first cross section was located at the downstream most end of Kruses Drain, immediately prior (upstream of) to where it is piped under the buildings before leaving the site. The remaining nine cross sections were then spaced at approximately 10 - 12 m intervals along

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[1] The macroinvertebrate and fish community information collected for Kruses Drain was incorporated into the SEV score as described in Neale et al. (2011).

the waterway in an upstream direction. The final (tenth) cross section was located immediately downstream of the piped input to Kruses Drain at the perimeter of the Sanitarium site.

The following parameters were measured at each cross section:

- Velocity was estimated using the floating particle method; the time a short stick took to travel 1 m was measured three times. The velocity estimate was calculated as '*distance travelled / time taken'*;
- Water depth (mm) was measured with a 1 m metal ruler at distances 10%, 30%, 50%, 70% and 90% across the stream channel;
- Substrate composition was assessed using the Wolman method, where the B-axis (i.e. second longest axis) of ten particles randomly was measured. This included an assessment of woody debris (i.e. sticks and logs). Each particle measured was then categorised as silt/sand (< 2mm), small gravel (2-8 mm), small medium gravel (8-16 mm), medium large gravel (16-32 mm), large gravel (32-64 mm), small cobble (64-128 mm), large cobble (128-256 mm), boulder (> 256 mm), bedrock, small wood (< 50 mm), medium wood (50-100 mm), or large wood (> 100 mm);
- The amount of organic material (i.e. leaf litter, periphyton, moss, macrophytes) overlying the substrate was assessed;
- Proportional cover of macrophytes (aquatic plants) present in a 1 m band was recorded;
- Amount of shade at the water surface, from both vegetation and topography, was estimated, and categorised as very high shading (> 90%), high shading (71-90%), moderate shading (51-70%), low shading (31-50%), very low shading (11-30%), or no effective shading (< 10%); and
- Permanence of vegetation shading (i.e. the proportion of canopy cover in the immediate riparian zone that was not deciduous) was estimated.

In addition to the above cross-sectional measures, the following SEV parameters were measured or estimated along the entire 130 m reach:

- The number and size of stormwater pipes and drains that flowed into the reach;
- The number and type of artificial barriers to fish and invertebrate migration;
- Assessment of the type and extent (proportion) along the reach of:
    - Channel modification (e.g. channelization, culverts, weirs);
    - Channel lining (i.e. artificial bank and / or bed lining);
    - Riparian vegetation (20 m either side of the waterway);
    - Intactness of riparian zone (20 m either side of the waterway);
    - Filtering capacity (i.e. run off) of the riparian zone;
    - Connection between riparian zone and waterway channel; and
    - Interaction between flood waters and floodplain (taking into account artificial barriers to floodplain connectivity – e.g. channel widening, artificial bank lining);
- Indicators of oxygen reducing processes present, categorised as *optimal*, *sub-optimal*, *marginal*, or *poor*;
- General assessment of in-stream and riparian physical habitat quality; and
- Assessment of the extent and quality of Galaxiidae spawning habitat.

4.0 State of the Existing Environment

4.1 Water and Sediment Quality

A summary of the water and sediment quality measures taken in Kruses Drain on 27 May 2014 is presented below. Sampling occurred approximately 18 hours after a small fresh that was preceded by several weeks' of low flows. Some stormwater discharges would have been occurring in the 24 hours prior to sampling.

4.1.1 Spot measures of basic water chemistry and temperature

Water temperature was cool, measuring 10 °C on the day of sampling. New Zealand's freshwater fauna have wide ranging thermal tolerances; stoneflies are often absent from waterways with summer temperatures >19 °C (Quinn and Hickey 1990), and the mayfly *Deleatidium* has an upper tolerance somewhere around 22 °C, while snails (e.g. *Potamopyrgus*) are generally less temperature sensitive with an upper limit of around 31 °C (see Cox and Rutherford 2000, and references therein). This water temperature recorded in late autumn is well within the tolerance levels of most aquatic biota (Quinn et al. 1994) and met the recommended guidelines of the proposed Canterbury Land and Water Regional Plan (pLWRP) (i.e. maximum water temperature of 20 °C for spring-fed (plains) urban waterways). However, it is possible that summer temperatures of the unshaded and slow flowing areas within this reach of Kruses Drain may rise to temperatures some taxa, especially the sensitive EPT taxa, will not tolerate.

Dissolved oxygen (DO) levels were relatively low with 65% saturation and 7.06 mg / l recorded in the upper section of the reach. Although sensitivity to low levels of DO is species specific, most freshwater fish species will become distressed when DO falls below 2 – 4 mg / l and death usually occurs at concentrations below 2 mg / l. Large fish are often affected by low DO before smaller fish. The recorded DO concentration of 65% saturation was below (i.e. the guideline was not met) the minimum of 70% saturation recommended in the pLWRP for spring-fed – plains, urban waterways.

pH was circum-neutral (7.2) and within the ANZECC trigger values for lowland streams (pH 7.2 – 7.8; ANZECC 2000). Specific conductivity, which can be indicative of pollution (e.g. dissolved heavy metals) was moderately low (103.4 µS / cm), and what might be expected in an urban waterway receiving stormwater contributions.

4.1.2 Heavy metals in deposited sediments

It is important to have a good understanding of heavy metal concentrations in the environment as these can be acutely and chronically toxic to freshwater flora (plants) and fauna (animals) at high concentrations.

Copper, lead and zinc are the most commonly detected heavy metals in urban freshwater ecosystems, while cadmium, chromium, and nickel, and the metalloid arsenic can also be present. These heavy metals (and metalloid) can accumulate on impervious surfaces in urban areas, such as car parks and roads, often as a result of nearby industry and building materials on some houses, and pollutants from motor vehicles. These are then transported into urban waterways during rainfall events, via stormwater discharges.

All seven heavy metals / metalloid tested for were at or above detectible limits in the deposited sediments of Kruses Drain. More importantly, arsenic, copper, and lead exceeded the ANZECC (2000) interim sediment quality guidelines (ISQG) for ISQG-low trigger values recommended for sediment quality in freshwaters (Table 2). Zinc exceeded both the ISQG-low and ISQG-high trigger values in the mid and lower sections of the waterway.

Table 2. Concentrations of six heavy metals (cadmium, chromium, copper, lead, nickel and zinc) and one metalloid (arsenic) in sediment collected from downstream, mid and upstream sections of Kruses Drain within the Sanitarium site on 27 May 2014. The ANZECC (2000) ISQG-low and ISQG-high trigger values are shown for comparative information on recommended guidelines. Values in bold indicate where a metal / metalloid exceed the ISQG-low value, while bold and underline indicate both ISQG-low and ISQG-high trigger values have been exceeded.

Heavy metal / metalloid (total recoverable, mg / kg dry weight)	Upstream	Mid	Downstream	ANZECC (2000) ISQG-low trigger value	ANZECC (2000) ISQG-high trigger value
Arsenic	8	**30**	**30**	20	70
Cadmium	0.35	0.55	0.77	1.5	10
Chromium	31	28	19	80	370
Copper	21	53	**79**	65	270
Lead	**198**	**138**	**189**	50	220
Nickel	11	12	13	21	52
Zinc	**340**	**<u>800</u>**	**<u>1,070</u>**	200	410

4.2 Habitat

Kruses Drain within the Sanitarium site ranged from 1.1 to 2.0 m wide, with an average channel width of 1.5 m and an average wetted width of 1.13 m. The water depth varied along the 130 m survey reach with an average water depth of less than 4 cm. The greatest water depth of 8 cm was found upstream near the stormwater input pipe. The waterway was very shallow and slow flowing in places, particularly in the mid to lower reaches (Figure 2). A piped input from a water fountain was contributing to the flow into the piped network at the downstream most end of the Kruses Drain survey reach.

Soft sediment, of variable depths, dominated the bed substrates. The soft sediment was up to 20 cm in places, with an average soft sediment depth of 11 cm along the survey reach. Leaf litter and fine organic materials were abundant along the waterway. The Substrate Index of 1.2 indicated the bed substrates were dominated by silt and sand, with few coarser substrates present and only in the upper areas of the reach.

Undercut banks, which can provide important in-stream habitat for freshwater fishes, were absent from the survey reach; the banks were reinforced by rock walls along the entire survey reach.

Riparian vegetation was limited in places, with manicured lawns to the water's edge along much of the waterway. Some tall exotic trees, such as willows, rhododendrons and other evergreen species were present in the wider riparian margin. Nevertheless, there was little effective shading from riparian vegetation, except in the mid sections, where the introduced *Gunnera* and native ferns were abundant. No algae was visible growing on the substrates and macrophytes were virtually absent from the waterway, except for two small patches of the native *Nitella hookeri* in the upper section of the reach.

Figure 2. The 130 m reach of Kruses Drain within the Sanitarium site from upstream (top left), mid (top right and bottom left) to downstream (bottom right). Note the negligible flow, high in-stream organic and sediment conditions and sparse exotic riparian plantings along much of the waterway.

4.3 Macroinvertebrate Community

Table 3 gives an overview of the macroinvertebrate community found in Kruses Drain. In summary, a total of 2,534 macroinvertebrates belonging to 10 taxonomic groups were collected in the three kick-net samples with an average total abundance of 844 (±405) macroinvertebrates, and an average taxonomic richness of 8 (±0.3).

The macroinvertebrate community was dominated by molluscs (the ubiquitous native mud snail *Potamopyrgus antipodarium* and the tiny freshwater clam *Sphaerium*) and oligochaete worms. Seed shrimp ostracods (Crustacea) and chironomid midge fly larvae (Diptera, Chironomidae) were present, but generally in low numbers.

All of the macroinvertebrate taxa found were particularly pollution-tolerant taxa, and no 'clean-water taxa' (e.g. caddisflies) were found in Kruses Drain (Figure 3). This absence of caddisflies and the dominance of highly tolerant taxa was also reflected by the MCI-hb and QMCI-hb scores calculated for the site. The average MCI-hb score for Kruses Drain was 56.9 and the average QMCI-hb was 2.5 (Table 3), both of which fell well within Stark and Maxted's (2007)'poor' stream health category, indicating probable severe enrichment (see Table 1).

Table 3. Macroinvertebrate biotic indices from the three kick-net samples collected from along the 130 m reach of Kruses Drain surveyed 27 May 2014. Refer to Section 3.4 for details on the calculation of these biotic metrics. Refer to Table 1 for information on how to interpret the MCI-hb and QMCI-hb scores.

Biotic Indices	Upstream	Mid	Downstream	Average for Kruses Drain
Total abundance	615	1633	286	844 (±405)
Taxonomic richness	9	8	8	8 (±0.3)
EPT richness	0	0	0	0
EPT richness (excl. hydroptilids*)	0	0	0	0
% EPT richness	0	0	0	0
% EPT (excl. hydroptilids*)	0	0	0	0
MCI-hb	55.6	57.5	57.5	56.9 (±0.6)
QMCI-hb	2.1	3.1	2.2	2.5 (±0.3)

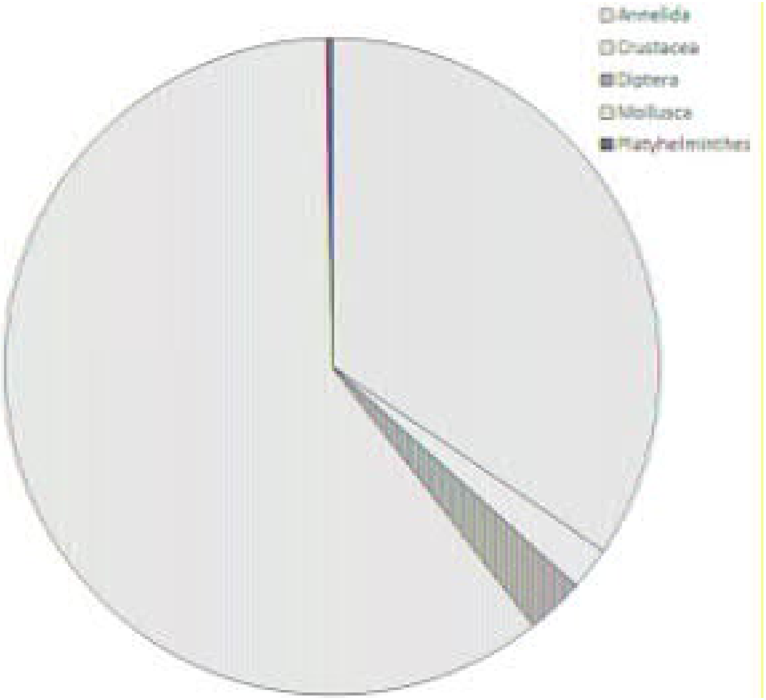

Figure 3. Average macroinvertebrate community composition (%) calculated from the three kick-net samples taken along Kruses Drain, 27 May 2014. Annelida = oligochaete worms; Crustacea = seed shrimp ostracods; Diptera = chironomid midge fly larvae; Mollusca = snails and freshwater clams; and Platyhelminthes = freshwater flatworm.

4.4 Fish Community

Shortfin eel (*Anguilla australis*) was the only species of freshwater fish to be found in Kruses Drain. This migratory species is native to New Zealand, thought to be the most tolerant of native species, and is currently listed as not threatened (Goodman et al. 2013). A total of 61 shortfin eels were captured in the 130 m reach fished ranging in size from 90 to 500 mm in length. The average size was 223 mm (±11 mm), while the majority of eels were less than 300 mm in length (Figure 4).

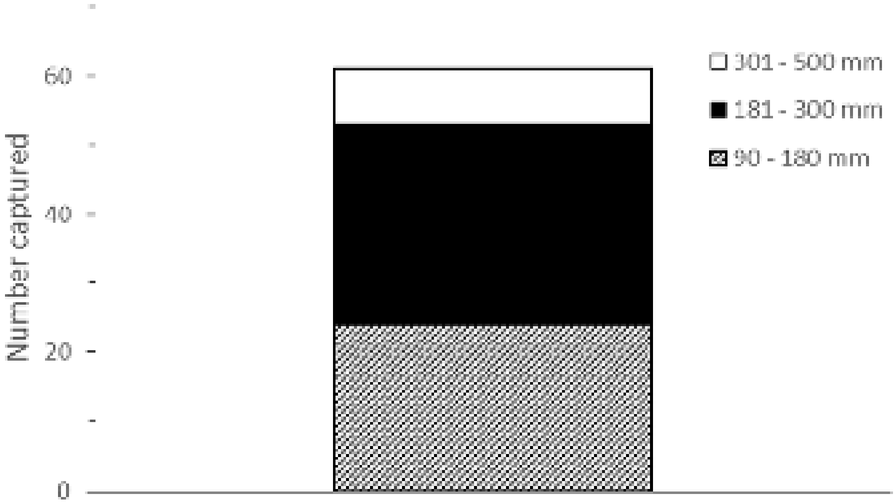

Figure 4. Size distribution of shortfin eels (*Anguilla australis*) captured using electric-fishing techniques from a 130 m survey reach of Kruses Drain within the Sanitarium site.

4.4.1 New Zealand Freshwater Fish Database

There were no records listed for Kruses Drain in the New Zealand Freshwater Fish Database, however, shortfin eels have been previously recorded further downstream in Kruses Drain (downstream of Grimsey's Road and upstream of the confluence with Horner's Stream).

4.5 Stream Ecological Valuation – Ecological Function

The overall SEV score for Kruses Drain was 0.21 out of a possible 1.0, where 0 indicates no remaining ecological function and 1 indicates an intact ecological function. Therefore, the SEV for Kruses Drain indicated that the survey reach currently retains only very limited ecological function.

The SEV consists of four broad functional types (hydraulic, biogeochemical, habitat provision and biodiversity provision). Biodiversity function was the lowest scoring of these four broad functional types, scoring 0.11 (out of a possible maximum of 1.0). Hydraulic function was the next lowest with 0.17 (out of 1.0), then habitat provision function (0.19 out of 1.0) and biogeochemical function (0.29 out of 1.0). Overall, this indicated the low SEV score was influenced by a range of factors (including issues with hydraulic flows, stream structure and water quality, lack of habitat diversity and riparian cover, and associated poor biodiversity values), all of which contributed to the poor ecological functioning of the stream reach.

Although SEV hasn't been applied much (if at all) to waterways in Canterbury, based on knowledge from around the North Island, we anticipate that SEV scores for reference waterways would fall somewhere between 0.7 and 0.8. The literature also suggests that a stream (reach) with an SEV score of less than 0.4 is unlikely to be of sufficient ecological function to warrant restoration (i.e. off-site, rather than on-site, restoration should be applied; Rowe et al. 2008).

5.0 Assessment of Ecological Values

The health of this reach of Kruses Drain can be considered to be very poor, with low DO, potentially fluctuating water temperatures, slow flowing and sometimes stagnant water, lots of deposited sediments with high concentrations of heavy metals, little riparian and poor in-stream habitat availability. This was reflected by the depauperate and pollution-tolerant macroinvertebrate and fish communities, and the low MCI and QMCI values, which indicated 'poor' water quality with probable severe enrichment.

It must be noted that Kruses Drain was found to provide habitat for shortfin eels, however, those captured (and seen but not captured) in Kruses Drain were mainly small, juvenile fish. This may indicate that, in their search for suitable freshwater habitat, elvers and juveniles are navigating upstream from the Styx River through the piped stormwater system, and subsequently residing (possibly only temporarily) within Kruses Drain. It is likely that many of these eels migrate downstream in search of more suitable habitat, and those that remain may die due to the less than optimal habitat conditions and poor food resources available in Kruses Drain. The macroinvertebrate community is also limited to a few pollution-tolerant taxa, due to poor riparian and in-stream habitat conditions. All of the macroinvertebrate taxa found are considered to be very pollution-tolerant taxa (i.e. they all have MCI scores of less than 5, out of a possible 10). While poor habitat conditions are likely to be the one of the main drivers limiting the fish and macroinvertebrate communities that reside within Kruses Drain, the lack of ecological connectivity with upstream and downstream reaches almost certainly also plays a role.

The Christchurch City Plan (2012) classifies Kruses Drain within the Sanitarium site as an environmental asset waterway. Environmental asset waterways are described as generally having some natural character with a high potential for restoration (CCC 2012). It is noteworthy that the SEV of Kruses Drain indicated only very limited ecological function remaining (SEV score of 0.2). Rowe et al. (2008) suggest that a stream (reach) with an SEV score of less than 0.4 is unlikely to be of sufficient remaining ecological function to warrant restoration. Therefore, despite its classification as an environmental asset waterway, it is unlikely that the ecology of Kruses Drain could be greatly enhanced even with concentrated rehabilitation efforts. This is particularly relevant given the limited ecological connectivity along Kruses Drain due to the piped (underground) network immediately up- and downstream of the Sanitarium site, as discussed below.

Many of New Zealand's clean-water (or more pollution-sensitive) taxa are aquatic insects, such as mayflies, stoneflies and caddisflies. Aquatic insects, which generally have a winged adult stage, can populate waterways via three main pathways: downstream drift (where juveniles drift downstream with the current to colonise a new area); upstream migration (where juveniles crawl upstream); and aerial dispersal of a winged adult. However, the piped network immediately upstream and downstream of this part of Kruses Drain, along with the highly urban nature of the surrounding environment, probably restricts not only the upstream and downstream migration of juveniles but also the ability of winged adult aquatic insects to navigate to this 'isolated' section of Kruses Drain.

There is good evidence that ecological connectivity along a waterway is a crucial element for maintaining both fish and macroinvertebrate communities. Even short sections of piped waterways (e.g. road culverts) can have a marked influence on the ability of freshwater fauna to navigate through a stream network. A poorly constructed and placed road culvert (or longer piped system) can act as a barrier to fish passage, thereby preventing its migration along a waterway (Boubée et al. 1999). Many of New Zealand's freshwater fish species, including shortfin eels, are migratory, requiring access to the sea during certain life stages. Shortfin eels are present in Kruses Drain, and throughout many of Christchurch's natural and human-made waterways; no other fish species were found in Kruses Drain. Road culverts are also known to impede the movement of crustaceans along a waterway (Resh 2005) and can limit the dispersal of the winged adult stages of aquatic insects, such as caddisflies (Blakely et al. 2006). It may be that aquatic insects cannot navigate through culverts, or that predation pressure is increased by a great number of spiders that often sit-and-wait inside road culverts. It is highly likely that aquatic insect adults cannot (or will not) navigate through longer piped sections of a waterway.

Adult aquatic insects may also disperse overland (i.e. between waterways), but it's probable that built-up areas they may become disconnected from the stream and lost in the urban environment. Thus, the likely lack of ecological connectivity along Kruses Drain (i.e. with long sections immediately upstream and downstream of the Sanitarium site being piped) almost certainly play a role in limiting the fish species and macroinvertebrate taxa that reside within this 130 m reach of open waterway.

Taking all of this into consideration the ecological values of Kruses Drain are considered very low, and much lower than many other waterways within the Christchurch metropolitan area (Boffa Miskell 2014, EOS 2008).

6.0 Assessment of Potential Ecological Effects

The proposed piping of Kruses Drain will result in the total loss of the 130 m reach of Kruses Drain within the Sanitarium site. This total loss of habitat will affect the limited number of pollution-tolerant macroinvertebrate taxa and shortfin eels present in the waterway. However, given the low ecological values of Kruses Drain, the limited ecological connectivity with up- and downstream areas of the catchment, and that it is part of a highly modified (piped) system of little or no conservation value, the significance of this effect is anticipated to be less than minor. Therefore the only recommended mitigation required is:

- To relocate the shortfin eel population from the waterway to a suitable site downstream, prior to piping of the waterway:
    - We recommend that dewatering, when required, should be done gradually over several days to provide the shortfin eels present the opportunity to move downstream;
    - A suitably qualified and experienced freshwater ecologist should then search the ponded areas for any stranded shortfin eels;
    - These will need to be relocated to an appropriate alternative site;
    - There will need to be some consideration of the local, resident eel population when selecting a suitable relocation site; and
- Enter into discussions with the CCC regarding appropriate forms of offset or mitigation to compensate for the loss of an environmental asset waterway.

7.0 Conclusion

Kruses Drain (within the Sanitarium site) is of poor condition with low ecological value. The existing ecological function suggests that even with concentrated rehabilitation efforts, the ecological values is unlikely to be improved. This is particularly relevant given the isolated nature of the 130 m reach of Kruses Drain within the Sanitarium site. The piped network immediately up- and downstream of the survey area is expected to greatly limit the existing and potential future (i.e. if the waterway was enhanced) ecological function and values. Based on this assessment, we conclude that although piping of this reach of Kruses Drain would result in a total loss of this freshwater habitat, the significance of this effect would be less than minor. However, we recommend that the shortfin eel population of Kruses Drain be relocated to a suitable alternative site prior to piping of the waterway. It may also be appropriate for R & H Investments Ltd to enter into discussions with the CCC regarding potential compensation for the loss of an environmental asset waterway.

8.0 References

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Appendix 1: Ryder Consulting – Macroinvertebrate Processing

Boffa Miskell

C14066, May 2014

Summary of Freshwater Macroinvertebrate Sample Processing & Results

Prepared by Katie Blakemore, BSc. (Hons.) and Ben Ludgate, MSc.

June 2014

Ryder Consulting Limited
PO Box 1023
Dunedin
New Zealand
Ph: 03 477 2119
Fax: 03 477 3119

Background

Preserved benthic macroinvertebrate samples were provided to Ryder Consulting by Boffa Miskell. Boffa Miskell staff collected these samples in May 2014. Ryder Consulting Ltd was engaged to process the C14066 samples, and report the results of taxonomic composition.

Laboratory Analysis

Samples were passed through a 500 μm sieve to remove fine material. Contents of the sieve were then placed in a white tray and macroinvertebrates were counted and identified by eye and under a dissecting microscope (10-40x) using criteria from Winterbourn *et al.* (2006).

Results

The macroinvertebrate results have been forwarded to Boffa Miskell in electronic form.

References

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ANNEXURE G: BASELINE SCENARIO CALCULATIONS

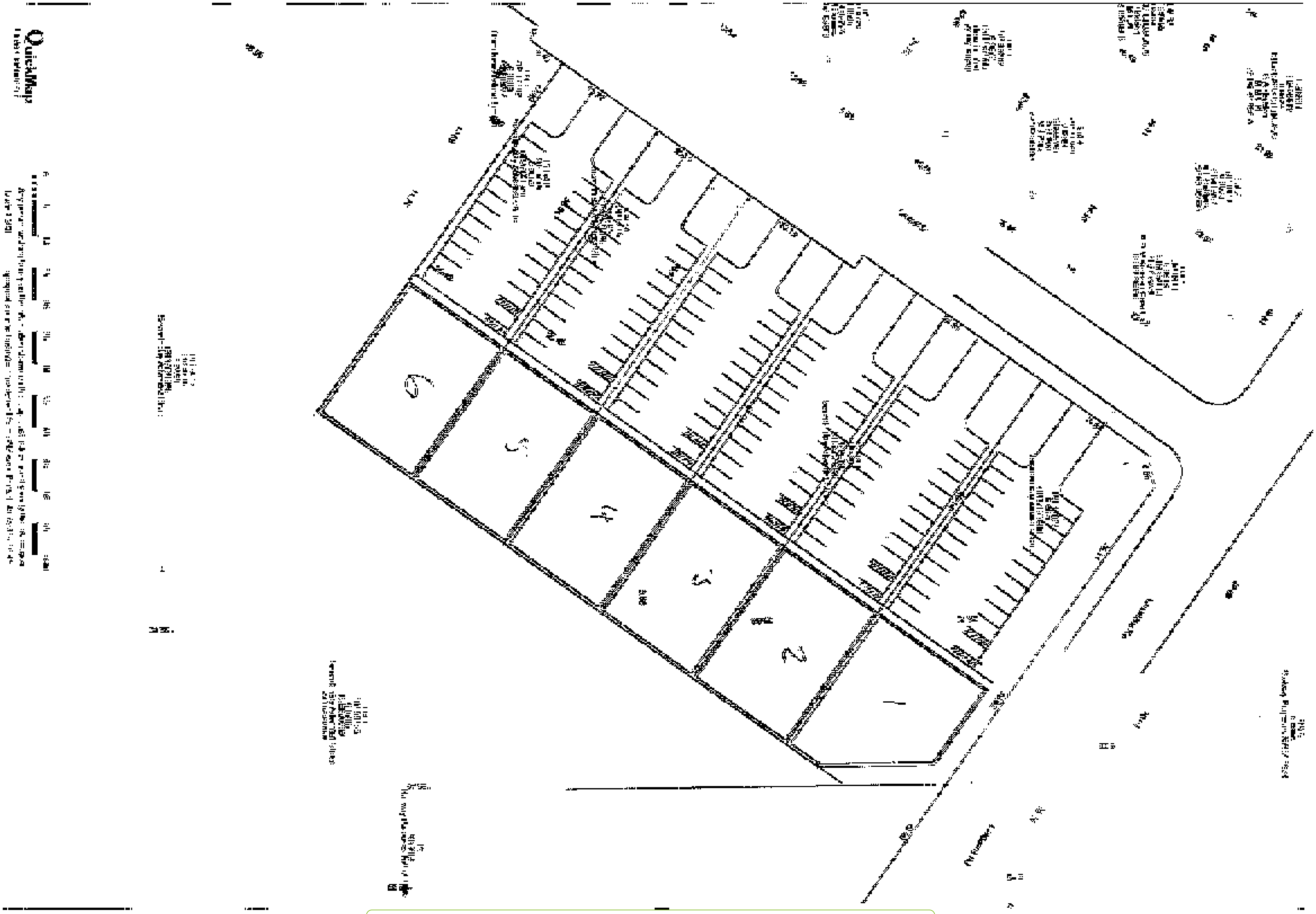
Site area	876
	2010
	705
	660
	12899
	5206
	3004
	1315
	1012
	1012
	768
	768
	768
	768
	755
	543
	33069

Mitre 10 mega		
Weekday PM peak	371	total generation Thursday PM peak
	124	CAST one third to chapel street Thursday PM peak
Saturday peak	279	total generation Saturday peak to Chapel Street

Permitted Offices		Visitor	Staff		
How much floor space requires a max of 25 spaces?	975 m²	1	24	25	
3 level building	325 m²	footprint			
	30 m²	area per space			
	750 m²	parking area			
	120 m²	10% landcsape area			
	1200 m²	total site area			
Estimated trip generation per site	18	per 100m² SWPD daily generation rate			
	175.5	tirps per day per site	= >250vpd = OK		
	2	per 100m² SWPD PM peak generation rate			
	20	trips Thursday PM peak			
How many office sites needed to equal M10 generation?	124	CAST one third to chapel street Thursday PM peak			
	20	trips Thursday PM peak			
	6	Office sites required			
Calculation of typical site size	108	frontage to chapel street			
	18	average site frontage to chapel street	= realistic site width to aceive efficient parking layout		
	66.7	typical site depth			
Weekdays	124	Total Thursday PM peak generation from Mitre 10 activity			
	120	Total Thursday PM peak generation from some office activity			

Offices doesn't solve Saturday situation, therefore consider specialty retail

Specialty retail	2000m² max under variation 86 on any one site sharing common parking and access			
	3000m² maximum permitted within 200m of the site also in an industrail zone			
	Therefore 3000m² permitted across several sites within the Sanitarium site			
Estimated trip generation per site	55.5	**per day** specialty retail rate RTA guide Thursday		
	5.1	Average of RTA Thursday/Friday PM peak generation rates		
	10.7	RTA Guide Saturday peak hour		
Check complaince with HTG rule	450 m²	max tenancy size to be 250vpd		
	21	parks required = OK		
	250 vpd	trips per unit		
	6	number of units bassed on same site layout as for office scenario		
	2700 m²	complex area		
	1500 trips	for complex	Thursday **daily**	
	140	for complex	Thursday **PM peak**	All accessing Chapel Street = higher than Mega (124 trips)
	290 trips	for complex	Saturday peak hour	All accessing Chapel Street = higher than Mega (279 trips)
Calculation of typical site size	108 m	frontage to chapel street		
	18 m	frontage to chapel street		
	450 m²	footprint		
	21 spaces	parks required		
	30 m²	area per space		
	630 m²	parking area		
	120 m²	10% landcsape area		
	1200 m²	total site area		
	18 m	Site width		
	67 m	Site depth	langdons frontage = 75m deep therefore OK	


QuickMap
6
5
4
3
2
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ANNEXURE H: SEDIMENT CONTROL PLAN

SEDIMENT CONTROL PLAN

Project	Mitre 10 Papanui
Client	Mitre 10 Mega Ltd
Job No.	14011
Date	21/10/2014

Site Location

54-64 Harewood Road, Papanui

Description of Works

The site is currently used for commercial food production (Marmite and Weetbix factories), and is to be developed into a Mitre10 store. The site works involve:

- Piping of Kruses Drain, which currently flows in an open channel through the site
- Earthworks for site clearance and levelling:
  - Stage 1 – Demolition of existing Weetbix factory and construction of Mitre10 store, carpark and landscaping
  - Stage 2 – Demolition of existing Marmite factory and extension of Mitre10 store and carpark
- Decommissioning of an existing above-ground fuel storage tank
- Construction of services for the developed site, including possible dewatering of service trenches during construction

This sediment control plan covers the works associated with the diversion of Kruses Drain.

Existing and Proposed Site plans are included in Appendix A.

Site Description

Soil Type	The existing site cover includes buildings, hardstand area and landscaping. The underlying soils on the site are deep silt loams (Kaiapoi*f* and Matapihi*f*).
Site Topography	The site is generally flat. The land in the immediate vicinity of Kruses Drain in the northern half of the site drops towards the drain relatively steeply.
Soil Susceptibility	Soils on site have slight to moderate susceptibility to erosion.
Land Use	The site is currently used for commercial food production, and is to be developed into a Mitre10 store. Commercial food production (Marmite factory) will continue in the northern part of the site during Stage 1 of the works.
Existing Vegetation	There is a landscaped area at the frontage of the site on Harewood Road. On the western side of the site, the riparian margin around Kruses Drain is also vegetated.
Existing Overland Flow	An open drain (Kruses Drain) enters the site in the south-west and flows north-east across the site. Stormwater runoff on the site is collected in a number of sumps and discharged into the CCC reticulated stormwater network.
Area of Works	The total site area is approximately 3.3ha.
Volume of Material	Stage 1 – 3,000m^3 approx. Stage 2 – 1,750m^3 approx.
Site Access	The main entry point to the site for construction traffic will be from the Chapel Street entrance.

Site Requirements

Timing of Works	• The diversion and piping of Kruses Drain is to occur before commencement of other earthworks on the site. • Works in the bed of Kruses Drain will only be undertaken in low flow conditions. • All other works on site are to be carried out at any time of the year with due care to erosion and sediment control. • Works are to be avoided in extreme weather conditions.

Erosion and Sediment Proposal	• Works to be installed as required to meet Environment Canterbury's *Erosion and Sediment Control Guidelines 2007*. **Kruses Drain diversion** • Works in Kruses Drain to occur in low flow conditions. • Construction methodology is as per ECan's *Erosion and Sediment Control Guideline 2007*, Chapter 8 (Stream works): 1. Start construction of the new pipeline at the downstream end by installing a new manhole on the existing pipeline and laying pipes upstream until pipe installation works cannot be undertaken without affecting the existing drain. 2. Relocate the shortfin eel population from the waterway to a suitable site downstream, prior to the completion of final piping of the waterway. 3. De-watering of the streambed, if required, should be done gradually over several days to provide any remaining shortfin eels the opportunity to move downstream. 4. A suitably qualified and experienced freshwater ecologist should then search the ponded areas for any stranded shortfin eels. These will need to be relocated to an appropriate alternative site, giving consideration to the local, resident eel population when selecting a suitable relocation site. 5. When there is a clear weather forecast for at least a week, install a temporary coffer dam with diversion flume or over- pump flows from the existing 450Ø pipe outlet to create a 'dry' working environment. 6. Remove any contaminated stream sediment as per the requirements of the Remedial Action Plan for the site. 7. Install remaining pipework and final manhole 'in the dry' and complete the diversion and allow water to flow into new pipeline. 8. Once diversion is complete, disconnect the existing outlet of Kruses Drain from existing piped network. 9. Backfill Kruses Drain with suitable compacted fill. **General Site earthworks applicable to all stages** • Control of run-on water around excavations: provide barrier socks, excavated lined channels or similar to divert flows away from disturbed areas of the site during earthworks. Divert clean water flows into existing sumps on the site. • Control dust on site by watering as required during excavations. • Contractor to clearly demarcate where soil will be stockpiled. Any stockpiles of soil on site to be bunded with barrier socks or straw bales. Stockpiles should be watered in hot windy conditions to prevent wind erosion of soil. • Promptly re-vegetate or seal disturbed areas. Disturbed areas that will be exposed and unworked for more than 2 weeks should be mulched with crushed rock or gravel for building site/carpark areas, or organic materials (e.g. cereal straw, hydromulch, compost, wood chip) for areas that will be landscaped. • Provide inlet protection (e.g. barrier socks) around all sumps on site (including the new sump(s) once built).
Construction Restrictions	• Sediment control measures are to be installed prior to construction commencement. • All earthworks shall be sealed or vegetated as soon as possible. • No stockpiles are to be left on site after construction. • Temporary stockpiling of material is to be placed in locations free of run-off and material to be placed in final location as soon as possible.

Maintenance	• All fences to be checked daily • All sedimentation areas/silt fences to be cleared of debris after each rain/ wind event. • All works to be assessed daily as to their effectiveness.

Site Erosion and Sediment Control

The Contractor shall recognise its responsibility to minimise and, if possible, eliminate erosion and the chances of sediment reaching existing drains or waterways, as a result of construction processes. The Contractor shall ensure that:

- They have a suitable erosion and sediment control quality procedure
- Supervisors and operators are aware of the measures and requirements of Environment Canterbury's *Erosion and Sediment Control Guideline 2007*
- Site work and the removal of vegetation shall be limited to the smallest area possible at any one time
- Prior to the commencing of work, an assessment of the risks and control measures shall be carried out and recorded. The records are to form part of the job file and a copy to be sent to the Engineer
- An assessment of the suitability of the proposed sedimentation and erosion control measures is to be carried out at the start of the project. Where changes are proposed these are to be forwarded to the Engineer and approved prior to work construction
- Regular worksite inspections shall include the identification of any sedimentation being caused and the efficiency of control measures in place

Erosion and Sediment Control measures shall be placed in general accordance with the proposal outlined above. Additional measures may be required and are to be installed to suit the work proposal of the Contractor. All amendments are to be noted and forwarded to the Engineer.

Limitations of Plan

The preparation and supply of this sediment control plan does not negate the responsibility of the Contractor to carry out their own assessment and control measures to ensure that all runoff from the site is controlled and clean. The Contractor is to ensure that the site is under their control and if additional works are required to control the site these are to be carried out at no additional cost.

This sediment & erosion control plan has been prepared as part of the requirements for gaining a building consent. All erosion and sediment control will be assessed against this plan.
If the Contractor wishes to use a different proposal a separate application is to be made to Christchurch City Council prior to any works

Signed	AR	Date	21 October 2014

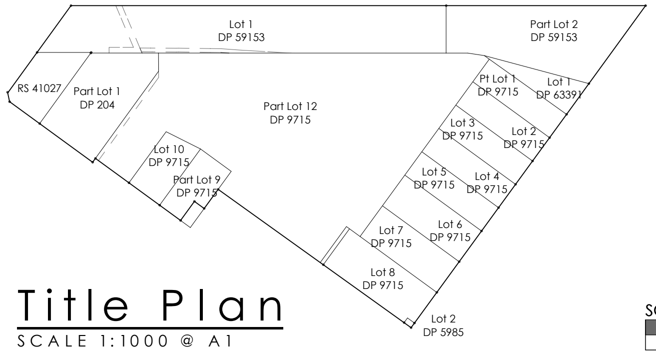
Contractor to verify all dimensions on site. Drawings may not be to scale if received in pdf format

Existing Site Plan

SCALE 1:500 @ A1
SCALE 1:1000 @ A3

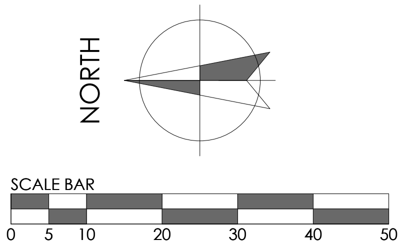
Key

🟦	Existing open drain to be re directed
- - -	Existing drainage pipes to be removed
-·-·-	Existing stormwater pipe retained
☐ C	Existing stormwater chamber retained



Title Plan

SCALE 1:1000 @ A1
SCALE 1:2000 @ A3



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PROJECT STATUS:

Resource Consent
9-7-2014

EXISTING SITE PLAN

NEW DEVELOPMENT FOR

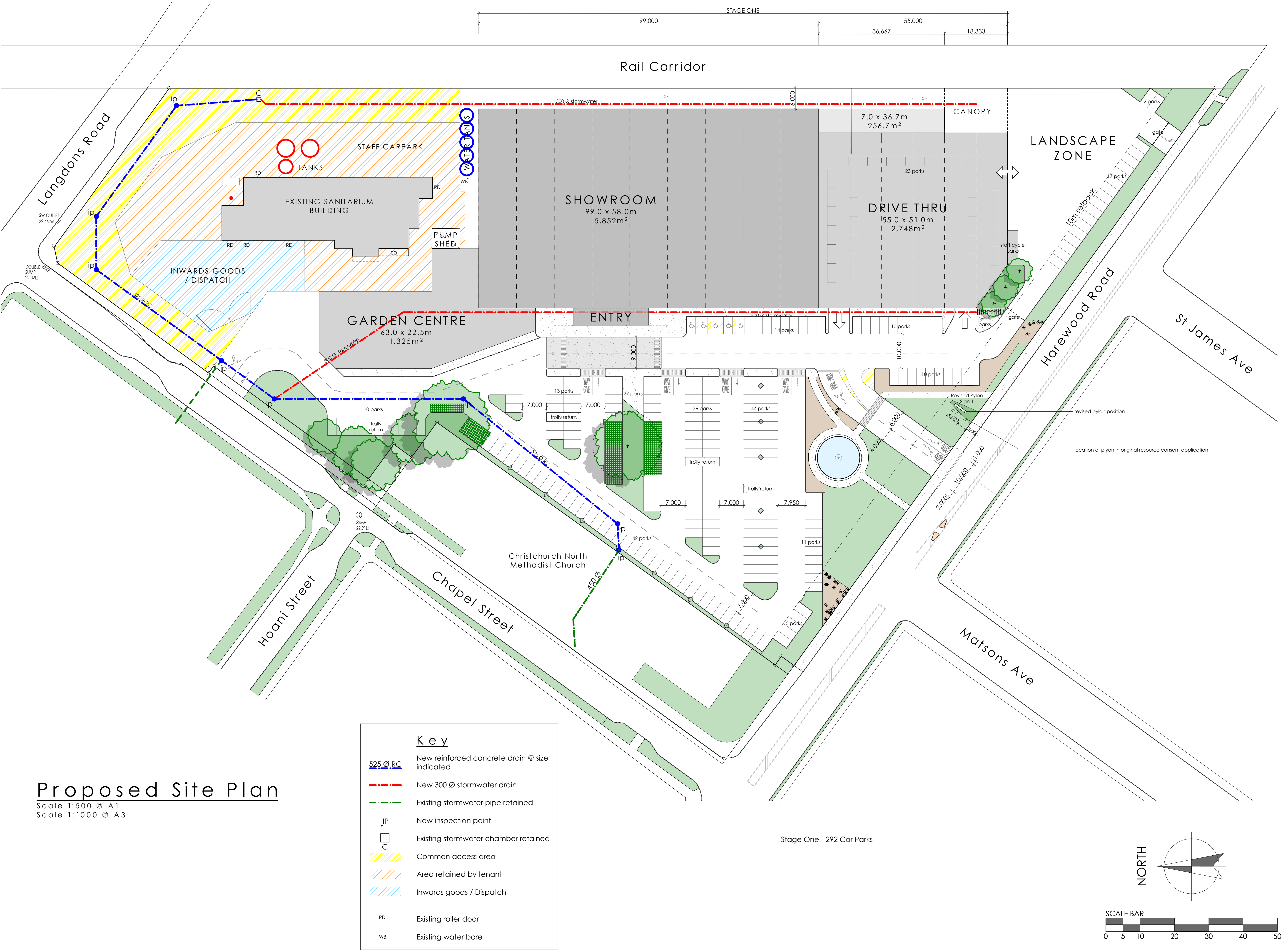
R & H INVESTMENTS

SCALE : 1:2000, 1:500
DATE : 18/09/14
JOB NO : 1279
DRAWN : GARETH

SHEET

A1.01

Contractor to verify all dimensions on site. Drawings may not be to scale if received in pdf format



Proposed Site Plan

Scale 1:500 @ A1
Scale 1:1000 @ A3

Stage One - 292 Car Parks

Key

525 Ø RC	New reinforced concrete drain @ size indicated
🟥	New 300 Ø stormwater drain
🟩	Existing stormwater pipe retained
IP	New inspection point
☐ C	Existing stormwater chamber retained
▨	Common access area
▨	Area retained by tenant
▨	Inwards goods / Dispatch
RD	Existing roller door
WB	Existing water bore

BERNARD
JOHNSTON
ARCHITECT LTD

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PROJECT STATUS:

Resource Consent
9-7-2014

Revision 1
22-9-2014

revision 2
31-10-2014

revision 3
19-02-2015

PROPOSED
SITE PLAN
STAGE 1

NEW
DEVELOPMENT
FOR

R & H
INVESTMENTS

SCALE : 1:500
PRINTED : 19/02/15
JOB NO : 1279
DRAWN : GARETH

SHEET

A1.02

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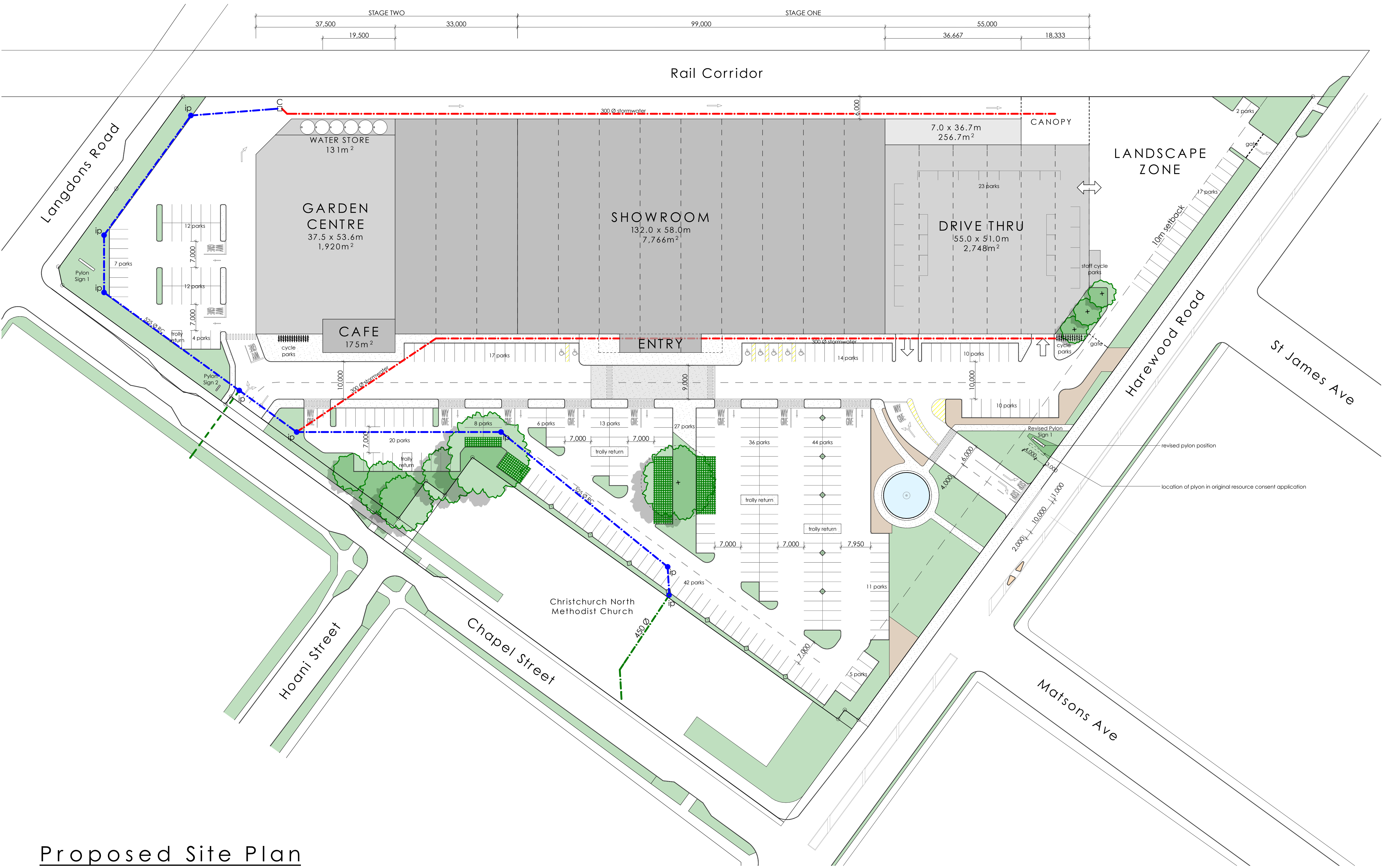


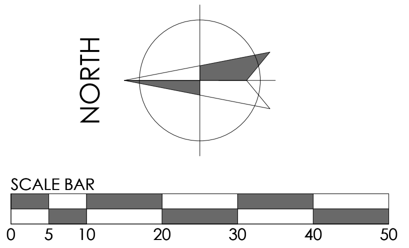
Proposed Site Plan

Scale 1:500 @ A1
Scale 1:1000 @ A3

Key

525 Ø RC	New reinforced concrete drain @ size indicated
🟥	New 300 Ø stormwater drain
🟩	Existing stormwater pipe retained
IP	New inspection point
☐ C	Existing stormwater chamber retained

Stage One	-	294 Car Parks
Stage Two	-	46 Car Parks
Total	-	340 Car Parks



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PROJECT STATUS:

Resource Consent
9-7-2014

Revision 1
22-9-2014

revision 2
31-10-2014

revision 3
19-02-2015

PROPOSED
SITE PLAN
STAGE 2

NEW
DEVELOPMENT
FOR

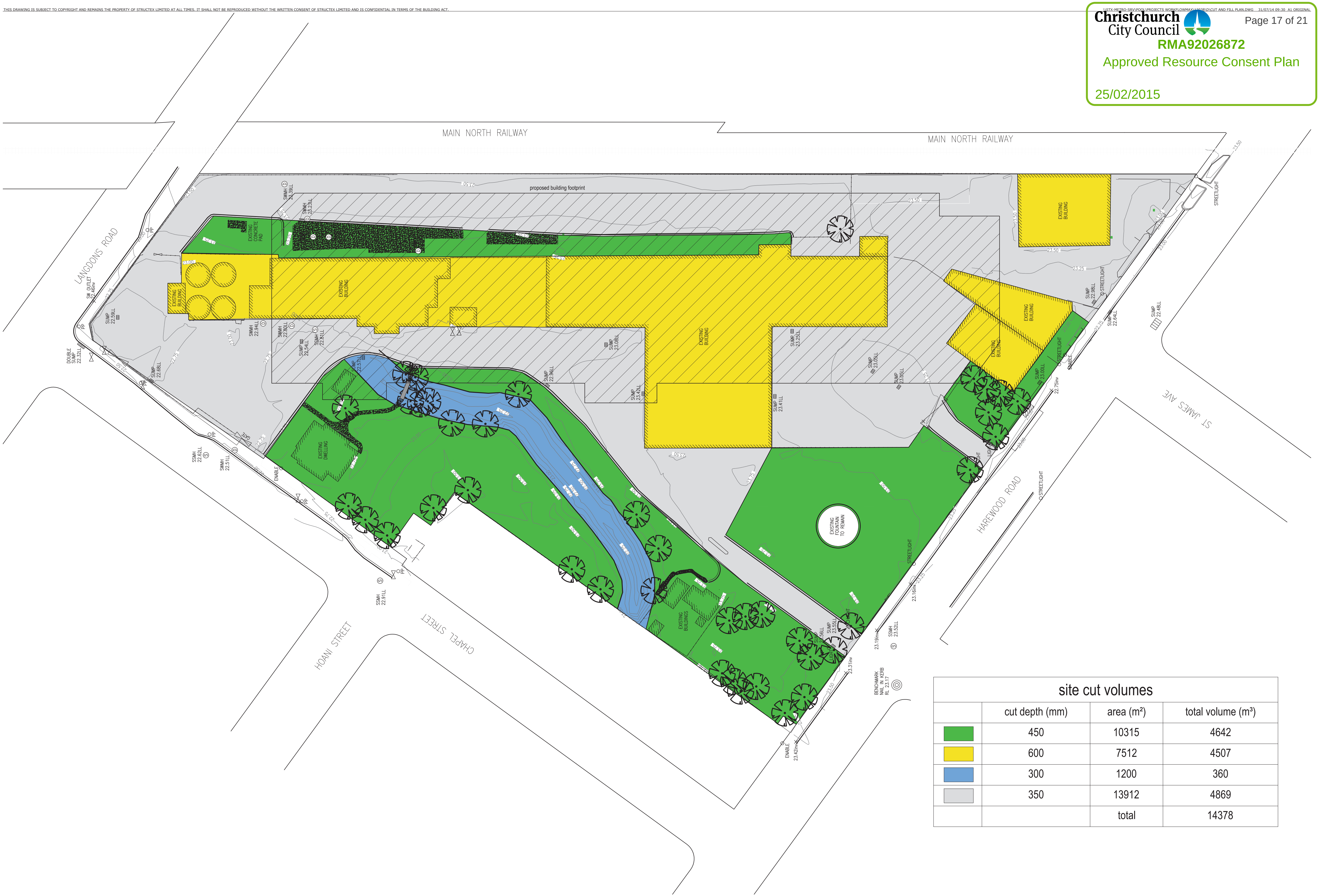
R & H
INVESTMENTS

SCALE : 1:500
PRINTED : 19/02/15
JOB NO : 1279
DRAWN : GARETH

SHEET

A1.03

\\STX-METRO-SRV\POOL\PROJECTS WORKFLOWMAX\12038\D\CUT AND FILL PLAN.DWG 31/07/14 09:30 A1 ORIGINAL



site cut volumes

	cut depth (mm)	area (m²)	total volume (m³)
🟩	450	10315	4642
🟨	600	7512	4507
🟦	300	1200	360
⬜	350	13912	4869
		total	14378

issue	description	by	appd.	date

Structex Metro Ltd : 968 4925 (tel)
P.O. Box 25 438
Christchurch

drawn	designed	approved	scales
SP		BAG	1:500 (A1)

client

project title

structex
"giving support a whole new meaning" www.structex.co.nz

drawing title	drawing no	project	issue
site cut volumes	CUT	12038	A

site fill volumes

	fill depth (mm)	area (m²)	total volume (m³)
🟧	300	7654	2296
🟨	650	5084	3305
🟦	580 *	1200	696
⬜	300	16688	5006
⬛	550	2434	1339
		total	12642

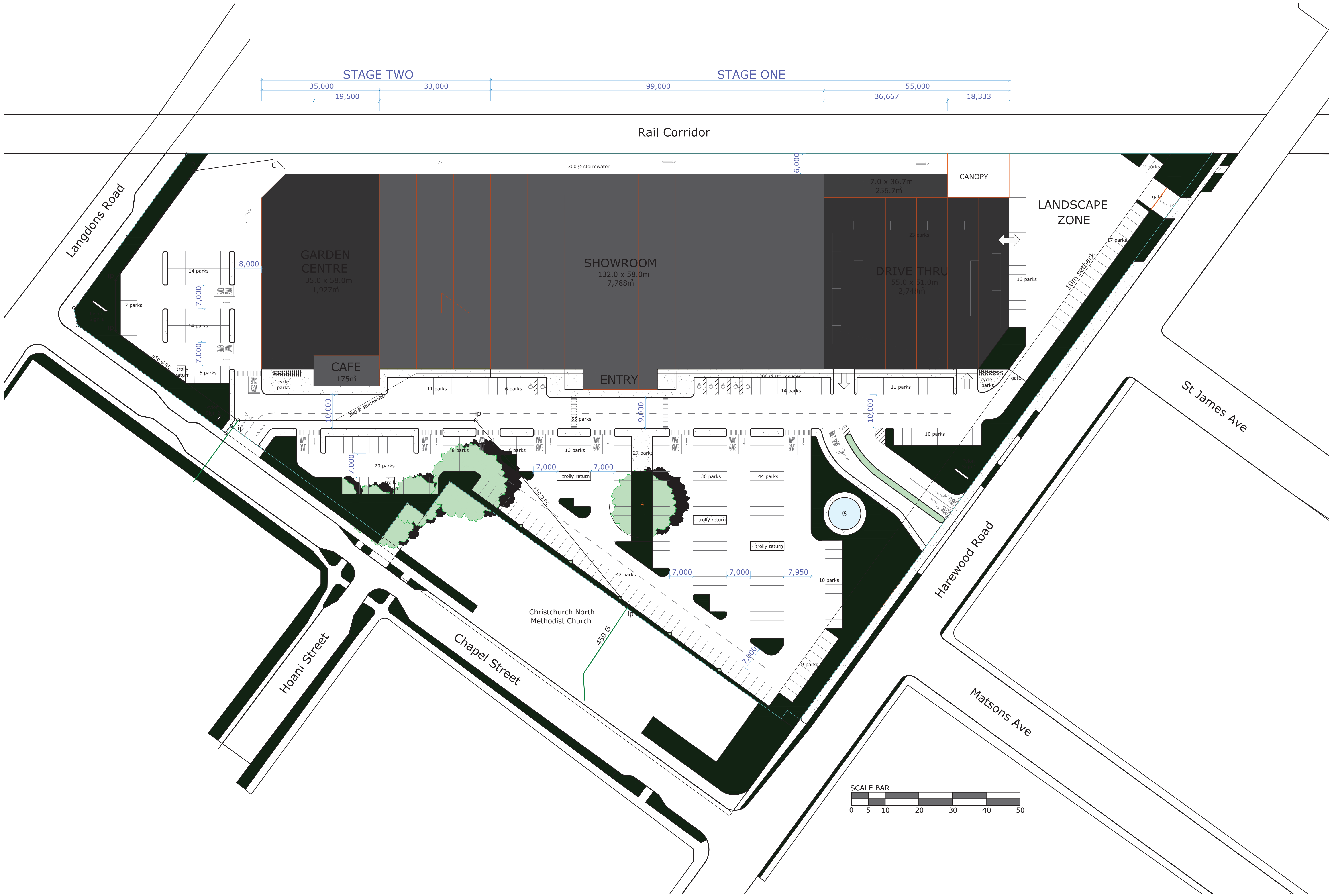
* average depth over area of creek

issue	description	by	appd.	date

Structex Metro Ltd : 968 4925 (tel)
P.O. Box 25 438
Christchurch

drawn	designed	approved	scales	client	project title	drawing title	drawing no	project	issue
SP		BAG	1:500 (A1)			site fill volumes	FILL	12038	A

structex
"giving support a whole new meaning" www.structex.co.nz



issue	description	by	appd.	date

Structex Metro Ltd : 968 4925 (tel)
P.O. Box 25 438
Christchurch

drawn	designed	approved	scales
SP		BAG	1:500 (A1)

client

project title

structex
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drawing title: proposed site plan

drawing no	project	issue
SITE	12038	A

ANNEXURE I: TRANSPORT ASSESSMENT

Traffic Impact Assessment

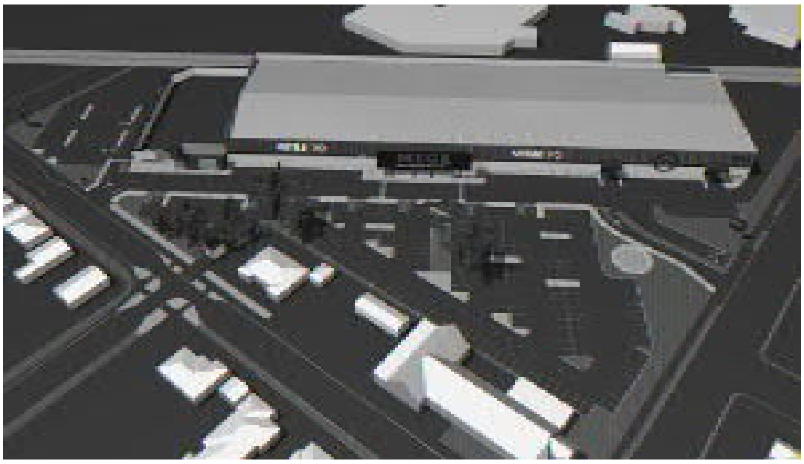
Mitre 10 Mega
Papanui, Christchurch

December 2014

Papanui Properties Limited

Reference: 254009

Consent Lodgement (revision 1)



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Urbis TPD Limited is part of
the Urbis Group of Companies

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Appendix A - Northlands Mall Expansion Site Generated Traffic Diagrams

QUALITY ASSURANCE

Project Reference:	254009
Title:	Traffic Impact Assessment – Mitre 10 Mega, Papanui
Client:	Papanui Properties Limited
Filename:	254009 141201 Traffic Impact Assessment.FINAL(R1).docx
Version:	Consent Lodgement (revision 1)
Date:	01 December 2014
Prepared By:	Wayne Gallot Transportation Planner Urbis TPD Limited
Peer Reviewed By:	Ray Edwards Director Urbis TPD Limited

1.0 INTRODUCTION

Urbis recently prepared and lodged a resource consent application (RMA92026872) on behalf of Papanui Properties Limited for a proposed Mitre 10 Mega store on the Sanitarium Health Food factory site and neighbouring sites in Papanui, Christchurch. The application site, which is described in detail in the application, is known as 30-64 Harewood Road, 22 Chapel Street and 41 Langdons Road.

The resource consent application provided an assessment of 'on-site' traffic effects, including those related to the identified non-compliances of parking space numbers, marked staff parking, cycle parking, queue spaces provision (Chapel Street access only) and vehicle crossing length. That assessment concluded that any effects associated with those non-compliances would be negligible.

The resource consent application also identified that the proposal breached development standard 13-2.3.8 (High Traffic Generators), but explained that the assessment of potential effects on the adjoining road network in relation to site generated traffic volumes would be provided in a separate document. This was because the Council had sought additional road network information to be included in the network effects assessment and that information was not available at the time the resource consent application was lodged.

The purpose of this report is therefore to provide an assessment of potential effects associated with site generated traffic on the adjoining road network. It is intended that this traffic assessment be included and form part of the lodged resource consent application.

2.0 APPLICATION SITE AND SURROUNDING ENVIRONMENT

As noted earlier, the application site is the Sanitarium Health Food factory and neighbouring sites in Papanui, which are known as 30-64 Harewood Road, 22 Chapel Street and 41 Langdons Road. Detailed descriptions of the application site and its surrounds were included in the lodged application document, and it is not intended to repeat that information in this report. The following points however summarise the key traffic related elements of the site description that were provided in the application.

- The application site is zoned Business 4 (Suburban Industrial) for which the City Plan notes one of the anticipated environmental results as being *"…relatively high levels of traffic generation with standards for access and manoeuvring to mitigate adverse effects"*.
- The application site is served by a total of six access points and vehicle crossings on Harewood Road, and a single access point and vehicle crossing on Chapel Street. There is no existing site access to Langdons Road.
- At the height of activity in previous years, it is estimated that the Sanitarium Health Food factory historically generated around 250-280 light vehicle movements and 15-18 heavy vehicle movements per day, much of which used the Chapel Street access.
- While the scale of activity at the Sanitarium site has reduced in recent times, it is important to note that there is nothing to prevent a return to historic levels without further consent. While it may not be reasonable to assume a return to the absolute peak historical traffic levels, volumes of around 200 light vehicle trips per day (75% of 250-280 trip total) and around 10-12 heavy vehicle trips per day (67% of 15-18 HGV total) across the Chapel Street site access are not considered unrealistic.

3.0 ROAD NETWORK

3.1 Overview

The application document provided a detailed description of Harewod Road, Langdons Road and Chapel Street, being the three roads adjoining the application site. A brief description of other roads in the vicinity, including Restell Street, Sisson Drive, Sawyers Arms Road, Matsons Aveneue and St James Avenue was also provided. For clarity, the location of the application site relative to the above roads and the wider road network is shown in Figure 1 below.

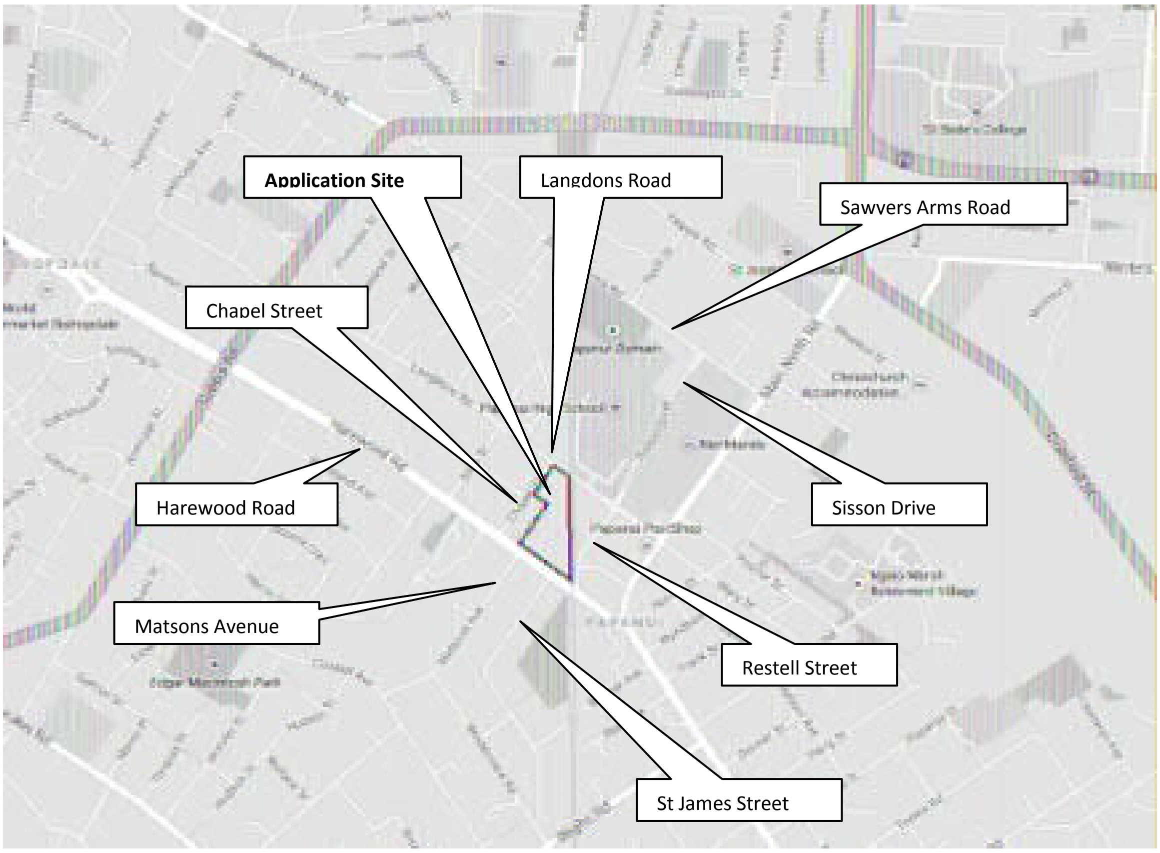

Figure 1: Application Site Location and Surrounding Road Network

As noted in the application document, the most recent Council traffic count data available for Harewood Road in the vicinity of the site is from March 2012 at the railway crossing. This data indicates a weekday PM peak volume of around 1,200 vehicles per hour, with relatively equal flows east and west. For the Saturday peak period, the March 2012 data indicates a slightly lower volume of around 1,100 vehicles per hour again with relatively equal flows east and west.

For Langdons Road at the railway crossing, the most recent Council traffic count data is from June 2012. As described in the application document, the Council's count data indicated peak volumes on that section of Langdons Road of around 800 vehicles per hour during both the weekday PM peak period and the Saturday peak period, with relatively equal flows east and west.

There is no Council traffic count data available for Chapel Street.

3.2 Recent Traffic Counts

To further supplement the description of the road network environment surrounding the application site that was presented in the lodged application, and at the request of Council, Urbis undertook peak hour intersection traffic counts at the following locations;

- Sawyers Arms Road - Sisson Drive
- Langdons Road - Chapel Street
- Harewood Road - Matsons Avenue

The Sawyers Arms - Sisson counts were undertaken on Thursday 7 August 2014 between 4:00pm and 6:00pm, and on Saturday 16 August 2014 between 11:45am and 12:45pm. Within the surveyed two hour period on the Thursday, the peak one hour period was identified as 4:45-5:45pm.

The Langdons - Chapel and Harewood - Matsons counts were undertaken on Thursday 21 August 2014 between 4:30pm and 5:30pm, and on Saturday 23 August 2014 between 11:30am and 12:30pm. Owing to high traffic volumes, through traffic volumes on Harewood Road were not recorded during the Thursday PM peak period.

Figures 2 to 4 below summarise the surveyed peak traffic volumes. The numbers in brackets represent the recorded number of heavy vehicles included in the total volume for each movement.

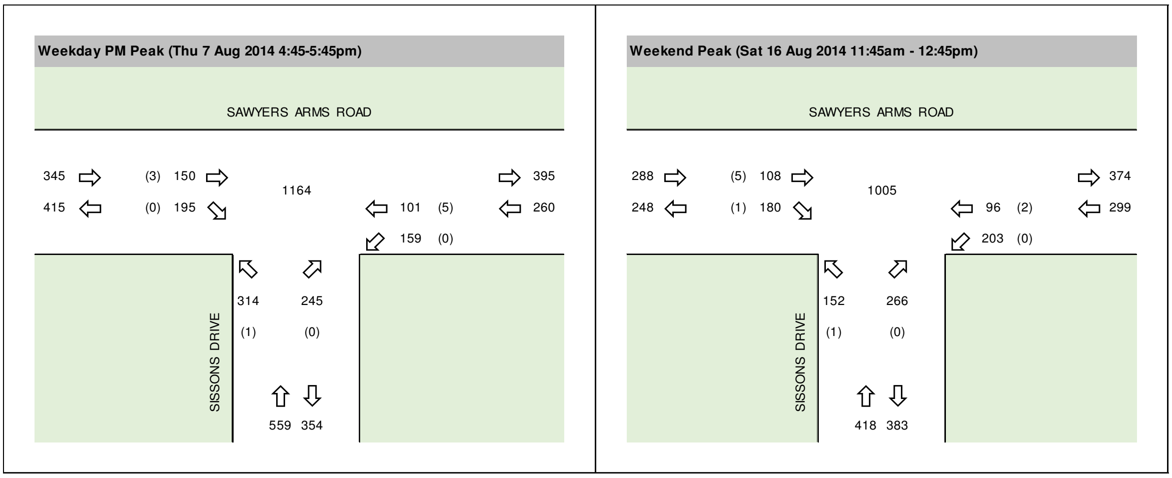

Figure 2: Surveyed Peak Period Traffic Volumes (Sawyers Arms - Sisson Intersection)

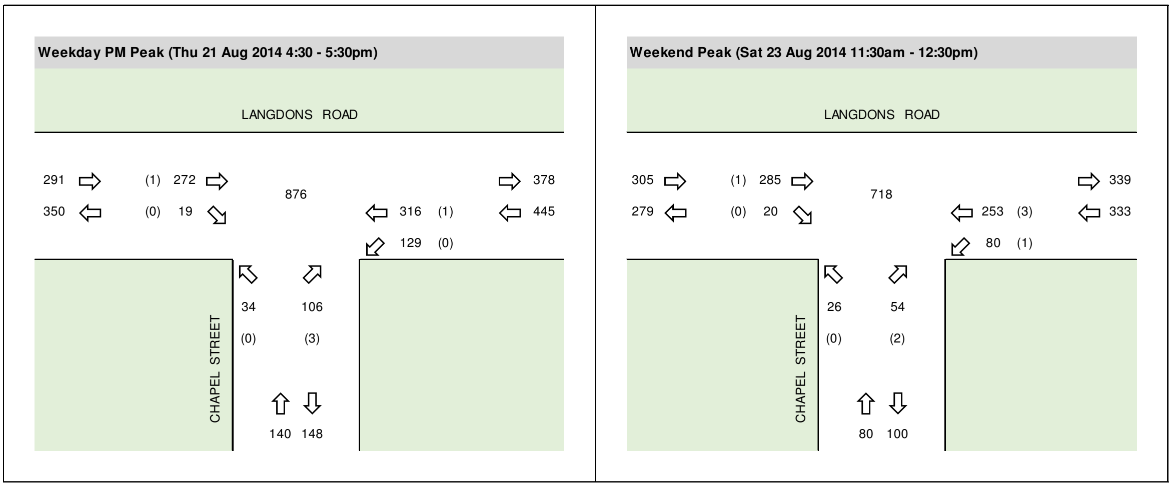

Figure 3: Surveyed Peak Period Traffic Volumes (Langdons - Chapel Intersection)

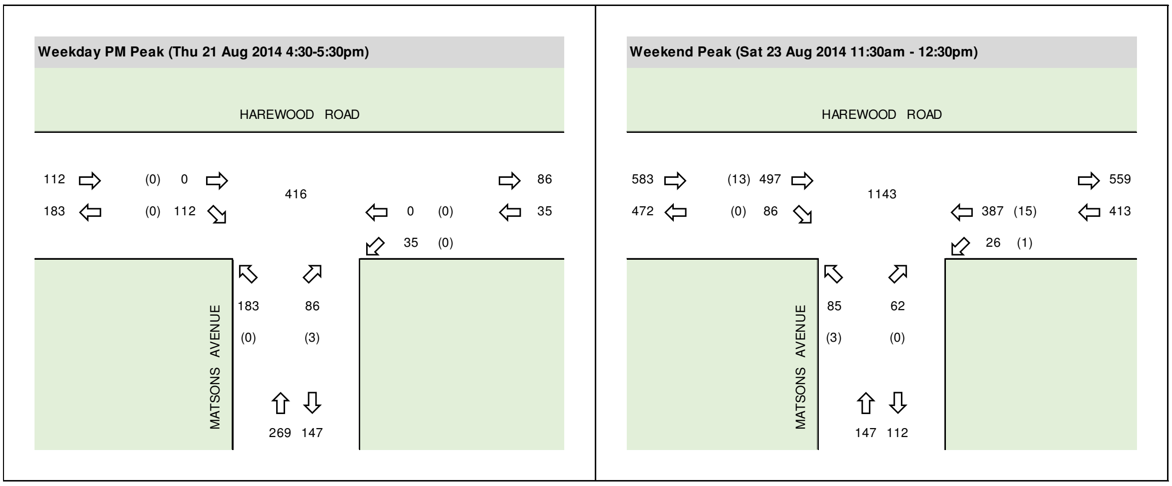

Figure 4: Surveyed Peak Period Traffic Volumes (Harewood - Matsons Intersection)

The two-way volumes for Langdons Road and Harewood Road (Saturday only) that were recorded in the Urbis surveys are reasonably consistent with, albeit slightly lower than, those indicted in the most recent Council count data as summarised below.

	Langdons Road @ Railway		**Harewood Road @ Railway**	
	Weekday PM Peak	**Weekend Peak**	**Weekday PM Peak**	**Weekend Peak**
CCC Count Data	800 vph	810 vph	1,210 vph	1,080 vph
Urbis Survey Data	820 vph	670 vph	-	970 vph
Difference	+ 20 vph	- 140 vph	-	- 110 vph

Table 1: CCC and Urbis Traffic Count Data Comparison

Analysis of the above intersections has been undertaken using SIDRA intersection analysis software. Points to note in regard to the SIDRA modelling are as follows;

- The lane geometry for the Langdons - Chapel intersection included notional 20m long left and right turn lanes on each Langdons Road approach, and a notional 10m long left turn lane on the Chapel Street approach, based on the absence of any on-street parking demand in those locations.
- The lane geometry for the Harewood - Matsons intersection also included a notional 20m long left turn lane on the eastern Harewood Road approach and a notional 10m long left turn lane on the Matsons Avenue based on the absence of on-street parking in those locations. The western Harewood Road approach was modelled with a 25m long right turn bay, based on the practical use of the flush median for that purpose.
- Gap acceptance and follow-up headway values were adopted from the Austroads Guide to Traffic Engineering Practice: Part 5 (Intersections at Grade) as recommended for a two-lane, two-way major road.
- As noted earlier, the Urbis traffic count did not record through volumes on Harewood Road during the weekday PM peak period. For the purpose of the SIDRA analysis therefore, the through volumes were based on a two-way volume of 1200 vehicles per hour east of Matsons Avenue with equal flows (600 vehicles per hour) in each direction. These volumes are indicated by the most recent (March 2012) traffic count data.
- Traffic composition (i.e. heavy vehicle percentage) assumptions were based on the Urbis traffic count data. At the Sawyers Arms - Sisson intersection, the Sawyers Arms Road through movements were modelled with a 5% heavy vehicle component while all other movements were modelled with a 1% heavy vehicle component. At the Langdons-Chapel intersection, all movements were modelled with a 1% heavy vehicle component, except for the right turn out of Chapel Street where a 3% heavy vehicle factor was adopted in recognition of the buses on this movement. At the Harewood - Matsons intersection, the Harewood Road through movements were modelled with a 5% heavy vehicle component while all other movements were modelled with a 2% heavy vehicle component.

Tables 2a - 2c below summarise the SIDRA results for control delay, level of service (LOS) and 95th percentile queue lengths.

Approach	M'ment	Weekday PM Peak				Saturday Peak			
		Volume (vph)	Delay (sec)	LOS	Queue (m)	Volume (vph)	Delay (sec)	LOS	Queue (m)
Sawyers Arms W	Th	150	0.0	A	0	108	0.0	A	0
	Rt	195	6.3	A	4	180	6.4	A	4
Sawyers Arms E	Lt	159	5.6	A	0	203	5.6	A	0
	Th	101	0.0	A	0	96	0.0	A	0
Sisson	Lt	314	6.0	A	7	152	5.9	A	3
	Rt	245	7.0	A	6	266	6.9	A	6

Table 2a: SIDRA Summary - Sawyers Arms-Sisson Intersection (Existing/Surveyed Volumes)

Approach	M'ment	Weekday PM Peak				Saturday Peak			
		Volume (vph)	Delay (sec)	LOS	Queue (m)	Volume (vph)	Delay (sec)	LOS	Queue (m)
Langdons W	Th	272	0.0	A	0	285	0.0	A	0
	Rt	19	7.1	A	1	20	6.6	A	0
Langdons E	Lt	129	5.6	A	0	80	5.6	A	0
	Th	316	0.0	A	0	253	0.0	A	0
Chapel	Lt	34	7.0	A	1	26	6.6	A	1
	Rt	106	8.3	A	3	54	7.8	A	2

Table 2b: SIDRA Summary - Langdons-Chapel Intersection (Existing/Surveyed Volumes)

Approach	M'ment	Weekday PM Peak				Saturday Peak			
		Volume (vph)	Delay (sec)	LOS	Queue (m)	Volume (vph)	Delay (sec)	LOS	Queue (m)
Harewood W	Th	514	0.0	A	0	497	0.0	A	0
	Rt	112	8.5	A	4	86	7.2	A	2
Harewood E	Lt	35	5.6	A	0	26	5.6	A	0
	Th	565	0.0	A	0	387	0.0	A	0
Matsons	Lt	183	10.2	B	9	85	7.7	A	3
	Rt	86	13.8	B	5	62	10.7	B	3

Table 2c: SIDRA Summary - Harewood-Matsons Intersection (Existing/Surveyed Volumes)

The data presented in the tables above confirms on-site observations that these intersections all operate with minimal delays and corresponding good levels of service as well as negligible queue lengths during both the weekday PM peak period and the weekend peak period. The only occasional exception to this was for vehicles turning right out of Matsons Avenue in the Thursday PM peak period where exiting delays did result in short queues however these tended to clear without excessive levels of delay being experienced.

3.3 Network Growth

A review of historical Council count data for Harewood Road at the railway crossing over the last 10 years indicates negligible annual traffic growth rates on that section of Harewood Road of around 0.1% to 0.6% as shown by the linear trend lines in Figures 5 and 6 below:

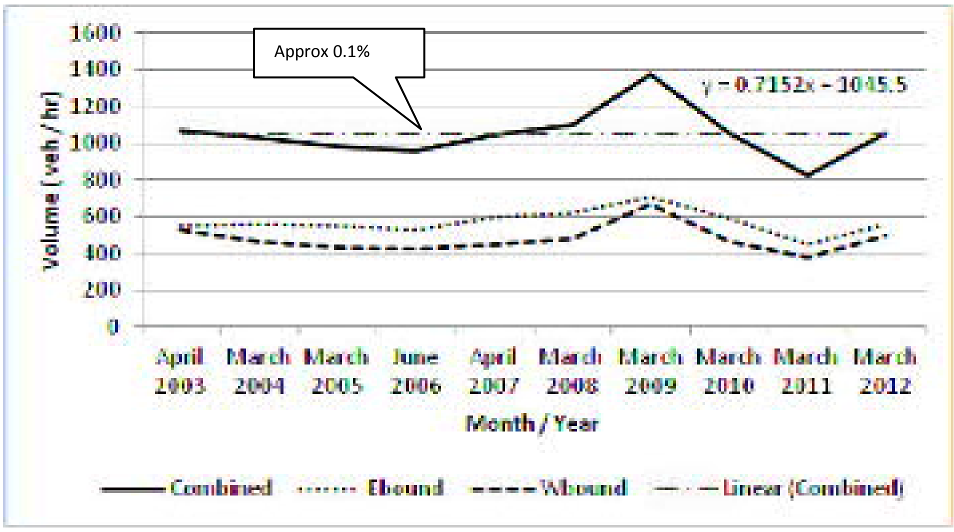

Figure 5: Historical CCC Weekday PM Peak Traffic Volumes 4:00-5:00pm

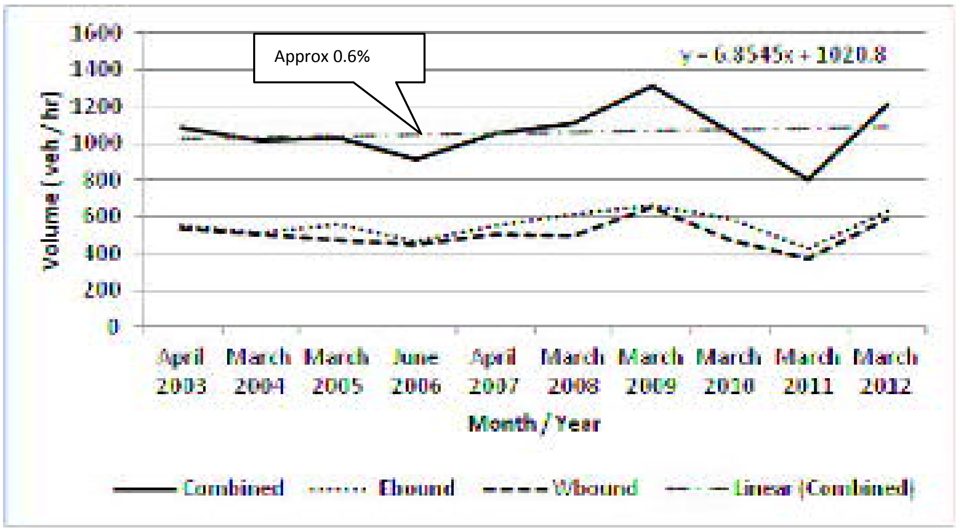

Figure 6: Historical CCC Weekday PM Peak Traffic Volumes 5:00-6:00pm

For the Saturday peak periods however, the historical data indicates marginally negative growth rates of around -0.7% to -0.9% as indicated in Figures 7 and 8 below:

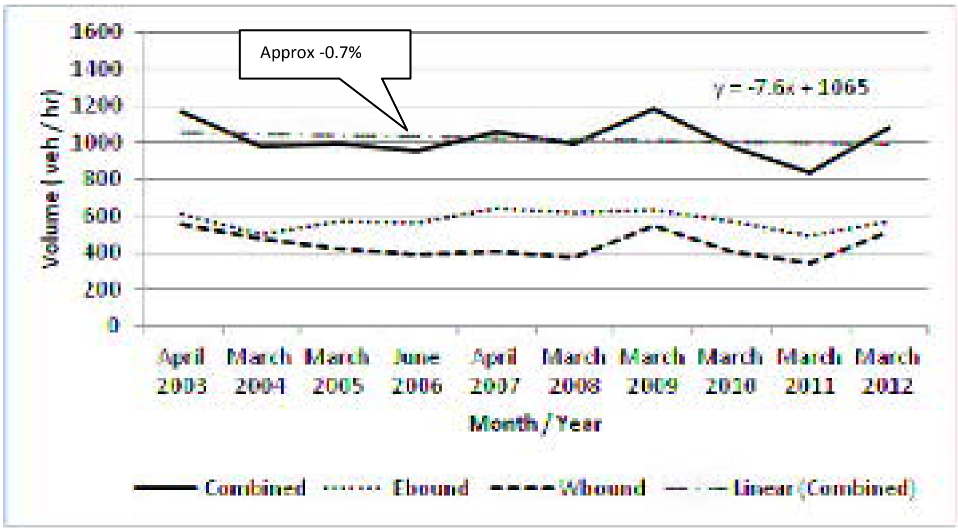

Figure 7: Historical CCC Saturday Peak Traffic Volumes 11:00am-12:00pm

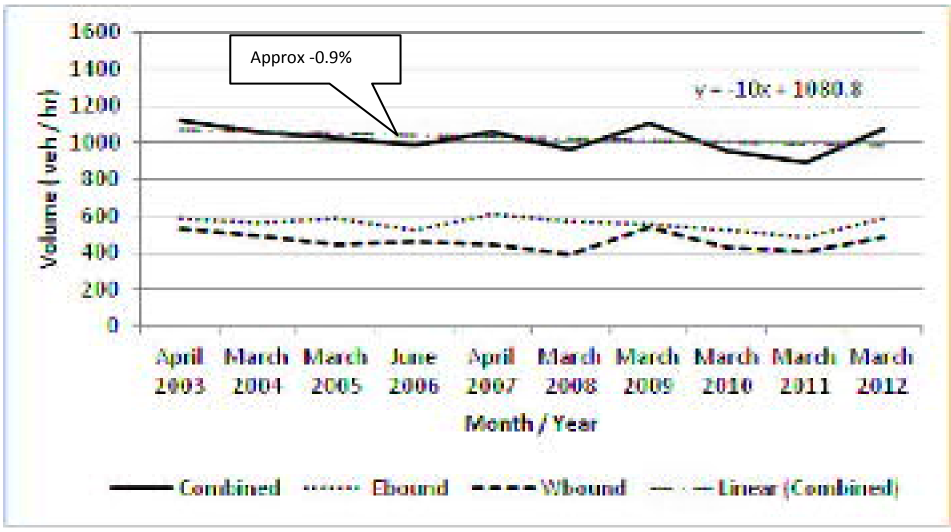

Figure 8: Historical CCC Saturday Peak Traffic Volumes 12:00-1:00pm

In terms of planned development in the area, Urbis is aware of future planned expansions to the nearby Northlands Mall complex, and have been provided with a copy of a draft traffic assessment relating to the Mall expansion project prepared by Abley Transportation Consultants (dated Sep 2013). It is not clear from the Abley report exactly how much additional floor area is being created through the Mall expansion, nor how much additional traffic is estimated to be generated. Figure 5.6 of the Abley report however indicates that the Mall expansion will not induce any additional traffic on Harewood Road during the weekday PM peak period. Additionally, Figure C-4 (Appendix C) of the Abley report indicates that there will be no introduced traffic from the Mall expansion on Harewood Road during the weekend peak period. The diagrams from the Abley report are attached as Appendix A to this assessment.

Urbis is also aware of consents for a number of office developments with a combined floor area of approximately 5,500m² on the Firestone site located on the northern side of Langdons Road. None of the consent documents for those developments however specifically indicate estimated generated traffic volumes and/or distribution of site generated traffic on the adjacent road network. The RTA Guide to Traffic Generating Developments traffic generation rates for commercial office activities of 10 vehicle trips per day per 100m² GFA, and 2 vehicle trips per hour per 100m² during peak periods. Based on the latter, the consented office developments on the Firestone site are estimated to generate around 110 vehicle trips per hour during the weekday PM peak period. On the assumption that most office activities are closed on weekends, it is considered unlikely that the consented office developments on the Firestone site will generate negligible (if any) additional traffic on the adjoining road network during the weekend peak period.

Nominally assuming that 60% (66 vehicle trips per hour) of the additional Firestone office development traffic will travel through the Langdons-Chapel intersection, that represents an increase of around 7.5% on the weekday PM peak intersection volume of 876 vehicles per hour recording by Urbis as shown in Figure 2 earlier. Even somewhat unrealistically assuming all that additional Firestone office development traffic travelling through the Langdons-Chapel intersection also uses Harewood Road past the application site, that represents a lesser increase of around 5.5% on the weekday PM peak volume of around 1200 vehicles per hour indicated by the Council's 2102 count data. Taking a very conservative approach however, this assessment will increase all base weekday PM peak network volumes (surveyed by Urbis and/or indicated by Council count data) by 7.5% and weekend peak volumes by a nominal 2.5% to account for the influence of development on the Firestone site on the future base road network volumes.

4.0 THE PROPOSAL

The proposal has been described in detail in the application, however the key traffic related elements of the proposal can be summarised as follows;

- Staged development and operation of a 13,518m² Mitre 10 Mega store with associated parking, goods loading, pedestrian access areas, landscaping and signage on the application site.
- On-site parking provision of 294 spaces for the Stage 1 development (10551m²), increasing to 340 spaces upon completion of Stage 2. Forty seven (47) of the on-site parking spaces will be signed and/or marked for staff use. On-site parking for 22 cycles (10 covered, 12 uncovered) will also be provided for the Stage 1 development, increasing to a 36 space cycle parking supply at the completion of Stage 2 with the addition of 14 more uncovered cycle parks.
- Provision for vehicle access in two locations - one on Harewood Road immediately east of Matsons Avenue, and the other on Chapel Street utilising the existing Chapel Street access. All other existing Harewood Road accesses and vehicle crossings will be removed, except for the existing access and vehicle crossing in the southeast corner of the site that will be retained for left turn egress only.
- A dedicated loading and service vehicle area at the rear (east side) of the building, typically accessed via a one-way route around the northern end of the building and then travelling southbound along the rear of the building parallel with the adjoining railway corridor. The on-site parking and access areas have also been designed such that, if occasionally required, service and delivery vehicles can still access the site and negotiate around the southern part of the building via the main Harewood Road access.

4.1 Daily Traffic Generation Estimate

The applicant has consistently held the view that previously surveyed and/or published trip generation rates of other established and local trade retail stores produced site generated traffic volume estimates that were too high based on their forecasted customer/transaction numbers for the proposed Papanui store based on market and industry data.

Based on the applicant's experience, knowledge and market research, the proposed Papanui store will serve a similar catchment size and have a similar (but most likely slightly lower) number of transactions and spend within the catchment as the following established and strong trading Mitre 10 Mega stores;

- Albany (Auckland);
- Glenfield (Auckland);
- Mt Wellington (Auckland);
- New Lynn (Auckland); and,
- Hamilton.

The applicant provided Urbis with data for each of the above stores that showed the total daily customer transaction numbers for each Saturday and Sunday during November 2013 (being one of the busiest trading months of the year), as well as total daily customer transaction numbers for the single busiest weekday of every week during that month. Due to commercial sensitivity of that data, it can not be presented in full in this assessment, however it is summarised below.

	Weekday	**Weekend**
Average Daily Customer Transactions Range	917-1011	1624-1863
85th Percentile Daily Customer Transactions Range	955-1049	1672-1968
Average 85th Percentile Daily Customer Transactions	**1017**	**1852**
Absolute Maximum Daily Customer Transactions	1092	2001

Table 3: Auckland and Hamilton Mitre 10 Mega Customer Transaction Data Summary

Based on the average of the 85th percentile values in Table 3 above, the proposed Papanui Mitre 10 Mega store is conservatively expected to generate around 1020 customer transactions per day on weekdays and 1850 customer transactions per day on weekends during the peak November trading month.

In the applicant's experience, and supported by Urbis' own experience from surveys and/or observations of other Mitre 10 Mega stores, most customers and/or customer groups that visit the store will generate a transaction. It is estimated that perhaps as low as 5% more customers/customer groups might visit the store but not generate a sales transaction however, for the purpose of this assessment, a higher factor of 10% will be conservatively adopted.

It is understood that staffing levels at the proposed Papanui Mitre 10 Mega store will be around 40 people on weekdays and 45 people on weekends (there are typically more floor staff, but less office staff on weekends), of which it is nominally assumed that 80% of staff will arrive by private car.

Based on the above trading data approach, and conservatively allowing for an additional 20 heavy vehicle trips per day, the proposed Papanui Mitre 10 Mega store is estimated to generate a weekday traffic volume of around 2330 vehicle trips per day, and around 4160 vehicle trips per day on Saturdays during the peak November trading month as summarised in Table 4 below.

	Weekday	**Weekend**
Estimated Daily Customer Transactions	1020	1850
Additional 10% Non-Spending Customers	102	185
Total Estimated Daily Customers	1122	2035
Estimated Customer Generation (2 vehicle trips per day per customer)	**2244**	**4070**
Estimated Staff Numbers	40	45
Assumed Staff Vehicle Numbers (80% by car)	32	36
Estimated Staff Generation (2 vehicle trips per day per staff vehicle)	**64**	**72**
Nominal Service / Delivery Vehicle Movements	**20**	**20**
Total Estimated Daily Generation	**2328 veh trips / day**	**4162 veh trips / day**

Table 4: Estimated Daily Site Generated Traffic Volumes Based on Trading Levels

4.2 Revised Peak Period Traffic Generation Estimates

Urbis also has access to trading data from the Masterton Mitre 10 stores (Queen Street and Ngamautawa Road) for a 2 week period in November- December 2007 which indicates that trading during the weekday PM peak period represents an average of around 14% of the daily trading whereas other more recent Hornby Mitre 10 Mega trading data indicates that the weekday PM peak trading represents only around 7% of the total daily sales. On that basis, 10% is nominally adopted as roughly representing the average of the two stores. For the Saturday peak period, the Masterton trading data indicated around 17% of the daily transactions occurred, whereas the Hornby data indicated the Saturday peak trading represents around 13% of the total daily sales. Again adopting the average, a figure of 15% is nominally adopted for the purpose of this assessment.

Based on the above peak period ratios, the proposed Papanui Mitre 10 Mega store would is expected to generate around 230 vehicle trips per hour during the weekday PM peak period (2328 vehicle trips per day x 10% = 233 vehicle trips per hour) and around 620 vehicle trips per hour during the Saturday peak period (4162 vehicle trips per day x 15% = 624 vehicle trips per hour).

4.3 Site Generated Traffic Distribution

Leading up to the preparation and lodgement of the consent application, there was a considerable amount of consultation and correspondence with Council staff. During that process, Council staff were provided with tables and diagrams that summarised Urbis' distribution assumptions for the weekday PM peak and Saturday peak periods. Council staff reviewed the information provided, and entered Urbis' estimated demand flows (site generated traffic volumes) into the Christchurch Assignment and Simulation Traffic (CAST) model to compare Urbis' assumed distribution assignments against those reported by the CAST model. The differences are summarised in Figures 9 and 10 below whereby (U) notates Urbis' assumed assignments and (C) notates the distribution assignments used by the CAST model (note that the Harewood Road site access figures include both the main access as well as the egress only access in the southeast corner of the site).

Figure 9: Original Urbis vs CAST Distribution Assignments (Weekday PM Peak)

Figure 10: Original Urbis vs CAST Distribution Assignments (Saturday Peak)

Key points to note from Figures 9 and 10 include;

- Urbis did not initially allow for any site generated traffic accessing or leaving the site via Matsons Avenue or St James Avenue. One of the reasons for this was to focus initially on major road network intersection that the Council may have wanted included in the traffic assessment. While it is accepted that some site generated traffic will use Matsons Avenue and (to a lesser extent) St James Avenue, it is difficult to accept that the amounts will be as high as suggested by the CAST model (15-28% of total traffic approaching the site, and 18-20% of total traffic departing the site).

- The CAST assignments for Sisson Drive (1-2% approaching the site, 10-11% departing the site) were calculated from CAST model output diagrams that were included in a summary report prepared by the Council prepared by Mr Mark Gregory (dated 4 April 2014)). In the report text however (page 5, para 4.1 h), it is suggested that the CAST model assigned 22% of traffic departing the site during the weekday PM peak to access Main North Road via Sisson Drive). Also, on page 8 (para 4.5 h), the report suggests that CAST assigns 14% of traffic leaving the site to turn left into Restell Street (the report incorrectly states Sisson Drive) in order to access Main North Road.

- Because CAST assigns a notable amount of traffic to Matsons Avenue and St James Avenue whereas the Urbis assignment did not include any, the CAST assignments on most of the other network links are lower than the Urbis percentages. The exception to this is on Langdons Road east of the site where Urbis initially assigned only 7-8% of departing traffic whereas CAST assigned 27-34% of departing traffic.

Notwithstanding the differences noted above, it has been mutually agreed with Council staff (Mr Michael Calvert) that the CAST assignments will be adopted for further analysis and assessment of this proposal.

On that basis, the Urbis distribution model was adjusted to reflect the CAST assignments (as close as possible taking account of differences resulting from rounding) and derive the following estimated distribution patterns of peak period site generated traffic volumes as shown in Figures 11 and 12 on the following pages. The percentage values shown in red text represent the CAST model assignment values of inbound/outbound site generated traffic, whereas the percentage values in the blue highlighted cells are the actual percentages calculated from the Urbis model based on the site generated traffic volumes discussed earlier.

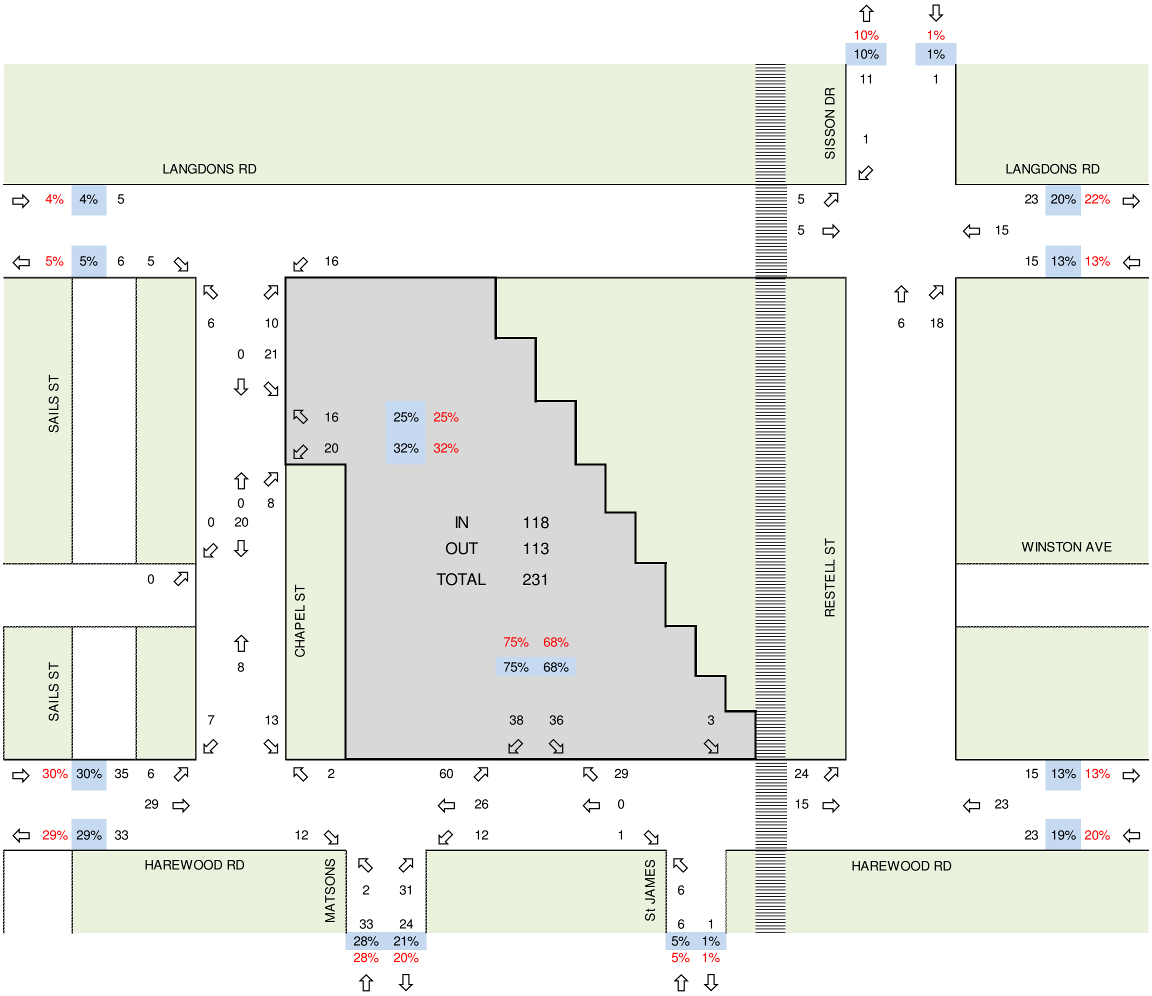

Figure 11: Estimated Site Generated Traffic Volumes and Distribution – Weekday PM Peak (vph)

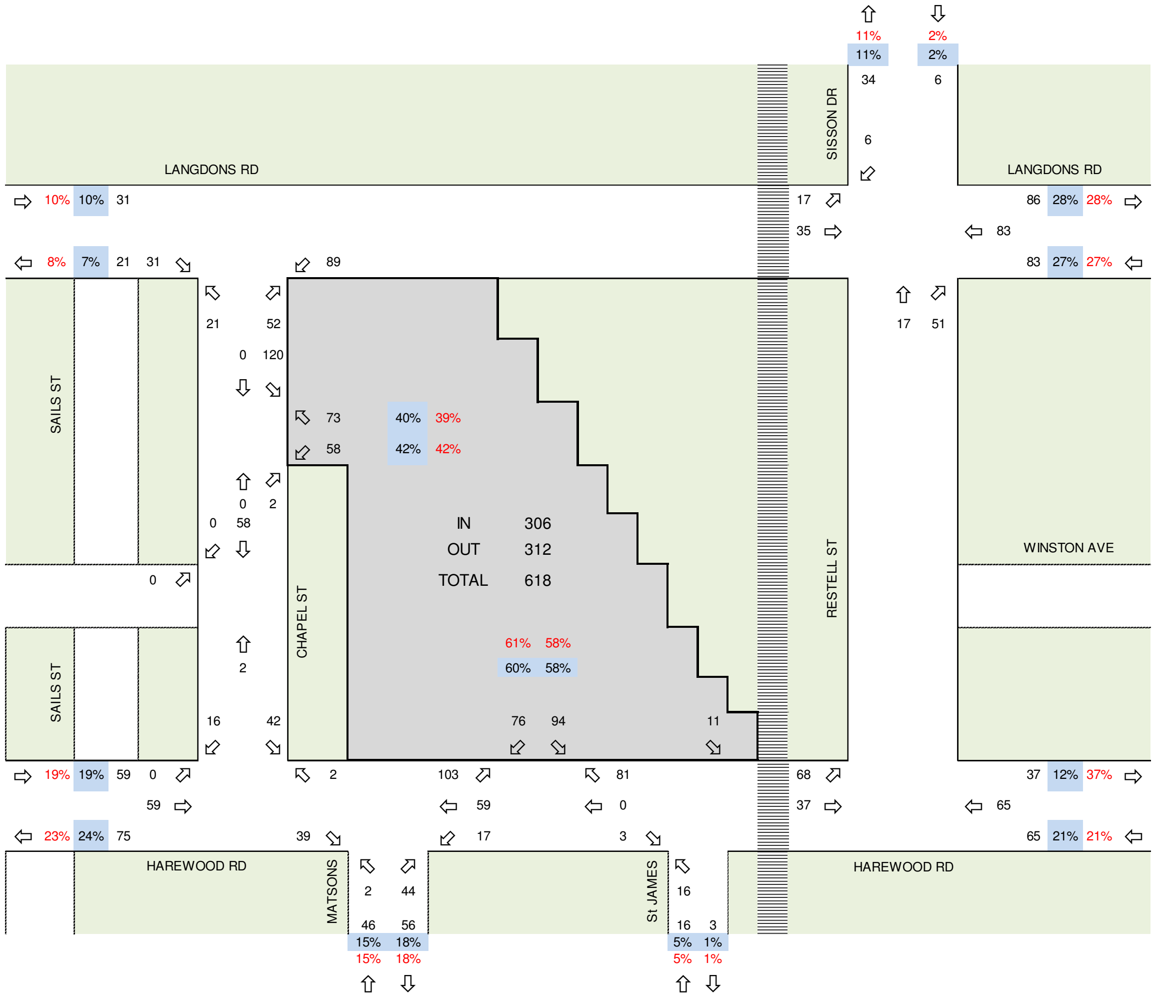

Figure 12: Estimated Site Generated Traffic Volumes and Distribution – Saturday Peak (vph)

5.0 COMPLIANCE ASSESSMENT

5.1 Identified Non-Compliances

As noted earlier, the application document identified the proposal as having six traffic related non-compliances against the following City Plan development standards;

- Development Standard 13-2.2.1 – Parking provision
- Development Standard 13-2.2.4 – Marked staff parking provision
- Development Standard 13-2.2.6 – Cycle parking provision
- Development Standard 13-2.2.14 – Queue space provision (Chapel St access only)
- Development Standard 13-2.3.3 – Length of vehicle crossing
- Development Standard 13-2.3.8 – High traffic generator

While the above traffic non-compliances would individually be dealt with on a restricted discretionary basis, the overall activity status of the proposal under the City Plan is **non-complying** on the basis of breaching Critical Standard 9–5.8.1 (Content of Fill and Excavated Material) as well as a number of other planning related standards.

The first five traffic non-compliances identified above have already been addressed in the application, therefore this assessment relates only to the non-compliance against development standard 13-2.3.8 and the required assessment of effects on the surrounding road network related to the overall non-complying activity status.

6.0 ASSESSMENT OF EFFECTS

As the proposal has an on-site parking provision of more than 25 spaces and will generate more than 250 vehicle trips per day, it is required to be assessed as a high traffic generator under development standard 13-2.3.8. The City Plan assessment matters relating to this standard are contained in 13-3.2.14 as follows;

(a) The actual or potential level of vehicle, cycle, and pedestrian traffic likely to be generated from, and moving past, the proposed access point(s).

(b) The extent to which the traffic using the access, either alone or in association with other nearby activities, will adversely affect the traffic function and/or the safety of the surrounding road network.

(c) Whether the present and projected vehicle, cycle and pedestrian flows along the frontage road will exacerbate any adverse effects created by extra on-street parking and manoeuvring associated with the site.

(d) The ability to gain access to an alternative road which has a lesser traffic function and the environmental impacts on that alternative road in respect of residential amenities where relevant.

(e) The extent to which the noise, vibration and fumes of vehicles using the access would affect surrounding activities, particularly residences.

(f) The adverse effects of extra traffic, particularly heavy vehicles, generated by the development on the amenity and safety of surrounding residential streets.

(g) The extent to which the physical form of the frontage road may mitigate the adverse effects of the extra vehicle movements generated for example, the presence of a solid median to stop right hand turns.

(h) Any cumulative effects of traffic generation from the activity in conjunction with traffic generation from other activities in the vicinity.

(i) Whether the speed of vehicles travelling on the frontage road is likely to exacerbate the adverse effects of the access on the safety of road users.

(j) The proximity of the access to other high traffic generating land use access points and intersections.

(k) The extent to which any extra conflict may be created by vehicles queuing on the frontage road past the vehicle crossing.

(l) The extent to which the traffic generated by the site will adversely affect the frontage road, particularly at times of peak traffic flows on the road.

(m) Whether the adverse effects of the traffic could be minimised/mitigated by on-street traffic management measures including the installation of signals or pedestrian refuges or deceleration and acceleration lanes.

(n) The actual or potential effects on the safety and efficiency of the state highway.

(o) Whether the sight distances at the access are adequate to provide safe access/egress with reference to "Road and Traffic Standards Guidelines for Visibility at Driveways".

(p) For retail activity in the B3, B3B, B4 and BRP zones, the relationship of parking, access and manoeuvring areas, including freight deliveries, in respect to the safety of pedestrians.

In considering the above assessment matters, particularly those relating to residential amenity effects, it is important to recognise that the site is zoned Business 4 and also to consider the potential traffic effects of permitted development on the site. The lodged application document presented two permitted baseline scenarios (retail and office) for the northern end of the site, and also summarised the traffic elements of historic Sanitarium factory activity on the site. Of particular relevance is that the permitted baseline scenarios are estimated to generate more traffic onto Chapel Street than the current proposal, as summarised in Table 5 below.

	Weekday PM Peak	Weekend Peak
Current Proposal (from figures 11 and 12)	**70 vehicle trips per hour**	**250 vehicle trips per hour**
Permitted Baseline Scenario A (Retail)	140 vehicle trips per hour	290 vehicle trips per hour
Permitted Baseline Scenario B (Office)	120 vehicle trips per hour	-

Table 5: Comparison of Estimated Chapel Street Site Generated Traffic Volumes (rounded to nearest 10 trips)

Recognising the above, the key traffic related issues to consider in this assessment (as verbally agreed with Council staff) are as follows;

- Operation of the proposed main Harewood Road access;
- Effect of site generated traffic on the safety and efficiency of the Langdons-Chapel intersection;
- Effect of site generated traffic on the safety and efficiency of the Sawyers Arms-Sisson intersection; and,
- Effect of site generated traffic on the safety and efficiency of the Harewood-Matsons intersection.

6.1 Harewood Road Access

Figures 11 and 12 earlier showed the estimated peak traffic volumes on the main Harewood Road site access during the weekday PM peak period and the weekend peak period. It can be seen from those diagrams that the combined two-way access volume during the weekday PM peak period is around 160 vehicle trips per hour, with around 350 vehicle trips per hour during the weekend peak period. In terms of through volumes on Harewood Road past the site access, it is conservatively assumed for the purpose of this assessment that all site generated traffic will be new network traffic. In other words, the future through volumes past the site access will not be reduced to allow for pass-by trips into/out of the application site.

As discussed earlier, it is assumed that the future base volumes on Harewood Road are those indicated by the most recent (March 2012) traffic count data (i.e. 1200 vehicles per hour during the weekday PM peak period and 1100 vehicles per hour during the weekend peak period) but conservatively increased by 2.5 (weekend peak) - 7.5% (weekday PM peak) to account for development on the Firestone site. On that basis, future traffic volumes at the main Harewood Road site access that will be used for SIDRA modelling are estimated as shown in Table 6 below.

		Weekday PM Peak (vehicles per hour)	**Weekend Peak (vehicles per hour)**
Harewood E	Through	600 + 7.5% = 645	550 + 2.5% = 564
	Right	29	81
Harewood W	Left	60	103
	Through	600 + 7.5% = 645	550 + 2.5% = 564
Site Access	Left	36	94
	Right	38	76

Table 6: Estimated Site Future Base + Development Traffic Volumes - Main Harewood Road Site Access

In terms of the SIDRA model set up, the following points are relevant;

- Although Urbis is aware that Council is investigating a project to install cycle lanes along Harewood Road, there is no indication at this stage as to how this would affect the lane formations past the site access. For that reason, the SIDRA model is based on the current formation. Importantly, the current formation provides a 1.8m wide painted median separating the 4.0-4.5m wide traffic lanes and there are no stopping lines on the north side of Harewood Road west of the proposed site access location. As such, notional 25m long 2.5m wide left/right turn lanes have been modelled on both Harewood Road approaches to the site access with the through lanes notionally reduced to 3.5m.
- Urbis and Council traffic count data indicates the Harewood Road traffic composition includes 2.5-4.0% heavy vehicles, however 5% was conservatively adopted on the Harewood Road through movements for the SIDRA modelling. Turning movements into and out of the site were assumed to include a notional 2% heavy vehicle composition.
- Gap acceptance and follow-up headway values were adopted from the Austroads Guide to Traffic Engineering Practice: Part 5 (Intersections at Grade) as recommended for a two-lane, two-way major road.
- Although some bunching was observed in the Harewood Road traffic flows during the Harewood-Matsons intersection surveys, a bunching factor was not included in the SIDRA modelling of the site access. This is again considered a conservative approach.

Table 7 below summarises the SIDRA results for control delay, level of service (LOS) and 95th percentile queue lengths at the main Harewood Road site access

Approach	**M'ment**	**Weekday PM Peak**				**Saturday Peak**			
		Volume (vph)	**Delay (sec)**	**LOS**	**Queue (m)**	**Volume (vph)**	**Delay (sec)**	**LOS**	**Queue (m)**
Harewood E	Th	645	0.0	A	0	564	0.0	A	0
	Rt	29	9.2	A	1	81	9.0	A	3
Harewood W	Lt	60	5.6	A	0	103	5.6	A	0
	Th	645	0.0	A	0	564	0.0	A	0
Site Access	Lt	36	10.1	B	2	94	9.4	A	4
	Rt	38	15.5	C	3	76	14.4	B	5

Table 7: SIDRA Summary - Main Harewood Road Site Access (Estimated Future Base + Development Traffic)

As can be seen in Table 7, SIDRA modelling indicates that the main Harewood Road site access will operate with minimal delays to turning movements into the site, and acceptable delays of around 9-16 seconds on turning movements out of the site access during both the weekday PM peak period and the Saturday peak period. Importantly, based on the assumed lane configuration on Harewood Road, there will be no effect on through traffic past the site access.

Given the relatively modest delays that will be experienced by vehicles turning into and out of the site access, drivers are less likely to take risks by accepting smaller gaps in the through traffic streams. On this basis, it is expected that the proposed site access will operate both safely and efficiently.

6.2 Langdons - Chapel Intersection

As can be seen in Figure 11 earlier, the proposal is estimated to generate a relatively modest volume of 37 additional vehicle movements through the Langdons-Chapel intersection during the weekday PM peak period. During the Saturday peak period however, the higher site generated traffic volumes and adopted CAST model assignments result in a significantly higher volume of 193 additional vehicle movements through the Langdons-Chapel intersection.

As discussed earlier, the future base weekday PM peak intersection volumes are conservatively assumed to be 7.5% higher than those surveyed by Urbis (summarised in Figure 3) while the surveyed Saturday peak volumes are conservatively increased by 2.5% to represent the assumed future base volumes. While the existing surveyed traffic volume scenario was modelled in SIDRA with only a 1% heavy vehicle component on all movements, except for the right turn movement from Chapel Street to Langdons Road (where a 3% heavy vehicle component was adopted), SIDRA modelling of the future (base plus development traffic) scenario conservatively assumes a 3% heavy vehicle composition on all movements at this intersection.

SIDRA modelling of the Langdons-Chapel intersection under the future (base plus development traffic) scenario based on the above, indicates that the intersection will continue to operate with minimal delays and corresponding good levels of service as well as negligible queues even with the addition of site generated traffic from the proposed Mitre 10 Mega development as summarised in Table 8 below.

Approach	M'ment	Weekday PM Peak				Saturday Peak			
		Volume (vph)	Delay (sec)	LOS	Queue (m)	Volume (vph)	Delay (sec)	LOS	Queue (m)
Langdons W	Th	272 + 7.5% = 292	0.0	A	0	285 + 2.5% = 292	0.0	A	0
	Rt	19 + 7.5% + 5 = 25	7.5	A	1	20 + 2.5% + 31 = 52	7.2	A	1
Langdons E	Lt	129 + 7.5% + 16 = 155	5.6	A	0	80 + 2.5% + 89 = 171	5.6	A	0
	Th	316 + 7.5% = 340	0.0	A	0	253 + 2.5% = 259	0.0	A	0
Chapel	Lt	34 + 7.5% + 6 = 43	7.3	A	1	26 + 2.5% + 21 = 48	6.8	A	1
	Rt	106 + 7.5% + 10 = 124	8.8	A	4	54 + 2.5% + 52 = 107	8.5	A	4

Table 8: SIDRA Summary - Langdons-Chapel Intersection (Estimated Future Base + Development Traffic)

Based on the above SIDRA results, no mitigation measures in terms of intersection improvements are considered necessary at the Langdons-Chapel intersection. That said, with higher traffic flows on Langdons Road and Chapel Street associated with development on the Firestone site as well as this application site, the Council may wish to consider removing some/all of the on-street parking on the northern side of Langdons Road between Chapel Street and the railway. Again, this is not required to mitigate any effects of this proposal. As demonstrated in the lodged application document through reference to comprehensive survey data, the on-site parking supply for the proposed Mitre 10 Mega store more than satisfies the expected parking demand that will be generated. On that basis, the proposal will not be reliant on on-street parking surrounding the site, and the removal of any parking spaces from Langdons Road will therefore have no impact on parking supply and demand associated with the proposed Mitre 10 Mega.

6.3 Sawyers Arms - Sisson Intersection

As shown in Table 2a earlier, SIDRA modelling based on existing/surveyed traffic volumes indicates that the Sawyers Arms - Sisson intersection currently operates with minimal delays and a corresponding good level of service during both the weekday PM peak period and the weekend peak period.

Based on the site generated traffic volumes presented in this assessment, and adopting the CAST model route assignments as agreed with Council staff, the proposed Mitre 10 Mega development is estimated to generate very modest volumes of additional traffic onto Sisson Drive. Figure 11 earlier showed that the estimated weekday PM peak volume of additional site generated traffic on Sisson Drive is only 12 vehicles per hour, while Figure 12 showed that the estimated weekend peak volume of additional site generated traffic on Sisson Drive is only 40 vehicles per hour. When distributed over the various turn movements at the Sawyers Arms - Sisson intersection, these modest volumes of additional site generated traffic will have no measurable effect on delays, levels of service or queue lengths. As such, it is considered unnecessary to model the future (base plus development traffic) scenario for this intersection.

6.4 Harewood - Matsons Intersection

As shown in Figures 11 and 12 earlier, the proposal is estimated to generate around 112 additional vehicle movements through the Harewood-Matsons intersection during the weekday PM peak period and 220 additional vehicle movements through the intersection during the Saturday peak period. As before, the future base weekday PM peak intersection volumes are conservatively assumed to be 7.5% higher than those surveyed by Urbis (summarised in Figure 4) while the surveyed Saturday peak volumes are conservatively increased by 2.5% to represent the assumed future base volumes.

SIDRA modelling of the Harewood-Matsons intersection under the future (base plus development traffic) scenario based on the above growth assumptions, and again assuming 5% heavy vehicle components on the Harewood Road through movements and 2% heavy vehicles on Matsons Avenue, indicates that the intersection will continue to operate with modest delays and corresponding good levels of service as well as negligible queues even with the addition of site generated traffic from the proposed Mitre 10 Mega development as summarised in Table 9 on the following page.

Approach	**M'ment**	**Weekday PM Peak**				**Saturday Peak**			
		Volume (vph)	**Delay (sec)**	**LOS**	**Queue (m)**	**Volume (vph)**	**Delay (sec)**	**LOS**	**Queue (m)**
Harewood W	Th	514 + 7.5% + 26 = 579	0.0	A	0	497 + 2.5% + 59 = 568	0.0	A	0
	Rt	112 + 7.5% + 12 = 132	9.3	A	5	86 + 2.5% + 39 = 127	7.8	A	4
Harewood E	Lt	35 + 7.5% + 12 = 50	5.6	A	0	26 + 2.5% + 17 = 44	5.6	A	0
	Th	565 + 7.5% + 26 = 633	0.0	A	0	387 + 2.5% + 59 = 456	0.0	A	0
Matsons	Lt	183 + 7.5% + 2 = 199	11.7	B	11	85 + 2.5% + 2 = 89	8.3	A	3
	Rt	86 + 7.5% + 31 = 123	18.6	C	11	62 + 2.5% + 44 = 108	13.8	B	7

Table 9: SIDRA Summary - Harewood-Matsons Intersection (Estimated Future Base + Development Traffic)

As can be seen in Table 9, the effects of the assumed 2.5-7.5% growth plus the addition of site generated traffic are most noticeable at this intersection in regard to the right turn movement from Matsons Avenue into Harewood Road. Even then however, a comparison of the SIDRA results of the existing/surveyed traffic volume scenario presented in Table 1c earlier shows that the increase to average delays is only around 3.1-4.8 seconds, and the resultant level of service remains in the entirely acceptable range of LOS B-C.

One potential (albeit relatively minor) issue however relates to queuing on Matsons Avenue. As noted earlier, the SIDRA model was set up on the basis of a notional 10m left turn lane on the Matsons Avenue approach however the SIDRA results indicate average queue lengths of 11m associated with this movement during the weekday PM peak period. For this reason, the Council may wish to consider extending the existing no-stopping lines on the west side of Matsons Avenue a further 10m south of Harewood Road. It is important to recognise however, that this is not considered essential in terms of a mitigation measure and the installation of road markings is beyond the applicant's control.

In terms of additional traffic movements along Matsons Avenue itself, the weekday PM peak volume is estimated to be around 57 vehicles per hour whereas the weekend peak volume is estimated to be around 102 vehicles per hour. Again, as noted earlier, Urbis question whether the proportion of site generated traffic on Matsons Avenue will be as high as suggested in the CAST assignments. Additionally, Council have accepted that Matsons Avenue is already used by traffic associated with other commercial activities in the area (e.g. Northlands Mall) and the Business 4 zoning of the application site allows for permitted commercial development that could also generate traffic onto Matsons Avenue. For that reason, it has been agreed with Council that the most appropriate approach at this stage is to offer/impose a monitoring condition whereby Urbis (or another qualified agent appointed by the applicant) periodically record traffic volumes on Matsons Avenue and identify how much is directly associated with development on the application site and/or other commercial development in the vicinity.

6.5 General Matters

Returning to some of the other City Plan assessment matters pertaining to the high traffic generator rule, the following comments are provided;

- The proposed site layout provides for good pedestrian connectivity to/from and within the site. In response to feedback from Council staff, the width of the main Harewood Road access has been reduced from earlier versions of the proposal so as to minimise the crossing distance for pedestrians travelling past the site access on Harewood Road.
- The proposed on-site parking provision for both the Stage 1 and Stage 2 developments notably exceeds the estimated demand that will be generated by the activities on the site. As such, the proposal is not expected to generate any additional on-street parking demand on the surrounding road network.
- There is no evidence of any existing issues relating to excessive speeds on any of the frontage roads to the application site. Speeds are tempered on Chapel Street through the formation width and inclusion of narrowed sections, and on Harewood Road and Langdons Road speeds are tempered by the presence and design (horizontal and vertical alignment) of the railway level crossings.
- Sight distances at the proposed site accesses notably exceed all relevant design guidelines.
- There are no state highways in the immediate vicinity of the application site.

7.0 SUMMARY AND CONCLUSION

The proposed Mitre 10 Mega development on the existing Sanitarium Health Food factory site at 30-64 Harewood Road, 22 Chapel Street and 41 Langdons Road has six traffic related non-compliances against the provisions of the City Plan. The identified non-compliances relate to parking provision (including staff and cycle parking provision), queue space (Chapel Street access only), vehicle crossing lengths and traffic generation.

The first five non-compliances are addressed in the application document, and it was concluded that the effects were negligible. This assessment has addressed the non-compliance against development standard 13-2.3.8 (High Traffic Generators) and the effect of site generated traffic on the adjoining road network.

Based on the applicant's forecasted customer/transaction numbers, and through reference to actual trading data from similarly sized Auckland and Hamilton Mitre 10 Mega stores that also serve a similar catchment, the proposed Papanui Mitre 10 Mega store is estimated to generate around 2300 vehicle trips per day during weekdays, and around 4150 vehicle trips per day on weekends during the peak November trading month. The proposal is estimated to generate around 230 vehicle trips per hour during the weekday PM peak period, and around 620 vehicle trips per hour during the Saturday peak period.

Though Urbis has some reservations about the distribution of site generated traffic that has been suggested by the CAST model, it has been agreed with Council to adopt those route assignments. Also as agreed with Council staff, the focus of this assessment was on the operation of the main Harewood Road site access, and the effect of site generated traffic on the Sawyers Arms - Sissons, Langdons - Chapel and Harewood - Matsons intersections. Even allowing for additional traffic associated with consented development on the nearby Firestone site, SIDRA modelling of these locations indicates that they will continue to operate with minimal delays and corresponding good levels of service as well as negligible queuing during both the weekday PM peak period and the weekend peak period. Furthermore, and perhaps more importantly, the proposal is estimated to generate less traffic onto Chapel Street (and other residential streets) during peak periods than that which could be generated in association with permitted development on the application site recognising the Business 4 zoning of the site as presented in the previously lodged application document.

Based on the above, it is considered that the proposal will have a minimal (and certainly less than minor) effect on the continued safe and efficient operation of the surrounding road network, and will not result in any adverse amenity effects on adjoining residential properties over and above that which could be expected from permitted development of the site.

Appendix A

Northlands Mall Expansion Site Generated Traffic Diagrams

(Source: Proposed Expansion of Northlands Shopping Centre Integrated Transport Assessment, Abley Transportation Consultants, Sep 2013)

Urbis
traffic planning and development

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e: damienne@urbisgroup.co.nz

Christchurch City Council
PO Box 73013
Christchurch 8154

Attention: Kathryn Stapleton
Via Email – Kathryn Stapelton@ccc.govt.nz

6 November 2014

Dear Kathryn,

RE: RMA92026872 REQUEST FOR FURTHER INFORMATION – 32-54 HAREWOOD ROAD, CHRISTCHURCH

I write in response to your request for further information (RFI) dated 7 October 2014. In particular you were seeking clarification on 13 points relating to various elements of the proposal. The following comments are listed in order of your request. For completeness I also attach a copy of an updated application document and the necessary additional appendices. The updated application document incorporates much of the RFI response commentary made below. Changes over the original application document are shown as blue text.

Notable Tree

1. *A methodology detailing how the proposed works within 10m of the protected Tulip Tree are to be undertaken.*

Please see attached methodology Notable Tree from Brett Gilmore at Structex.

2. *An arborist report on the state of the Tulip Tree and potential impacts on it form the car parks and other works being constructed within 10m of its base.*
3. *Consideration regarding the fact the Tulip Tree is located close to Kruses Drain and uses this water source.*

Points 2 and 3 above, please see attached report from Mark Hutching at Allwood Trees

Contamination

4. *A detailed DSI including any concerns re ACM*
5. *A Site Management Plan in relation to earthworks and construction, including details on Traffic Management*

Please see attached DSI from Geoscience which addresses points 4 and 5 above.

Please note Gareth Oddy (Geoscience) has had a conversation with Hannah (23rd October) who has advised she is happy with the attached DSI report and concludes that the site resource consent application is likely to be classed as restricted discretionary with conditions to be added in the consent regarding required remediation of the land. As such, it is not proposed to produce a remedial action plan until we have the final design plans and confirmed volumes of soil to be excavated.

Waterway

6. *The draft ECSP did not include a the map attachment*

The relevant map has been attached

7. *The draft ECSP is required to include specific details as to how the waterway will be located off to achieve the filing, mitigation the discharge of sediment downstream, and the steps that will be taken to achieve fish salvaging.*

Please refer to the attached e2 solutions report which provides a detailed escp and drawings which covers this phase of works.

Regarding the fish salvage details "The relocation of the shortfin eel population will be undertaken as per the method outlined in the Kruses Drain Ecological Assessment." previously submitted.

8. *Confirmation is required of the excavation and deposition of the material from the streambed at an appropriate landfill.*

This has been addressed in the DSI.

Traffic

9. *Clarification on Table reference numbers is sought*

All references to Table 6 on page 61 of the application should in fact refer to Table 7. The reference to Table 7 in the paragraph immediately following the bullet points is correct. The table numbering itself on what is now page 63 is incorrect, and should read Table 7 rather than Table 6.

10. *Clarification on staff numbers is sought*

The staff numbers referenced in the application (i.e. 40-45 people) refer to the expected typical staffing levels on completion of Stage 2. While the Stage 1 and Stage 2 site plans submitted with the application did not specifically identify the location of staff parks on the site, it is stated in a number of places both in the application and in the supplementary traffic assessment that there would be 47 staff parking spaces provided on site for both stages of the development. The RFI suggests that "…when Stage 2 is completed…there are 56 spaces available in the secure yards for staff parking…". It is unclear what 56 spaces the RFI is referring to, as there is only one secure yard/compound proposed (adjacent to Harewood Road) and that area contains only 19 parking spaces.

The exact location of the 47 staff parks has not yet been finalised, however they will include the 19 spaces within the secure compound adjacent Harewood Road plus 28 of the 35 spaces at the northern end of the development adjacent to Langdons Road. For the purposes of this application and RFI response, the 28 northern staff spaces are provisionally nominated as being those marked in red in Figure 1 on the next page, recognising that development standard 13-2.2.4 (staff parking) specifically allows for staff parking to be relocated within the site.

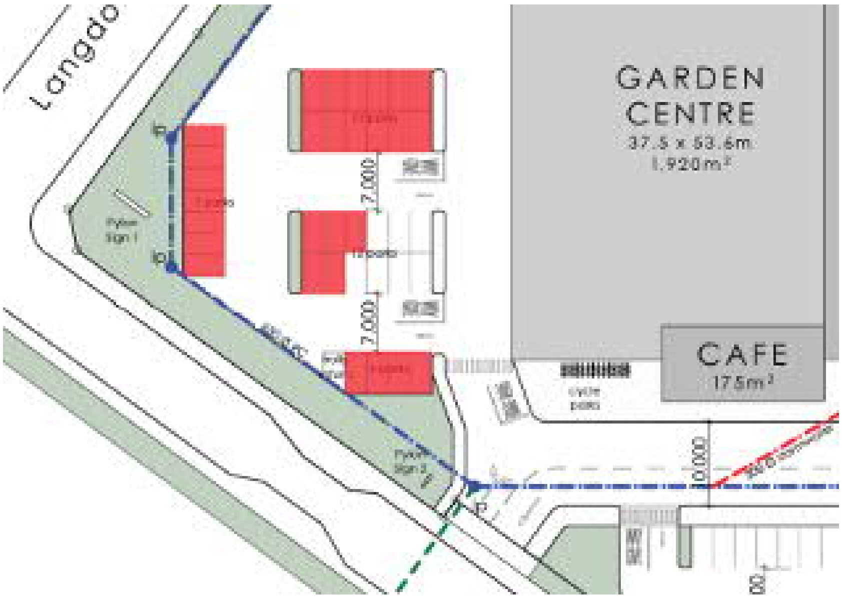

Figure 1: Provisional Location of 28 Stage 2 Staff Parking Spaces

11. Provide Stage 1 staff numbers including Sanitarium and indicate these spaces on a plan, noting the stage 1 site plan indicates 19 spaces within a secure yard , clarification is sought on is this the stage 1 staff car parking? And is it sufficient?

Firstly, it should be noted that Sanitarium intend to provide their own staff parking area, within the boundaries of their nominated site area at the rear (north-eastern side) of the building. For the purpose of the application, and this RFI response however, the City Plan parking requirements associated with the Sanitarium facility have been considered in conjunction with the proposed Mitre 10 parking requirement and supply.

As noted in response to point 10 above, a total of 47 staff parking spaces are proposed for both Stage 1 and Stage 2 of the development. Exact staff numbers for the Stage 1 development are not known at this stage, however the combined staff numbers of the Mitre 10 Stage 1 development plus Sanitarium staff numbers will be less than the expected typical Mitre 10 staffing levels on completion of Stage 2.

As with the Stage 2 staff parking provision, the Stage 1 staff parking provision of 47 spaces will include the 19 spaces located within the secure compound adjacent Harewood Road. The remaining 28 spaces are provisionally nominated as being those marked in red within the southwest corner of the site as shown in Figure 2on the next page, recognising again that development standard 13-2.2.4 (staff parking) specifically allows for staff parking to be relocated within the site.

Figure 2: Provisional Location of 28 Stage 1 Staff Parking Spaces

Based on the expected typical staff numbers of 40-45 people, and the assumed staff car mode split of 80%, the typical staff parking demand is only expected to be around 32-36 spaces. The provision of 47 staff parking spaces is therefore considered to be more than capable of accommodating the expected staff parking demand of both the Stage 1 and Stage 2 development proposals. In addition, the practical staff parking surplus means that occasional periods of increased staff parking demand can also be accommodated on-site (e.g. associated with extra temporary/casual staff during Easter and Christmas holiday trading periods).

12. *Clarification on sought as to reasons for not providing covered staff cycle parking spaces, in particular staff parking in reasonable proximity to the pedestrian entrance of the proposed building.*

As stated in the application, the nature of the activity is such that it is not expected to generate much (if any) customer cycle parking demand. In terms of staff parking demand, the supplementary traffic assessment submitted with the application notes that the expected typical staff numbers will be around 40-45 people, of which 80% (32-36 people) are expected to come by private car. Allowing for other modes such as car pooling, public transportation and walking therefore, the actual staff cycle parking demand is unlikely to exceed 4-5 spaces. Overall therefore, the provision of 12 on-site cycle parking spaces for the Stage 1 development and 26 cycle parking spaces for the Stage 2 development is expected to be more than adequate to cater for the expected staff and visitor cycle parking demand generated by the activity. The proposed cycle parks are located less than 100m from the main store entrance lobby, and are thus considered to be conveniently located for both staff and visitors.

In terms of covered staff cycle parking, Urbis remain of the opinion that the effects of not providing covered spaces are negligible on the basis that a cyclist will get wet on a wet day regardless of the provision of covered cycle parks. Notwithstanding this, the applicant has chosen to provide a covered staff cycle parking area (capable of accommodating at least 10 cycles) within the secure compound area near the southwest corner of the building.

13. *Owing to potential effects on Harewood Road cycle and pedestrian movements past the Harewood Road access, the need for the proposed 20m width of the vehicle crossing is questioned. Swept path diagrams are required showing a B-train vehicle turning left into the site from Harewood Road. Additionally, a SIDRA analysis (including files) is required for a scenario with only one exit lane.*

Subsequent to the issue of the RFI, Urbis has consulted with Mike Calvert on the design of the Harewood Road site access and vehicle crossing. From those discussions, Urbis explored two alternate design options for the Harewood Road access as below;

- Retaining the same access lane widths (i.e. a 4m entry lane and two 3.5m exit lanes separated from the entry lane by a 2m wide solid median). However, rather than splaying the access (particularly the entry lane) at the boundary as shown on the lodged Stage 1 and Stage 2 site plans, this option sought to provide mountable kerbs to the splay areas and form them with a trafficable surface capable of accommodating the swept path requirements of occasional heavy vehicle movements.
- Similar to the above, but increasing the width of the central median on the access to 2.6m and reducing each of the exit lanes accordingly to 3.2m. The increased median width was intended to provide refuge for pedestrians passing the site access on Harewood Road such that, if required, they could negotiate it as a 2-stage crossing.

Mr Calvert was consulted on both concepts, and we provided sketch plans for his evaluation. After consideration however, he advised that he was still uncomfortable with the overall width of the access and vehicle crossing. Urbis then explored a third alternate access design option as described below;

- Delete the central median and reduce the two exit lanes to 3m each, resulting in an overall access width of 10m at the boundary. Rather than splaying the access, or providing mountable kerbs to occasional trafficable areas, the intention with this design option is that heavy combination vehicles would manoeuvre across the exit lanes upon entry. Given that heavy combination vehicles will enter the site via the Harewood Road access very infrequently, and typically at times outside times of peak customer traffic movements, this situation is considered to be acceptable and unlikely to result in any adverse effects on the adjoining road network. The design concept has been verbally described to Mr Calvert, and it is understood he accepts it in principle. Figure 3 on the following page shows a concept sketch of this design option with the swept path of a B-train vehicle turning left into the site.

Figure 3: B-Train Swept Path Turning Left Into Site From Harewood Road

The required SIDRA analysis has been undertaken, and summary tables are provided with this response that show average control delay and 95th percentile queue lengths for both the weekday PM peak and Saturday peak periods for options with one or two exit lanes. The SIDRA modelling was based on the original exit lane widths of 3.5m, however it is unlikely the reduced 3m lane widths now proposed will have a significant bearing on the results. The SIDRA file will also be provided with this RFI response as requested.

Affected Party Approvals

You will recall from our recent meeting that there is a difference in opinion in relation to the need to provide affected party approvals in relation to this proposal. Your RFI identified one Chapel Street property and three Harewood Road properties as being affected by the proposal, however you subsequently advised at our meeting that a decision on affected party approvals is yet to be made.

The following two points are noted in terms of potential site generated traffic effects on residential amenity:

a) The permitted baseline comparison provided in Section 5.2 of the application demonstrated that Mitre 10 Mega traffic utilising the Chapel Street access the generation numbers are broadly similar and there will be no noticeable additional effects over and above those previous and existing environment.

b) An analysis of the performance of the proposed main Harewood Road site access using SIDRA showed that the predicted traffic volumes generated by the proposed activity will not result in traffic congestion at this site access location that could be considered to have any noticeable effect on residential amenity. In terms of this it is important to keep in mind that the proposed Mitre 10 Mega activity is anticipated by the City Plan to establish in the Business 4 zone, the anticipated environmental outcomes for the zone include relatively high levels of traffic generation, that Harewood

Road is a higher volume arterial road, and that the proposed site access location has been specifically identified as being the optimum location by Council engineering staff.

We therefore respectfully request that the Council reconsider its position in relation to potentially affected parties and advise us of the outcome.

I trust the above satisfactorily addresses the related questions and issues raised, and that processing of the application can now proceed. Please do not hesitate to contact me on 03 963 8724; or alternatively email damienne@urbisgroup.co.nz if you have any questions.

Yours faithfully,

URBIS TPD LIMITED

Damienne Donaldson
Planner

Allwood Trees

366 Halswell Junction Road
Christchurch 8025, New Zealand
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fax: (03) 349-9245
email: info@allwood.co.nz
website: www.allwood.co.nz

15 October 2014

Andrew Smith
Managing Director
Mitre10 Mega
Hornby
PO Box 16323
Christchurch 8441

Dear Andrew

Re: Notable Trees – Tulip Tree/Car Park

With reference to the Harewood Mite10 Mega – Supportive Documentation, page 9 (Landscape concept), I am able to provide responses to the following, as per the email from Damienne Donaldson, dated 22 September 2014:

- Arborist report on the state of the Tulip Tree and the potential impact on it from the car parks and other works being constructed within 10m of its base.
  Chris Long (Arborist) and I (Horticulturalist) have both inspected the tree and report that given the age of the tree it is in reasonable condition and from close inspection is a healthy tree typical of the species Liriodendron tulipfera (Tuplip Tree)

  In terms of construction within 10m of the tree's base, given any construction work disturbs the existing tree root system to a minimum, construction equipment does not damage the tree structure above ground, and that the car park areas are constructed in accordance with accepted engineering methods as prescribed for these situations there will be little or no impact on the tree. The important factor in relation to any effect on the tree is to minimise root disturbance/damage and to ensure construction equipment does not damage the trunk or significant branch structure.

- Consideration to the fact that the Tulip Tree is located close to Kruses drain and uses this as a water source. Removing the drain and piping the water will suddenly cut off the water source the tree is tapping into.
  There are two options available to resolve this issue.
  (1.) Construct the drain in such a way that part of the piped drain is effectively a field drain which allows water to continue to seep in a controlled manner into the surrounding area. This option is subject to engineering requirements for the drain and car park so may not be applicable.

(2.) Install deep watering irrigation to ensure the existing water supply is replaced, therefore the tree does not lose the water supply to its root system. This process requires an irrigation supply to the tree and this will need to be factored in when designing and constructing the car park area.

This system is achieved by driving pipes into the ground, flushing the soil from the pipes and then installing irrigation to the pipes so water can be delivered deep to the rootball.

Please contact me should you require additional information.

Yours sincerely

Mark Hutching
Managing Director (Qualified Horticulturalist)

structex

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14 October 2014

Andrew Smith
R & H Investments Ltd
PO Box 16 323
Hornby
Christchurch 8441

Dear Andrew

Re: Resource Consent for New Development for R & H Investments Ltd at 54 Harewood Road, Papanui, Christchurch
Carpark Siteworks around Protected Tree

We understand that the Christchurch City Council have requested information on how the carpark siteworks construction will be formed around the protected Tulip Tree.

The documentation for the civil works construction of the carpark will be included in the design, working drawings and specification to be completed by Structex Metro Limited.

To assist with the Resource Consent, Structex Metro Limited notes that the design documentation and subsequent construction will include the following:

(a) The design and documentation will comply with the requirements of the Christchurch City Council Civil Engineering Construction Standard Specification (CSS).

Specific sections and requirements include:

(i) Part 1 Section 19.4 Protection of Existing Trees (including Private Trees)

- A temporary barrier shall be erected around existing trees identified to be retained on the site.
- Section 19.4.1 states the requirements to protect roots of the tree(s). This may require review by the Christchurch City Council Arborist.

- All underground services within the tree's drip line shall be installed using trenchless methods.

(b) At this early stage of design, it is important that the existing surface levels directly around the protected tree are maintained so as to not disturb the critical root systems of the tree. It is proposed that the existing surface levels be maintained as close as possible to their current state.

(c) It is proposed that the area of carparking beneath the drip line of the tree will be formed using the Firth Ecopave system (or similar equivalent), to ensure that the required distribution of watering to the tree is maintained.

This may require the use of structural soil as specified in CSS Part 1, Section 37.

The final design will maintain the surface levels as noted in (b) above, and take into account the root systems and structure of the tree. An arborist will be engaged to advise on the specific requirements of the protected Tulip Tree.

(d) As part of the design and documentation for Building Consent, further consultation will be required with the Christchurch City Council's drainage division to discuss, agree and approve final construction details of the siteworks drainage. It is Structex Metro Limited's expectation that the protection of the Tulip Tree is paramount and all efforts will be made to ensure that the tree is fully protected as required.

If you, or the Christchurch City Council have any queries regarding the proposed design and construction of the siteworks with respect to the protected Tulip Tree, then please do not hesitate to call.

Yours sincerely
Structex Metro Ltd

B A Gilmore

Brett Gilmore CPEng (# 139988)
B.Eng (Hons)(Civil);MIPENZ PE (USA), Int PE
Senior Structural Engineer &
Director

ACENZ

Stapleton, Kathryn

From: Damienne Donaldson [damienne.donaldson@urbisgroup.co.nz]
Sent: Tuesday, 30 September 2014 11:27 a.m.
To: Stapleton, Kathryn
Cc: Damienne Donaldson
Subject: RMA92026872 - Response re Planning/General and Signage
Attachments: Sanitarium Site Plan.pdf; mem 140915 ECan Compliance Assessment.pdf; Preliminary Design_Mitre ten_ Stage one landscape plan_140922_LR.pdf; 2014 09 15-PAPANUI MITRE 10- ELEVATIONS Stage 1 and Stage 2.pdf; mem 140826 SW Modelling Summary .pdf; let 140724SW request CCC14011.compressed.pdf

Hi Kathryn,

As per your email on the 9 September I have provided the following information related to:

Planning/General.

1- Stage 1 Site plan (Provided to you via email on the 9th September)
2- Elevation plans for both Stage 1 and Stage 2 are attached – note the elevations indicate amended signage designs which show a reduction is signage.
3- Sanitarium Activity – please see attached a site plan which indicates the operational layout of the Sanitarium factory. This plan indicates the operational area of Sanitarium and includes the goods loading areas, staff parking areas all contained within a gated compound. In terms of the operation of this activity Sanitarium will continue to operate as they currently are which involves the manufacturing and distribution of Marmite. The current manufacturing plant runs 5 days per week and the packing plant runs 4 days per week. Whilst, there are no floor plans for the building the building contains staff amenity areas, offices, raw material store and the manufacturing area. At present the building features a approx. 2m² sign along the western elevation which will be retained.

Landscaping

-
1- A stage 1 landscape plan has been prepared and is attached
2- Detailed on the Stage 1 plan indicates the locations of those existing trees which are to be removed
3- The site plan further illustrates the location of the existing low height wall along Harewood Road

Notable Tree

-
1- The Applicant has commissioned an Arborist to prepare a report and will address the four points highlighted, this report will be submitted on receipt.
2- Please note the application erroneously states a 6m wide pedestrian path is within 10m of the protected tree this is not correct rather the area is fully landscaped as per the landscape plan attached.

Contamination/NES/Environmental Health

1- DSI – this should be to you next week
2- Noise – we anticipate compliance with development standards at the boundaries.
3- Glare/Lighting – a lighting plan has not been prepared and will not be provided at this stage

Waterway/Stormwater

-
1- a detailed erosion and sediment control plan that mitigates the discharge of sediment downstream

during the piping of the waterway, as well as the discharge of dust to air. E2 have covered this off with a construction methodology and draft ESCP which I will forwarded as a separate email.

2- as the sediment in the streambed is currently contaminated with heavy metals, can the applicant please confirm they will excavate and deposit this material at an appropriate landfill facility prior to backfilling with 'clean' material (overlap with NES considerations noted, but have left this in here for completeness for the timebeing). Geoscience will address this in the DSI which is to follow.

3- Clarification that the applicant is proposing the fish salvaging recommendations in the Aquatic Ecology report in their entirety. This is correct.

4- confirmation from the applicant whether they will also require a works in watercourse consent from ECan (likely not as they will consider it an artificial waterway) but this needs to be confirmed.E2 have advised that works in water course will be required as Kruses Drain does not meet the ECAN definition of artificially watercourse. Please refer to the attached ECAN compliance assessment.

5- please provide the E2 stormwater report as part of the application. Please see attached the original letter sent to Brian Norton and memo with additional info that Brian had requested.

-

Signage

1- As mentioned above the overall signage has been reduced in particular, the Applicant has reduced the signage on the elevations. These changes reduces the overall on site signage to 534m².

Regards,

Damienne Donaldson
Planner
URBIS TRAFFIC PLANNING AND DEVELOPMENT LIMITED

Urbis TPD

Unit 17, 211 Ferry Road, Christchurch 8011
PO Box 10-318, Christchurch 8145
Phone: 03 963 8724
Email: damienne@urbisgroup.co.nz

Please note my office hours are: Tuesday and Wednesday 8:30-2:30 and Thursday 8:30-12:30.

e2 Environmental Ltd
PO Box 31159, Christchurch

Ph 03 358 49 55
andrew.tisch@e2environmental.com
www.e2environmental.com

24 July 2013

Brian Norton
Planning Engineer
Asset and Network Planning
Christchurch City Council

Dear Brian

APPLICATION TO EXERCISE CRC131249 AT HAREWOOD ROAD CHRISTCHURCH

This letter describes how the proposal meets the conditions of CRC131249 plus the agreed stormwater treatment and drain piping discussed on 9 June 2014[1].

We now request:

1. a letter of approval from Council to use CRC131249
2. approval in writing to pipe the Kruses Drain together with any comments regarding Council requirements and cost implications for Mitre10 Mega (M10)

Background

1. The site is to be developed into a M10 store in two stages. The Sanitarium Weetbix operation (south end) has already ceased operation and this area will comprise the first stage. The existing Marmite operation (north end) will remain for approximately 5 years.
2. Boffa Miskell Ltd have produced an ecology report covering the stretch of Kruses Drain inside the property. See Appendix B. The Boffa's report found that the existing drain has low ecological value.
3. M10 have proposed that the drain is piped all the way inside the site. Belinda Margetts, the Councils Ecologist agrees with this based on Boffa's findings.
4. M10 has agreed to pay a financial contribution to CCC for environmental compensation and land lost. A private agreement between CCC and M10 is proposed.
5. We understand from Kathryn Stapleton that a CCC Land Use consent is required. We will confirm if an Ecan Land Use consent is needed for 'dam and divert' and working near the bed of waterway.

---

[1] Belinda Margetts (CCC - Ecology), Kathryn Stapleton (CCC -Planner), Tanya Blakely (Boffa's- Ecology), Brian Norton (CCC -, Stormwater), Andrew Tisch (e2 Stormwater)

6. A phase 1 PSI report by Geoscience Ltd is attached in Appendix C. It recommends intrusive tests in four locations as part of a phase 2 study. This is now underway.
7. Isobel Stout (CCC – contaminated land) will be consulted following the phase 2 report.
8. As part of the building consent, authority to discharge stormwater via CCCs global stormwater consent CRC131249 is required.

Stormwater Proposal

Requirements

Attenuation is required for the 2%AEP, 24 hour storm for additional hardstand (post cf pre-development) as is 25mm first flush treatment for all vehicle hardstand areas. Secondary flow paths need to be identified and the pipe for Kruses Drain needs to be designed for the 10%AEP[2] event. Two other key storm durations were also considered as discussed below.

Treatment and Attenuation

First flush treatment will be provided by proprietary systems such as SPEL Storm Filter, Hynds Up-Flo or SW360.

Several attenuation options were considered, including dropping the carpark to provide surface storage. This was rejected because the only feasible place to store is in the carpark near the Harewood Road entrance (the Chapel street carpark will be too low compared to the Chapel Street footpath and berm). Unfortunately, this will be the most used carpark and the applicant does not want shoppers to be subjected to standing water on a reasonably regular basis.

A PC_SWMM[3] one-dimensional hydraulic model was built to simulate the existing situation (Sanitarium Weetbix and Marmite operations), the proposed with no attenuation and the proposed with five 30,000L rain tanks[4] with 90% available capacity. Discharge was simulated by a combined outlet orifice of 100mm diameter in three durations for the 2%AEP storm:

1. the 15 minute event – the time of concentration for the site. This relates to the proposed pipe capacity because it generates peak site runoff.
2. the 5 hour event –the time of concentration for Kruses Drain at the site (see correspondence in Appendix A). This relates to the proposed pipe capacity; and
3. the 24 hour event as discussed above in compliance with CRC131249

The results are shown in Table 1.

In summary, five 30,000L tanks capturing all of the roof runoff, with a combined single 100mm orifice can adequately attenuate the three critical events to below (or close to in the case of the 5 hour event) pre-development levels.

---

[2] Note that Councils level of service is for the 20% AEP, however, the NZ Building Act clause E1 requires protection against the 10%AEP

[3] SWMM was developed by the USEPA. PC SWMM is a proprietary version.

[4] See the Drawings in Appendix A

Table 1. Hydraulic Modelling Results

PRE DEVELOPMENT	**2%AEP**	**20 min**	**5 hr**	**24 hr**
	From roof	198	50	23
	From pavements	505	177	79
	Peak flow at outfall (L/S)	***703***	***227***	***102***
DEVELOPED (NO ATTENUATION)	**2%AEP**	**20 min**	**5 hr**	**24 hr**
	From roof	354	91	33
	From pavements	466	141	72
	Peak flow at outfall (L/S)	***820***	***232***	***105***
DEVELOPED (ROOF ATTENUATION)	**2%AEP**	**20 min**	**5 hr**	**24 hr**
	Unattenuated From Pavements (L/s)	466	141	64
	Peak Roof Discharge by orifice (l/s)	38	37	37
	Peak Overflow rate by SFP from tank (l/s)	157	53	0
	Water depth in tank system (m)	2.8	2.8	2.76
	Volume in tanks (m^3) (max 158m^3)	150	150	148
	Peak flow at outfall (L/S)	***661***	***231***	***101***

Secondary Flow Paths

These will be finalised at the design stage but are generally as shown on the drawing.

Piping of Kruses Drain

The proposed pipe route is shown on the plans. At the design stage the pipe will be sized. However, as shown above the post development peak flow rates are no greater than the existing in three critical events, so the existing pipe sizes (where it enters the site and where it leaves the site) may be adequate.

Compliance with Conditions

On the basis of the information CRC131249 conditions. Erosion and Sediment Control plans will be included with the Building Consent and Engineering Approval documentation.

Please could you forward a letter or phone to discuss if you have any questions.

Yours sincerely
e2environmental Ltd

Andrew Tisch
Principal Engineer
CC
Andrew Smith – Mitre10 Mega

APPENDIX A

DRAWINGS and CCC CORRESPONDANCE

e2environmental
CONSULTING ENGINEERS

Level 2,Unit 2/29 Acheron Drive PO Box 31159, Christchurch
P 64 3 358 4955 www.e2environmental.com

Client
MITRE 10 MEGA

Project
MITRE 10 MEGA - PAPANUI

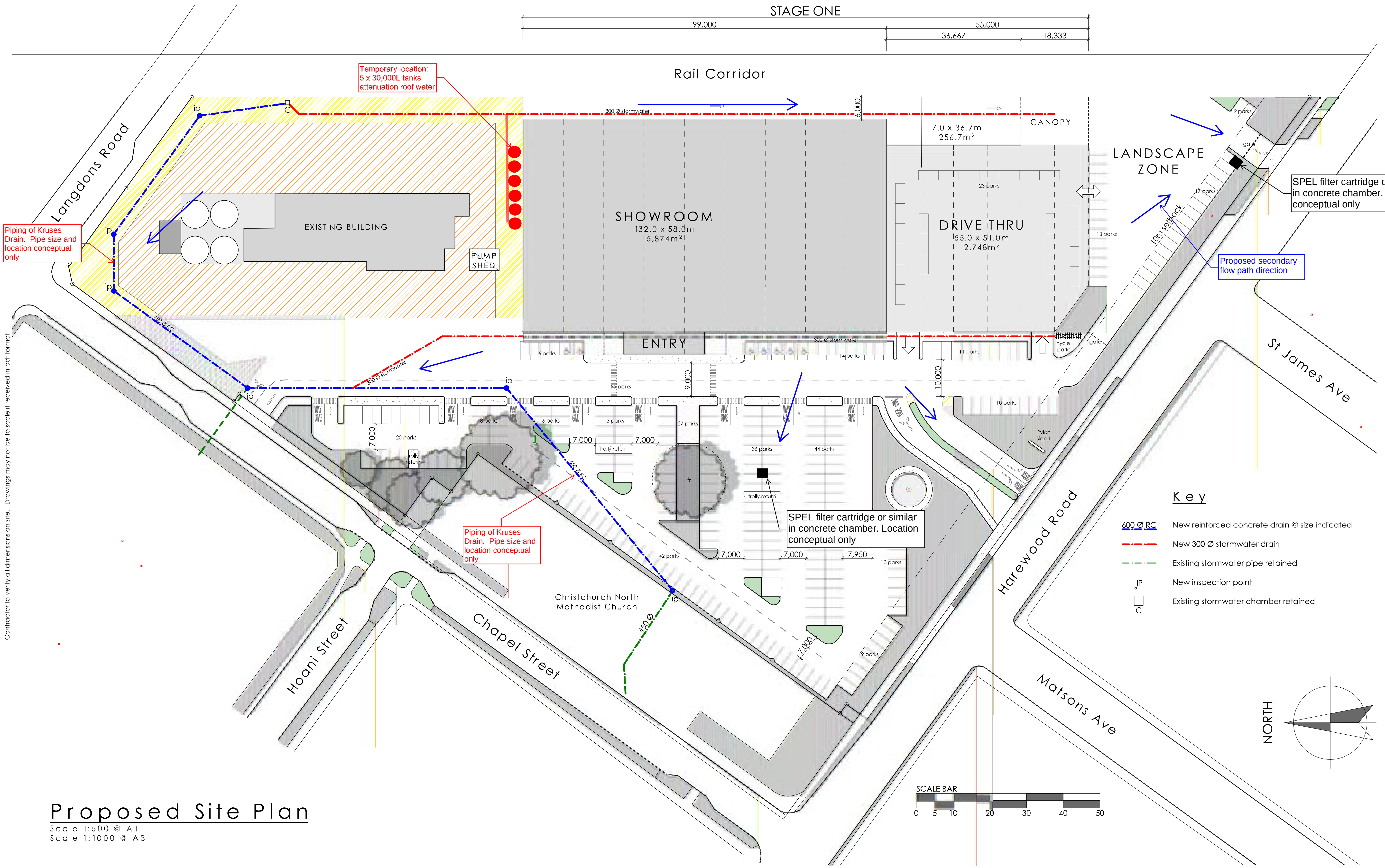
Title
EXISTING SITE PLAN

THIS DESIGN AND DRAWING IS COPYRIGHT OF E2ENVIRONMENTAL LTD AND SHALL NOT BE USED OR REPRODUCED WITHOUT WRITTEN AUTHORITY

Designed AJT
Drawn ADF
Checked
Approved
Date APRIL 2014

REV	COMMENTS	DATE	APR

Scale 1:1000 (A3)
Sheet 1 OF 1
Drawing No 14011-01-001
Revision P4



Proposed Site Plan

Scale 1:500 @ A1
Scale 1:1000 @ A3

STAGE 1 STORMWATER TREATMENT AND ATTENUATION

Stage One - 311 Car Parks

BERNARD
JOHNSTON
ARCHITECT LTD

P.O. BOX 22726
CHRISTCHURCH 8142
PH : (03) 379-9525
bernard@intrados.co.nz

PROJECT STATUS:

PROPOSED
SITE PLAN
STAGE 1

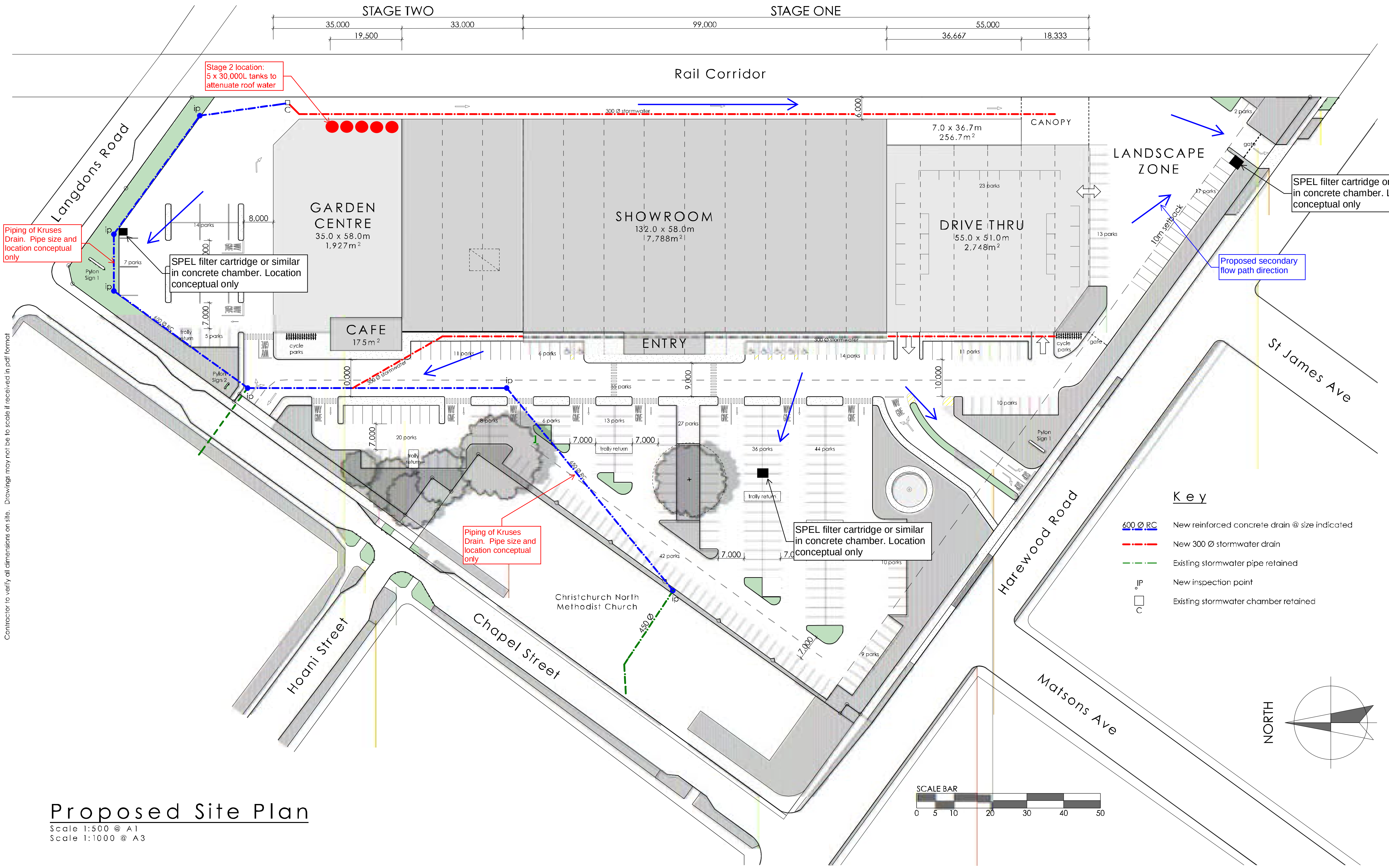
NEW
DEVELOPMENT
FOR

R & H
INVESTMENTS

SCALE : 1:500
DATE : 7/07/14
JOB NO : 1279
DRAWN : GARETH

SHEET

A1.02



Stage 2 location:
5 x 30,000L tanks to attenuate roof water

Piping of Kruses Drain. Pipe size and location conceptual only

SPEL filter cartridge or similar in concrete chamber. Location conceptual only

SPEL filter cartridge or similar in concrete chamber. Location conceptual only

Proposed secondary flow path direction

SPEL filter cartridge or similar in concrete chamber. Location conceptual only

Piping of Kruses Drain. Pipe size and location conceptual only

Contractor to verify all dimensions on site. Drawings may not be to scale if received in pdf format

Proposed Site Plan

Scale 1:500 @ A1
Scale 1:1000 @ A3

STAGE 2 STORMWATER TREATMENT AND ATTENUATION

Stage One -	311 Car Parks
Stage Two -	51 Car Parks
Total -	362 Car Parks

BERNARD
JOHNSTON
ARCHITECT LTD

P.O. BOX 22726
CHRISTCHURCH 8142
PH : (03) 379-9525
bernard@intrados.co.nz

PROJECT STATUS:

PROPOSED
SITE PLAN
STAGE 2

NEW
DEVELOPMENT
FOR

R & H
INVESTMENTS

SCALE : 1:500
DATE : 7/07/14
JOB NO : 1279
DRAWN : GARETH

SHEET

A1.03

Andrew Tisch

Subject: FW: Harewood Rd -my ph message

From: Norton, Brian [mailto:Brian.Norton@ccc.govt.nz]
Sent: Wednesday, 28 May 2014 3:32 p.m.
To: 'Andrew Tisch'
Cc: andrew smith (Mitre10Mega)
Subject: RE: Harewood Rd -my ph message

Hi Andrew,

You need to provide first flush treatment for the entire carpark area. No credit for existing carparking.

You need to provide sufficient storage to keep peak flows at pre-developed rates up to a 50-year, 24-hour design storm. In this calculation the existing hardstand can be credited.

Does this make sense? Its sounds like 386m3 is your minimum storage requirement if you go with a sedimentation pond.

Cheers
Brian

From: Andrew Tisch [mailto:andrew.tisch@e2environmental.com]
Sent: Wednesday, 28 May 2014 3:13 PM
To: Norton, Brian
Cc: andrew smith (Mitre10Mega)
Subject: Harewood Rd -my ph message

Hi Brian
I need to know your policy on attenuation/treatment volume.

For :

- Attenuation, I need 179cu.m to cover extra-over hardstand (post vs pre)

- First flush treatment from proposed vehicle areas requires 386cu.m but this reduces to 40cu.m for additional vehicle areas only (extra-over for Mitre10 proposal compared to existing)

		C	A (sq.m)	CA (sq.m)	depth (mm)	I(mm/hr) 2hr, 50yr	Vol	
First Flush Vol	All proposed vehicle hardstand	0.9	17,174	15,457	25		386	cu.m
	Extra/over vehicle hardstand	0.9	1760	1,584	25		40	cu.m
Attenuation Vol	Total storage required (extra-over hardstand)			4421		20.2	179	cu.m

My suggestion is that we have a target 179cu.m for both attenuation and first flush treatment in a combined treatment attenuation device (lowered carpark with treatment). Your thoughts?

Andrew Tisch

p 03 358 4955
m 021 906 538
e2 Environmental Ltd
Unit 2
29 Acheron Drive
PO Box 31159
Christchurch 8444

Andrew Tisch

Subject: FW: Papanui Site -Confidential

From: Norton, Brian [mailto:Brian.Norton@ccc.govt.nz]
Sent: Thursday, 22 May 2014 11:14 a.m.
To: 'Andrew Tisch'
Subject: FW: Papanui Site -Confidential

Hi Andrew,

See below results from our stormwater model. Victor has not had time to run the model, so he's just reported on previous results. Please note that in order to identify the critical duration at the site, he would have to make some more runs. I don't know that water levels would really change much, however.

Regards
Brian

Existing modelling information is limited for the Sanitarium site. In Vicky's model, Kruses Drain only started at Chapel Street and we only have modelled SW levels for 50y 4hrs and 6hrs storms (I suspect the critical duration for the site could be 2 hrs or even shorter). I'll email you these WLs just in case:

	Location	**Model chainage**	**WLs**	**Add Info**
50y 4hr	Chapel Street	Kruses 10681	22.778	GL from a WW MH in Chapel St = 23.40m
	Just prior to ex. 600mm in Sanitarium site	Kruses 10838	22.484	GL from a WW MH in Langdons Rd just east of Main North Railway = 22.65m
50y 6hr	Chapel Street	Kruses 10681	22.772	
	Just prior to ex. 600mm in Sanitarium site	Kruses 10838	22.485	

(Result files - *Ex_Rev115i_50y6h_5-2.res11* and *Ex_Rev115i_50y04h+cc 5-2.res11)*

From these results, it appears there is little existing flooding problem for the site. However, any modification in impervious areas or downstream conditions could change all that.

I didn't include the 24hr storms as they do not produce the peak WLs for this site. No shorter duration storm for 200yr ARI events has been carried out.

Hope these suffice at the moment. Let me know if you require me to do some additional modelling runs.

Cheers,
Victor

From: Norton, Brian
Sent: Friday, 9 May 2014 1:33 p.m.
To: Wong, Victor
Subject: FW: Papanui Site -Confidential

Hi Victor,

Awhile back we discussed two sites up in this part of town, Firestone and the Sanitarium site at 54 Harwood Rd. I can't recall if you were able to give me peak flows through Kruses Drain at this location. Anyhow, Andrew is after the 50-year flood level in Kruses and the Tc (which I assume he means the critical duration corresponding to this peak water level...but I will verify).

Is this something you can extract for me, maybe next week?

Thanks

Brian Norton

Planning Engineer
Asset and Network Planning, Team Greenspace
City Environment Group
DDI 03 941 8394
Fax 03 941 8384
Email brian.norton@ccc.govt.nz
Web www.ccc.govt.nz

Christchurch City Council
53 Hereford Street, Christchurch 8011
PO Box 73014, Christchurch 8154

From: Andrew Tisch [mailto:andrew.tisch@e2environmental.com]
Sent: Wednesday, 7 May 2014 11:59 AM
To: Norton, Brian
Subject: Papanui Site -Confidential

Hi Brian
Could you please send me the following for Kruses Dn at the site:

1. Tc
2. Modelled (if any) 50 and 200year RLs

Thanks

Andrew

APPENDIX B
ECOLOGY REPORT BOFFA MISKELL LTD

APPENDIX C

CONTAMINATED LAND REPORT PHASE 1 GEOSCIENCE CONSULTING LTD

Memo

To: Brian Norton **From:** Lindsay Blakie

Cc: David Wilson **Date:** 26/8/2014

Subject: Summary of Attenuation at Papanui Mitre10

The purpose of this memo is to provide additional information on how the proposed attenuation solution performs in smaller AEP events as requested by CCC.

RESULTS

With our request for approval to discharge we provided peak discharge rates for the 20 minute, 5 hour and 24 hour durations of the 2% AEP storms because these correspond to critical duration (respectively) for the discharging catchment, Kruses Drain upstream of the site and for the receiving Avon River Catchment.

The results for 10% and 5% in the same durations are attached to this memo. Generally all the post-development discharges are at or below pre-development discharge rates. In the 5 hour duration storm in the 10 year the rain tanks overflow, resulting in an additional 10 L/s discharging to the Council receiving network. If council feels this is significant, extra storage can be added to roof attenuation tanks.

ASSUMPTIONS

We have used a simple hydrological model to compare the pre and post runoff and the attenuation necessary to ensure the peak post-development runoff is no greater than the pre-development runoff for the same duration storm.

We used PCSWMM to model the runoff from the site. The following parameters were used in this model:

Catchments	Pre-Development	Post-development
Roof Area	7,125	12,910
Hardstand	15,590	17,174
Landscaped	10,740	3,371
Total	33,455	33,455
% imperviousness of non roof area	60%	80%
% imperviousness of roof area	100%	100%

- Used WWDG 2011 rainfall intensities.
- Infiltration was modelled using Horton equations.
- Initial infiltration rate 10mm/hr and ultimate infiltration rate of 2mm/hr.
- Horton Decay constant of 5hrs^{-1} or 1.5x10^{-3} s^{-1} (as per default values Mike Urban Runoff, Model B).
- Depression storage was set to 0.25mm for impervious surfaces and 1mm on pervious surfaces.
- Catchment roughness set to 0.014 for impervious surfaces and 0.2mm on pervious surfaces (assumed that these parameters are similar to the Heathcote River Catchment parameters provided by Victor Wong).

- Post development, all roof runoff discharges via a series of five 30,000L tanks that are connected in series. These tanks discharge via a single 100mm dia orifice. The tanks are allowed to fill to 90% full before overflowing.

As the proposed attenuation system is designed so that post development runoff does not exceed pre-development runoff there will be no impact on the existing drainage network outside the so. Therefore our modelling has been limited to the development site only.

Possible Mitre10 Mega Development -Sanitarium Site

Stormwater Modelling Results

27/08/2014

	20%AEP	20 min	5 hr	24 hr
PRE DEVELOPMENT	From roof	110	20	10
	From pavements	260	70	45
	Peak flow at outfall (L/S)	*370*	*90*	*55*

	10%AEP	20 min	5 hr	24 hr
PRE DEVELOPMENT	From roof	135	35	15
	From pavements	330	120	50
	Peak flow at outfall (L/S)	*465*	*155*	*65*

	2%AEP	20 min	5 hr	24 hr
PRE DEVELOPMENT	From roof	200	50	20
	From pavements	505	180	80
	Peak flow at outfall (L/S)	*705*	*230*	*100*

Post-development the roofs discharge via 5 x 30,000L tanks in series

	20%AEP	20 min	5 hr	24 hr
POST-DEVELOPMENT (ROOF ATTENUATED)	Unattenuated Pavement Runoff (L/s)	250	60	35
	Peak Roof Discharge via orifice (l/s)	30	30	20
	Overflow from tank (l/s)	0	0	0
	Water depth in tank system (m)	*1.87*	*1.54*	*1.05*
	Volume in tanks (m³) (max 158m³)	*97*	*78*	*50*
	Peak flow at outfall (L/S)	*280*	*90*	*55*

	10%AEP	20 min	5 hr	24 hr
POST-DEVELOPMENT (ROOF ATTENUATED)	Unattenuated Pavement Runoff (L/s)	310	100	45
	Peak Roof Discharge via orifice (l/s)	35	40	30
	Overflow from tank (l/s)	0	25	0
	Water depth in tank system (m)	*2.3*	*2.79*	*1.46*
	Volume in tanks (m³) (max 158m³)	*121*	*150*	*74*
	Peak flow at outfall (L/S)	*345*	*165*	*75*

	2%AEP	20 min	5 hr	24 hr
POST-DEVELOPMENT (ROOF ATTENUATED)	Unattenuated Pavement Runoff (L/s)	465	140	60
	Peak Roof Discharge via orifice (l/s)	40	40	40
	Overflow from tank (l/s)	160	50	0
	Water depth in tank system (m)	*2.8*	*2.8*	*2.76*
	Volume in tanks (m³) (max 158m³)	*150*	*150*	*148*
	Peak flow at outfall (L/S)	*665*	*230*	*100*

adding an additional 30,000L tank reduces the post dev. 10yr 5hr discharge by 20L/s or to 145L/s

www.e2environmental.com

Memo

To: Andrew Smith
From: Alex Ross
Cc: David Wilson
Date: 18 September 2014
Subject: Mitre 10 Papanui – Preliminary Compliance Assessment

---

Summary – Resource Consents Required

The proposed Mitre10 store development at 54-64 Harewood Road has been assessed against the requirements of ECAN's operative Natural Resources Regional Plan (NRRP) and the proposed Land and Water Regional Plan – Decisions Version (pLWRP).

Based on this assessment, the proposed development is:

- A **discretionary activity** under the NRRP
- A **discretionary activity** under the pLWRP (Decisions Version), except for the construction-phase stormwater discharge, which is considered to be a **non-complying activity**

Resource consents will be required for
- Earthworks on the site (pLWRP,)
- Construction of the 600mm diameter pipe to divert Kruses Drain (NRRP, pLWRP)
- Construction-phase discharges of stormwater to Kruses Drain (NRRP, pLWRP)
- Possible dewatering of service trenches (pLWRP)

Introduction

A new Mitre10 Mega store is proposed for a site at 54-64 Harewood Road, Papanui. The site is currently occupied by Sanitarium and used for commercial food production. The site is listed on the LLUR due to historic activities and materials used on site, including fuel storage and asbestos in buildings. These activities are included on the Ministry for the Environment's '*Hazardous Activities and Industries List*' (HAIL). A detailed site investigation is underway at the site at the time of writing.

This memo presents a preliminary compliance assessment for the proposed Mitre10 store development. The proposed development has been assessed against the NRRP and the pLWRP.

The activities considered in this compliance assessment include:

- Site clearance, including decommissioning of an existing above-ground fuel storage tank and earthworks
- Stormwater discharges to Kruses Drain during construction
- Construction and operation of the proposed stormwater system for the developed site, including piping of Kruses Drain
- Possible dewatering of any service trenches during construction

This compliance assessment does not include any activities associated with site remediation. Once finalised, any site remediation plan will need to be assessed separately against the relevant regional plans and national standards.

Compliance Assessment

Site Clearance

The site is to be cleared in two stages, with Stage 2 to be carried out approximately 5 years after Stage 1:

Stage 1

- Demolition of existing Sanitarium Weetbix factory and removal of foundations (5,700m^2 floor area; estimated cut volume of at least 2,850m^3)
- Decommissioning of existing above-ground fuel storage tank
- Removal of existing stormwater drainage pipes

Stage 2

- Demolition of existing Sanitarium Marmite factory and removal of foundations (3,500m^2 floor area; estimated cut volume of at least 1,750m^3)

Under the NRRP, no resource consent is required for earthworks as there is more than 1m between the base of the excavations and Aquifer 1 (Rule WQL36).

Under the pLWRP, the site clearance activities are considered to be a **restricted discretionary activity** as more than 100m^3 of material is to be excavated, and the excavation occurs within 50m of a surface water body (Rules 5.176 and 5.169).

Under the pLWRP, a consent is not required for the decommissioning of the above-ground fuel storage tank, provided that the required information (as listed in Part B of Schedule 4, pLWRP) is provided to ECan at least one week before the tank decommissioning (Rule 5.183).

Works in a streambed

Kruses Drain would not be defined as an artificial watercourse under ECan's definition:

> *"Artificial watercourse means a watercourse that is created by human action. It includes an irrigation canal, water supply race, canal for the supply of water for electricity power generation, and farm drainage canal. It* ***does not*** *include artificial swales, kerb and channelling or other* ***watercourses designed to convey stormwater****".*

However, Kruses Drain is classified as an 'environmental asset waterway' in the Christchurch City Plan. We have therefore conservatively assumed that Kruses Drain is a 'river' for the purposes of this compliance assessment.

Under the NRRP, a consent will be required to construct the reinforced concrete pipe which will divert Kruses Drain. This activity is a **discretionary activity** under Rule BLR4 (erect or place, and use a structure in the bed of a lake or river, including earthworks and vegetation clearance associated with the placement of the structure).

Under the pLWRP, the construction of the pipe to divert Kruses Drain (including the associated diversion and discharge of water) is a **discretionary activity** under Rule 5.143.

Also under the pLWRP the taking of groundwater for site dewatering (for example, during trenching for pipes) is a **restricted discretionary** activity as the site is a HAIL site (Rule 5.120).

Stormwater

During construction, erosion and sediment control measures will be in place on the site. Depending on when the piping of Kruses Drain takes place, construction stormwater will discharge to Kruses Drain, and from there into the reticulated CCC stormwater network or post diversion directly into CCC reticulation.

If CCC decides that they cannot accept the construction discharge under their Global Consent CRC131249, then as the site is a HAIL site that is listed on the LLUR, the construction-phase stormwater discharge must be assessed against Rule WQL48 of the NRRP. The proposed stormwater discharge to Kruses Drain during construction will therefore be a **discretionary activity** under Rule WQL48 of the NRRP, provided that total suspended solids (TSS) in the discharge can be kept at less than 250g/m^3.

The construction-phase stormwater discharge is a **non-complying activity** under the pLWRP, because the discharge would not be into a reticulated stormwater system, the discharge is from potentially contaminated land and the discharge occurs within the boundaries of Christchurch City (Rules 5.95 and 5.96).

The stormwater system for the developed site includes:

- Capture of roof runoff in five 30,000L rain tanks, with discharge into the reticulated CCC system at Chapel Street.
- First-flush treatment for all vehicle hardstand areas by a proprietary system such as SPEL Storm Filter, Hynds Up-Flo or SW360.
- Treated hardstand runoff will be discharged to the reticulated CCC system at Chapel Street.
- Piping of a 130m reach of Kruses Drain in a 600mm diameter reinforced concrete drain, with discharge into the reticulated CCC system at Chapel Street

The post construction stormwater discharge will be authorised by CCC's global stormwater consent (CRC131249).

BETWEEN

CHRISTCHURCH CITY COUNCIL
("CCC")

AND

R & H INVESTMENTS LIMITED AND/OR NOMINEE
("RHIL")

DEED OF AGREEMENT

DF-305863-60-260-V2

cavell leitch law

Head Office
6 Hazeldean Road, Addington
PO Box 799, Christchurch 8140, New Zealand
Tel +64 3 379 9940 Fax +64 3 379 2408
www.cavell.co.nz

THIS DEED is dated the 18th day of September 2014

Between CHRISTCHURCH CITY COUNCIL (**CCC**) pursuant to section 17 of the Public Works Act 1981

and R & H INVESTMENTS LIMITED AND/OR NOMINEE (**RHIL**)

Background

A. RHIL intends to purchase and then develop the property to erect the building.

B. The stream known as the Kruses Stream ("stream") currently runs partly along the surface of and partly underneath the property as highlighted in pink on plan A1.01 attached to the First Schedule herein.

C. Subject to RHIL obtaining all necessary consents and approvals to do so, CCC (in its capacity only as the party having the benefit of the existing easements and not in its regulatory capacity) has agreed that RHIL may redirect the stream's current path to the location outlined in green on plan A1.03 attached to the First Schedule herein.

D. In consideration for CCC at the request of RHIL consenting (in its capacity only as the party having the benefit of the existing easements and not in its regulatory capacity) to the redirection of the Stream, the surrender of the existing easements and the grant of the replacement easement, RHIL has agreed to make payment of the mitigation payment to CCC.

This Deed witnesses

1. Interpretation

1.1. In this Deed:

1.1.1. **building** means the building proposed to be erected on the property in the location shown on plan A1.03 attached to the First Schedule herein;

1.1.2. **consents and approvals** means all resource consents required under the Resource Management Act 1991, building consents required under the Building Act 2004, and all other consents and approvals from the relevant government authorities necessary to complete RHIL's proposed development of the property, the surrender of the existing easements and the stream redirection works;

1.1.3. **existing easements** means:

(a) the right to drain water easement contained within Transfer 997947.5 registered on Certificate of Title CB36A/232; and

(b) the pipeline easement contained within Transfer 178385 registered on Certificate of Title CB37C/1080; and

(c) the stormwater easement contained within Transfer 514282 registered on Certificate of Title CB37C/1080; and

(d) the right to convey and drain water easement contained within Transfer 543398.1 registered on Certificate of Title CB37C/1080;

1.1.4. **mitigation payment** means the sum of $129,000.00 plus GST comprising the sum of $50,000.00 plus GST to purchase from CCC the replacement easement and the sum of $79,000.00 plus GST to be utilised by CCC as a contribution towards the stream enhancement works;

1.1.5. **property** means the property located at 54 Harewood Road, Christchurch being Lot 1 Deposited Plan 59153 (contained within Certificate of Title CB36A/232 (Canterbury Registry)) and Rural Section 42107; Lots 2-8, Lot 10, Part Lot 1, Part Lot 9 and Part Lot 12 on Deposited Plan 9715; Lot 2 Deposited Plan 5985; and Part Lot 1 Deposited Plan 204 (contained within Certificate of Title CB37C/1080 (Canterbury Registry));

1.1.6. **replacement easement** means a right to drain and convey water easement in the form attached to the Second Schedule herein with RHIL as grantor and CCC as grantee over that part of the property as is shown and marked green on plan A1.03 attached to the First Schedule herein, or as otherwise agreed between the parties;

1.1.7. **stream enhancement works** means the alternative stream enhancement works to be carried out by CCC within the larger drainage catchment of Kruses Stream and its tributary waterways; and

1.1.8. **stream redirection works** means such works to be carried out by RHIL at RHIL's cost as are necessary and as are reasonably required by CCC to redirect the stream through a pipeline to be constructed underneath the path outlined in green on plan A1.03 attached to the First Schedule herein, or as otherwise agreed between the parties.

1.2. Where obligations bind more than one person those obligations shall bind those persons jointly and severally.

2. Conditions

2.1. This Deed is conditional upon:

2.1.1. RHIL completing its purchase of the property from its existing owner within six months of the date of this Deed. The condition contained in clause 2.1.1. is for the sole benefit of RHIL; and

2.1.2. RHIL successfully obtaining such consents and approvals as are required to complete RHIL's proposed development of the property, the surrender of the existing easements and the stream redirection works on terms and conditions which are acceptable to RHIL and CCC in all respects within six months of the date of this Deed. The condition contained in clause 2.1.2 is for the joint benefit of the parties.

2.1.3. CCC determining at a formal council meeting or under delegated authority in its absolute and sole discretion within one month of the date of this deed that the transactions proposed by this deed are fully acceptable to it in all respects. CCC may take into account any matters that its considers appropriate (in its sole and absolute discretion) in making such decision and shall not be under any obligation whatsoever to provide RHIL with reasons for its decision under this clause. The condition contained within clause 2.1.3 is for the sole benefit of CCC.

to the effect that if the conditions outlined in clauses 2.1.1 and 2.1.2 above are not satisfied the stream shall not be redirected and the mitigation payment shall not be paid from RHIL to CCC.

2.3 The parties agree that clause 9.8 of the Ninth Edition 2012 (2) of the Agreement for Sale and Purchase of Real Estate approved by the Real Estate Institute of New Zealand Incorporated and by the Auckland District Law Society Incorporated shall be deemed to be incorporated into this deed and apply to the conditions referred to in clauses 2.1 and 2.2.

3. Payment of mitigation payment

3.1. RHIL shall make payment of the mitigation payment in one (1) lump sum in cleared funds to CCC's nominated bank account within ten (10) working days of RHIL's confirmation of the conditions outlined in clauses 2.1.1 and 2.1.2 above.

3.2. For the sake of clarity the stream redirection works shall not be undertaken unless and until the mitigation payment has been paid to CCC.

3.3. RHIL acknowledges that the mitigation payment shall not be off-set or credited against any liability that RHIL may have for development contributions in respect of its development of the property or the building.

4. Completion of stream redirection works

4.1. RHIL shall complete the stream redirection works at RHIL's cost and in accordance with any all required consents and approvals and in accordance with CCC's reasonable requirements. Subject to clause 3.2, RHIL shall complete the stream redirection works within five (5) years following satisfaction of the conditions contained in clauses 2.1.1 and 2.1.2

4.2. Upon completion of the stream redirection works and the expiry of any applicable defect liability period the ownership of the piping containing the stream shall vest in CCC.

5. Completion of stream enhancement works

5.1. CCC shall apply the mitigation payment towards the cost of the stream enhancement works without further recourse to or involvement from RHIL.

6. Surrender of existing easement and granting of replacement easement

6.1. Immediately upon completion of the stream redirection works RHIL shall at RHIL's cost in all things proceed with all due speed to prepare and have deposited at Land Information New Zealand a survey plan defining the area to be subject to the replacement easement.

6.2. The parties shall register, or cause to be registered, the replacement easement against the title to the property within 10 working days of the date that the survey plan referred to in clause 6.1 shall be approved as to survey by Land Information New Zealand.

6.3. RHIL acknowledges that CCC shall not be required to pay RHIL any compensation for the grant of the replacement easement.

6.4. The parties shall contemporaneously with the registration of the surrender of the existing easements register, or cause to be registered, the replacement easement.

7. Costs

7.1. Each party will pay their own costs and disbursements in relation to this Deed.

8. Nominee

8.1. Where RHIL executes this Deed with provision for a nominee, RHIL shall at all times remain liable for all obligations under this Deed on the part of RHIL.

9. CCC as local authority

9.1. RHIL acknowledges that:

- 9.1.1. CCC, in its capacity as a territorial authority, is required to carry out its statutory functions under the Resource Management Act 1991, the Building Act 2004 and the Local Government Act 1974 in accordance with the provisions of those statutes;
- 9.1.2. The granting by CCC of any consent or approval by CCC as territorial authority under any of those Acts will not of itself be deemed to be a consent or approval by CCC under this deed; and
- 9.1.3. CCC is bound by statutory obligations to exercise its powers, including discretionary powers and duties under any of those Acts without regard to any relationship it may have with RHIL under this deed.

10. Compensation Certificate

10.1. RHIL acknowledges that CCC may register a compensation certificate under section 19 of the Public Works Act 1981 against the title to the property upon, or at any time after, the execution of this agreement.

IN WITNESS whereof the parties have executed these presents on the day and year first hereinbefore written.

SIGNED by
R & H INVESTMENTS LIMITED
AND/OR NOMINEE

)
) ______________________
) Director
)
) ______________________
) Director

SIGNED for and on behalf of
CHRISTCHURCH CITY COUNCIL)
)
)
)

Witness Signature:

Witness Name: Stuart McLeod

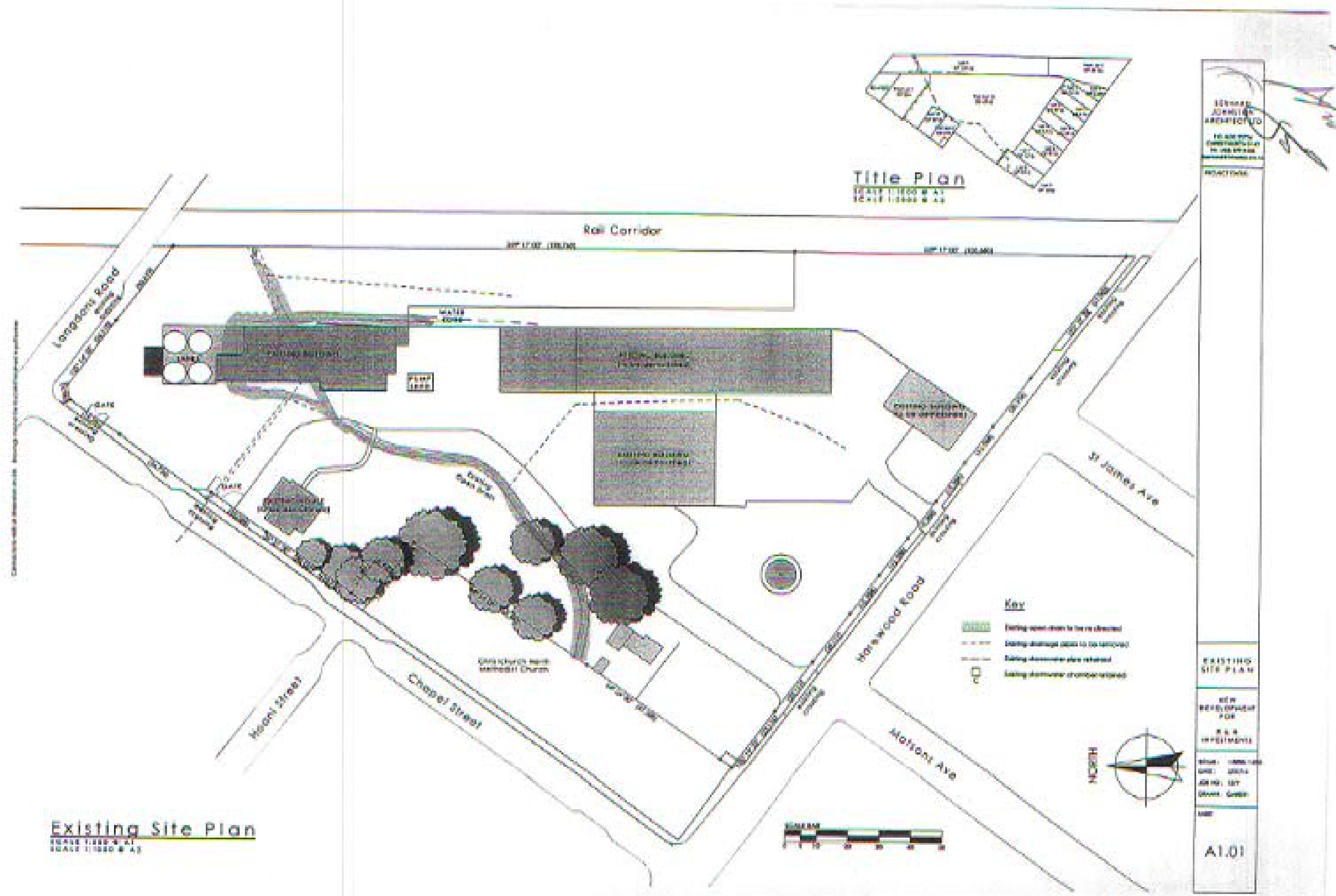
Witness Occupation: Property Consultant

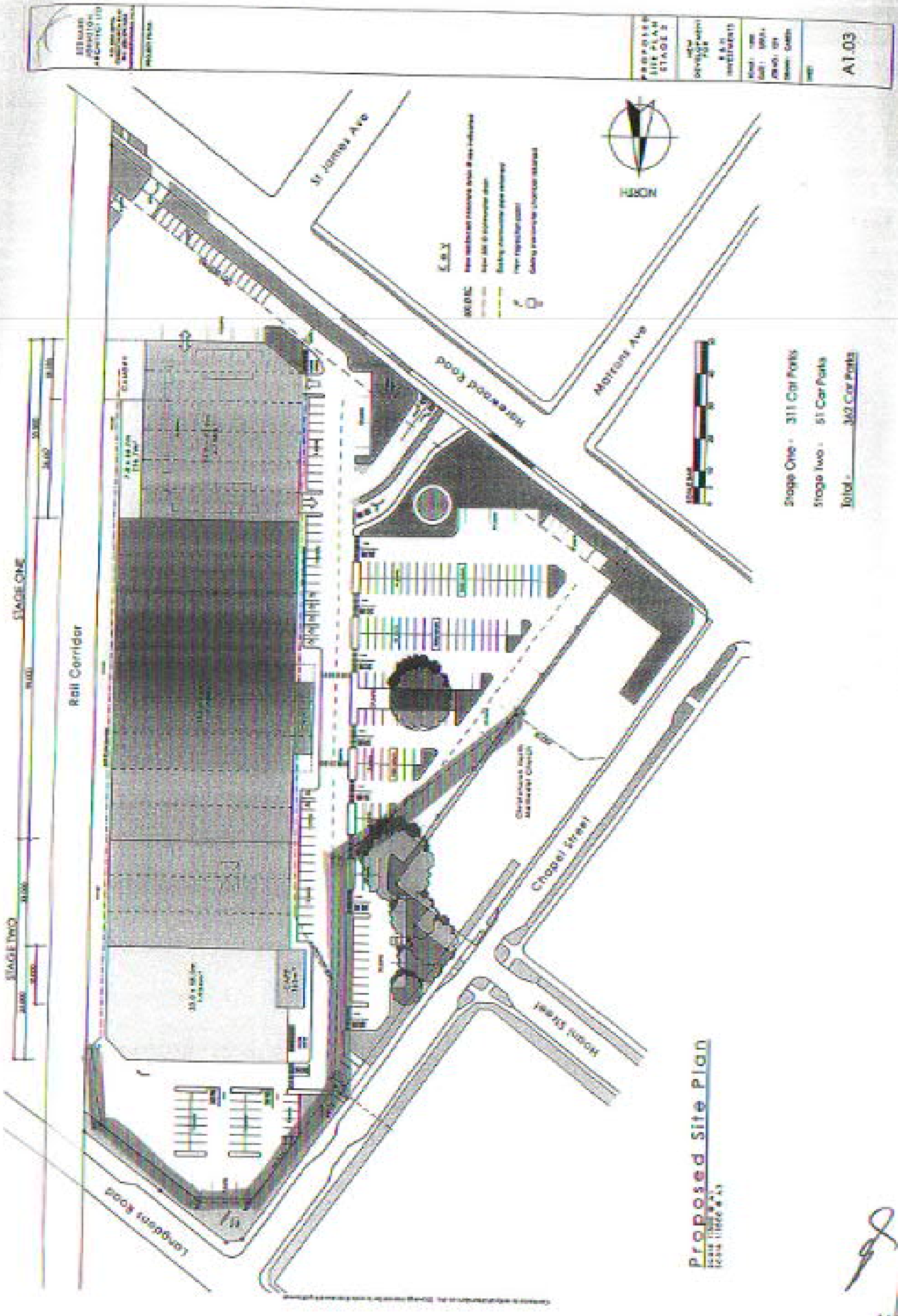
Witness Address: Christchurch

Angus Smith
Property Consultancy Manager
Under delegated authority for
the Christchurch City Council

FIRST SCHEDULE

PLANS


Title Plan
Rail Corridor
Langdons Road
GATE
Hoani Street
Chapel Street
Harewood Road
Matsons Ave
St James Ave
Key
NORTH
Existing Site Plan
EXISTING SITE PLAN
NEW DEVELOPMENT FOR
A1.01



A1.03
NORTH
Key
St James Ave
Harewood Road
Matsons Ave
Rail Corridor
STAGE ONE
STAGE TWO
Chapel Street
Langdons Road
Stage One - 311 Car Parks
Stage Two - 51 Car Parks
Total - 362 Car Parks
Proposed Site Plan

SECOND SCHEDULE

FORM OF THE REPLACEMENT EASEMENT INSTRUMENT

Easement instrument to grant easement or *profit à prendre*, or create land covenant

(Sections 90A and 90F Land Transfer Act 1952)

2003/5229EF
APPROVED
Registrar-General of Land

Grantor

R&H INVESTMENTS LIMITED

Grantee

CHRISTCHURCH CITY COUNCIL

Grant of Easement or *Profit à prendre* or Creation of Covenant

The Grantor being the registered proprietor of the servient tenement(s) set out in Schedule A **grants to the Grantee** (and, if so stated, in gross) the easement(s) or *profit(s) à prendre* set out in Schedule A, **or creates** the covenant(s) **set out** in Schedule A, with the rights and powers or provisions set out in the Annexure Schedule(s)

Schedule A *Continue in additional Annexure Schedule, if required*

Purpose (Nature and extent) of easement; *profit* or covenant	Shown (plan reference)	Servient Tenement (Computer Register)	Dominant Tenement (Computer Register) or in gross
Right to Drain Water		**Lot 1 DP 59153 (CB36A/232)** **Rural Section 42107 Lots 2-8, 10 and Part Lot 1, Part Lot 9 and Part Lot 12 DP 9715, Lot 2 DP 5985 and Part Lot 1 DP 204 (CB37C/1080)**	**In Gross**
Right to Convey Water		**Lot 1 DP 59153 (CB36A/232)** **Rural Section 42107 Lots 2-8, 10 and Part Lot 1, Part Lot 9 and Part Lot 12 DP 9715, Lot 2 DP 5985 and Part Lot 1 DP 204 (CB37C/1080)**	**In Gross**

REF: 7203 – AUCKLAND DISTRICT LAW SOCIETY INC.

Easements or *profits à prendre* rights and powers (including terms, covenants and conditions)

Delete phrases in [ ] and insert memorandum number as required; continue in additional Annexure Schedule, if required

Unless otherwise provided below, the rights and powers implied in specified classes of easement are those prescribed by the Land Transfer Regulations 2002 and/or Schedule Five of the Property Law Act 2007

The implied rights and powers are hereby **[varied]** ~~**[negatived]**~~ ~~**[added to]**~~ or ~~**[substituted]**~~ by:

~~[Memorandum number , registered under section 155A of the Land Transfer Act 1952]~~

[the provisions set out in Annexure Schedule [ ]]

Covenant provisions

Delete phrases in [ ] and insert Memorandum number as require; continue in additional Annexure Schedule, if required

The provisions applying to the specified covenants are those set out in:

[Memorandum number , registered under section 155A of the Land Transfer Act 1952]

[Annexure Schedule]

2009/5043EF
APPROVED
Registrar-General of Land

Insert instrument type

Continue in additional Annexure Schedule, if required

ANNEXURE SCHEDULE 1

(Right to Drain Water and Convey Water all in Gross)

1 INTERPRETATION

1.1 In this Easement Instrument unless the context otherwise requires:

"Easement Facility" in relation to a right to drain water, means pipes, conduits, drains, pumps, tanks (with or without headwalls), manholes, valves, surface boxes, other equipment suitable for that purpose, and anything in replacement or substitution.

"Easement Facility" in relation to a right to convey water, means pipes, conduits, pumps, pump sheds, storage tanks, water purifying equipment, other equipment suitable for that purpose, and anything in replacement or substitution.

"Stipulated Area" has the same meaning given to it in Schedule 4 of the Land Transfer Regulations 2002.

"Utilities" means any structure, pole or other appurtenant structure for the provision of utilities or services supplied to or used on the land including but not limited to electricity, gas, telephone, storm water, sewage and water.

2 GRANT OF RIGHTS, POWERS AND PRIVILEGES

Right to Convey Water

2.1 The Grantee (to the exclusion of the Grantor and any other party) shall have the full free uninterrupted and unrestricted right liberty and licence at all times hereafter:

(a) to take and convey water in a free and unimpeded flow (except during any periods of necessary cleaning and repairing) through the Easement Facility and under the Stipulated Area;

(b) to lay, make, construct, maintain, alter or repair the Easement Facility as the Grantee shall from time to time think fit.

2.2 The Easement Facility referred to in 2.1 ~~2.2~~(a) and (b) is the Easement Facility laid or to be laid under the Stipulated Area.

Right to Drain Water

2.3 The Grantee (to the exclusion of the Grantor and any other party) shall have the full free uninterrupted and unrestricted right liberty and licence at all times hereafter:

2009/6043EF
APPROVED
Registrar-General of Land

Insert instrument type

Continue in additional Annexure Schedule, if required

(a) to drain water (whether sourced from rain, springs, soakage, or seepage) in a free and unimpeded flow (except during any periods of necessary cleaning and repairing) and in any quantity through the Easement Facility and under the Stipulated Area;

(b) to lay, make, construct, maintain, alter or repair the Easement Facility as the Grantee shall from time to time think fit.

2.4 The Easement Facility referred to in 2.3(a) ~~2.5(a)~~ and (b) is the Easement Facility laid or to be laid under the Stipulated Area.

2.5 No power is implied in respect of any easement for the Grantor to determine the easement for breach of any provision of this Easement Instrument (whether express or implied) or for any other cause, it being the intention of the parties that the easement shall subsist until it is surrendered in writing.

3 GRANTEE'S RIGHTS

3.1 For the purpose of performing any duty or in the exercise of any rights implied in this Easement Instrument the Grantee may:

(a) enter upon the servient land by the most practicable route from the nearest public street across any part of the servient land;

(b) remain on the servient land for a reasonable time for the purposes of completing any work;

(c) bring on to the servient land such materials, tools, equipment, machinery, vehicles or other things as may be necessary for the purposes of completing the necessary work;

(d) leave any vehicle or equipment on the servient land for a reasonable time if work is proceeding;

(e) sink and make trenches and shafts on the Stipulated Area;

(f) excavate any clay, gravel, shingle, stones, and earth from the Stipulated Area;

(g) inspect, maintain, cleanse, repair, extend, remove, enlarge or replace the Easement Facility;

(h) generally do and perform such acts and things in or upon the Stipulated Area as may be necessary or proper for or in relation to any of the purposes of this easement.

4 GRANTOR'S OBLIGATIONS

4.1 The Grantor will not:

(a) build over or erect any other improvements upon, plant trees upon or permit any tree roots to grow within the Stipulated Area;

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(b) permit any Utilities to be located within the Stipulated Area unless the siting and installation of such Utilities is expressly consented to in writing by the Grantee, such consent to be at the sole discretion of the Grantee;

(c) do or permit or suffer to be done anything which may in any way injure or damage the Easement Facility or interfere with the free flow and passage of any matter through the Easement Facility. If the Grantor is in breach of this obligation the Grantor shall promptly at the Grantor's expense properly and substantially repair and make good all such injury or damage and restore such free flow and passage. If the Grantor fails to promptly comply with this obligation then the Grantee may perform the obligation and recover any costs incurred from the Grantor.

5 GRANTEE'S OBLIGATIONS

5.1 The Grantee shall at its own cost:

(a) install (except where the creation of this easement is part of a subdivision in which case the Grantor will install the Easement Facility at its own cost), maintain and cleanse the Easement Facility so that it is not or does not become a nuisance or annoyance to the Grantor;

(b) remove and carry away all surplus clay, gravel, shingle, stones and earth which may be excavated from the Stipulated Area;

(c) upon the Grantee disturbing the surface of the Stipulated Area for any reason, without delay restore the same as nearly as possible to its original condition;

(d) repair and make good any damage which may be done to any fence building surface or improvement, or to any part of the Grantor's land, in the exercise by the Grantee of any of the rights granted by this Easement Instrument but the Grantee shall not be responsible for the cost of removing or damaging any fence building improvements or trees upon, or any tree roots growing within, the Stipulated Area as prohibited under clause ~~5.1(e).~~ 4.1(a).

6 EASEMENT FACILITY TO BE PROPERTY OF GRANTEE

6.1 The Easement Facility and any other structures, plant or equipment erected or installed by the Grantee on the Stipulated Area or any other structures, plant or equipment required to vest in the Grantee pursuant to a condition of a subdivision consent shall be the property of the Grantee.

7 LIMITATION OF LIABILITY

7.1 Any right of action which shall at any time accrue to the Grantee by reason of breach or non-observance by the Grantor of any of the covenants contained in this Easement Instrument may be enforced by the Grantee only against:

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(a) the registered proprietor for the time being of that part of the Stipulated Area in respect of which such breach or non-observance shall occur; and

(b) the registered proprietor at the time of such occurrence,

to the intent that the liability of any registered proprietor of the Stipulated Area shall cease (except as to any breach or non-observance occurring during the period of ownership of that registered proprietor) upon registration of a transfer of ownership.

8 DEFAULT

8.1 If the Grantor or the Grantee does not meet the obligations implied or specified in any easement:

(a) the party not in default may serve on the defaulting party written notice requiring the defaulting party to meet a specific obligation and stating that, after the expiration of seven working days from service of the notice of default, the other party may meet the obligation;

(b) if, at the expiry of the seven working day period, the party in default has not met the obligation, the other party may:

(i) meet the obligation; and

(ii) for that purpose, enter the servient land.

(c) the party in default is liable to pay the other party the cost of preparing and serving the default notice and the costs incurred in meeting the obligation;

(d) the other party may recover from the party in default, as a liquidated debt, any money payable under this clause.

9 ARBITRATION

* the parties shall meet in good faith to attempt to resolve the dispute provided that if a resolution cannot be agreed within ten (10) working days

9.1 If any dispute arises between the parties relating to this Easement Instrument,* that dispute shall be determined by a single arbitrator should the parties agree upon one, or failing agreement, by a single arbitrator to be appointed by the President for the time being of the New Zealand Law Society, in accordance with the Arbitration Act 1996 or any statute enacted in substitution of that Act and for the time being in force.

10 GENERAL PROVISIONS

10.1 Nothing contained or implied in this Easement Instrument shall be construed so as:

(a) to compel the Grantee to exercise all or any of the rights granted by this Easement Instrument at any time and the Grantee may commence, discontinue or resume the exercise of all or any such rights at will;

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(b) to abrogate, limit, restrict or abridge any of the rights, powers or remedies vested in the Grantee by statute.

10.2 The Grantor shall pay the Grantees reasonable costs of the variation and any surrender of this Easement Instrument including the staff processing costs and/or the legal costs incurred by the Grantee in relation to variation and surrender of this Easement Instrument.

10.3 The following provisions are applicable to the easement granted by this Easement Instrument:

(a) the rights, powers and privileges conferred on the Grantee by this Easement Instrument are in substitution for the definition of "Easement Facility" and the rights and powers set out in clauses 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14 Schedule 4 of the Land Transfer Regulations 2002 but the remaining provisions of the Land Transfer Regulations 2002 shall apply to this Easement Instrument;

(b) where there is a conflict between the provision of the Fifth Schedule of the Property Law Act 2007 and the Fourth Schedule of the Land Transfer Regulations 2002, the provisions of the Fifth Schedule of the Property Law Act 2007 will prevail;

(c) where there is a conflict between the provisions of the Fourth Schedule of the Land Transfer Regulations 2002 or the Fifth Schedule of the Property Law Act 2007 and the provisions of this Easement Instrument, the provisions of this Easement Instrument will prevail.