DUNEDIN CITY COUNCIL
Kaunihera-a-rohe o Otepoti
CITY PLANNING

APPLICATION FORM FOR RESOURCE CONSENT

APPLICATION DETAILS

We **Mark and Vicki Lambert** hereby apply for

■ Land Use Consent ■ Subdivision Consent ☐ Other _____ (select one)

Brief description of proposed activity: **Proposed 5-Lot subdivision and residential density breach.**

(eg Alter house, construct garage, establish a commercial activity, subdivide the site, remove a tree etc)

Have you applied for a building consent? ☐ Yes, Building Consent Number: ABA _____ ■ No

The following additional resource consents are required and have/have not (delete one) been applied for:

☐ Water Permit ☐ Discharge Permit ☐ Coastal Permit ■ Not applicable

SITE DESCRIPTION/LOCATION

We are the **Owners** of the site (*owner, occupier, lessee, prospective purchaser etc*)

Street address of site: **380 South Road, Caversham, Dunedin**

Legal description: **Sec 2 SO 23278**

Certificate of title: **OT15B/689** Valuation No. _____ Property No. _____

ADDRESS FOR CORRESPONDENCE

Name (agent) **Kurt Bowen**

Address: **C/- Paterson Pitts Group**

P.O. Box 5933, Dunedin

Phone: Daytime: **(03) 477-3245** Fax: **(03) 474-0484**

E-mail: **kurt.bowen@ppgroup.co.nz**

OWNERSHIP OF THE SITE

Who is the current owner of the subject site? **The Applicant**

If the applicant is not the site owner, please provide the site owner's contact details:

Address: _____

_____ Phone: _____

MONITORING OF YOUR RESOURCE CONSENT

What is your best estimate of the date of completion of the work for which this resource consent is required? Your resource consent will be monitored for compliance with any conditions at the completion of the work. (If you do not specify an estimated time for completion, your resource consent will be monitored six months before it is due to expire, which is normally 18 months after the date the consent is granted.)

September 2016 (month and year)

DETAILED DESCRIPTION OF PROPOSED ACTIVITY

Describe your proposal in detail, including reference to the rules in the District Plans that the proposal does not comply with.

Refer to separate sheets attached.

(Continue on a separate sheet if necessary)

AFFECTED PERSONS' APPROVALS

I/We have obtained the written approval of the following people/organisations and they have signed the plans of the proposal:

Name:	Name:
Address:	Address:
Name:	Name:
Address:	Address:
Name:	Name:
Address:	Address:

Please Note: You must submit the completed written approval form(s), and the plans of the proposed activity signed by affected persons, with this application for resource consent, *unless* it is a notified application in which case affected persons' approvals need not be provided with the application.

ASSESSMENT OF EFFECTS ON ENVIRONMENT

What effects will the proposed activity have on the environment? Discuss both positive and adverse (negative) effects. Effects could include things such as the generation of noise or odour, positive and/or negative visual effects, shading, loss of sunlight or privacy, traffic/car parking effects, earthworks, effects on the landscape or townscape etc. The extent of the assessment must be proportional to the degree of potential effects of the proposed activity.

Refer to separate sheets attached.

(Continue on a separate sheet if necessary)

DECLARATION

I certify that, to the best of my knowledge and belief, the information given in this application is true and correct.

I accept that I have a legal obligation to comply with any conditions imposed on the resource consent should this application be approved.

I agree to pay all the fees and charges levied by the Dunedin City Council for processing this application, including a further account if the application is notified and the cost of processing it exceeds the deposit paid.

Signature of Agent

Date:

24 September 2015

Have you read the notes on the following page?

PRIVACY – Local Government Official information and Meetings Act 1987

Under this Act, any person can request applications lodged with Council. Council is obliged to make available the information requested unless there are grounds under the above Act that justify withholding it. While you may request that it be withheld, Council will make a decision, following consultation with you. If Council decides to withhold an application, or part of it, that decision can be reviewed by the Office of the Ombudsmen.

Please advise if you consider it necessary to withhold your application, or parts of it, from any persons (including the media) to: (tick those that apply)

☐ Avoid unreasonably prejudicing your commercial position

☐ Protect information you have supplied to Council in confidence

☐ Avoid serious offence to tikanga Maori or disclosing location of waahi tapu

WHAT HAPPENS WHEN FURTHER INFORMATION IS REQUIRED?

If an application is not in the required form or does not include adequate information, the Council may not accept the application. In addition, section 92 of the Resource Management Act 1991, allows the Council to request further information from an applicant at any stage through the process where it is considered necessary to better understand the nature of the activity, the effects it may have on the environment, or the ways in which adverse effects may be mitigated.

FEES

The Council has set application fees. These may be subject to change by resolution of the Council and will be publicly notified. Enquire at the planning enquiries counter for the details.

FURTHER ASSISTANCE

If you require any further help, please contact:

Planning Enquiries
First Floor, Civic Centre
50 The Octagon
PO Box 5045 **Phone 477 4000**
Dunedin **Fax 474 3523**

This is also where you can lodge your resource consent application. We are there to provide you with planning information. If you consider you need further planning advice, you may wish to discuss your application with an independent planning consultant.

INFORMATION REQUIREMENTS	OFFICE USE
☐ Completed and Signed Application Form	☐
☐ Description of Activity and Assessment of Effects	☐
☐ Plans	☐
☐ Site Plan and Elevations	☐
☐ Certificate of Title (less than 3 months old)	☐
☐ Written Approvals	☐
☐ Forms and Plans signed by Affected Persons	☐
☐ Application Fee	☐

In order to ensure your application is not rejected or delayed through requests for further information, please make sure you have included all of the necessary information. A full list of the information required for resource consent applications is in the Information Requirements Section of the Proposed District Plan.

OFFICE USE ONLY

Has the application been completed appropriately (including necessary information and adequate assessment of effects) Yes ☐ No ☐

Application: Received ☐ Rejected ☐ **Received by:** Counter / Post / Courier / Other

Comments: .....

.....

Include reasons for rejection and/or notes to handling officer.

Planning Officer: ..... **Date:** .....

3 September 2015

City Planning Department
Dunedin City Council
PO Box 5045
DUNEDIN 9054

380 South Road, Caversham, Dunedin

Hazardous Activities and Industries Investigation

This information is provided in support of the attached subdivision application. A Land Use and Site Contamination Status search was sought from the Otago Regional Council. They undertook the appropriate search of their records and concluded that "there is no identified land-use or site contamination information held for the above site".

Recently, we sought a HAIL search from the Dunedin City Council, becoming HAIL 2015-??

This site appears to have had an interesting although less than glamorous history. A little confusingly, the over-bridge abutment that currently lies on the western boundary is not for the bridge that is shown in the 1910 and 1937 photos, and was aligned with Sydney Street, not Barnes Drive as is presently the case. One of the abutments for the bridge shown on these photos (Sydney Street bridge) is on the subject property, adjacent to the neighbouring store. The pedestrian crossing shown in the aerial photos appears to have remained in the same location since at least the 1930's and provides a useful reference point.

The site was extensively modified during the reconstruction and realignment of the railway, a process that was largely complete in the 1910 photograph. The old railway was at ground level and on a different alignment, leading to the old Caversham Tunnel. The extensive earthworks and construction of the Sydney Street over-bridge approach is likely to have seen any residue of the rubbish that was recorded as being on the site, either removed or buried deeply by the abutment work. The balance of the site (post the construction of the railway) appears to slope from South Road, down to the railway formation; with the area partly obscured by railway advertising hoardings. Extensive fill was extracted from the Caversham tunnel and surrounding area and used to fill the timber trestle viaduct between Andersons Bay Road and beyond "the Glen" to create the embankment that is part of the current cityscape. It's probably fair to assume that all signs of human habitation at 380 South Road prior to the reconstruction of the railway will have been obliterated by the construction work.

The aerial photos illustrate the development of the area and the limited utilisation that was made

of the site. City Council records note that that polite sheeting had been dumped and subsequently removed from the site. We're aware that older versions of this product contain Asbestos, however as the fibres are encased in cement, Polite results in a relatively low human health risk. (It's the shape of the fibre that creates the hazard, so asbestos attached to a cement particle or a droplet of water or grease doesn't create the same harm to lungs).

Council records also record that abandoned cars have been deposited in the area. This doesn't appear to create an elevated risk above using the area for car-parking unless there is evidence of automotive dismantling on the property.

The adjacent railway has in the past been extensively used for the heavy haulage of freight as well as passenger traffic, however the site was never used as sidings (rail yard) nor for the transshipping of loose commodities to or from rail wagons. Areas located near railways are associated with elevated levels of carbon and iron particulates, which isn't an attractive proposition on washing day, but these emissions are generally less harmful than the compounds emitted by the road vehicle exhausts, tyres and brakes.

There is no doubt that this is not a natural site and that considerable quantities of material have been deposited and removed over time, and that the property has been through periods of semi-disuse. It is difficult to conclude that it's more probable than not that this isn't a HAIL site. However, we are confident that any contamination discovered as a result of subsequent investigation, will be able to be remedied or mitigated in a manner that allows the proposed residential use to proceed.

Yours faithfully
PATERSON PITTS PARTNERS LTD

Andrew Robinson
14981

PATERSONPITTSGROUP

Your Land Professionals
www.ppgroup.co.nz
0800 PPGROUP

24 September 2015

The Resource Consents Planner
City Planning
Dunedin City Council
PO Box 5045
Dunedin

Dear Sir / Madam

APPLICATION FOR RESOURCE CONSENT (SUBDIVISION AND LAND USE)
CAVERSHAM APARTMENTS RESIDENTIAL DEVELOPMENT
380 SOUTH ROAD, DUNEDIN

Please find below, information in support of a resource consent application (subdivision and land use) in relation to the proposed Caversham Apartments development at 380 South Road, Caversham, Dunedin.

Also attached to this application are the following documents-

1. Form 9 application.
2. Subdivision scheme plan (2 sheets, plus aerial and site plan overlays).
3. Architectural plans (5 sheets).
4. Property certificate of title.
5. Second Generation District Plan zone comparison map.
6. HAIL assessment report.
7. Car parking and hard surfaces assessment
8. Cheque for $1,700 to cover the anticipated consent processing deposit fee.

DESCRIPTION OF ACTIVITY

The objective of this application is to obtain resource consent for the subdivision of the property at 380 South Road into a total of 5 new allotments for proposed residential use and a number of additional allotments that will contain infrastructure necessary to support the new residential sites.

In addition to the resource consent sought for subdivision, the Applicant seeks resource consent for land use to enable new residential activities to be established on the 5 new residential sites as these do not comply with the underlying zone density requirements. Land use consent for several other related non-compliances is also sought.

The reason for the subdivision aspect of this application is simply that all forms of subdivision require consent under the Dunedin City District Plan, regardless of the level of compliance that the proposal might achieve when measured against the relevant activity rules.

The reason for the land use aspect of this application is to recognise and address by way of specific consent a number of proposed non-compliances with the Dunedin City District Plan (the District Plan). The large majority of these non-compliances relate to the objective of establishing a number of additional new residential activities within a property that does not enjoy sufficient land area to be able to meet the relevant density provisions of the District Plan. All non-compliances stem in some form from the proposed new residential activities.

The Applicant is Mr and Mrs Mark and Vicki Lambert. The subject property is currently owned solely by the Applicant.

Background to the Property

The land subject to this application has been, and currently still is, operated as a mixture of informal open car park and undeveloped green area. The subject site was owned by Dunedin City Council from October 1993 to October 2014, at which point the ownership was transferred to the Applicant. The current informal open car park is used by local community residents and the staff of nearby businesses for free parking (this area has a maximum capacity for 17 cars). The green areas are comprised of generally grass and shrubs, which are maintained in moderate condition by the Applicant.

Current Situation

The legal description of the application site is Sec 2 SO 23278. The property has a total area of 1,314m^2 and is currently held in certificate of title OT15B/689, a copy of which is attached. There are no existing easements or encumbrances of any material relevance registered on the property title. The physical address of the property is 380 South Road, Caversham, Dunedin.

In the broader sense, the subject property is situated at the north-eastern corner of the intersection of South Road and Barnes Drive, on the southern side of the Main South Railway corridor. The land is entirely surrounded by Legal Road (South Road to the south and Barnes Drive to the west) and Railway Land, except for a relatively short boundary (6.6m) at the site's southern-eastern edge which is shared with Pt Lot 6 Deeds Plan 67 (held in title OT286/170).

In addition to the reasonably high-usage roads at South Road and Barnes Drive (which connect the Caversham suburb with SH1 on the northern side of the Main South Line), the site also lies opposite the low-usage roads at Morrison Street and Caversham Place. The combination of these intersections provides a relatively complex traffic network in this vicinity.

The Railway Land lying to the north and east of the application site contains the Main South Line track infrastructure (running parallel to the sites northern boundary) and an irregular-shaped open green area that wraps around the subject land. This open area contains a modest-sized open water channel, but otherwise appears to enjoy little active usage.

As noted previously, the land subject to this application has been, and currently still is, operated as a mixture of informal open car park and undeveloped green area. The current informal open car park is used by local community residents and the staff of nearby businesses for free parking (this area has a maximum capacity for 17 cars). The green areas are comprised of generally grass and shrubs, which are maintained in moderate condition by the Applicant. There is an existing vehicle entrance to the site from South Road, located at the south-eastern corner of the property. The Dunedin City District Plan recognises South Road as a District Road. Sight distances, for vehicles exiting the property by way of the existing crossing on South Road, are approximately 40m in a westerly direction and in excess of 300m in an easterly direction.

The adjoining privately owned property at Pt Lot 6 Deeds Plan 67, at 378 South Road, contains a commercial fish and chip shop. This shop is the last commercial business in a line of approximately 9 commercial activities that occupy the stretch of land between the application site and the nearest intersection to the east, between South Road and Laing Street.

The Caversham neighbourhood surrounding the subject property broadly comprises a range of commercial activities to the east, relatively dense residential activities to the south and south-east (with an average area of approx. 350m^2), more typically dense residential activities to the south-west, and Railway Land to the north and north-west. The application site sits fairly squarely at the center of these various activities.

The subject site is currently zoned Residential 1 under the Dunedin City District Plan, as is the land surrounding the site in all but an eastern direction. The land to the east, containing the existing commercial activities lies in the existing Local Activity 1 zone. There are no planning designations or special controls shown in the District Plan as being attached to the application property, although the adjoining Railway Land to the north and north-east is subject to Designation 419 (relating to its railway usage).

The application site itself resembles a roughly square block, with its south-west side arced to match the curve in the alignment of South Road. Of the site's total 1,314m^2 land area, some 618m^2 is covered in hard-stand material (which supports the existing car parking activity), with the remaining 696m^2 making up the green, undeveloped portion of the land. There are no established dwellings or residential structures of any kind within the existing property, although we note that there is an electricity transformer and another unconfirmed utility cabinet both located within the application site along its southern boundary.

In terms of its elevation, the application site generally lies at approx. 30m above sea level. The landform across the subject site exhibits a reasonably gentle slope running from west to east, demonstrating a drop of approx. 3m over a distance of around 50m.

In terms of existing services, the site does not appear to have a water connection at the boundary. Neither does it appear to have foul nor does stormwater drain connections. We

speculate that these connections have not been previously installed as they have not been needed to support previous or current activities within the property.

There are, however, several existing piped stormwater facilities (reticulation mains) running through the property. The largest of these facilities is a 1.05m diameter Council-owned public stormwater sewer, which runs from north to south through the site. Two smaller-diameter private pipes watercourse facilities connect to the main sewer within the northern reaches of the property. These facilities vary in depth below the present ground level of the subject property.

The photographs below show an aerial view and a number of oblique views (both inwards and outwards) to the application site.

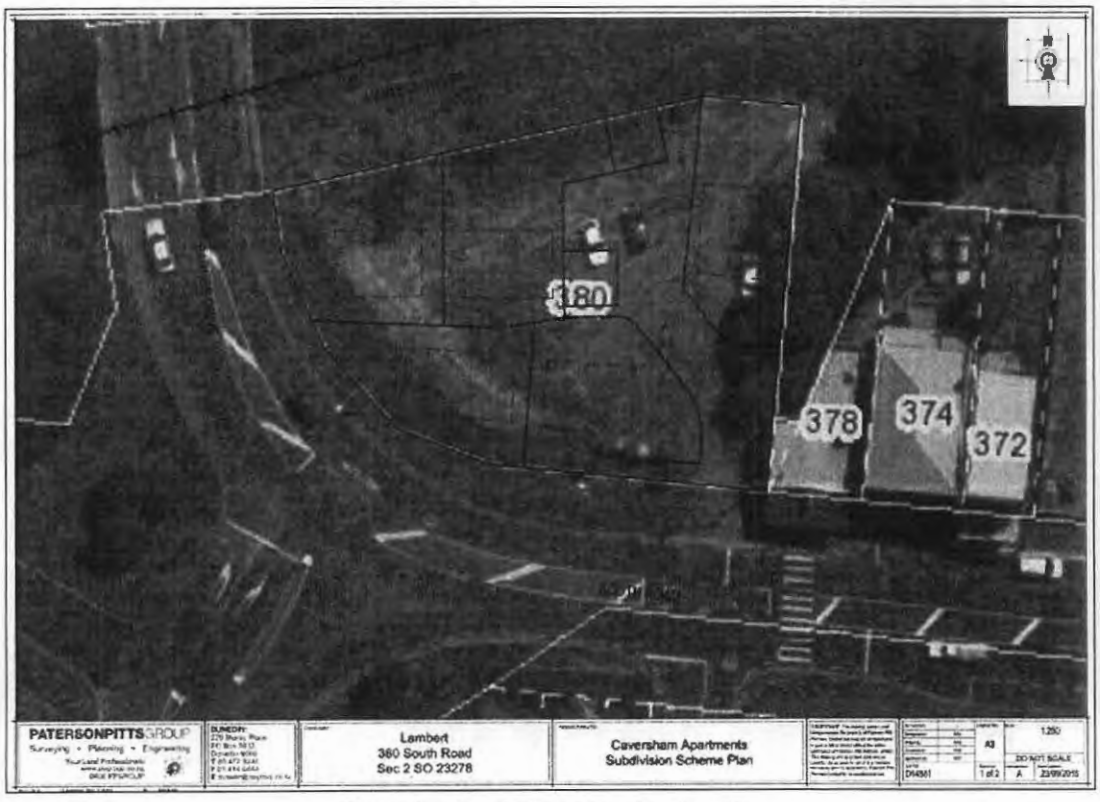


Photo A – Aerial view of application site.

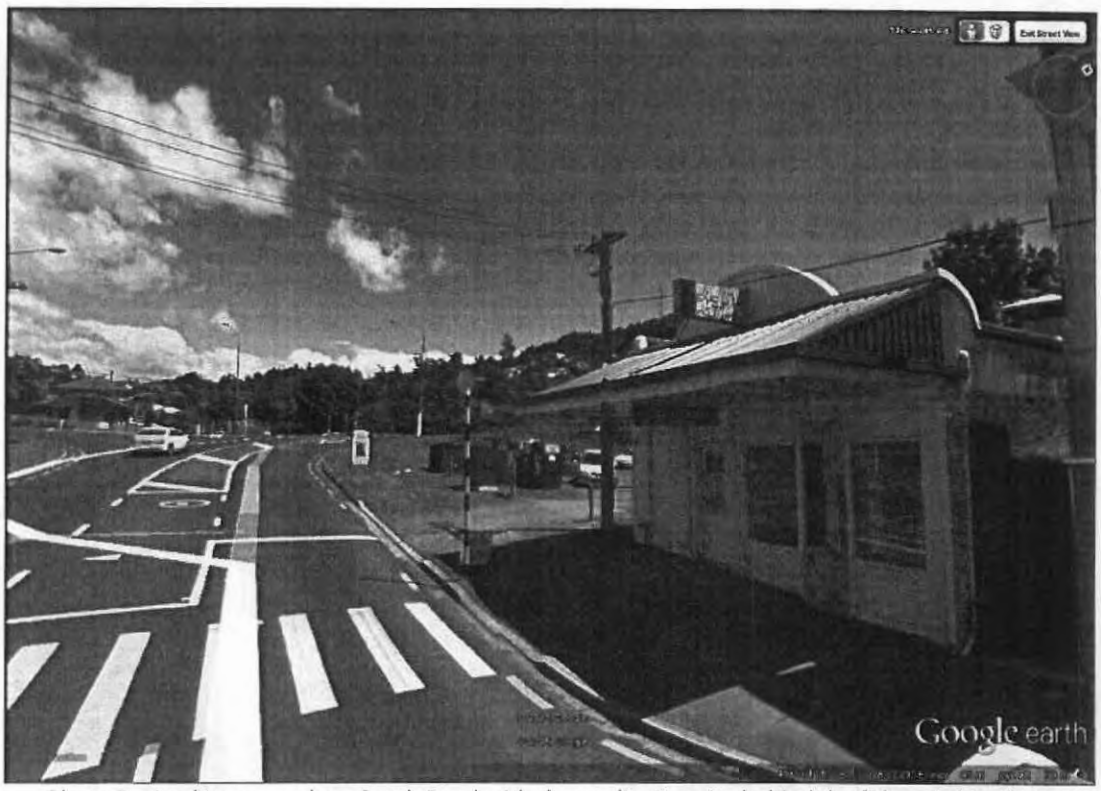


Photo B – Looking west along South Road with the application site behind the fish and chip shop.

Photo C – Looking west along South Road with the application site on the right.

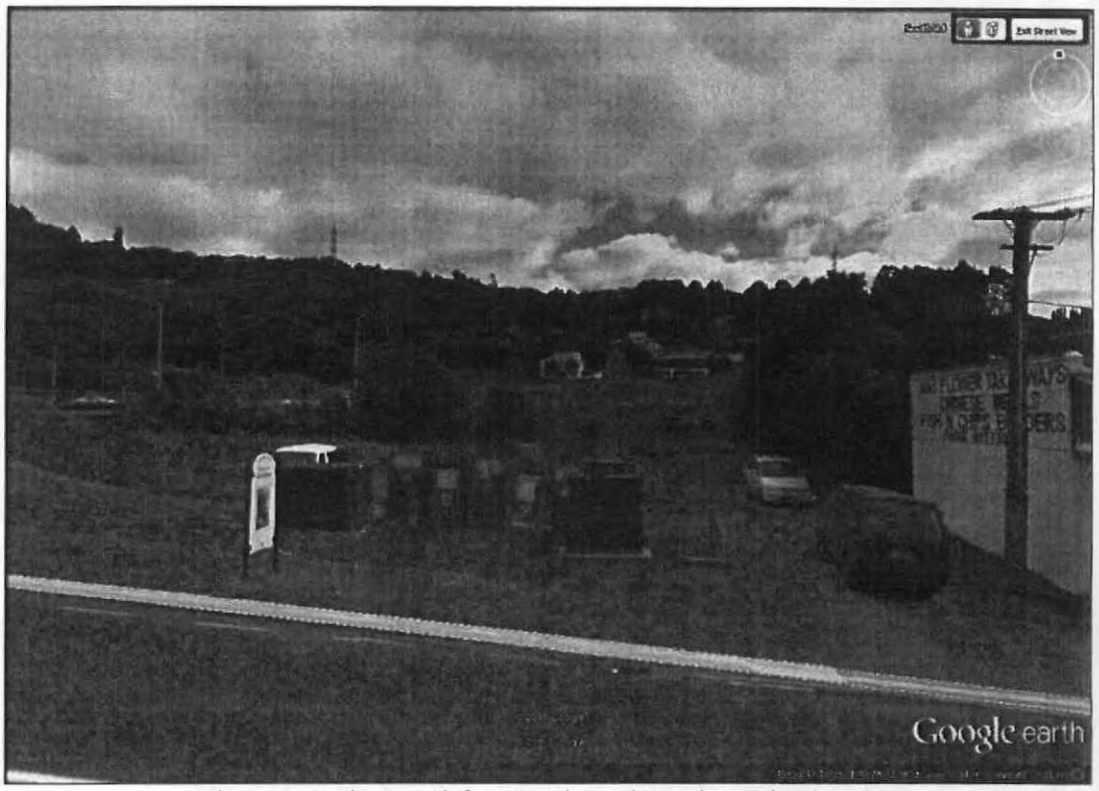


Photo D – Looking north from South Road into the application site.

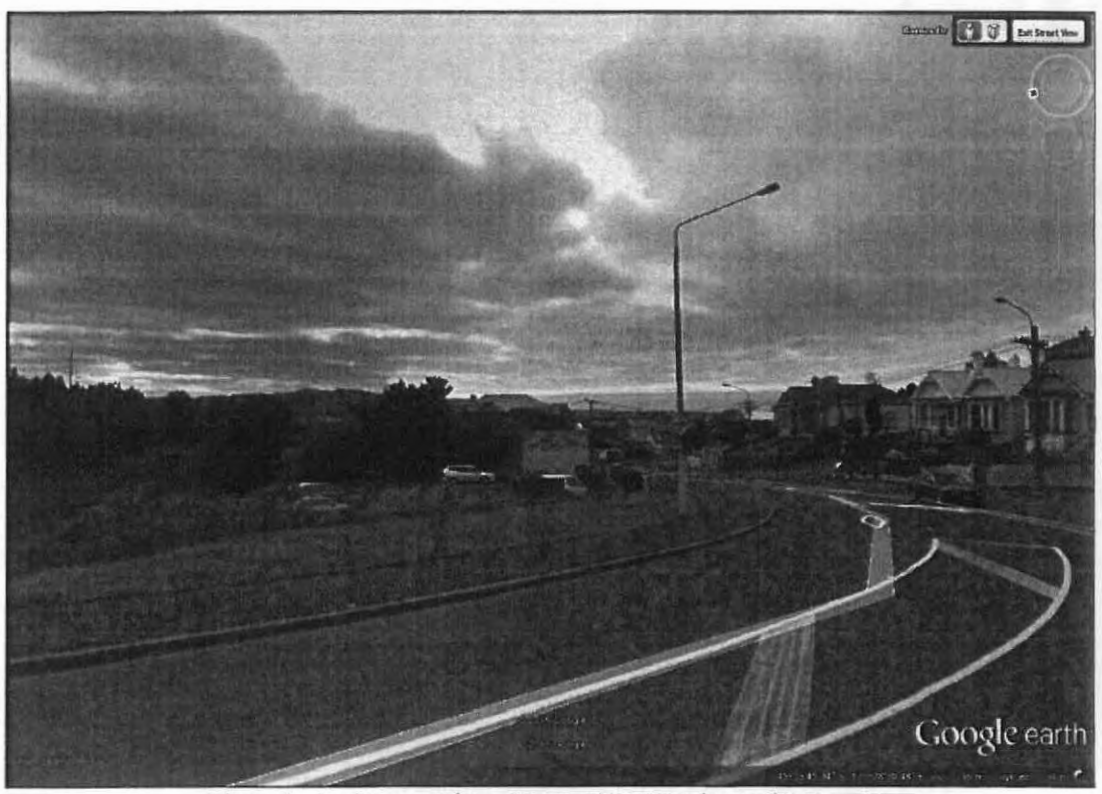


Photo E – Looking east from Barnes Drive into the application site

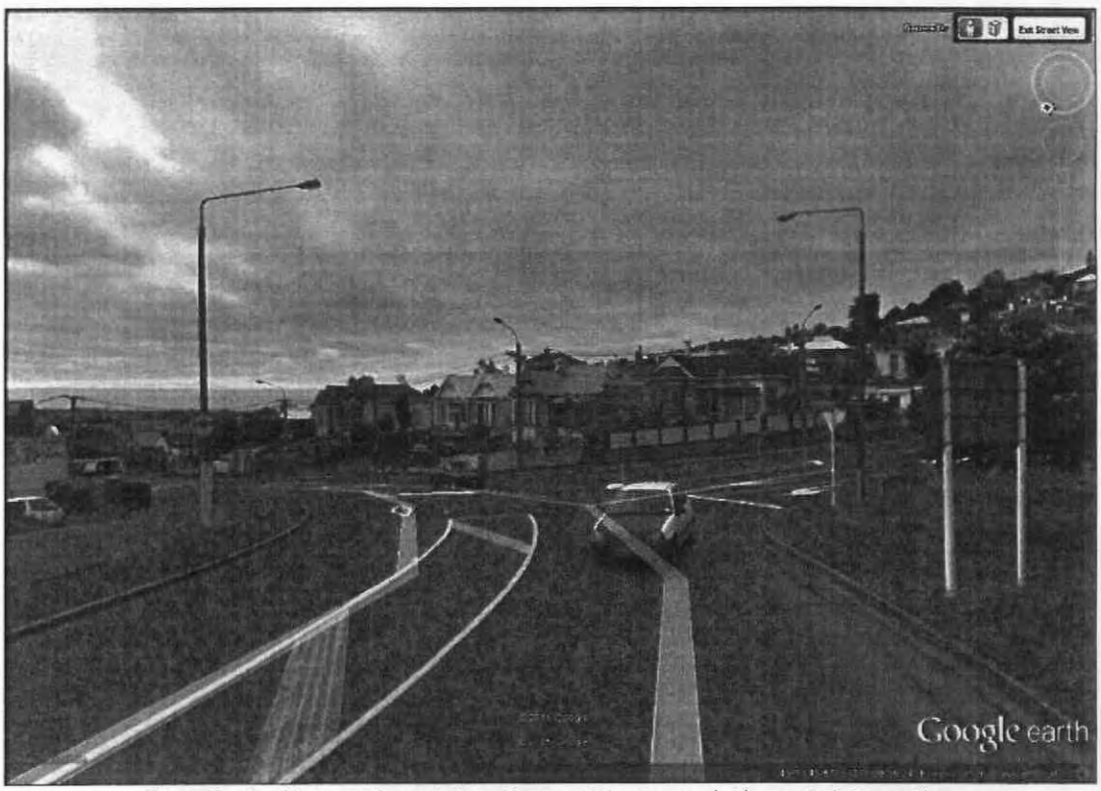


Photo F – Looking south-east from Barnes Drive towards the main intersection.

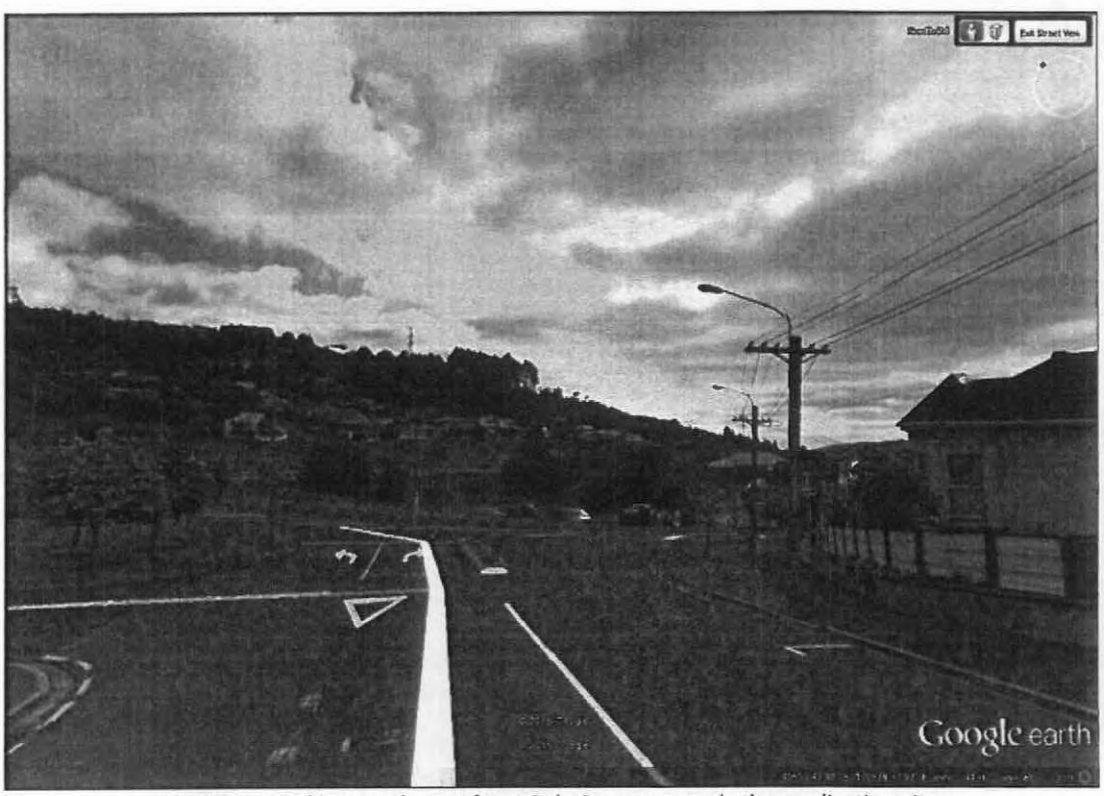


Photo G – Looking north-east from Cole Street towards the application site.

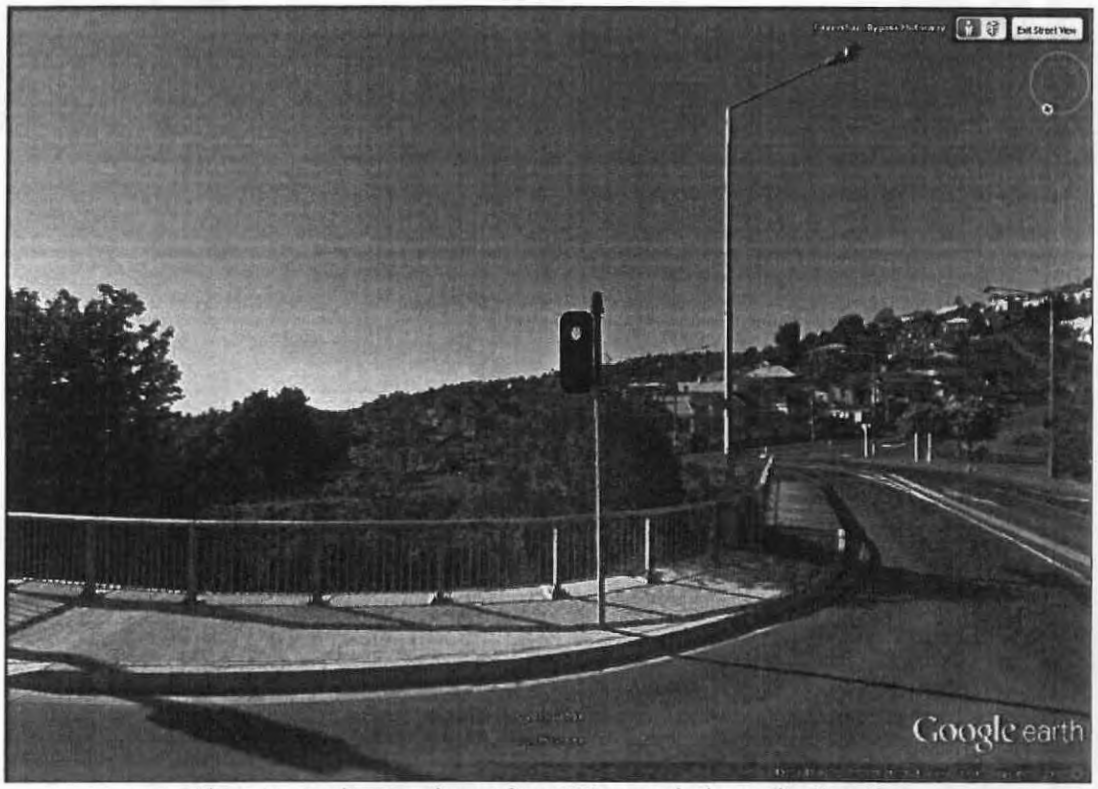


Photo H – Looking south-east from SH1 towards the application site.

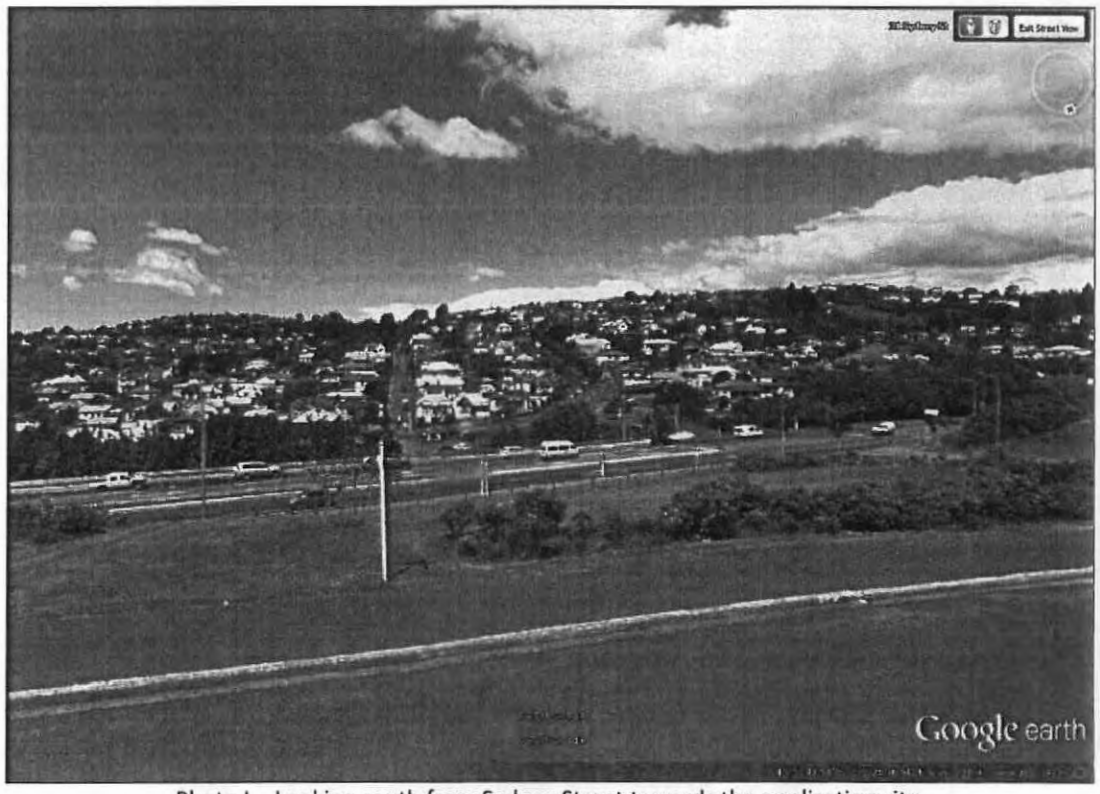


Photo I – Looking south from Sydney Street towards the application site.

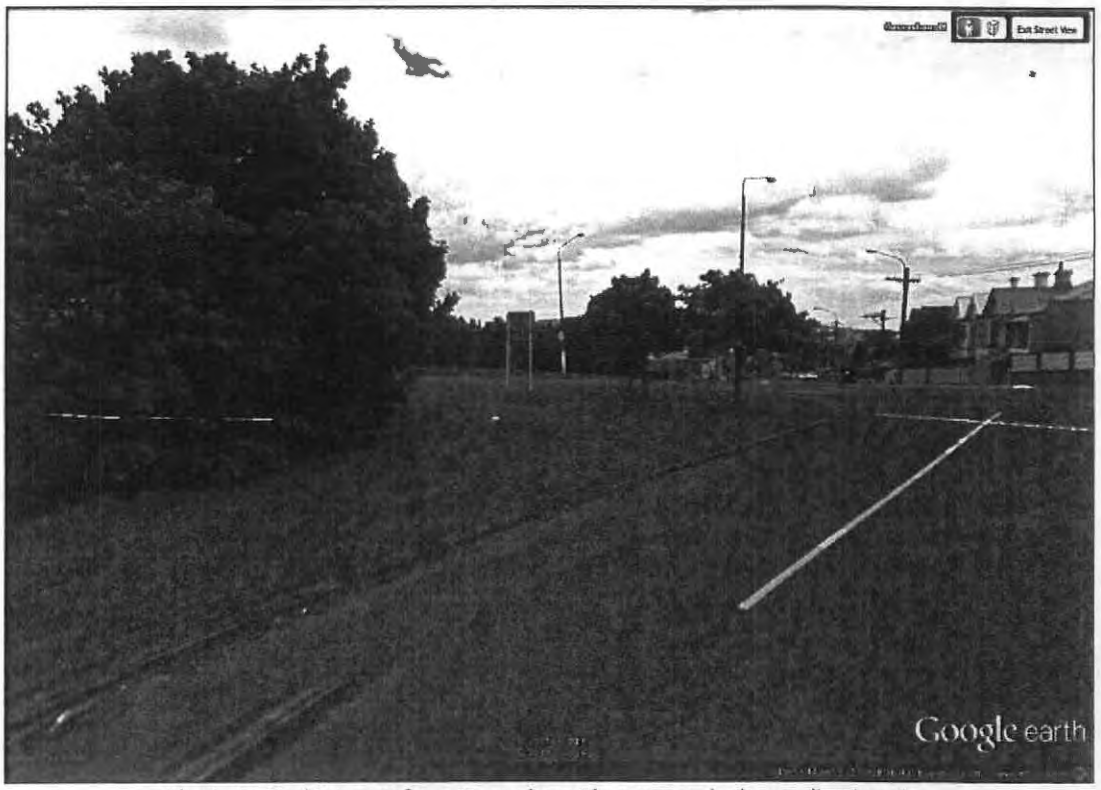


Photo J – Looking east from Caversham Place towards the application site.

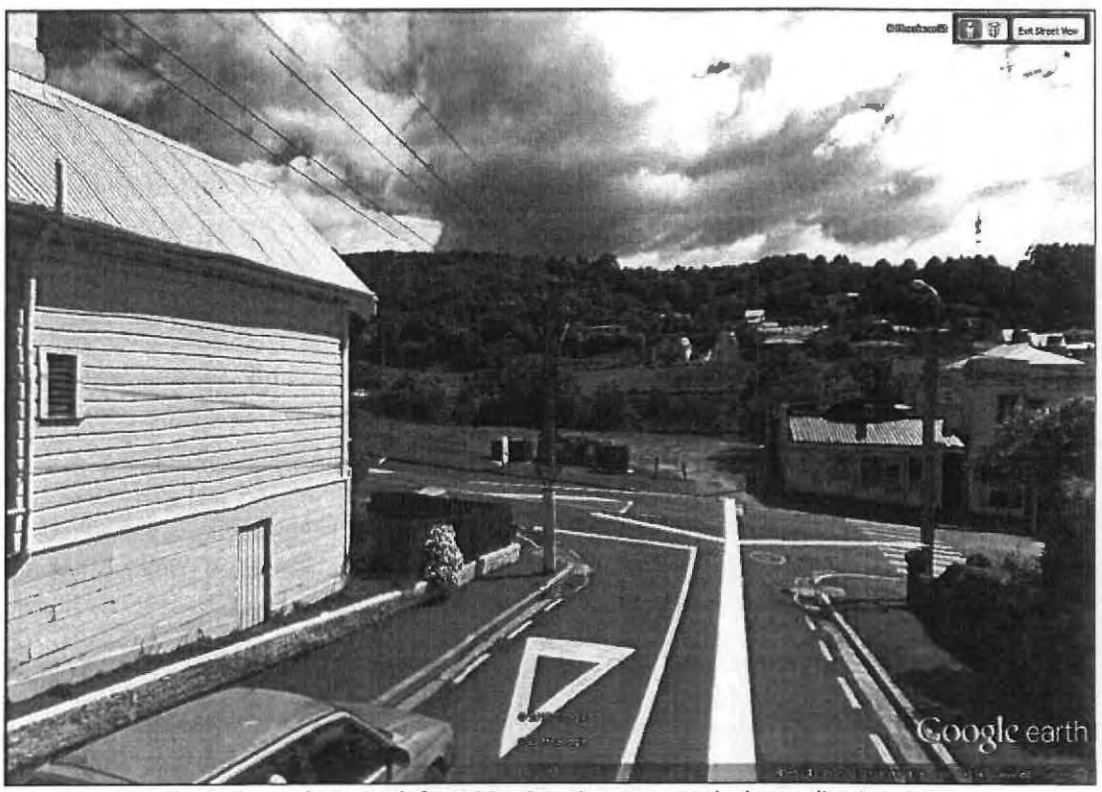


Photo K – Looking north from Morrison Street towards the application site.

Proposed Residential Activity and Subdivision

The Applicant proposes to establish a total of 5 residential activities within the application property. In addition to this, the Applicant wishes to subdivide the subject property in such a manner as to allow each new residential activities to occur on a separately titled site. The attached subdivision scheme plan and architectural plan illustrates the nature of the proposed residential development.

The Applicant's goal in this project is to build warm, well insulated, houses that can be rented at fair price to meet the needs of Dunedin residents. The present rental market in Dunedin includes a large volume of old houses that are often cold and damp, and this is a particular issue in Caversham and the adjoining South Dunedin, Carton Hill and Corstorphine communities. The Applicant is hoping that by obtaining consent for the proposed development, and the consequent provision of high quality, affordable, and healthy rental housing, this issue can be improved, at least in part.

The proposed units will be constructed from various products that can be sourced cost-effectively, but without compromising on the intended quality of the finished construction. The cost of land value attached to each unit will be minimised by way of the sought consent, which will enable a greater number of residential units to be established on the land than would normally be permitted. It is these features of the development that will enable the Applicant to achieve a high-quality result that can still meet an affordable housing budget.

In terms of the proposed units themselves, these will be stand-alone two-storey apartments, each with a similar layout. These will each a footprint of approximately 8.6m by 6.4m, giving a footprint area of $55m^2$ and a total floor area of $110m^2$ per unit. The attached architectural plans illustrate the intended shape, size, internal layout and visual appearance of the proposed units. The units are intended to be compatible with the surrounding built environment, with regard to scale and bulk, and will be a good example of the successful medium-density development (consistent with the City's vision for development in other areas).

Each unit will have several outdoor amenity areas, including permeable decking and open green areas. Two car parks will be provided to each unit, reached by way of the proposed Lot 6 right-of-way access from South Road, and suitable pedestrian pathways (with appropriate right-of-way easements also) will be constructed to link the parking areas to the units, where these are necessary. A communal covered bike storage facility is proposed adjacent to the Lot 6 right-of-way, as a means of supporting an alternative transport option for residents of the development.

A reasonably significant level of landscaping and planting will be undertaken to make the proposed units both attractive and environmentally sustainable. The landscaping elements are illustrated on the attached architectural plans.

In terms of amenity and character, we note that the surrounding environment is generally represented by modest residential housing of mostly older stock as well as a block of commercial businesses along South Road. The integration into the community of the

proposed new good-quality, affordable units, on a site that is presently vacant, is expected to enhance the overall amenity values of the neighbourhood and will bring new residents into the community to support the local businesses.

We note that some elements of the proposed access, parking and landscaping vary between the attached subdivision scheme plan and the attached architectural plans. In these instances we advise that it is the subdivision scheme plan that provides the correct layout. The subdivision scheme plan has been finalised more recently than the architectural plans, and has taken into account a broader range of considerations. In any case, there are no fundamental variations between the two plan sets.

The new allotments, to be created by way of the proposed subdivision, will achieve the following-

Site	Area (m^2)	Purpose
Lot 1	196	New Residential activity.
Lot 2	183	New Residential activity.
Lot 3	202	New Residential activity.
Lot 4	209	New Residential activity.
Lot 5	196	New Residential activity.
Lot 6	278	Infrastructure allotment to be owned in equal shares by the owners of Lots 1-5 and to contain the access formation and other shared facilities.
Lot 20	25	Car park allotment to be owned in common with Lot 2 (by amalgamation).
Lot 30	25	Car park allotment to be owned in common with Lot 3 (by amalgamation).

Please note that new title areas for each site will include a share of the Lot 6 infrastructure allotment (adding $55m^2$ to the areas of Lots 1-5 above), and that Lots 2 and 3 will additionally include the areas of the associated car park allotments, Lots 20 and 30 respectively, adding a further $25m^2$ to those sites.

With the above in note mind, we can confirm that all of the new residential activities will have a site area for assessment purposes of at least $251m^2$, and an average site area of $262m^2$. All of the proposed site areas are less than the $500m^2$ minimum area required by the District Plan (Residential 1 Zone).

The units proposed on Lots 1, 2, and 3 will be established at distances of 3.9m, 2.1, and 2.8m (respectively) from the South Road boundary. The District Plan specifies a minimum front yard distance of 4.5m. A relatively significant level of landscaping and planting will be established within the frontage yards of these units to provide a buffer between the proposed residential activities and the external environment, to the benefit of both. We also note that the unit proposed on Lot 2 breaches the 63° height plane angle required by the District Plan, to a relatively minor extent.

The unit proposed on Lot 5 will be established at a distance of 2.3m from the eastern boundary of the application site. While this complies with the side yard requirements of the District Plan, the proximity of this unit to the boundary does introduce a breach of the 63° height plane angle required by the District Plan. For reasons discussed later in this document, this breach is considered acceptable.

In respect of site coverage, the proposed activity achieves an overall coverage of around 21%, well below the 40% permitted by the District Plan. This is due to the modest footprint sizes of the proposed units.

Proposed Lot 6 will contain the necessary access and common service infrastructure needed to support the proposed development. The majority of this site will be hard-surfaced to enable vehicle access and manoeuvring, although there will be several areas of green landscaping as discussed under the 'Landscaping' heading below. Common service infrastructure within this allotment is almost certainly to be installed underground for protection and so as to not interfere with vehicle passing. Maintenance of the access formation and common services within Lot 6 shall be shared by all of the benefitting owners.

The proposed Lot 6, in addition to supporting access and service infrastructure and landscaping, shall also contain an area for letterboxes and the previously mentioned covered bike storage facility.

Much of the application content below considers the nature of the proposed activity against the existing land use activity that is present with the site (i.e. informal car parking for local residents and/or business) and against the 'permitted baseline' activity that in the Applicant's opinion could most likely be expected to occur within the site (without breaching the relevant District Plan rules). As the application land is located within an area that is primarily occupied by residential housing, and because the site is contained within the Residential 1 Zone of the current District Plan, it is our view that the appropriate permitted baseline activity to consider the proposed development against is that of a residential activity in accordance with the provisions of the Residential 1 Zone.

The 1,314m^2 application site, if developed in accordance with the provisions of the Residential 1 Zone, would support two residential units (one unit per 500m^2 of land area is permitted), and these units could occupy a combined site coverage area of 525m^2 (being 40% of the total land area). If the land was to be allocated to these two units in equal amounts, each unit would enjoy a land area of 657m^2 and an available dwelling footprint area of 262m^2. It is not difficult to imagine that the 'permitted baseline' development, utilising the generous areas indicated above, might very easily comprise two large single-storey four-bedroom family homes (allowing perhaps 200m^2 of floor area each in each), and it is this outcome that the proposed activity is judged against in later section of this application when we apply the 'permitted baseline' analyses.

In respect of the proposed site density, we need to consider the difference in effects as generated between the proposed activity (being 5 modest-sized residential units within a site that has an area of 1,314m^2) and the permitted baseline activity (being 2 normal

residential activities). The density of the proposed development itself is clear a significant difference, but the level of the effects between the activities will not be quite so apparent. For instance, if we compare site coverage under the proposed development, being 275m² or 21% of the site, this is distinctly less than what might be expected under the permitted baseline development, being 400m² or the 30% of the site. This results from the total floor area of the 5 proposed units combined being less than the combined floor area of the 2 units that might be established under the permitted baseline model. For this very reason, we can naturally expect that there will be less residents, on a per-unit basis, under the proposed activity than there would likely be with a permitted baseline development, and this ultimately leads to a balancing of the effects of the two developments in many respects, including traffic and servicing demands.

Access and Car Parking

Physical access to the proposed sites will be achieved from South Road, at the location indicated on the attached Subdivision Scheme Plan. This entrance coincides with the existing crossing that enters the site in support of the present car parking activity.

All of the proposed site will have direct frontage to the entranceway, and ownership of the access facility, by virtue of their shared ownerships of Lot 6. In addition to this, each of the proposed allotments will enjoy a right-of-way easement over the access formation within Lot 6.

Car parking will be provided on-site as shown on the attached Subdivision Scheme Plan. This comprises 11 parking spaces, 10 of which are associated in pairs with each of the 5 proposed units and 1 visitor park. The parks for each of Lots 1 and 5 will be contained within the bulk area of those allotments and accessed from the main right-of-way corridor. The parks for Lot 4 will also be contained within the bulk area of that allotment, but will be accessed instead from the wider right-of-way region. The parks for Lots 2 and 3 be contained in discrete allotments (Lots 20 and 30 respectively) due to the separation of the right-of-way area from the parent sites. These parks will be accessed from the wider right-of-way region. Suitable vehicle turning has been integrated into the development design

The flush path described on the attached Subdivision Scheme Plan will be built to standard that will enable vehicle passage, and this will operate as a shared space for both vehicles and pedestrians. The path will be distinguished in from the main driveway alignment, so as to create a preferential arrangement (i.e. cars on the driveway and pedestrian on the path), but the full 5.5m width of the combined access will be available for both purposes.

The proposed activity is expected to generate 30-40 traffic movements per day. This rate of activity has been determined by adopting an average figure of 6-8 traffic movements per day per unit. The rate of traffic movement for normal residential activities is 8 movements per day per unit, however because the proposed units are somewhat smaller than normal residential units we would expect these to accommodate fewer residents, and therefore we can expect there to be fewer traffic movements.

The permitted baseline activity could be expected to create 16 traffic movements per day (two normal residential activities times 8 movements per day).

The existing car parking activity provides space on-site that is sufficient to contain 17 parks. Accepting that these park are likely to be predominantly used by staff working normal hours at local businesses, or residents living nearby, it is probably reasonable to determine that perhaps 12 of the 17 parks will be subject to 2 traffic movements per day (i.e. 1 in and 1 out). The remaining 5 parks might however be subject to 4 traffic movements per day, which recognises that there is likely to be some level of shorter-term parking for shoppers, etc. Combining these figures, the total daily traffic movements generated by the existing situation might come to 44 for the whole site. This is slightly greater than the anticipated level of traffic movements that will be generated by the proposed activity.

The Applicant recognises that there is also a reasonably high level of pedestrian traffic along the footpath adjoining the application site, and further notes that there is a pedestrian crossing on South Road in close proximity to the site entrance. While it is not anticipated that the level of traffic passing for the site onto South Road will markedly change as a result of the proposed activity, the Applicant intends to paint white 'give-way' style markings on the new driveway as a means of encouraging vehicles exiting the development property to pause and consider whether there are any hazards to a safe entry onto South Road.

Landscaping

There are a number of regions of proposed landscaping shown on the attached Architectural Plan (sheet 3). This landscaping includes a corridor of planting around the South Road and Barnes Drive frontage, and a number of pockets of planting between, and around, the proposed units within the site.

Please note that following variations to the Architectural Plan in respect of landscaping (decided subsequent to the supply of the attached plan)-

1. The Architectural Plan shows thee 'type 1' trees within a region of low shrubs within the road berm on South Road. For traffic sight-line reasons the three trees that are shown here have been removed from the proposal. Vehicles waiting to exit the site onto South Road will need a clear line of visibility in a westerly direction, and these trees might potentially conflict with that. The low shrubs remain part of the landscaping proposal as these will not overtly obscure sight-lines, however the Applicant understands that as this region of landscaping is on Council road, this planting can only occur at the discretion of Council.

2. The small region of landscaping at the southeast corner of the site, adjacent to the neighbouring fish and chip shop, will be extended further to the north to at least 2.0m past the end of the shop wall. This will provide a buffer between the existing shop activity and the proposed new residential activity.

3. The Architectural Plan includes a note stating that no boundary fence will be used. The Applicant has decided that a low fence (restricted to a maximum of 1.2m in

height) and constructed in a manner that allows partial visibility through the structure (minimum of 40% transparency), will still achieve a suitable degree of openness, but will also provide a fixed barrier to discourage unauthorised access into the property. The proposal therefore removes the 'no fence' notation on the Architectural Plan and replaces this with a modest fence structure as described.

Overall, the proposed landscaping will provide a pleasant environment for the new residential units, and will serve to soften the appearance of the development when viewed from adjoining and nearby locations, thereby maintaining the amenity and character values of the surrounding environment (when considered against the anticipated 'permitted baseline' development).

Water Supply

The new residential properties will each be supplied with an individual domestic water service connection from the public water main in South Road.

Water supply for fire-fighting purposes is achievable by way of an existing hydrant that is located in South Road near the entrance to the site.

Stormwater Drainage

The drainage of stormwater from the proposed residential sites will be achieved by disposal into the existing stormwater sewer that runs diagonally through the site. Each of the new residential sites will have a drain connection into this stormwater sewer, as will the collection facility that will be installed within the right-of-way (Lot 6) to manage the surface stormwater from the hard-surfaced area.

The Applicant understands that the downstream stormwater network is somewhat sensitive to catchment flows during severe rainfall events. For this reason, it is anticipated that the Applicant may be required to install one or more stormwater retention devices to detain for a suitable period any flows resulting from the developed land that are in excess of the current (undeveloped) off-site flows.

This retention, if necessary, could take the form of one or more site-specific tanks (to detail the flows from individual allotments), or might take the form of a larger common tank or open pond (used by several of the sites). The exact nature of this retention device will be determined in due course during the detail architectural design phase (prior to a building consent application), and approval from Council's Water and Waste Services Department might reasonably be required at that time. Please note that if the proposed retention was to be the form of a shared tank facility, then the pipe connecting this tank to the public stormwater sewer would be considered a 'drain in common'.

For the sake of our planning considerations, we have undertaken some preliminary calculations for possible stormwater retention. In a 1 in a 100 year rainfall event with a 20 minute storm duration we would anticipate that the site in its present state (approximately half hard-stand and half green areas) will generate a surface water discharge rate of 13.2

litres per second. If the site was to be developed as proposed (resulting in approximately 73m² of additional hard-stand) the resulting flows will be around 14.1 litres per second. It is the difference of 0.9 litres per second between these values that the Applicant might be required to retain, and this rate of flow equates to a total volume of approx. 1,080 litres when held back over the design 20 minute duration. This volume is a fairly modest capacity to retain and a suitable device, such as an underground chamber or an above ground tank, could easily be installed to achieve this.

We have considered the stormwater discharge from the site against the anticipated outcome from the anticipated 'permitted baseline' activity. As it happens, the expected flows from the 'permitted baseline' activity are very similar to the level of water that is discharged under the existing situation. On this basis, the proposed retention of the 1.6 litres per second difference between the development flows and the existing flows is confirmed as being appropriate.

The proposed units are located at a minimum distance of 3.5m from the centerline of the existing stormwater sewer that runs diagonal through the site. This separation distance is considered suitable to enable future maintenance works to occur on the public stormwater infrastructure without compromising the integrity of the new units.

Foul Sewage Drainage

The drainage of foul sewerage from the proposed residential sites will be achieved by disposal into the existing public foul sewer running alongside the property in South Road.

However, similar to the stormwater infrastructure, we understand that the existing public network is presently operating at, if not beyond, its available capacity. For this reason, the Applicant proposes to install an underground holding tank within the site to retain waste flows in the event that the public sewer system is operating full. A non-return valve will be installed on the connection pipe running between the holding tank and the public sewer, and this will prevent waste flowing from sewer into the property. During peak sewer flows, generally in the mornings and evenings, if the sewer is running at capacity this will automatically close the valve and waste from within the development site will begin to fill the holding tank. As soon as the peak flows reduce, the pressure across the valve will reverse and the vale will open, allowing the retained waste to move into the public sewer system.

The necessary size of the holding tank will be determined as part of the building consent process, however preliminary estimates place this at anywhere between 1,000 litres and 3,000 litres, depending on the parameter used to calculate the anticipated drainage rate from the site. This volume represented the amount of waste water that would be collected over a four hour period, which is considered an appropriate holding period as it will be exceedingly rare for the existing public foul sewer to operate at a full capacity for a duration in excess of four hours.

Please note that if the pipe connecting the sewerage holding tank to the public foul sewer would be considered a 'drain in common'.

Electricity and Telecommunications Supply

The supply of electricity and telecommunications to the new residential sites can be readily achieved from the existing network infrastructure that exists within the South Road corridor.

HAIL Matters

The Applicant has reviewed the Ministry for the Environment's Hazardous Activities and Industries List (HAIL) and has confirmed that none of the activities or industries shown on that listing have occurred within the application site, to the best of his knowledge during the time in which he has owned the site.

Further to this, requests have been lodged with Dunedin City Council and Otago Regional Council for property record searches to identify any evidence of a historical activity or industry that might be of concern. Some of this information has been received, and some is yet to be provided, however the information available as at the date of this application has been compiled into the attached HAIL assessment report.

The HAIL assessment report is unable to conclude that it is more probable than not that this is not a HAIL site. This judgement is formed on the basis of recorded evidence of the previous existence of Polite sheeting within the application site (historically dumped and removed), as well as records of abandoned vehicles being deposited on the property. While the abandoned vehicles is perhaps unlikely to cause contamination (there is no evidence of vehicle dismantling), the Polite product that has been historically dumped on the site, and later removed, may have contained elements of Asbestos, which would potentially be of greater concern.

The Applicant proposes to have the site tested for Asbestos prior to any ground disturbance activities taking place. This testing, and a resulting report, will be undertaken by a suitable qualified person and the report will be presented to Council's planning manager for approval prior to ground works proceeding. Any necessary ground remedial works, to remove potentially harmful contaminants, will be undertaken prior to construction of the proposed units.

It is anticipated that the testing, reporting and remedial work (if necessary) as described above will appear as a condition on the resource consent.

The Applicant understands also that he is under an obligation to monitor the site for possible causes of HAIL contamination during any earthworks and/or foundation construction. Due to the historical evidence of fill placement within the application property there is a degree of uncertainty as to what waste material might be encountered during future excavations. Should any material of concern be uncovered during site construction works, the Applicant will need to make an assessment of this material for possible contamination issues, and he will need to then respond appropriately.

Easements

New access easements will be created as part of the proposed subdivision over the right-of-way areas shown as easements 'A', 'B' and 'C' on the attached subdivision scheme plan. Easement 'A' will be a full right-of-way, allowing vehicle and service access, while easements 'B' and 'C' will be restricted to pedestrian access only.

New service easements for conveying water, stormwater, foul sewage, electricity and telecommunications will be created as necessary to protect all new infrastructure that is installed. It is likely that these easements will primarily coincide with the new access easements noted above, although we can expect that there may be several secondary service easement alignments that will extend beyond these.

Development Contributions

The Applicant understands that development contributions may apply to the proposed activity. Any applicable contribution will be calculated by Council staff at the completion of the consenting process and will take into account any existing credits that might be enjoyed by the current undeveloped property.

Second Generation District Plan

The Second Generation District Plan (2GP) is due to be notified shortly. At the date of this application, the preliminary zoning of the land within the application site appears to be proposed to become part of the new Medium Density Zone (refer attached zoning comparison map image), and this would represent a fairly significant change for the subject property in terms of the permitted density provisions that would take effect.

It will be interesting to review the proposed District Plan when it is notified (we expect that this will occur within several days of this application being submitted to Council). If the subject site is indeed proposed to become part of the new Medium Density Zone, then that very proposal would lend some level of support this this application. The desired density provisions of the Medium Density Zone have been published by Council as being 1 residential unit per 200m^2 of site area, and under this measure of density the proposed activity would be considered to be compliant.

The Applicants understands that the 2GP provisions will not carry a great deal of formal weight as at the date of this application (really guidance information only). Even once the proposed Plan is notified, the contained provisions will not necessarily supersede their counterpart provisions that exist in the current District Plan (although it is likely that they will demand formal planning consideration). Until the proposed Plan has passed through the required submission and hearing phases, and is ultimately adopted, the Medium Density Zone provisions will not take effect in full.

Adjoining Owners

There are two adjoining owners to this development, in addition to Dunedin City Council as the owner of the adjacent road corridors.

These adjoining owners are-

1. KiwiRail, Main South Line
2. Shao and Ban Tran, 378 South Road

Consultation has been undertaken with both adjoining owners.

Information provided by KiwiRail, in respect of the proposed activity, outlines the usual matters that KiwiRail has an interest in. These matters fall into three categories; noise issues, vibration issues and reverse sensitivity issues. Essentially, KiwiRail wish to ensure that any new units built within 100m of the railway operation are designed in such a way to reduce to an acceptable level the effects of the railway operation on residents of those units. The reverse sensitivity component seeks to safeguard KiwiRail's present and future operation from objections made by adjoining residents.

The Applicant has considered the information provided by KiwiRail and has integrated a number of features into the design of the proposed units to reduce to an acceptable level the effects of the railway operation on residents of those units. These design features include-

1. All of the units will have double-glazed windows in bedroom and living areas. This will not only reduce the effects of noise and vibration, but will provide a good level of heat insulation within the units.
2. The three units on the north side of the application site, Units 3, 4 and 5, will each include a 1.2m sound-shield barrier fence around their deck areas. This is illustrated on Sheet 5 of the attached architectural plans. The design elevations and boundary offset distances of these three units, combined with the proposed sound-shield fence, is expected to effectively reduce a significant portion of the noise generated by the railway operation. The architectural plan demonstrates how the noise produced at the wheels of a train (in blue arrows) and at the roof level of a train (green arrows) will be impeded by the proposed sound-shield fence, thereby assisting all but the very upper portions of the unit's structures.
3. The architectural plan also indicates some new native planting along the southern edge of the KiwiRail corridor. The Applicant proposes to plant this vegetation as a means of further supporting sound insulation for the new units, although it is recognised that this planting will only be able to occur with approval from KiwiRail (as owner of the land in which the planting is proposed). The Applicant will seek this approval, and undertake this planting if permitted, prior to the construction of the units being completed.

In respect of the Applicant's consultation with Shao and Ban Tran, who own the property at 378 South Road, we note that this has progressed on good terms. The Tran's understand the general nature of the proposed activity, and have not raised any fundamental objection to the concept, however due to some language difficulties the Tran's are presently seeking

some external assistance to fully understand some of the detail contained in the proposal. The Applicant anticipates that these owners will confirm that they are satisfied with the proposed activity over the coming weeks, although it is noted that the Tran's may wish to seek the provision of a formal pedestrian access right over the development's entranceway area to enable ongoing access to the rear of their fish and chip shop (currently this is achieved on an informal basis). The Applicant would be prepared to agree to this request, if it eventuates.

Overall, the consultation undertaken with adjoining owners has been useful in identifying the relevant concerns to those owners. The proposed activity has been modified to address these concerns and as a result the Applicant is confident that the adjoining owners will not be adversely effected by implementation of the proposed development beyond and acceptable level.

In regards to the permitted baseline analysis, we note that two full-sized residential houses could be established on this site without the need for resource consent. It is entirely feasible that the establishment of two full-sized houses could create effects for the adjoining owners that are greater than what is anticipated by the proposed development (regardless of the measures proposed above to reduce these effects). For instance, the closest proposed unit to the KiwiRail land is at a distance of 4.7m from the boundary and the closest proposed unit to the Tran land is at a distance of 12.9m from the boundary. It is entirely feasible that the permitted baseline activity could establish new residential dwellings as close to 2.0m from both of these boundaries (which would comply with the District Plan) and if this was to occur the cross-boundary effects might be considerably greater than those that might be expected to arise from the proposed activity.

Earthworks

The detailed design processes for the proposed development have not progressed sufficiently far for the Applicant to determine whether an earthworks consent will be required or not.

If an earthworks consent is required for the new development, this will be sought at a later date, possibly in conjunction with the building consent application.

REASONS FOR APPLICATION

The subject site is zoned **Residential 1** in the Dunedin City District Plan. South Road and Barnes Drive are both classified as District Roads in the Plan's Roading Hierarchy.

The proposal fails to comply with the Dunedin City District Plan, as noted below-

Residential 1 Section

1. Rule 8.7.2(i)(a) and Rule 8.7.2(i)(b), which require new residential activities within the Residential 1 Zone to have minimum yards of 4.5m (front) and 2.0m (others).

We seek land use consent from Council to allow the establishment of new residential activities on the proposed allotments with front and side yards reduced to the distances shown on the attached Subdivision Scheme Plan.

2. Rule 8.7.2(ii), which requires new residential activities within the Residential 1 Zone to comply with a 63° height plane angle.
   We seek land use consent from Council to allow the establishment of new residential activities on the proposed allotments with internal height plane breaches as described in the document above, and with external height plane breaches in respect of Lots 2 and 5 as illustrated on sheet 4 of the attached Architectural Plan.

3. Rule 8.7.2(vi), which requires new residential activities within the Residential 1 Zone to achieve a 4.0m separation between units.
   We seek land use consent from Council to allow the establishment of new residential activities on the proposed allotments with the internal separation distance between the units on Lot 1 and Lot 2 reduced to the distances shown on the attached Subdivision Scheme Plan.

4. Rule 8.7.2(xii)(a), which requires new residential activities within the Residential 1 Zone to have a minimum area of 500m^2 per site.
   We seek land use consent from Council to allow the establishment of the new residential activities on allotments with various undersized site sizes, for the following reasons-
   i. The proposed land use is the optimal method of utilising the City's land resource at this location. The site, at present, is a largely unused and the portion that is used (as an informal car park) offers limited value to the local environment, to the City as a whole, or to present the land owner.
   ii. The proposed development is at a density that is consistent and compatible with the surrounding environment. The surrounding environment already displays a pattern of undersized residential activities, including properties on the south side of South Road, opposite the application site, that comprise an average area in the order of 350m^2. The smallest of the existing sites opposite the application property are located at 377 and 377A South Road, these sites have combined area of 305m^2, resulting in an average site area of 153m^2 per site. The proposed average site density of 262m^2 per site is considerably larger than the smallest sites opposite the development land. It is our view that the proposed units will not appear out of place in consideration of the pattern of residential activity that already exists in the local environment.
   iii. The present zoning of the application site is somewhat of an anomaly. Had the Local Activity 1 Zone that exists to the east of the application land been extended through to Barnes Drive when the District Plan was put together, the proposed development would now be considered largely compliant with the relevant Plan provisions. Instead, the site has been placed within the Residential 1 Zone, despite being surrounded by road, railway and the adjoining Local Activity 1 Zone.

iv. The proposed 2nd Generation District Plan has, in a preliminary form, indicated that the application site should be rezoned to the new Medium Density Zone. This proposed zoning is intended to allow for development to a density of 200m² per site – the proposed activity is consistent with this. Furthermore, the properties on the southern side of South Road are also intended to change from the present Residential 1 Zone to either the Medium Density Zone or to the Other Activity Centres Zone (similar to the current Local Activity 1 Zone), and this will recognise, and provide for, the existing undersized sites within the local environment.

v. The effects of the proposed activity have been assessed as being no more than minor. All infrastructural-type effects can be suitable managed by way of the measures proposed in the above information. The modest sizes of the new units, combined with an attractive appearance and buffer landscaping, serve to mitigate any effects to the amenity and character of the application property, relative to the surrounding neighbourhood.

vi. The Applicant's proposal to provide good-quality, affordable housing is something that the City is in need of. The Applicant believes that the City should encourage greater levels of development, or re-development, similar to the proposed activity, and that this would provide a much improved housing stock throughout the district.

In accordance with Rule 8.7.6(iii) the proposed land use is assessed as being a non-complying activity.

Subdivision Section

5. Rule 18.5.1(iii)(a), which require subdivision of new residential activities within the Residential Zones to comply with the minimum area and frontage provisions of the relevant zone.
   We seek consent from Council to allow subdivision of the proposed residential allotments with the various undersized site areas detailed on the attached Subdivision Scheme Plan. This breach to the District Plan provisions is of the same nature as described under non-compliance 4 above, and the same reasons for issuing consent apply. The proposed subdivision will simply serve the purpose of providing a vehicle for the proposed residential properties to be held in separate ownerships, the effects of which are no greater than the establishment of the undersized residential activities themselves.

In accordance with Rule 18.5.2 the proposed subdivision is assessed as being a non-complying activity.

Overall, the proposed development is assessed as being a **non-complying activity.**

AFFECTED PERSONS

The site does not comply with the minimum area provisions of the Dunedin City District Plan. For this reason as assessment of whether there are any specifically affected persons needs to be made.

First considering is given to the immediately adjoining owners. Consultation has been undertaken with these owners and the proposal has been modified to reduce the level of any anticipated effects on these owners. For this reason, and in consideration of the evaluation made of the anticipated effects of the proposed activity against the possible effects from a permitted baseline activity (which indicates that a permitted baseline development might easily create a higher level of effect), the Applicant is confident that the adjoining owners will not be adversely affected by the proposed activity beyond an acceptable level. On this basis, the owners of the adjoining properties, being KiwiRail and the Tran's, are not considered to be affected persons.

Second consideration is given to the wider community. While no specific consultation has occurred with members of the wider community, it is considered highly unlikely that anyone living in the surrounding neighbourhood will be adversely affected beyond an acceptable level. The proposal has addressed transportation and servicing issues, and mitigation measures have incorporated where necessary to ensure that effects related to infrastructure do not occur, and the wide corridors of South Road and Barnes Drive serve to effectively minimise any likely adverse effect on the amenity of local residents. Furthermore, it is expected that there will be a positive effect on the businesses located with the Local Activity 1 Zone to the east of the application site, as the increase in local residents resulting from the proposed units will almost certainly provide for greater use of the local business services.

The final consideration, in regard to affected persons, is the City in general. It is not expected that implementation of the proposed activity will have any adverse effect on the City or in fact to the integrity of the District Plan. All physical and localised effects have been assessed and measures have been introduced to mitigate these where necessary. The matter of the density breach proposed has been considered in detail, and the Applicant has concluded that he effects of the proposed units will be no greater than the effects that could potentially arise from the implementation of a credible permitted baseline activity. The proposed activity includes a number of exceptional circumstances (while not necessarily unique, it would be difficult to find a similar site, with similar characteristics, elsewhere in the City), and with this in mind it is unlikely that this application, if consent is granted, could introduce any District Plan integrity or precedent issues.

Overall, the Applicant submits to Council that there are no affected persons in respect of the proposed activity.

EFFECTS ON THE ENVIRONMENT

The following assessment of effects on the environment has been carried out in accordance with Schedule 4 of the Resource Management Act 1991. It includes those assessment matters listed in Sections 8.13 and 20.6 of the District Plan considered relevant to the proposed activity.

Schedule 4 RMA

In accordance with section 6(1)(a) of Schedule 4, we do not consider that it is likely that the proposed activity will result in any significant adverse effect on the environment.

In accordance with section 6(1)(b) of Schedule 4, an assessment of the actual or potential effects on the environment of the proposed activity is contained herein.

In accordance with section 6(1)(c) of Schedule 4, we are not aware of any previous activity on the site that has included the use of hazardous substances and installations. This will be further assessed when the remaining property records are received from Dunedin City Council.

In accordance with section 6(1)(d) of Schedule 4, the Applicant does not propose the discharge of any contaminant.

In accordance with section 6(1)(e) of Schedule 4, relevant mitigation measures (including safeguards and contingency plans where relevant) to be undertaken to help prevent or reduce the actual or potential effects are described below under the various assessment headings.

In accordance with section 6(1)(f) of Schedule 4, prior consultation has been undertaken with the following parties/organisations-

- KiwiRail
- Shao and Ban Tran

The nature of these consultations is described in the application sections above.

In accordance with section 6(1)(g) of Schedule 4, we do not consider that the scale and significance of the proposed activity will require monitoring beyond the normal subdivision certification and approval processes.

In accordance with section 6(1)(h) of Schedule 4, we do not consider that it is likely that the proposed activity will have an adverse effect that is more than minor on the exercise of a protected customary right.

In accordance with section 6(2) of Schedule 4, the assessment of effects below has considered the applicable aspects of relevant policy statements and plans.

In accordance with section 7(1)(a) of Schedule 4, the assessment of effects below has considered the effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects.

In accordance with section 7(1)(b) of Schedule 4, the assessment of effects below has considered the effect on the locality, including any landscape and visual effects.

In accordance with section 7(1)(c) of Schedule 4, the Applicant has considered the effect of the proposed activity on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity, and considers that this effect will be no more than minor.

In accordance with section 7(1)(d) of Schedule 4, the Applicant does not consider that it is likely that the proposed activity will result in an adverse effect that is more than minor on natural and physical resources (having aesthetic, recreational, scientific, historical, spiritual, or cultural value, or other special value) for present or future generations.

In accordance with section 7(1)(e) of Schedule 4, we do not consider that it is likely that the proposed activity will have an adverse effect in respect of release of contaminants into the environment.

In accordance with section 7(1)(f) of Schedule 4, we do not consider that it is likely that the proposed activity will have an adverse effect in respect of natural hazards or the use of hazardous substances or hazardous installations.

Section 8.13 (Residential)

Sustainability (8.13.1)

The proposed activity is not considered to be inconsistent with the provision in the Sustainability section of the Dunedin City District Plan.

The Applicant submits that the land in question will be put to a better usage by comprising five small residential units than other forms of activity, including the existing informal car parking activity and the 'permitted baseline' activity. This will better provide for the residential capacity of the land, in a location that is considered sustainable, which will to a modest degree alleviate the City's current need for good quality, affordable residential units.

The proposed activity is unlikely to result in the need for capital investment by the City into new public infrastructure.

The anticipated environmental effects described under Rule 4.5 of the District Plan are supported by the proposed activity.

Bulk and Location (8.13.3)

The effects of bulk and location issues are anticipated to be generally no more than minor. The application seeks consent to undertake a number of new residential activities on the subject, and in doing so will breach the Residential 1 Zone bulk and location provisions at several locations. These breaches relate to the yard requirements and height plane angles in respect of all of the proposed allotments/units, and the unit separation distances in respect to Lots 1 and 2.

Of the proposed breaches, the majority of these relate to the internal boundary layout and unit configuration, for example the boundary in common between Lots 1 and 2, and the relative siting of the units on these allotments, creates the situation whereby the development design does not comply with the 2.0m minimum yard distance, the 63° height plane angle, and the 4.0m minimum separation between units. These internal boundary breaches are considered technical in nature and their effects are limited solely to the Applicant. These breaches are not believed to present a challenge to the integrity of the District Plan, and for these reasons the internal boundary breaches are anticipated to be no more than minor.

There are several proposed bulk and location breaches that relate to external boundaries, and these need closer consideration. Lots 1, 2 and 3 each breach the minimum 4.5m front yard distance, and of these Lot 2 also breaches the 63° height plane angle from the road boundary. In respect of the other external boundaries, there is a further breach proposed by Lot 5, and relating to the eastern boundary of the site where KiwiRail is the neighbour, whereby the height plane angle is encroached by a relatively small margin.

In respect of the breaches relating to the South Road boundary, these are anticipated to be no more than minor. South Road is a wide, open road corridor and there are examples of existing buildings being located within the front yards along this frontage and on other nearby roads. The extent of the breach is not severe; Lot 1 enters the front yard by a distance of 0.6m for the full length of its southern wall, while Lots 2 and 3 extend further into the front yard (2.4m and 1.7m respectively), but because these units are on an angle relative to the road boundary the maximum extent of these breaches occur at the south-west corners of the units, and are smaller at other locations. Of the total 54.3m length of road frontage, a distance of 21.1m, or 39%, is affected by a proposed front yard breach. The Applicant considers that these breaches are acceptable.

In respect of the proposed breach relating to Unit 5 and the eastern boundary of the site, shared with KiwiRail, this is also anticipated to be no more than minor. The extent of the breach is illustrated on Sheet 4 of the architectural plans, and this appears to be relatively discrete. There are no buildings or active land use activities occurring within the adjoining KiwiRail land (this land is instead covered in tree and plant vegetation) and given the unusual 'wedge' shape of the adjoining land parcel and it's apparent isolation from the rail tracks, it is reasonable to expect that it is unlikely that his land could be effectively used by KiwiRail for anything but open yard storage, and even that may not be practically feasible. For these reasons, the Applicant considers the proposed modest breach of the height plane angle to be acceptable.

The overall site coverage of the proposed development is compliant with the bulk and location provisions of the District Plan (despite the proposed density breach).

Overall, in consideration of bulk and location matters, the Applicant considers that all adverse effects in this regard are both no more than minor and acceptable.

Amenity Values and Character (8.13.5)

Assessment of amenity values and character includes consideration of the effect that the proposed activity is likely to have on the existing values of the site and surrounding environment, in respect of amenity and character.

In terms of the former, this is a relatively simple exercise as the present-day amenity and character values of the site are fairly minimal. The site, in its present form, is a vacant property. There are no particularly high amenity values attached to the land, at least in respect of landscaping, urban design or recreational elements. The existing land use, being an informal car park for local residents and business staff, will no doubt have some local amenity value attached to it, however this facility is entirely informal and unauthorised, and without commercial intent or contract. This amenity occurs entirely at the discretion of the Applicant, and there are no grounds for any expectation within the local community for this amenity to continue. The loss of this amenity therefore cannot be considered as an environmental effect resulting from the proposed activity. The Applicant considers that there will be no detrimental effect to the existing amenity values of the site as a result of the proposed activity being implemented.

In regard to the existing amenity and character values of the surrounding environment, the Applicant considers that these will more likely be improved than adversely impacted by the proposed activity. The surrounding environment is generally characterised by modest residential housing of mostly older stock as well as a block of commercial businesses along South Road. The integration into the community of the proposed new good-quality, affordable units, on a site that is presently vacant, will enhance the overall amenity values of the neighbourhood and will bring new residents into the community, which will support the local businesses.

We do not consider that the amenity and character values of the existing site and the surrounding environment will be adversely affected beyond a more-than-minor level as a result of this proposal.

Design and Appearance of Buildings (8.13.6)

The proposed units have been designed to be modern in appearance and operation, but at the same time to be compatible and sympathetic to the existing built environment. The new units will be modestly sized and limited to two-storeys in height, similar to many existing residential units within the immediate neighbourhood. The proposed landscaping elements will soften the overall development to further enhance successful integration.

We do not consider that the local environment will be adversely affected beyond a more-than-minor level as a result of the design and appearance of the proposed buildings.

Provision of Stormwater, Water and Sewerage (8.13.10)

The supply of water and the discharge of stormwater and sewerage can be satisfactorily achieved by way of the proposed reticulation methods, including mechanisms to retain development stormwater and sewerage flows on-site for a suitable period to time to avoid the possibility of exacerbating existing downstream catchment issues.

Therefore no adverse effects are anticipated in regard to the supply of water, or the discharge of stormwater or sewerage.

Cumulative Effect (8.13.13)

We do not consider that the site and surrounding environment will be adversely affected by cumulative effects beyond a more-than-minor level as a result of this proposal.

This is because the application site is confined to what appears to be the only undeveloped parcel of residential land within the local neighbourhood. It is possible that brownfield redevelopment might be proposed, and that this might present the potential for cumulative effects, however because the surrounding properties are in many cases already more densely developed than the District Plan would allow, there is a smaller opportunity for environment effects to increase than might otherwise exist.

Furthermore, as the proposed activity has presented solutions to avoid particular adverse effects, such as a holding tank for sewerage during high flows in the public main, it might be expected that future developments would be able to include similar measures to avoid unacceptable environment impacts. If this was to occur, then potential cumulative effects could be reasonably eliminated.

We do not consider that implementation of the proposed activity will lead to the generation of cumulative effects beyond a minor level.

Hazards (8.13.17)

There are no known hazards associated with the application property, except for the potential Asbestos contamination discussed above under the 'HAIL matters' heading.

The Applicant proposes to have the site tested for Asbestos prior to any ground disturbance activities taking place. This testing, and a resulting report, will be undertaken by a suitable qualified person and the report will be presented to Council's planning manager for approval prior to ground works proceeding. Any necessary ground remedial works, to remove potentially harmful contaminants, will be undertaken prior to construction of the proposed units.

It is anticipated that the testing, reporting and remedial work (if necessary) as described above will appear as a condition on the resource consent. With this in place, we do not anticipate that implementation of the proposed activity will generate and adverse effects, in respect of hazards, beyond a minor level.

Section 20.6 (Transportation)

Parking and Loading (20.6.1)

Suitable parking and loading facilities will be provided as part of the proposed residential development. We do not expect there will be any adverse effects generated by the proposed activity in this regard.

On-Site Manoeuvring (20.6.5)

Suitable manoeuvring facilities will be provided as part of the proposed residential development. We do not expect there will be any adverse effects generated by the proposed activity in this regard.

Vehicle Crossings from Intersections (20.6.9)

The proposed access into the application site, to service all 5 of the proposed new units, will occur at the location indicated on the attached Subdivision Scheme Plan, sited directly opposite the intersection of Morrison Street with South Road. This access will coincide with the existing site access, which presently services the 17 informal car parks which reside within the property.

The proposed activity is expected to generate 30-40 traffic movements per day. This rate of activity has been determined by adopting an average figure of 6-8 traffic movements per day per unit. The rate of traffic movement for normal residential activities is 8 movements per day per unit, however because the proposed units are notably smaller than normal residential units we would expect these to accommodate fewer residents, and therefore we can expect there to be fewer traffic movements.

The permitted baseline activity could be expected to create 16 traffic movements per day (two normal residential activities times 8 movements per day).

The existing car parking activity provides space on-site that is sufficient to contain 17 parks. Accepting that these park are likely to be predominantly used by staff working normal hours at local businesses, or residents living nearby, it is probably reasonable to determine that perhaps 12 of the 17 parks will be subject to 2 traffic movements per day (i.e. 1 in and 1 out). The remaining 5 parks might however be subject to 4 traffic movements per day, which recognises that there is likely to be some level of shorter-term parking for shoppers, etc. Combining these figures, the total daily traffic movements generated by the existing situation might come to 44 for the whole site. This is slightly greater than the anticipated level of traffic movements that will be generated by the proposed activity.

Strictly, in comparison of the existing site activity to the proposed activity, we can claim that implementation of the new residential development will not increase the level of traffic movements across the existing access point. On this basis alone we might claim that there cannot be any increase in the adverse effect relating to the proximity of the vehicle crossing to the Morrison Street intersection.

In regard to the safe operating of the crossing (putting aside for a minute that there is not expected to be an increase in traffic as a result of the proposed activity), we can advise that recent traffic count data shows an average number of daily movements along South Road of around 9,750 and an average number of daily movements along Morrison Street of around 250. The relatively high level of traffic along South Road is to be expected of a District Road, but the lower level of traffic along Morrison Street is particularly low, even for a Local Road. It cannot be claimed that the existing vehicle crossing is ideal in nature. The fact that the sight distance in a westerly direction, for vehicles existing the site, is 40m in length, and the site entranceway is complicated by the close proximity of the Morrison Street intersection and the existing pedestrian crossing, means that this access point will always need to be navigated with awareness and care. However, this is clearly the best location on the site for an access (which is probably why the existing access was established at this location), given that any relocation of the access to the west along South Road would result in shorter sight distances and create potential conflicts with the busier intersection at Caversham Place. To aid in driver awareness and care, the Applicant has proposed to paint white 'give-way' style markings on the new driveway as a means of encouraging vehicles exiting the development property to pause and consider whether there are any hazards to a safe entry onto South Road.

On balance of all matters considered, and in particular our evaluation that the proposed site traffic will not be any greater than the existing site traffic and the Applicant's desire to improve the existing situation by way of a more controlled crossing, we do not expect there will be any adverse effects, beyond a minor and acceptable level, generated by the proposed activity in regard to the proximity of the vehicle crossing to the existing intersection.

DISTRICT PLAN OBJECTIVES AND POLICIES

In accordance with section 104(1)(b) of the Resource Management Act 1991, the objectives and policies of the District Plan have been taken into account when assessing the application. The objectives contained in Sections 8.2, 14.2, 18.2, 20.2 and 21.2 (and their associated policies) have been evaluated and we comment below on those objectives and/or policies with which the proposed activity has particular relevance.

Objective 8.2.1 (and Policy's 8.3.1 and 8.3.2)
"Ensure that the adverse effects of activities on amenity values and the character of residential areas are avoided, remedied or mitigated."
The quality of the design of the proposed units, along with their modest sizes and the associated on-site landscaping, provides confidence that the amenity values and character of the neighbourhood will not be adversely affected. The proposed site density is more

closely akin to the existing pattern of residential activities in the immediate locality than a typical permitted baseline development would provide.

Policy 8.3.4
"Ensure that the density of new development does not exceed the design capacity of the urban service infrastructure."
The design capacity of the local infrastructure has been assessed as part of this application and measures have been introduced into the proposed activity, where necessary, to ensure that the various capacities will not be exceeded.

Objective 18.2.1
"To ensure that subdivision activity takes place in a coordinated and sustainable manner throughout the City."
The proposed residential development is sustainable in the sense that it proposes to utilise a parcel of existing vacant land in a manner that is consistent with the local environment and focused on meeting the City's present need for good-quality, affordance houses.

Objective 18.2.6
"Ensure that the adverse effects of subdivision activities and subsequent land use activities on the City's natural physical and heritage resources are avoided, remedied or mitigated."
All potential adverse effects from the proposed activity have been mitigated by way of the various measures proposed. This will enable the intended residential development to achieve an attractive and sustainable outcome that is sympathetic to the local environment.

Objective 18.2.7 (and Policy 18.3.6)
"Ensure that subdividers provide the necessary infrastructure to and within subdivisions to avoid, remedy or mitigate all adverse effects of the land use at no cost to the community while ensuring that the future potential of the infrastructure is sustained."
The Applicant has proposed a number of new elements of infrastructure as part of the development servicing for the purpose of ensuring that no undue stress is placed on existing public infrastructure. All of the new infrastructure will be installed at the Applicant's cost. The future potential of the existing public infrastructure will not be reduced as a result of the proposed activity being implemented.

SECTION 104D

Section 104D of the Resource Management Act specifies that resource consent for a non-complying activity must not be granted unless the proposal can meet at least one of two limbs. The limbs of section 104D require that the adverse effects on the environment will be no more than minor, or that the proposal will not be contrary to the objectives and policies of the District Plan. It is our opinion that the proposal meets both of these two limbs, keeping in mind that where objectives and policies conflict with each other the proposed activity cannot remain consistent with all. In these instances, we submit that the degree to which this proposal is inconsistent with the objectives and policies is acceptable.

We ask that Council exercises its discretion under Section 104D to grant consent.

PRECEDENT AND TRUE EXCEPTION

Section 104(1)(c) requires the Council to have regard to any other matters considered relevant and reasonably necessary to determine the application. The matter of precedent has been previously addressed by the Environment Court and case law now directs the Council to consider whether approval of a non-complying activity will create an undesirable example. Where the Plan's integrity is at risk by virtue of such a precedent the Council is required to apply the 'true exception test'. This is particularly relevant where the proposed activity is contrary to the objectives and policies of the District Plan.

In this case, the application is non-complying principally because the proposed new residential activities do not meet the site density provisions of the Dunedin City District Plan (Residential 1 Zone).

Due to the underutilised nature of the existing subject property and the sympathetic design of the proposed residential development (described under Reasons for Application above), we do not believe that approval of this application will undermine the integrity of the District Plan.

The Applicant submits the following matters to demonstrate exceptional circumstances-

- The property presently lies within the Residential 1 Zone, however the only adjoining private land lies within the Local Activity 1 Zone. This appears to be a bit of an anomaly and it is arguable that the subject land may have been more appropriately included in the local Activity 1 Zone at the time that the current District Plan was put together. Had this occurred, the proposed development would be largely compliant.
- The immediately surrounding residential land use pattern is far from consistent with the provisions of the Residential 1 Zone, in which this land exists. The majority of the properties on the southern side of South Road, opposite the application site, are undersized, and several of these are smaller than the proposed development site areas. It is entirely possible that development of the application site in strict accordance with the Residential 1 Zone provisions (i.e. the 'permitted baseline' development) would be less consistent and less compatible with the existing environment that the proposed development is anticipated to be.
- The application land is considered by Council to be suitable for re-zoning into the proposed Medium Density Zone (as part of the 2nd Generation District Plan process), as are some of the surrounding residential areas. This confirms an intent for this land to support a greater density of development. The proposed development is, from what we know presently, reasonably consistent with the preliminary provisions for the Medium Density Zone.
- The Applicant is proposing to specifically target the City's need for good-quality, affordable housing. This is something that is clearly needed within the City and it does not appear that there are many developers actively attempting to meet the demand in this regard. This application is an opportunity for Council to endorse this form of development, which will serve to demonstrate that there are means and

methods available to provide the standard of housing that should be accessible to all residents of the City.

PART 2 MATTERS

It is also considered that the proposal meets Part 2 matters of the Resource Management Act 1991. For the reasons outlined above, the proposal is not considered inconsistent with sections 5(2)(c) – *"Avoiding, remedying, or mitigating any adverse effects of activities on the environment"*, section 7(c) – *"The maintenance and enhancement of amenity values"*, and section 7(f) – *"The maintenance and enhancement of the quality of the environment"*.

CONCLUSION

In summary, the applicant is seeking the following-

1. A land use consent is sought for the establishment of 5 new residential activities within the land held in certificate of title OT15B/689. Each of the proposed new residential sites are undersized in respect of the current Residential 1 Zone density provisions.
2. A land use consent for the proposed breach of the minimum yards, height plane angles and separation distances as required by the Residential 1 Zone provisions.
3. A subdivision consent for the proposed subdivision of the new residential sites.

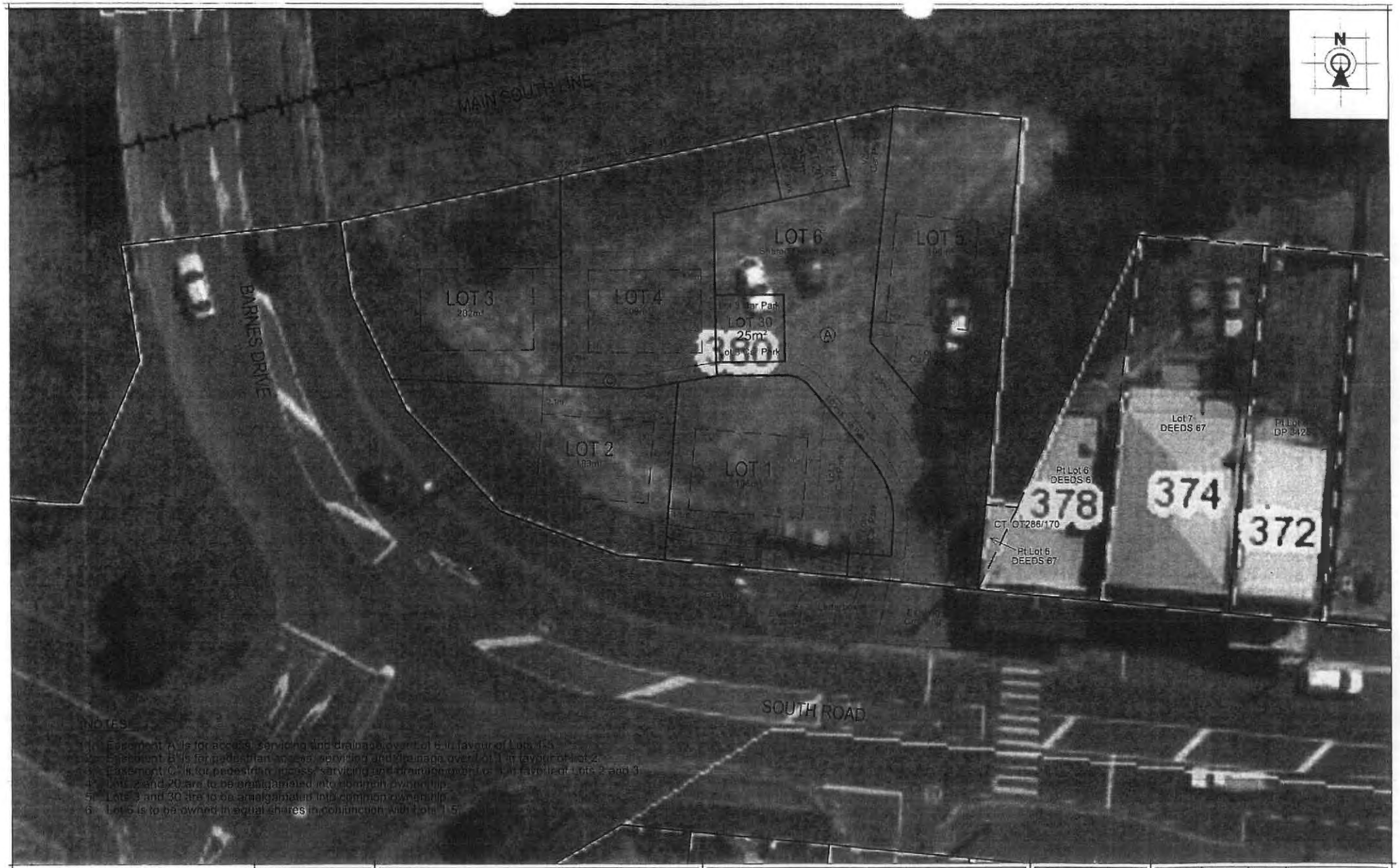
We believe that this application has demonstrated that all potential environmental effects are not beyond a more-than-minor level. Furthermore, we believe that this application has demonstrated that the proposed activity is not contrary to the objectives and policies of the District Plan and that it does not introduce any Plan integrity issues.

We request that Dunedin City Council give consideration to the proposed activity and that resource consent for the subdivision and land use elements of this application is issued under delegated authority, without the need for a public notification process. Please find the attached cheque ($1,700.00) being payment of the required deposit fee to process a non-notified application.

Please feel free to contact me should you require further information, otherwise I look forward to hearing from you in due course.

Yours Faithfully
PATERSON PITTS PARTNERS LIMITED

Kurt Bowen
Registered Professional Surveyor



NOTES:

1. Easement A is for access, servicing and drainage over Lot 6 in favour of Lots 1-5
2. Easement B is for pedestrian access, servicing and drainage over Lot 1 in favour of Lot 2
3. Easement C is for pedestrian access, servicing and drainage over Lot 1 in favour of Lots 2 and 3
4. Lots 2 and 20 are to be amalgamated into common ownership
5. Lots 3 and 30 are to be amalgamated into common ownership
6. Lot 6 is to be owned in equal shares in conjunction with Lots 1-5

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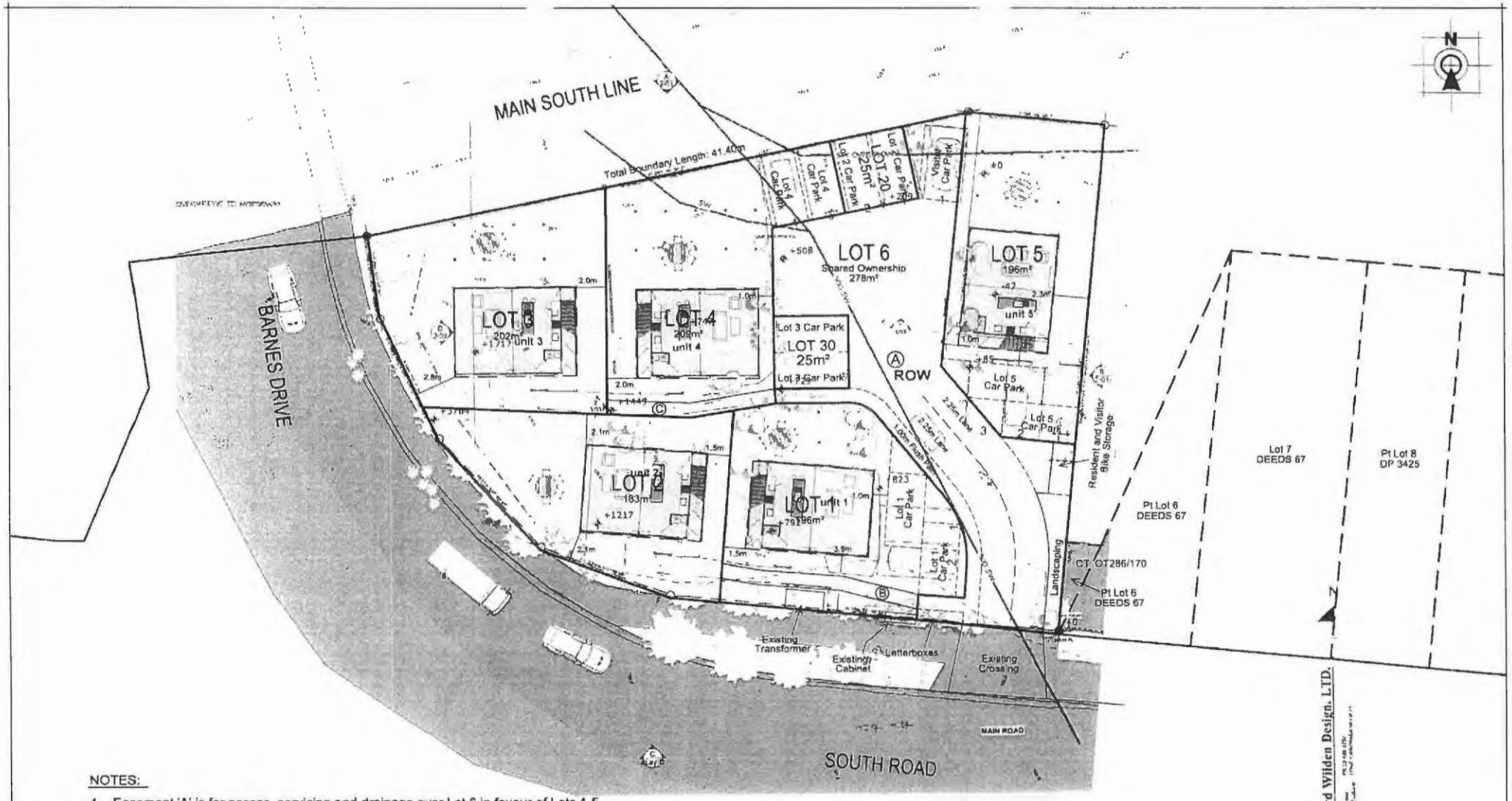
Client/Location:
Lambert
380 South Road
Sec 2 SO 23278

Purpose/Drawing Title:
Caversham Apartments
Subdivision Scheme Plan

Surveyed by:	-	Original Size: A3	Scale: 1:250
Designed by:	KAB		
Drawn by:	KAB		DO NOT SCALE
Checked by:	KAB		
Approved by:	KAB		
Job Ref: D14981		Sheet No: 1 of 2	Revision No: A
			Date Created: 23/09/2015

PLOT DATE: 23 September 2015 - 4:52 PM BY: Karl Bowen



NOTES:

1. Easement 'A' is for access, servicing and drainage over Lot 6 in favour of Lots 1-5.
2. Easement 'B' is for pedestrian access, servicing and drainage over Lot 1 in favour of Lot 2.
3. Easement 'C' is for pedestrian access, servicing and drainage over Lot 4 in favour of Lots 2 and 3.
4. Lots 2 and 20 are to be amalgamated into common ownership.
5. Lots 3 and 30 are to be amalgamated into common ownership.
6. Lot 6 is to be owned in equal shares in conjunction with Lots 1-5.

Caversham Apartments

Resource consent Rev B

SITE PLAN

Richard Wilden Design LTD.

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Client/Location: Lambert 380 South Road Sec 2 SO 23278	Purpose/Drawing Title: Caversham Apartments Subdivision Scheme Plan

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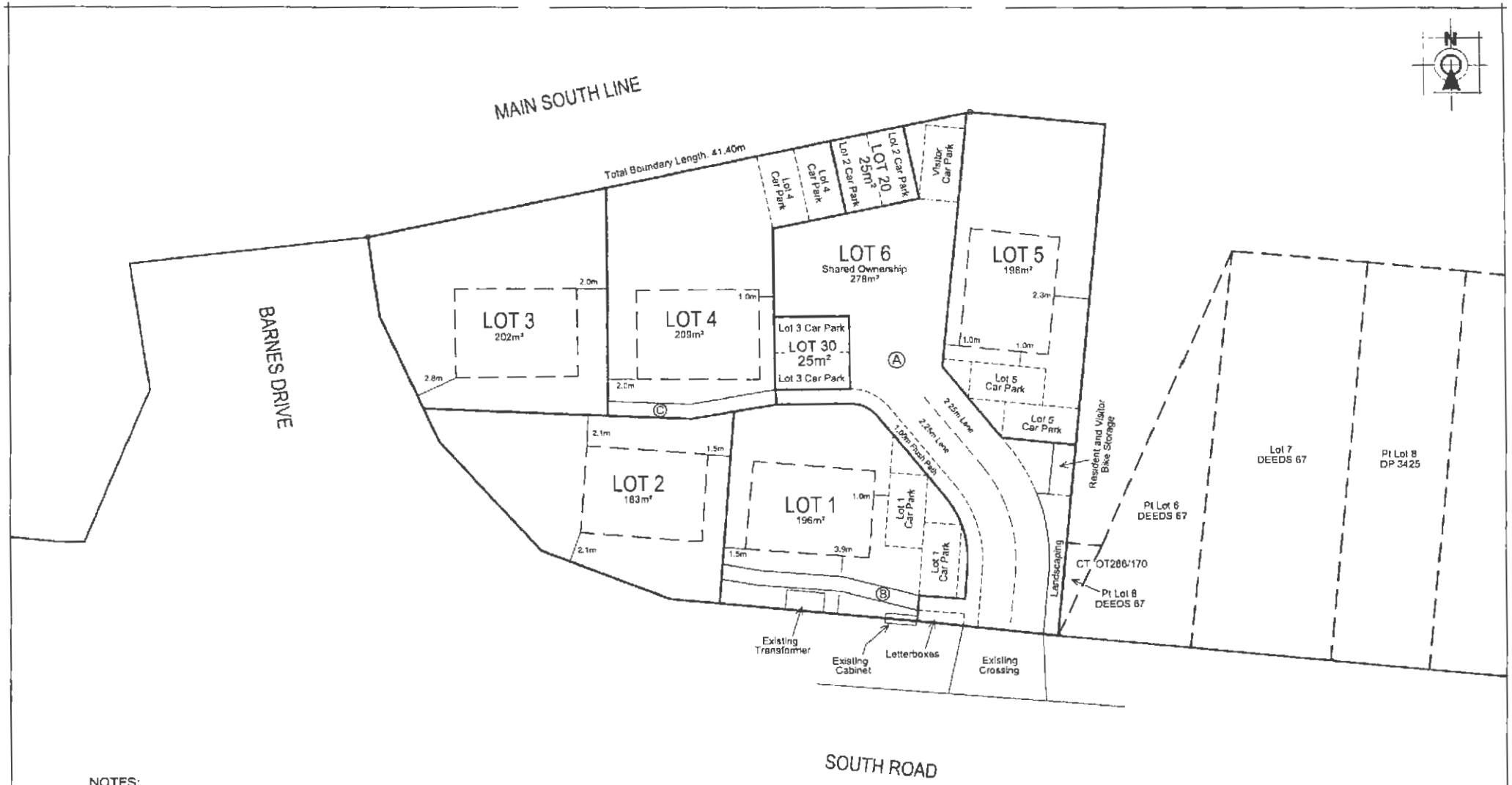
Drawn by	KAB		
Checked by	KAB		
Approved by	KAB		DO NOT SCALE
Job Ref: D14981	Sheet No: 1 of 2	Revision No: A	Date Created: 23/09/2015

PLOT DATE 23 September, 2015 - 4:52 PM BY Kurt Rowan



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Client/Location: Lambert
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Sec 2 SO 23278

Purpose/Drawing Title: Caversham Apartments
Subdivision Scheme Plan

Surveyed by		Original Size	Scale
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Checked by	KAB		
Approved by	KAB		
Job Ref	Sheet No	Revision No	Date Created
D14961	1 of 2	A	23/09/2015

PLOT DATE: 23 September, 2015, 4:31 PM By: Kori Steven

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Client/Location:
Lambert
380 South Road
Sec 2 SO 23278

Purpose/Drawing Title:
Caversham Apartments
Subdivision Scheme Plan

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Approved by:	KAB		
Job Ref: D14981		Sheet No: 2 of 2	Revision No: A
			Date Created: 23/09/2015

PLOT DATE: 23 September 2015 - 9:29 PM BY: Kurt Bowen

COMPUTER FREEHOLD REGISTER UNDER LAND TRANSFER ACT 1952

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**OT15B/689**
Land Registration District	**Otago**
Date Issued	28 October 1993

Prior References
GN 841432/1

Estate	Fee Simple
Area	1314 square metres more or less
Legal Description	Section 2 Survey Office Plan 23278

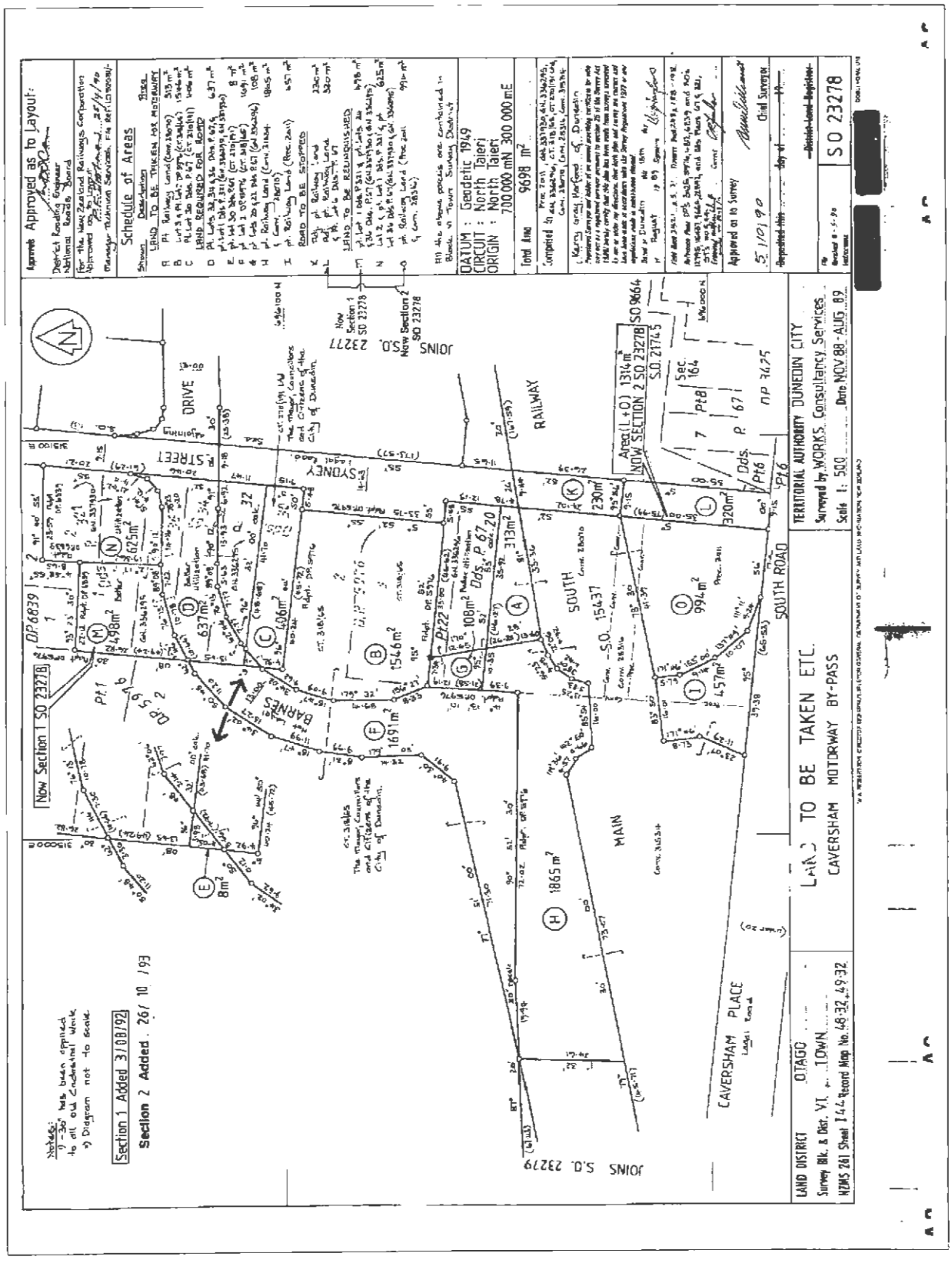
Proprietors
Mark Stephen Lambert and Vicki Joanne Lambert

Interests

Subject to Section 11 Crown Minerals Act 1991

Subject to Part IV A Conservation Act 1987

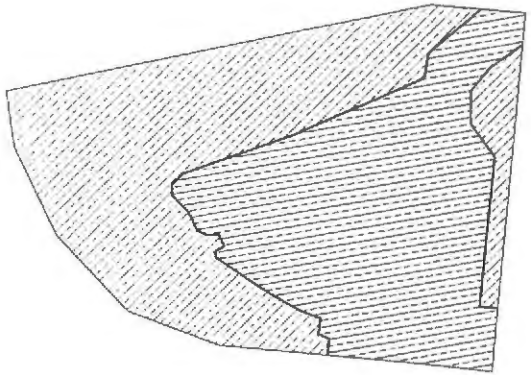
Identifier **OT15B/689**



STORMWATER FLOW CALCULATIONS

(1:100 year event, 20 minute duration)

Existing Catchment Areas

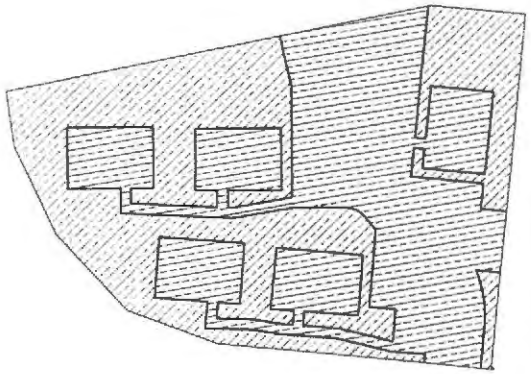


Hardstand 618m²

Softstand 696m²

Total SW Flow: 13.2 l/s

Proposed Catchment Areas



Hardstand 691m²

Softstand 623m²

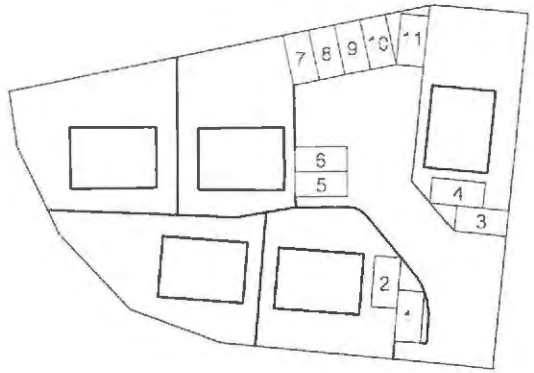
Total SW Flow: 14.1 l/s

CAR PARKING ASSESSMENT

Existing Car Parks

Existing Car Parks: 17 (max.)

Proposed Car Parks



Proposed Car Parks: 11

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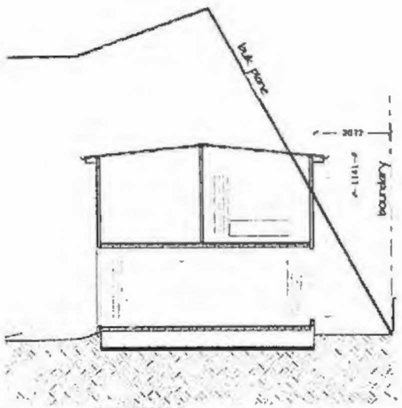
Client/Location
Lambert
380 South Road
Sec 2 SO 23278

Purpose/Drawing Title
Caversham Apartments
Car Parking and Hard Surfaces
Assessment Plan

Surveyed by:	-	Original Size: A3	Scale: 1:500
Designed by:	KAB		
Drawn by:	KAB		DO NOT SCALE
Checked by:	KAB		
Approved by:	KAB		
Job Ref: D14981		Sheet No: 1 of 1	Revision No: A
			Date Created: 23/09/2015

PLOT DATE 23 September, 2015 - 10:08 PM BY Kurt Bowen



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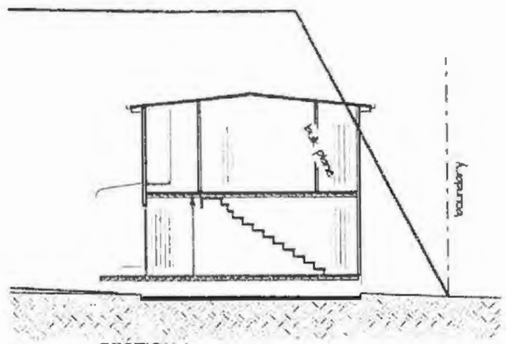

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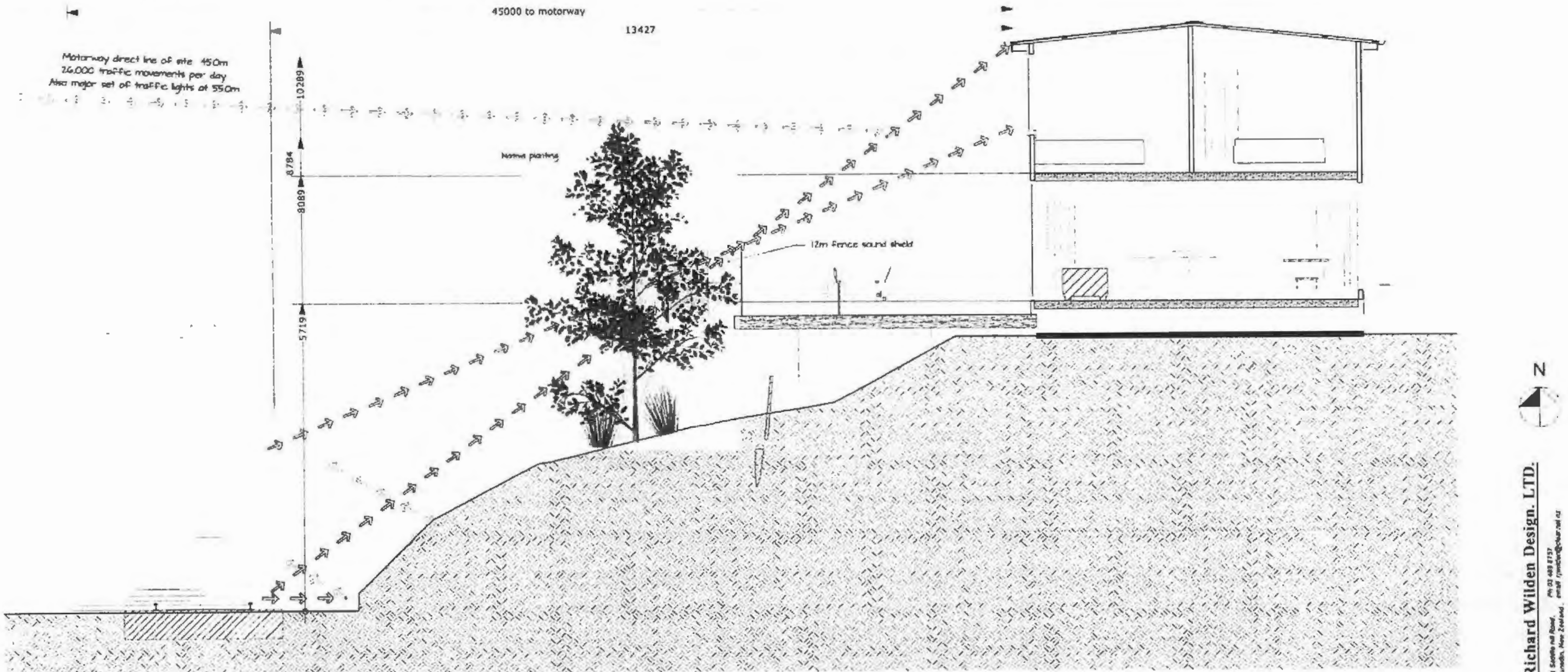

SECTION 3
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Caversham Apartments

Resource consent Rev B

SITE SECTIONS

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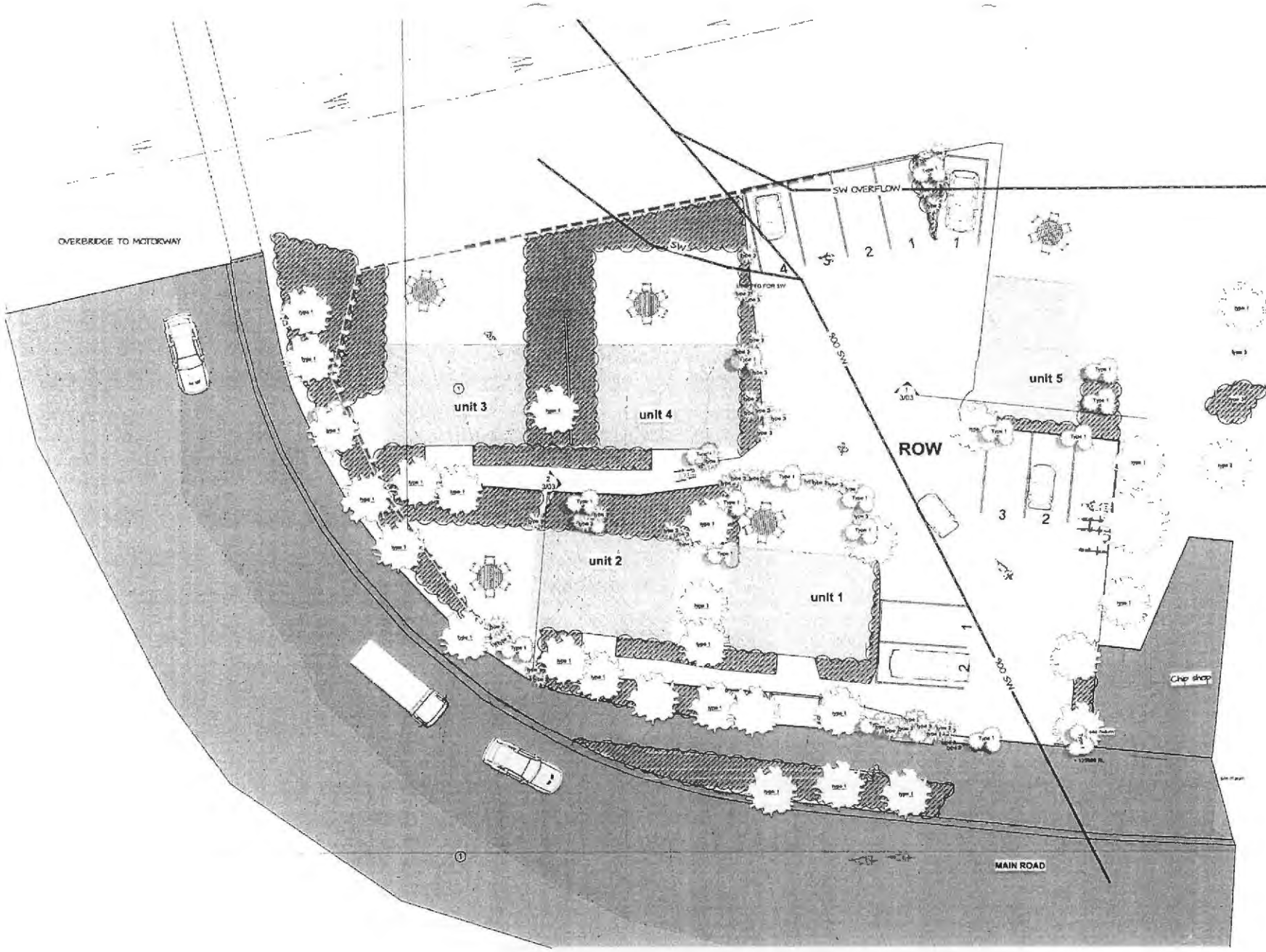
ADNZ

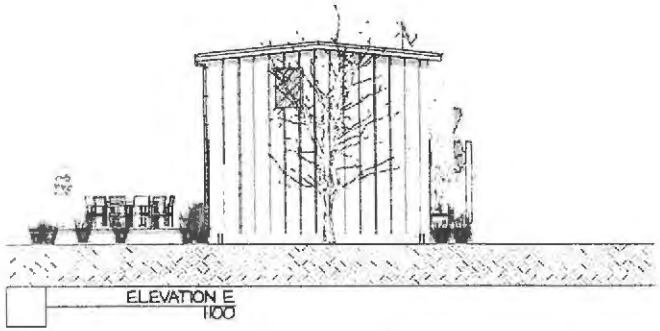


Caversham Apartments

Resource consent Rev B

LANDSCAPE

Richard Wilden Design. LTD.
41 Saddle Hill Road, Ph 03 489 8757
Dunedin, New Zealand email rjwilden@clear.net.nz



ELEVATION E
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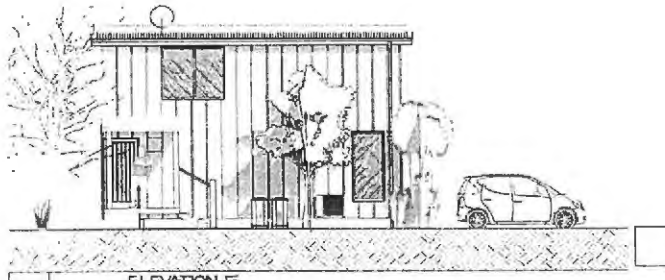

ELEVATION F
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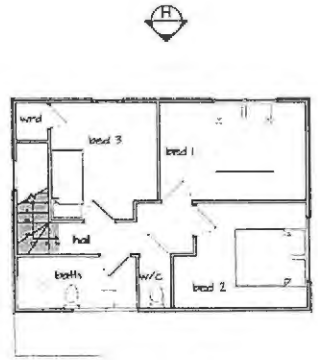

FIRST FLOOR PLAN
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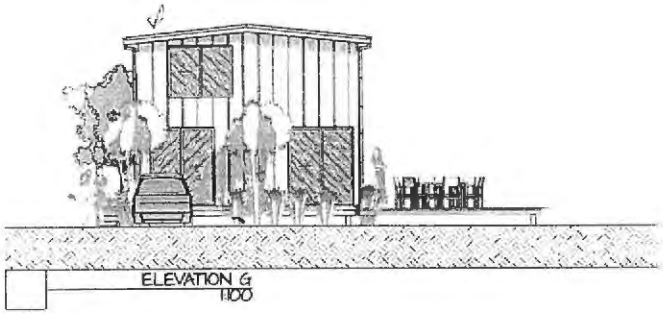

ELEVATION G
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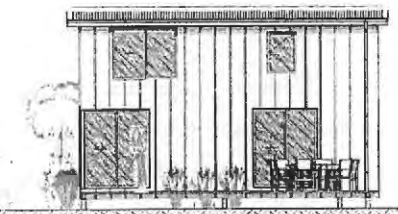

ELEVATION H
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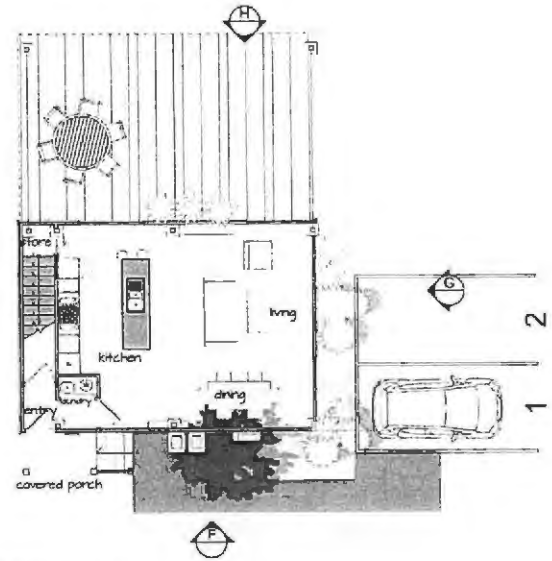

GROUND FLOOR PLAN
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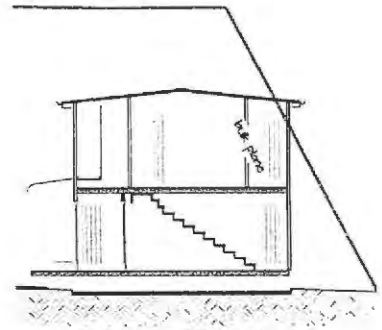
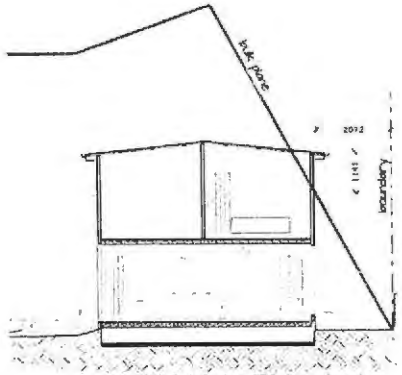


Unit 5 bulk plane 630 deg on boundary



Unit 2 bulk plane 630 deg on boundary

Cavendish Apartments

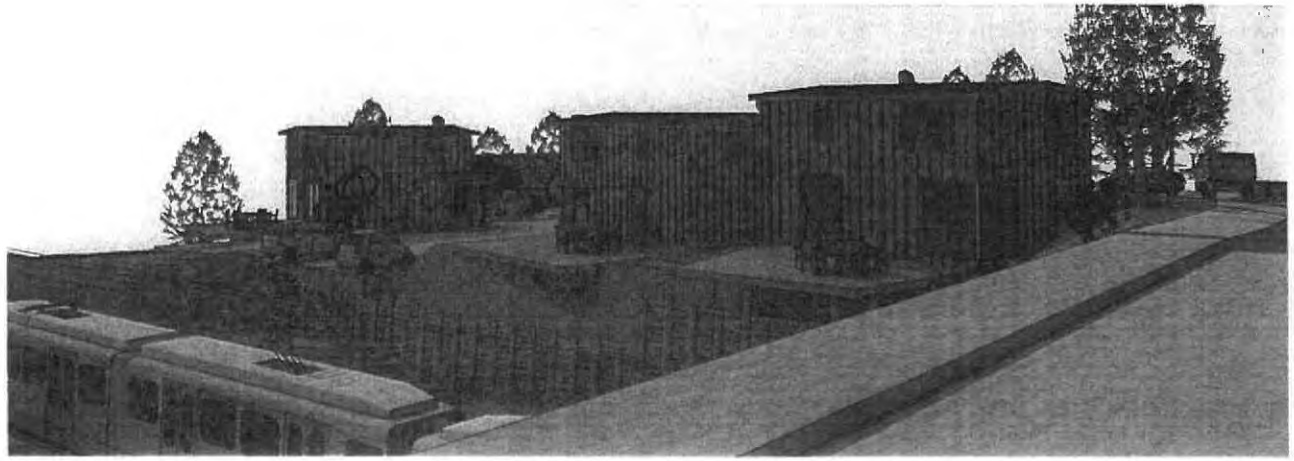
Resource consent Rev B

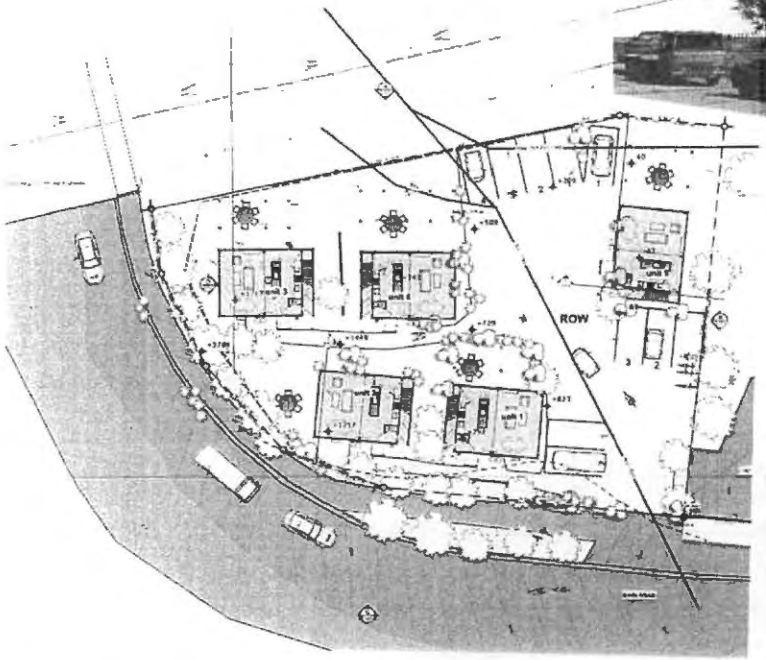
GROUND FLOOR PLAN

N

Richard Wilden Design. LTD.
Ph 03 489 8751
41 Saddle Hill Road,
Dunedin, New Zealand
email rwilden@clear.net.nz

BUILDING ENVELOPE RISK MATRIX		
North Elevation		
Risk Factor	Risk Severity	Risk Score
Wind zone (per NZS 3604)	Very high risk	2
Number of storeys	High risk	2
Roof/wall intersection design	Low risk	0
Eaves width	Very high risk	5
Envelope complexity	Low risk	0
Deck design	Low	0
Total Risk Score:		9





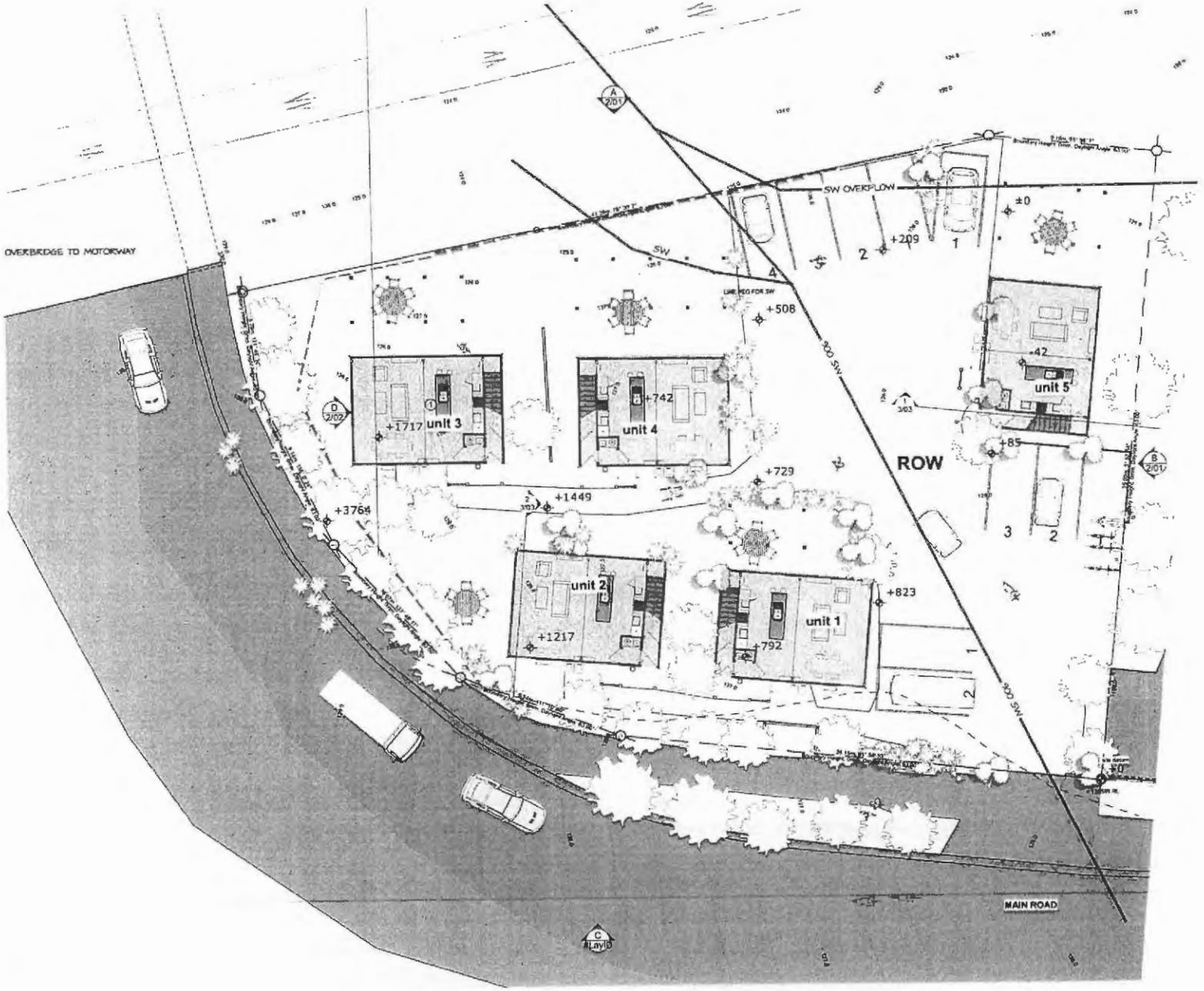
Caversham Apartments

Resource consent Rev B

COVER PAGE

N

Richard Wilden Design. LTD.
41 Saddle Hill Road, Dunedin, New Zealand
Ph 03 465 6757
email: rlwilden@clear.net.nz



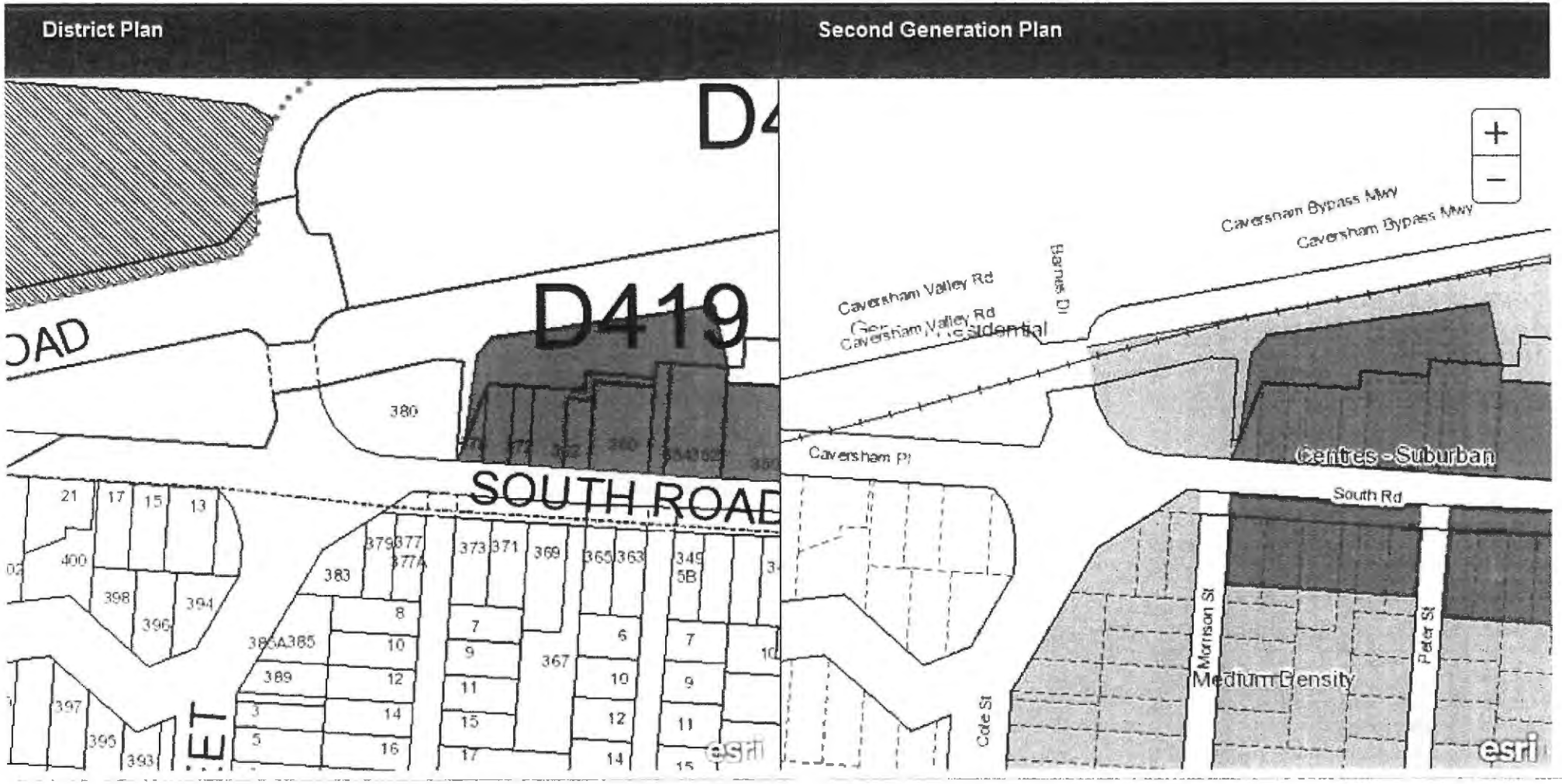
Caversham Apartments

Resource consent Rev B

SITE PLAN

Richard Wilden Design. LTD.

Current and Proposed Zoning around 380 South Road



Current Zoning

Pale yellow regions are Residential 1 Zone
Blue regions are Local Activity 1 Zone

Proposed Zoning

Orange Regions are Medium Density Zone
Blue regions are Other Activity Centres Zone (Centres - Suburban)
Pale tan regions are General Residential Zone

PATERSONPITTSGROUP

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0800 PPGROUP

4 April 2016

The Planner
City Planning
Dunedin City Council
PO Box 5045
Dunedin

Attn: Lianne Darby

Dear Lianne

SUB-2015-78 & LUC-2015-443
380 SOUTH ROAD
RESPONSE TO REQUEST FOR FURTHER INFORMATION

Thank you for your letter of 6 November 2015 seeking further information in regard to the proposed residential development at 380 South Road, Caversham, Dunedin. Please find the applicants response below, discussed beneath the relevant subject headings.

True Exception

Council has asked the applicant to further develop the case for true exception.

The Applicant submits the following matters serve to demonstrate that a true exception indeed exists in relation to the proposed activity-

1. The property presently lies within the Residential 1 Zone, however the only adjoining private land lies within the Local Activity 1 Zone. This appears to be an anomaly and it is arguable that the subject land should have been more appropriately included in the Local Activity 1 Zone at the time that the current District Plan was put together. Had this occurred, the proposed development would be largely compliant. It is the applicant's opinion that development of the proposed activity will result in an environment that is more consistent with the adjoining Local Activity 1 Zone than would a product of development in strict accordance with the provisions of the underlying Residential 1 Zone, and as such the appearance of the development will integrate more seamlessly with the adjoining activities.

2. The immediately surrounding residential land use pattern is far from consistent with the provisions of the Residential 1 Zone, in which this land exists. The majority of the properties on the southern side of South Road, opposite the application site, are undersized, and several of these are smaller than the site areas contained within the proposed development. As with the paragraph above, it is that applicant's opinion

that the proposed activity will result in an environment that is much more consistent with the adjoining built environment than would a product of development in strict accordance with the provisions of the underlying Residential 1 Zone, and as such the appearance of the development will integrate more seamlessly with the local community.

3. The Applicant is proposing to specifically target the City's need for good-quality, affordable housing. This is something that is clearly needed within the City and it does not appear that there are many developers actively attempting to meet the demand in this regard. This application is an opportunity for Council to endorse this form of development, which will serve to demonstrate that there are means and methods available to provide the standard of housing that should be accessible to all residents of the City.

4. The proposed units are all particularly compact in nature, occupying a footprint of $55m^2$ and a total floor area, over two levels, of $110m^2$. Therefore, the total built floor area of all five units combined is $550m^2$, which is essentially equivalent to what might be expected as a result of the permitted baseline development of two ordinary residential activities established in accordance with the Residential 1 Zone provisions. There is little, if any, difference in the number of people occupying the site between the proposed activity and the permitted baseline activity. The proposed activity is therefore exceptional in this respect as it does not seek to breach the existing zone density for reasons of achieving additional residents, but rather because the proposed activity simply makes more sense due to the nature of the existing site and the existing built environment, and because a development of the manner proposed is better able to achieve the applicant's objective of establishing warm, well-insulated houses that can be rented at fair price to meet the needs of Dunedin residents. The present rental market in Dunedin includes a large volume of old houses that are often cold and damp, and this is a particular issue in Caversham and the adjoining South Dunedin, Carton Hill and Corstorphine communities. The Applicant is hoping that by obtaining consent for the proposed development, and the consequent provision of high quality, affordable, and healthy rental housing, this issue can be improved, at least in part.

5. The proposed landscape plan (described in further detail below) is a relatively unusual feature and this is expected to be a useful method of establishing and maintaining a high level of urban design quality within the development. This will serve to ensure that the development remains attractive and efficient for both internal residents and residents/users of the local community.

6. The application land is considered by Council to be suitable for re-zoning into the proposed Medium Density Zone (as part of the 2nd Generation District Plan process), as are some of the surrounding residential areas. This confirms an intent for this land to support a greater density of development. The proposed development is, from what we know presently, reasonably consistent with the preliminary provisions for the Medium Density Zone.

The applicant trusts that the above commentary satisfied Council as to the proposed development indeed being a true exception.

Transportation Matters

Please see the attached transportation plan showing a proposed restriction on vegetation height to maximise the sight distance for vehicles turning out of the development site.

The proposed activity is expected to generate 30-40 traffic movements per day. This rate of activity has been determined by adopting an average figure of 6-8 traffic movements per day per unit. The rate of traffic movement for normal residential activities is 8 movements per day per unit, however because the proposed units are notably smaller than normal residential units we would expect these to accommodate fewer residents, and therefore we can expect there to be fewer traffic movements.

The permitted baseline activity could be expected to create 16 traffic movements per day (two normal residential activities times 8 movements per day).

The existing car parking activity provides space on-site that is sufficient to contain 17 parks. Accepting that these park are likely to be predominantly used by staff working normal hours at local businesses, or residents living nearby, it is probably reasonable to determine that perhaps 12 of the 17 parks will be subject to 2 traffic movements per day (i.e. 1 in and 1 out). The remaining 5 parks might however be subject to 4 traffic movements per day, which recognises that there is likely to be some level of shorter-term parking for shoppers, etc. Combining these figures, the total daily traffic movements generated by the existing situation might come to 44 for the whole site. This is slightly greater than the anticipated level of traffic movements that will be generated by the proposed activity.

With the above in mind, we are satisfied that there will be no worsening of adverse effects as a result of the proposed development on the operation of the local intersections and the existing pedestrian crossing in the vicinity of the site access.

However, the applicant recognises that the establishment of the units, in the layout proposed and in particularly Unit 2, will potentially reduce the effective sight distance in a westerly direction for vehicles existing the development site. The attached plan indicates that his could be reduced from 58m to 44m. This reduction, along with the queuing lengths discussed below, appear to be the principle concerns raised by Council transportation engineer.

To address the reduced sight distance, the applicant proposes a restriction on the height of vegetation and fencing in the area indicated on the attached transportation plan as well as a new give way sign and road marking at the exit from the development site. This will ensure that a sight distance of slightly greater than 44m is maintained. The applicant considers that this distance is suitable, principally for the following reasons-

1. 44m is considered to be sufficient distance to enable traffic to observe obstructions and slow to avoid conflicts within the local environment.

2. The proposed give way sign and give way markings will increase the level of traffic control at this exit location.
3. The proposed site access is the best access point available on the site – any other access point would create a less desirable outcome.
4. The permitted baseline would expect two larger residential units to be allowed on the site, which could create equal, or potentially greater, adverse effects in regard to site access.

The applicant also notes that Council's transportation engineer has been recently making an assessment of the potential for safe operation of the access. To date, the applicant has not received any advice as to the outcome of this assessment.

In respect to queuing, the attached plan indicates that there is sufficient space for 3 vehicles to queue in line without causing a conflict with a vehicle parked in the Lot 5 car parks, and that there is sufficient space for 4 vehicles to queue in line without causing a conflict with a vehicle parked in the Lot 1 car parks. This queuing count includes 1 vehicle parking in the road reserve awaiting entrance out onto the South Road carriageway. Given the low volume of traffic generated by the proposed development, the applicant is confident that the proposed queuing space will be sufficient.

On balance of all matters considered, and in particular our evaluation that the proposed site traffic will not be any greater than the existing site traffic and the Applicant's desire to improve the existing situation by way of a more controlled crossing, we do not expect there will be any adverse effects, beyond a minor and acceptable level, generated by the proposed activity in regard to the proposed access.

Landscape Plan

Please find the attached preliminary landscape plan showing the proposed landscape management provisions.

The applicant proposes that the preliminary landscape plan, and the provisions described below, will be implemented by way of a condition of consent that then requires a consent notice to be registered on the new certificates of title. The consent notice will include a final landscape management plan, comprising a plan and documented provisions, and it will be an obligation of future owners to ensure that the relevant requirements are maintained on an ongoing basis. The applicant intends to retain ownership of some, or all, of the new properties for the foreseeable future, and he expects to take a lead role in ensuring that the landscape management requirements are maintained through the period of his ownership.

Preliminary Landscape Plan

The attached plan shows various features for achieving suitable landscape management outcomes. These include requirements for certain installations and restrictions over certain activities. The plan includes provision for planted screening, larger plant specimens,

permeable 'soft' fence screening, location of utility facilities, common bin collection and letterbox areas, etc.

Utility Areas

Common bin collection and letterbox areas are provided on the western side of the main site entrance. These are helpfully accessible by virtue of the adjacent accessway (and path) and will not compromise the visual appearance of the development as these are sited between the proposed site entrance and an existing public utility cabinet.

Possible areas for closed storage (e.g. garden sheds), open storage (e.g. paved bin stand) and clothes lines are indicated within each of the 5 proposed sites. These are not indented to restrict such activities to these areas, but are included to demonstrate that residents will be able to provide for these activities in suitable locations on each site. These activities are however excluded from occurring on the south-west side of the red dashed Landscape Restriction Line, so as to avoid creating an undesirable visual effect when the development is viewed from Barnes Drive and South Road.

Vegetation Screening

Vegetation screening in proposed along the external edges of the development site, except for the majority of the eastern boundary, the northern side of the car park area, and at the entranceway. This screening is shown in green hatching on the attached plan.

This screening will be generally 2.0m wide along the Barnes Drive and South Road boundaries (except as indicated on the plan) and will be kept reasonable low in height (maximum 0.80m). This will achieve an attractive frontage to the adjacent public roads while allowing visual sight lines across the top of the vegetation.

The screening along the main South Railway boundaries will also generally be 2.0m wide (again except as indicated on the plan). The height of this vegetation will be greater than the roadside planting, and will be designed to grow to a mature height of approx. 1.5m above the deck levels on Lots 3-5. This height will be useful in assisting to mitigate visual and noise effects from the Railway Line and the State Highway beyond.

Other areas of planted screening will be included on either side of the initial length of the new access. These features will be kept reasonably low in height and will serve to create an attractive entranceway while also promoting a greater sense of separation form the building sited on the adjoining land shown as Pt Lot 6 on the attached plan.

A number of larger tree specimens are also proposed in the preliminary landscape plan, on the western side of Lots 2 and 3. These trees are intended to interrupt the built appearance of the development site at this location, to improve the visual amenity of the site.

The plant and tree species to be used is yet to be determined, however this is flexible should Council wish to suggest options.

Fence Screening

Low fences will be built along the Barnes Drive and South Road frontages. These will be no more than 0.50m in height. The purpose of these fences is to establish a defined 'boundary' line so that it is clear where public land stops and private land starts. Because these fences will be low in nature, with slightly higher vegetation behind, the appearance of the development will be open and attractive. Furthermore, the fence will be required to be of a permeable 'soft' nature, so as not to appear as a solid, imposing barrier. The exact definition of what might comprise a permeable 'soft' fence will be fully developed at the time a final landscape plan is presented to Council to form part of the required consent notice.

Taller fence screens, shown in orange double lines on the attached plan, will be established within the site at strategic location to hide utility and storage areas. These exist on south-east and south-west sides Lot 1, around the south-west side of the Lot 2 deck, on the northern side of the car parking area (with short returns at either end), and between the landscaping and bike storage facility on eth eastern side of the site. These fences will again be permeable 'soft' in nature and will extend to 1.8m in height to fully screen the relevant utility and storage areas.

Landscape Restriction Line

The landscape restriction line, shown in a dashed red line on the attached plan, will be implemented to prohibit any part of a dwelling or deck, or any closed or open-air storage facility, or any clothes line or other utility facility from being established on the south-western side of this line. The purpose of this is to ensure that the development maintains an attractive aspect when viewed from the Barnes Drive and South Road frontages.

Fencing, vegetation, paving and paths, and courtyards for recreation al enjoyment (including tables and chairs) will all be allowed activities within this restriction area (provided however that these do not breach the height restrictions required by other provisions).

Acoustic Report

The applicant has not obtained an acoustic report. It is considered that the proposed landscaping measures, and the set-back siting of the units within the property, are sufficient to overcome the need for an acoustic report. The units will be new, and will be double-glazed (now a requirement of all new dwellings).

In terms of a permitted baseline development, we note that two new full-size residential dwellings could be constructed within the site, at a location of 2.0m from the railway boundary, without the need for an acoustic report. In this instance the applicant is proposing three modest-sized units along the railway boundary (Units 3-5), at distances of between 4.7m and 8.9m from the boundary, and this would seem to be no worse than permitted baseline situation. With this in mind, the request for an acoustic report is considered somewhat unreasonable.

In recognition of possible reverse sensitivity effects, the applicant is prepared to enter into a reserve sensitivity covenant with Council to ensure that new owners of the proposed units are both fully aware of the nearby railway and state highway activities and are unable to object to the ongoing operation of these activities. This covenant will to some degree simply recognise a situation that will be obvious to anyone looking to either purchasing one of the unit or looking to rent one of the units.

HAIL and Earthworks

Please see the attached geotechnical reports (2) and earthworks concept plans to satisfy the further information request in regard to these matters. Please note that the earthworks cross-sections are indicative only and that the final development shape may vary from these once the detailed design has been completed. These do, however, provide a sensible concept for Council staff to visualise the generally anticipated earthworks outcome.

Affected Persons

No affected person's consents have been obtained by the applicant, and accordingly these cannot be supplied. The relevant affected persons are-

- Ban Sy Tran, at 378 South Road, and
- KiwiRail, at Main South Railway Line.

Process Forward

With the above considerations in mind, and understanding that he applicant has not provided the requested affected persons consents, the applicant suggests the following-

1. Sufficient information has been provided to enable Council to sully assess the application. This information establishes that the anticipated adverse effects of the proposed development will be no more than minor.

2. Sufficient justification has been provided to demonstrate that a true exception indeed exists, the nature of which is such that a general public notification is not required.

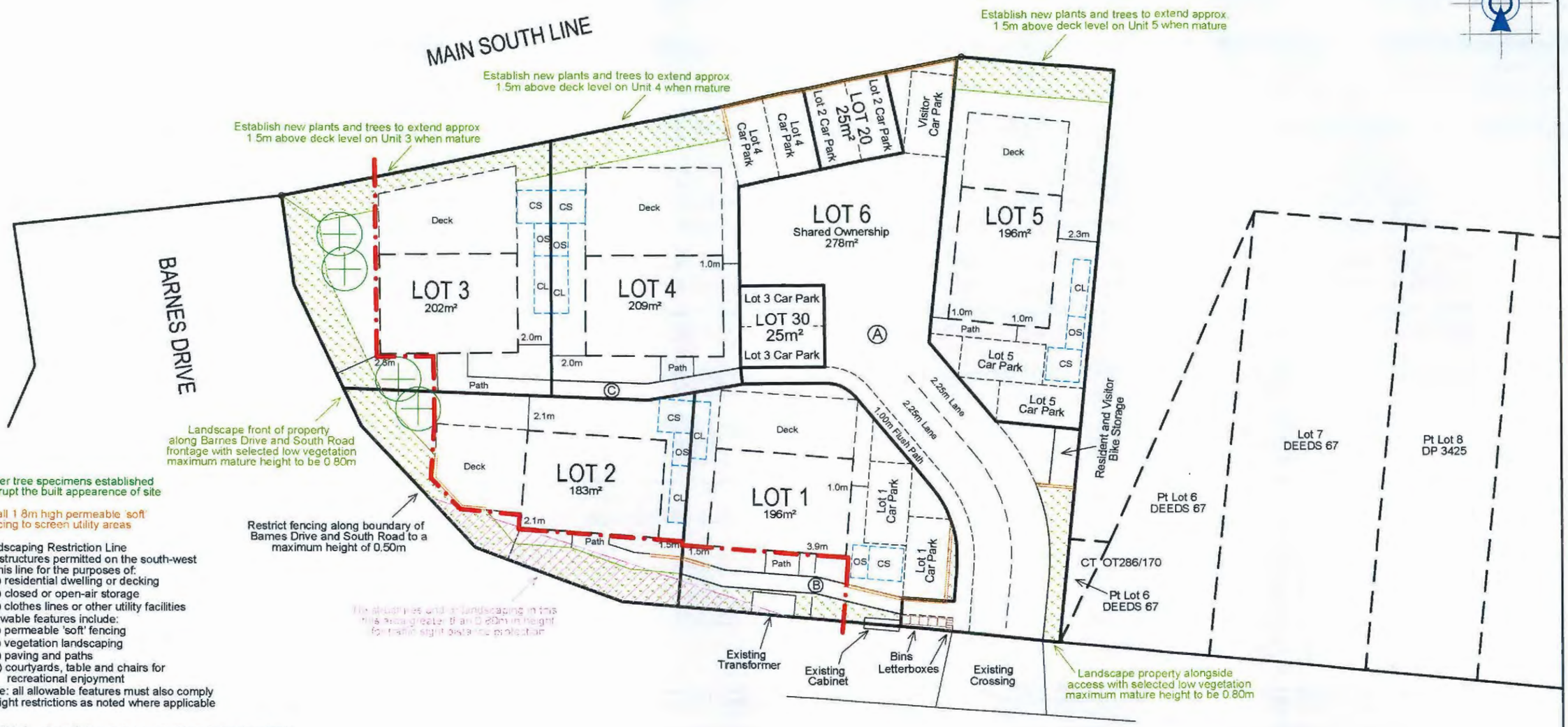
3. The applicant has not provided the affected persons consent for the two identified neighbours, thus a limited notification process, limited to involving the two identified persons, may be a suitable pathway forward.

Therefore, the applicant suggest that is may be appropriate for Council to initiate a limited notification process to progress this application. If Council is in agreement with this suggestion the applicant is prepared to pay the applicable fee so that this process can proceed.

I look forward to hearing from you in due course.

Yours faithfully
PATERSON PITTS GROUP

Kurt Bowen
Registered Professional Surveyor



Larger tree specimens established interupt the built appearence of site

Install 1.8m high permeable 'soft' fencing to screen utility areas

Landscaping Restriction Line
No structures permitted on the south-west of this line for the purposes of:
- i) residential dwelling or decking
- ii) closed or open-air storage
- iii) clothes lines or other utility facilities

Allowable features include:
- i) permeable 'soft' fencing
- ii) vegetation landscaping
- iii) paving and paths
- iv) courtyards, table and chairs for recreational enjoyment

Note: all allowable features must also comply height restrictions as noted where applicable

CS — Possible location of closed storage facility (e.g. garden shed)

OS — Possible location of open-air storage facility (e.g. paved bin stand)

CL — Possible location of clothes line

NOTES:

1. Easement 'A' is for access, servicing and drainage over Lot 6 in favour of Lots 1-5.
2. Easement 'B' is for pedestrian access, servicing and drainage over Lot 1 in favour of Lot 2.
3. Easement 'C' is for pedestrian access, servicing and drainage over Lot 4 in favour of Lots 2 and 3.
4. Lots 2 and 20 are to be amalgamated into common ownership.
5. Lots 3 and 30 are to be amalgamated into common ownership.
6. Lot 6 is to be owned in equal shares in conjunction with Lots 1-5.

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8 MAR 2016
BY:

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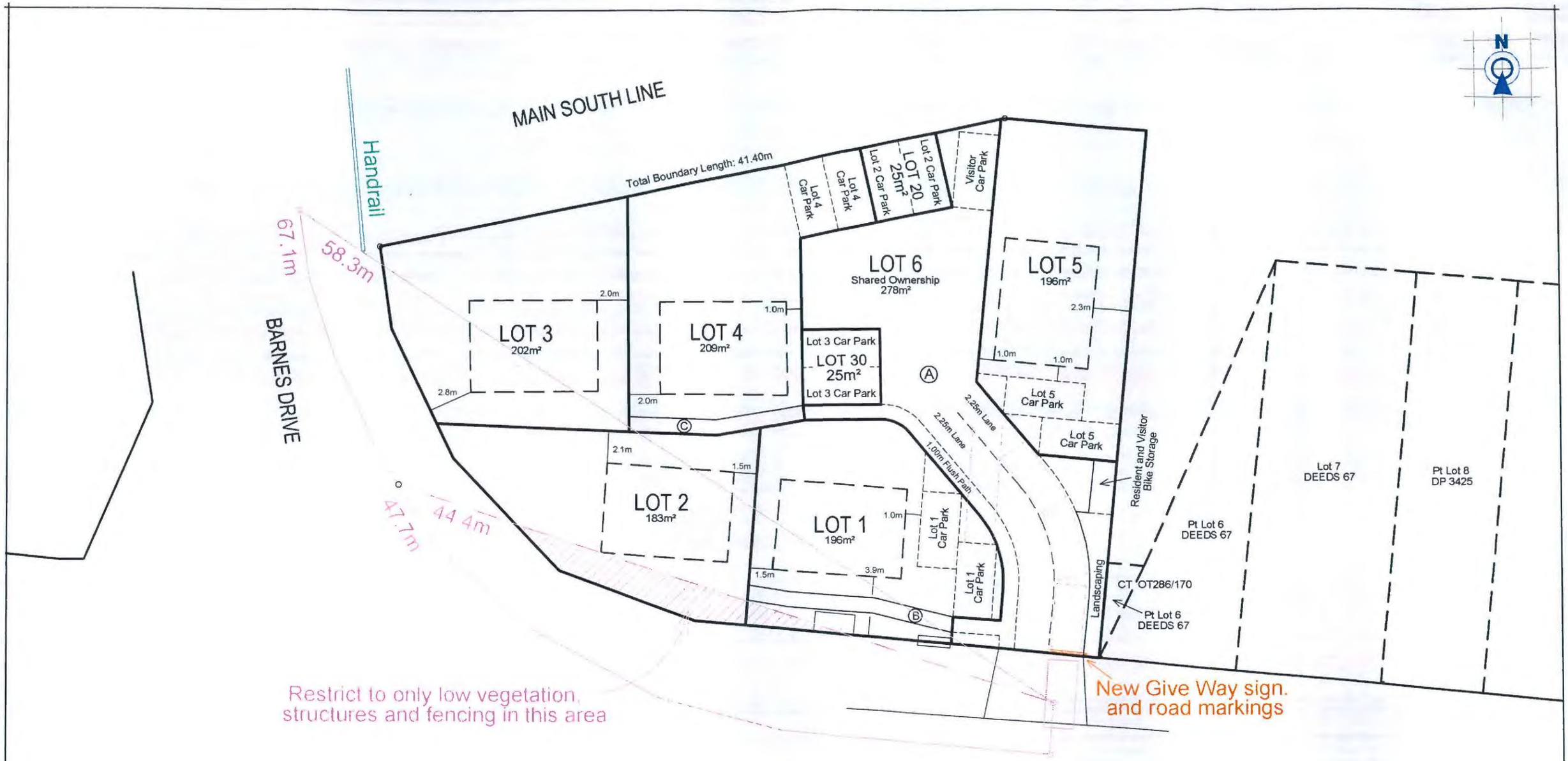
E dunedin@ppgroup.co.nz

Client/Location
Lambert
380 South Road
Sec 2 SO 23278

Purpose/Drawing Title
Caversham Apartments
Subdivision Scheme Plan
(with Landscape Features)

Surveyed by	-	Original Size	Scale
Designed by	KAB	A3	1:250
Drawn by	KAB		DO NOT SCALE
Checked by	KAB		
Approved by	KAB		
Job Ref		Sheet No	Revision No / Date Created
D14981		1 of	C / 04/04/2016

PLOT DATE 06 April, 2016 - 10:42 AM BY Kurt Bowen



NOTES:

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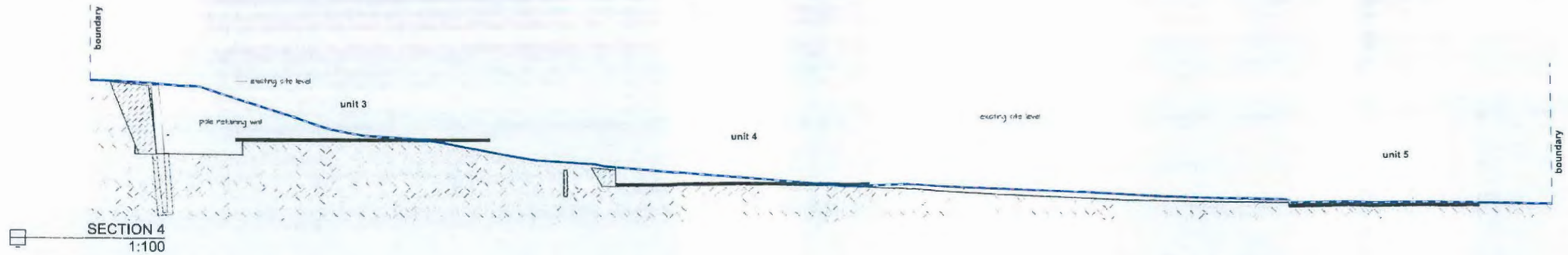
F 03 474 0484
E dunedin@ppgroup.co.nz

Client/Location: Lambert, 380 South Road, Sec 2 SO 23278

Purpose/Drawing Title: Caversham Apartments Transportation Plan

Surveyed by	-	Original Size	Scale
Designed by	KAB	A3	1:250
Drawn by	KAB		DO NOT SCALE
Checked by	KAB		
Approved by	KAB		
Job Ref		Sheet No	Revision No / Date Created
D14981		1 of	C 04/04/2016

PLOT DATE 05 April, 2016 - 10:44 AM BY Kurt Bowen



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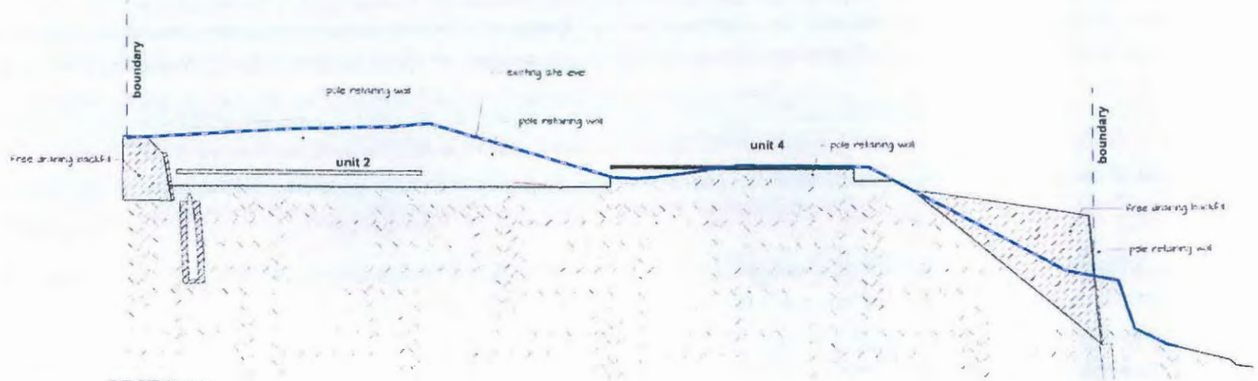

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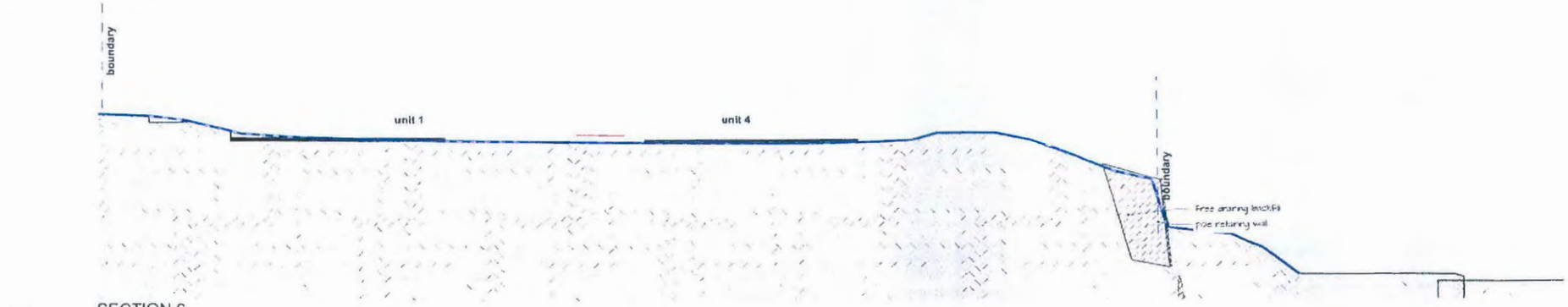

SECTION 6
1:100

SECTION 7
1:100

Caversham Apartments

Resource consent Rev B

SITE SECTIONS
Total excavation 220.8 m/3

N

Richard Wilden Design. LTD.
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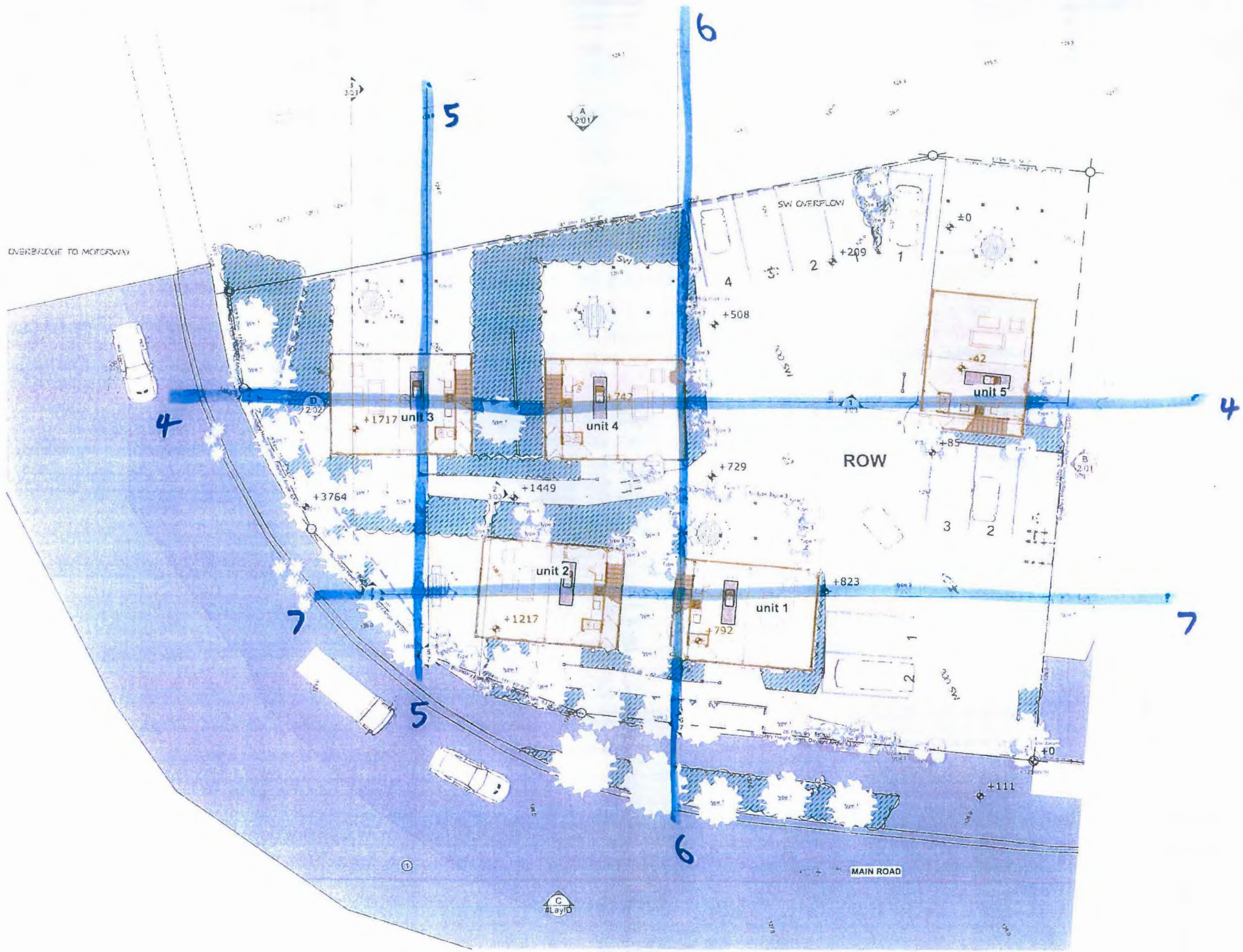
Dunedin, New Zealand email rjwilden@clear.net.nz



Caversham Apartments

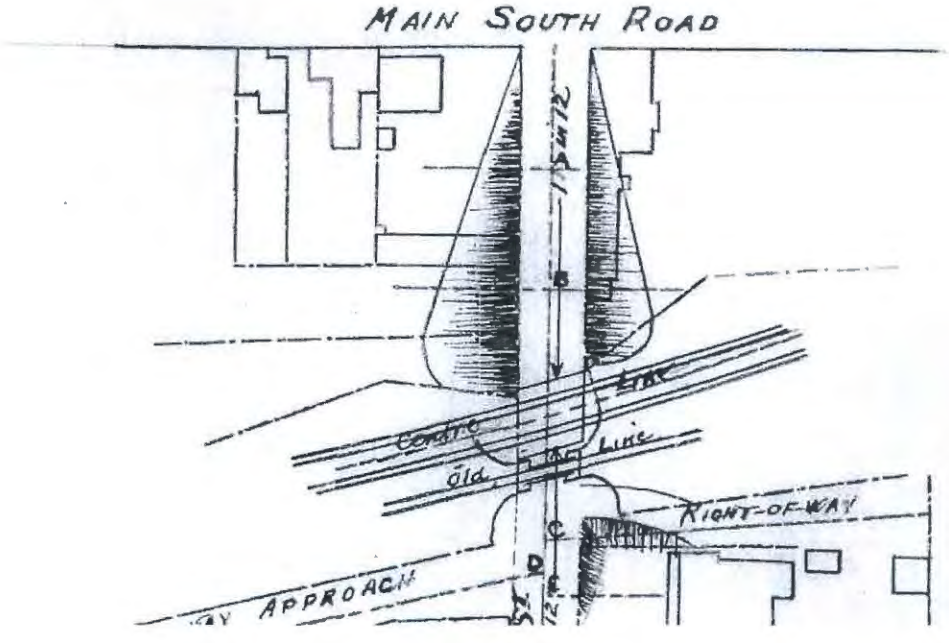
Resource consent Rev B

SITE PLAN

Richard Wilden Design. LTD.

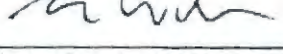
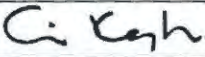
ECOtago

Preliminary Site Investigation
for
Ground Contamination
at
380 South Road, Dunedin
for
Mr Mark Lambert



February 2016

Environmental Consultants Otago Ltd
Environmental and Contaminated Site Assessment • Urban Planning & Design • Landscape Architecture • Project Management
PO Box 5522 Dunedin 9058 • 64 3 4728875 • office@ecotago.co.nz

Task	Responsibility	Signature
Project Manager:	Mona Wells	
Prepared By:	Ciaran Keogh	
Reviewed By:	Mona Wells	
Approved For Issue By:		

Issue Date	Revision No.	Author	Checked	Approved
January 2016				

Prepared By:
Environmental Consultants Otago Ltd Job Ref.: 1-380South
Date: 5 February 2016
PO Box 5522
Dunedin 9058
Telephone: + 64 3 472 8875
Email: ciaran.keogh@xtra.co.nz

Table of Contents

Executive Summary

INTRO

Mr Mark Lambert is proposing to establish a multi-unit residential development on a vacant block of land at 380 South Road in Caversham, Dunedin. The proposed development of the site includes the construction of five separate two storied residential dwellings with associated car parking and access. The proposed use of the land constitutes a change in use of the land. This report is a Preliminary Site Investigation with limited soil sampling to assesses the potential effects of past activities on the suitability of this site for the proposed development.

The site originally contained a small commercial/residential premises and also a part of the road reserve of Sydney Street. The land was acquired by NZ Railways in 1906 and the building demolished to allow for a realignment of the adjacent railway line and the construction of Sydney Street and the adjoining rail road overbridge. The overbridge was demolished and the road closed when the southern motorway was constructed and the land reverted to the Dunedin City Council. The site was subsequently used as a hard fill landfill and now contains a fill layer that the geotechnical investigation assessed as being between 5.9 – 7.5 metres thick over the original site surface. The fill is highly variable and from multiple sources and comprises clays containing some masonry and fragments of bitumen tar seal. The landfilling and the prior uses as public road, for railway operations, and the electricity substation are activities that are included on the hazardous activities and industries list (HAIL) as potentially contaminating.

To provide evidentiary support for the conclusions of this report as to the contamination status of the site, pits were excavated through the fill layer at site and soil sampling and analysis was performed. The results indicate that the site is generally well within the High Density Residential SCS/SGV's for the analytes with the exception of Sample 9, which shows a result at but not exceeding the High Density Residential SCS for PAHs, expressed as a benzo[a]pyrene (BAP-e) toxic equivalency (TEQ) of 24mg/kg This investigation concludes that the proposed development activity may be undertaken in a manner that will minimise risks to human health.

1 Introduction

Environmental Consultants Otago Limited (hereafter EC Otago) has been commissioned by Mr Mark Lambert to undertake a Preliminary Site Investigation (PSI) with limited soil sampling for soil contamination at 380 South Road Caversham, Dunedin. Investigation is required to facilitate assessment of the potential effects of past activities to ascertain suitability of the site for a proposed development and also to provide information regarding potential site contamination prior to its conversion to a high density residential development. This PSI was undertaken in accord with a proposal submitted by EC Otago on 16th December 2015.

1.1 Background and Objectives

If an activity or industry described in the Ministry for the Environment's (MfE's) Hazardous Activities and Industries List (HAIL) is being, or has been, undertaken on a property, then the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (hereafter the NES)[1], apply when soil disturbance, subdivision or change of use take place at the property. The HAIL is a compilation of activities and industries that are considered to have the potential to cause land contamination as a result of hazardous substance use, storage or disposal. However, it should be noted that the list merely indicates that such activities and industries have a greater probability of causing site contamination than other uses or activities, not that hazardous substances are present.

The 1314m^2 site has been subject to a number of potentially contaminating activities, including being a part of the railway corridor during construction of the nearby Caversham Rail Tunnel, having been a public road, having a small electricity transformer on its southern boundary, and having been used as a hard-fill landfill. Of late, the site has been used as a public carpark. The site is now proposed to be redeveloped for a high density residential development comprising five separate two-storey residential units with a common sealed curtilage and parking. The NES stipulates that a PSI be undertaken for a property such as the one that is the subject of this report. The main objectives of a PSI are to gather information about a designated land area in order to determine whether it may potentially be contaminated, to assess the suitability of the land for its current or intended future land use, and to determine whether a detailed site investigation is required. This PSI has been undertaken in order to confirm what current and historical activities have occurred at the property and what the potential is for these activities to have resulted in ground contamination.

[1] http://www.mfe.govt.nz/laws/standards/contaminants-in-soil/

1.2 Scope of Work

Consistent with the MfE Guidelines[2] for PSIs of potentially contaminated land, the following scope of work was undertaken:

- Source and review of all available relevant information, including any previous reports relating to the property at 380 Main South Road Caversham, Dunedin.
- Sources were as follows:
  - Dunedin City Council (DCC) HAIL Site Property Report;
  - HAIL enquiry of the Otago Regional Council (ORC);
  - Historical photographs dating back to ca.1880 and Google Earth; and
  - Other sources of information as cited herein.
  - Carry out a site walkover to verify site conditions and inspect for indicators of potential site contamination;
  - Sample the soils at eight locations.
- Prepare this report, which summarises our findings and is compliant with MfE reporting Guidelines[3], inclusive of all work having been undertaken, managed and reviewed by suitably qualified and experienced practitioners as defined in the NES[4].

Specifically, this report assesses the following:

- Whether previous and/or current on-site activities or adjoining land uses had or have the potential to cause on-site contamination;
- The likely nature of any contamination;
- The risks to future site users from any contamination;
- The disposition of the property with respect to the NES;
- The requirement for further on-site investigations to define the degree or extent of any contamination; and
- The disposition of the development with respect to anticipated soil disturbance at the site.

1.3 Limitations

Services for this project have been performed in accordance with current professional standards for environmental site assessments, and the persons undertaking, managing reviewing and certifying this PSI are suitably qualified and experienced practitioners as defined in the NES. No guarantees are either expressed or implied. This report does not attempt to fulfil the requirements of legal due diligence.

[2] https://www.mfe.govt.nz/issues/managing-environmental-risks/contaminated-land/managing/guidelines.html
[3] ibid
[4] https://www.mfe.govt.nz/publications/rma/users-guide-nes-for-assessing-managing-contaminants-in-soil/

There is no investigation that is thorough enough to preclude the presence of materials at the property that presently, or in the future, may be considered hazardous. As regulatory criteria are subject to change, a property status with respect to contamination that is presently considered to be acceptable may, in the future, become subject to different regulatory standards that cause the property to become unacceptable for existing or proposed land use activities. Any recommendations, opinions or findings stated in this report are based on circumstances, facts and assessment criteria as they existed at the time that we performed the work and on data obtained from the investigations and site observations as detailed in this report. Opinions and judgments expressed in this report, which are based on an understanding and interpretation of assessment standards, should not be construed as legal opinions. This report and the information it contains have been prepared solely for the use of Mr Mark Lambert. Any reliance on this report by other parties shall be at such party's own risk without prior agreement to the contrary.

2 Site Overview

2.1 Site Identification

The subject property is located at 380 South Road, Caversham, Dunedin, as shown in Figure 1. The property comprises a single title and is legally described as Sec 2 SO23278 with an area of 1314m^2. The land is zoned Residential 1 in the present Dunedin City District plan (DCDP) but is proposed to be zoned General Residential 2 in the proposed plan. The property subject of this report is shown outlined with a yellow dashed line in Figure 2 on an aerial photograph taken in 2013. The site of the proposed development covers the full extent of the property. All references to "the site" in the report refer to the development area.

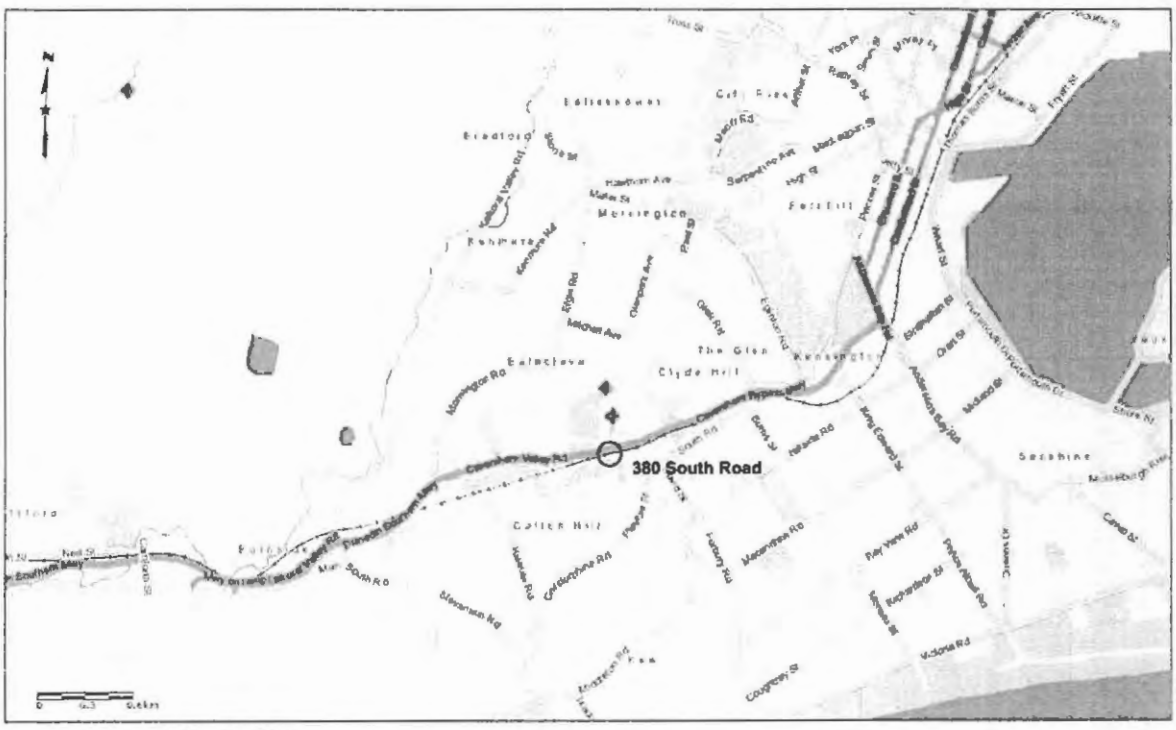


Figure 1: General locale of site.

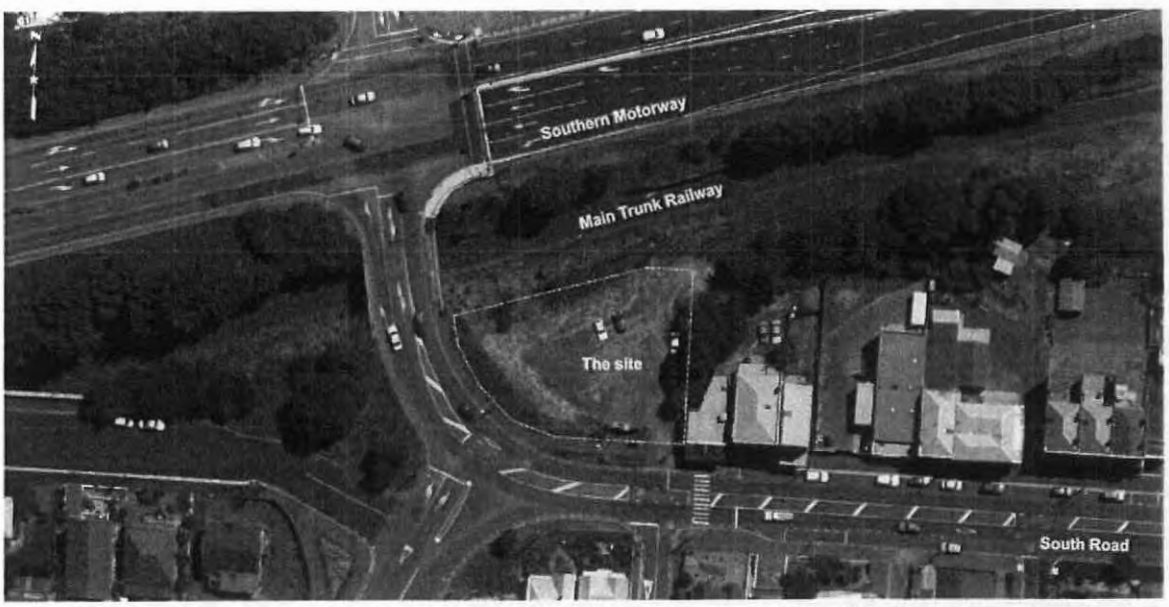


Figure 2: Aerial photo showing the specific locale of the site; the property subject of this investigation is outlined with a yellow dashed line. The proposed development occupies the full extent of the property.

2.2 Site Ownership and Use History

A property title search has not been included in this investigation as the use history provided in the Dunedin City Council HAIL Site Property Report (Appendix A) provides a reasonable record of land. Also, the land has only recently returned to private ownership after more than a century as railway land and road reserve, and this renders a property title search of little informational value. The most significant and most recent HAIL land use, the landfilling of the site, has been extensive and has buried all of the earlier site surfaces under at least 2m of fill over the majority of the site.

The HAIL use is known to be continuous for a period exceeding 100 years as confirmed by the photographic record and explained in more detail below. Photographs of the site date from ca. late 1800s, and aerial photographs from the years 1942, 1947, 1957, 1962, 1967, 1978, 1985, 1990 and 2000 where viewed as a part of this investigation. Google Earth imagery and two recent sets of photos from the DCC website cover the period 2005 to the present.

Figure 3: Blackwood's store (originally a bakery) on the corner of Sydney Street and Caversham Valley Road, possibly about the 1880's. Demolished when the property was acquired for the realignment of the railway in 1906.[5]

The DCC HAIL Site Property Report provided photographs, plans and records that detail activity on the site form the 1880's onwards. The earliest record of the site is a photograph of "Blackwoods Store", presumed to have been taken in the 1880's, shown in Figure 3[5]. A letter dated September 1892 from the Caversham Borough Town Clerk to John Sidey the then owner of the property that sought action to address the large amounts of foul smelling rubbish and ash dumped on the property. The rubbish is referred to as being in mounds that require to be levelled indicating a substantial deposit of waste. As this letter predates the acquisition of the land by the railways in 1906, it is therefore assumed that this waste is at the base of all of the fill on the site.

[5] From 'The Edge of the Town: Historic Caversham as seen through its streets and buildings', by Alma Rutherford (John McIndoe 1978, New Zealand Historic Place Trust 1983).

Figure 4 shows part of a 1906 Railways property plan prepared for the proposed realignment of the main trunk railway that occurred in 1910. This figure shows an outline of Blackwood's Store and one other structure on the site, with some additional structures on adjacent land to the east. Another plan in the DCC HAIL Site Property Report from the same period (front page image) shows an embankment for the road approach to the (then) proposed Sydney Street Road overbridge, encroaching on the area in which the Blackwood's store was located. Figure 5 shows the site in 1910 during the construction of the old highway rail overbridge and walkway. This footbridge in the background in this photo predates the Sydney Street road bridge over the rail that was built in the same location after the railway was realigned in 1910. The DCC building consent record notes a boundary drain in common was constructed within the site in 1915.

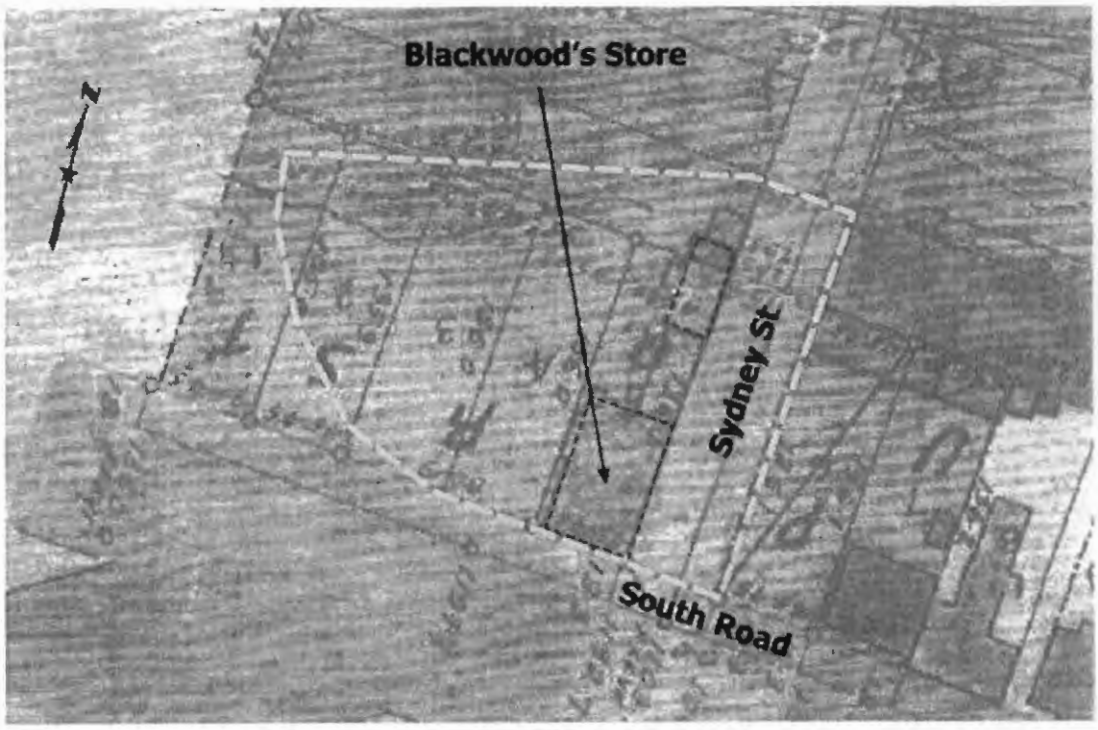


Figure 4: 1906 Railway plan showing the site (yellow dashed line) and structures present on the properties at that date (outlined with a red dashed line); Source DCC.

The Council building consent record (Appendix B p11) notes that a garage was built by a Mr Morrris on leased railway land on the site in 1927.

Figure 5: Photo from 1910 showing the site (n the centre of the photo) and including the footpath to the crossing over the rail in the background. The site is clear of structures at this time (Source DCC).

Figure 6 shows the site in 1937 where only billboards and rough vegetation are evident. This photo gives perspective on the relative level of the site, which was well below that of the street. The most informative of the early aerial photos was taken in 1947 (Figure 7); this shows that the site contains Sydney Street road formation along its eastern side with the rail overbridge on the north-eastern corner of the site boundary. The billboards in the foreground of Figure 6 are visible on the southern-eastern most site boundary in this image, at the intersection of Sydney Street and what is now South Road. The rest of the site is in rough grass with a row of trees beside the railway. The row of trees and appear to be lining the watercourse that is now piped across the site. Also visible in Figure 7 is a small rectangular structure evident on the north-eastern portion of the site, fronting to the Sydney Street overbridge near where the bridge crosses the rail line. The DCC Archivist commented that the structure was a garage or shed that was owned by the railways and it is assumed to be the garage built in 1927 as per the Council consent record. The site in Figure 7 appears to be unchanged from previous aerial imagery taken in 1942 (source NZ Aerial Mapping - not shown).

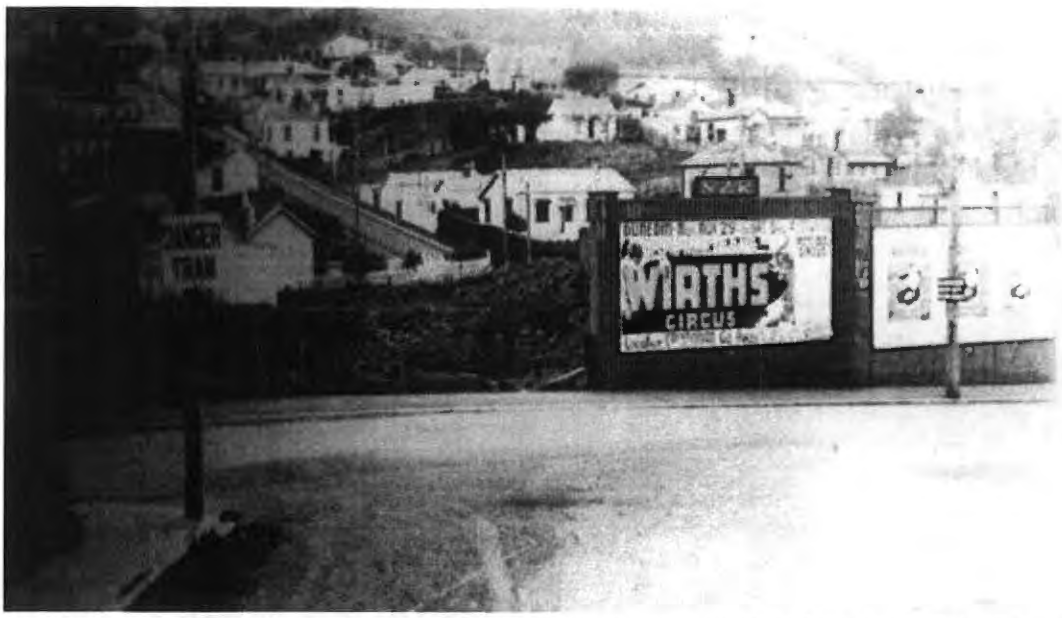


Figure 6: The site in 1937 showing the billboards on the corner of Sydney Street and the former State Highway 1, (now South Road) (Source DCC). The site drops away beyond the billboards and is covered in rough vegetation.

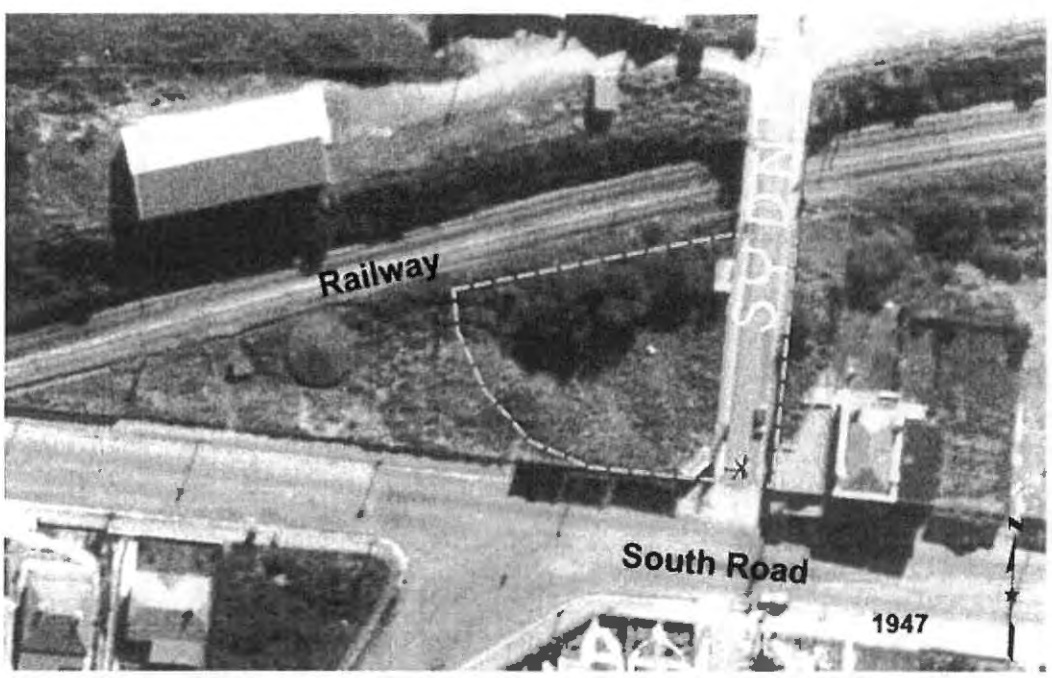


Figure 7 Site and surrounds 1947 showing the Sydney Street road rail overbridge with a utility building to the north-eastern side fronting Sydney Street, the railway to the north, and, on its southern boundary. The billboards shown in Figure 6 are visible on the south-eastern most road frontage of the site at the intersection of Sydney Street and what is now South Road. (Source DCC).

Figure 8 is of an oblique aerial view of the site taken in 1962 that shows the site in considerable detail. This shows the site is unchanged in nature from the earlier (1942 and 1947) aerial photography. The aerial photograph in Figure 9 shows that by 1978 the site has been cleared of trees and contains what appears to be several mounds of fill. The only other change evident from the earlier images is that the three billboards have been replaced by two in a slightly different layout.

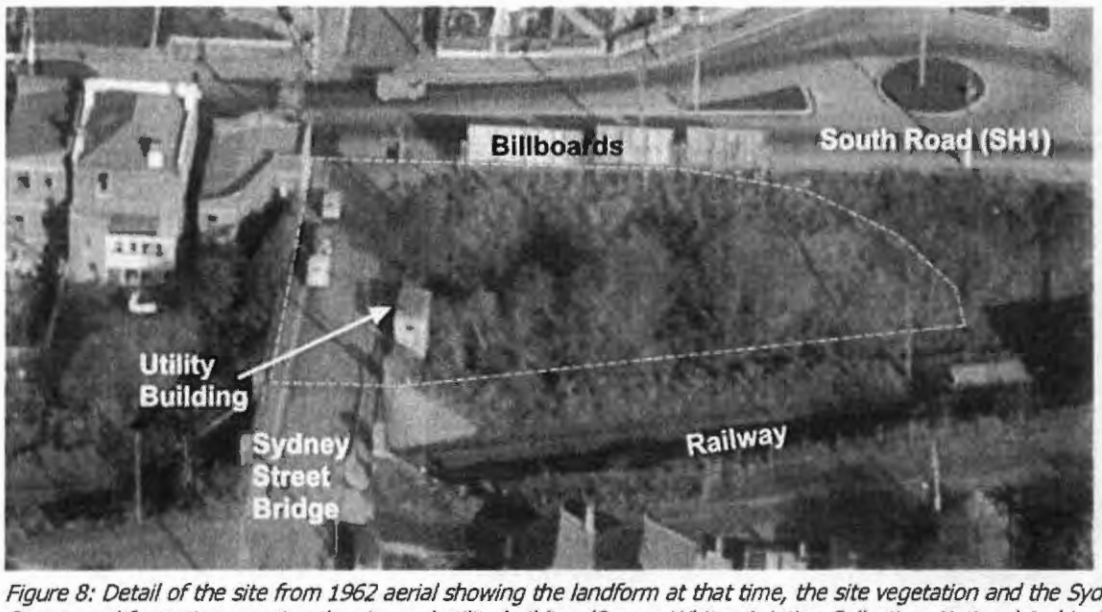


Figure 8: Detail of the site from 1962 aerial showing the landform at that time, the site vegetation and the Sydney Street road formation crossing the site and utility building (Source Whites Aviation Collection, National Archive).

Figure 9: Site aerial view from 1978 showing that the trees have been removed and what appear to be isolated mounds have appeared on the site. (Source DCC).

Subsequent to the 1978 image, a later aerial photograph from 1985 is suggestive that the site contained more fill than evident in 1978 (source NZ Aerial Mapping, 1985 photo not shown) and a later aerial photograph from 1990 (Figure 10) lends the impression that the site had been filled to close to the present extent. The Sydney Street rail overbridge was still present in 1985 but, as is evident in the aerial photo taken in 1990 in Figure 10, the Sydney Street rail overbridge and the small utility building on the north-eastern Sydney Street boundary had both been removed. The appearance in the 1990 suggests that the site was being actively filled at that time. The electricity transformer presently located on the South Road margin of the site was also installed in this period. The electricity transformer is a fully contained unit with a footprint of approximately $6m^2$. This installation post-dates the era when potentially contaminating Polychlorinated Biphenyls (PCB's)[6] were used as coolants and so presents a minimal contamination risk to the site. Photography from 2000 (not shown) shows the site contained a triangular area of surface, used as car parking, which is presumed to be the same tar seal as that which exists at present. Also the 2000 photograph shows an access track running from the northern-most corner of the site to the rear of the properties to the east. This configuration of the site has remained until the present as well.

Figure 10: The site in 1990 showing that the site has been cleared of the Sydney Street rail overbridge and the small utility building that had been fronting Sydney Street. It appears that the site was also being filled at the time of the photograph (Source DCC)

[6] http://www3.epa.gov/region9/pcbs/faq.html

2.3 Historical Use of Land Adjacent to Site

The surrounding land has primarily been used for road and rail services. Both of these activities potentially present a contamination hazard, the railway from combustion wastes and possibly from activities on the site during the construction of the railway and tunnel to the west. The former SH1, now South Road presents a risk of lead deposition both by aerial transmission of particulates and from sediment carried in storm water from the road to the site, which is lower lying.

The land immediately to the east has been a commercial centre with small shops since the land was first developed as a residential area. The site surrounds to the south and east are little changed from its original development as shown in the photo from 1962 in Figure 11. The area to the north of the railway corridor was cleared of residential development in the late 1980's to allow the construction of the SH1 Caversham Bypass (motorway). The adjoining land use has remained largely unchanged since the motorway was constructed.

Figure 11: Aerial oblique view of the site (outlined with a yellow dashed line) and surrounds, 1962. This shows the rail corridor on the northern boundary and SH1 on the southern boundary within a neighbourhood that is generally residential in character apart from the shops on South Road to the east of the site. (Source Whites Aviation Collection National Archive)

2.4 Previous and Associated Investigations

This investigation was conducted in concert with the site geotechnical investigations undertaken by GeoSolve Ltd[7]. No other investigations are known to have been undertaken of the site.

[7] Geotechnical Report, 380 South Road.,GeoSolve ref: 150805 Mark Lambert February 2016

2.5 Current and Proposed Future Use

The site has until recently been used as a sealed public carpark serving the neighbourhood shopping centre. The proposed future use is as a five-unit residential development as shown in Figure 12. The proposed future use is high density residential in character. The 1314m^2 site area will contain five separate dwellings with paved access and curtilage. The site will not provide any significant opportunity for recreational grassed space or vegetable gardening and the development could be considered to be, in the terms of the NES, a high density residential development and is to be assessed against the high density residential criteria.

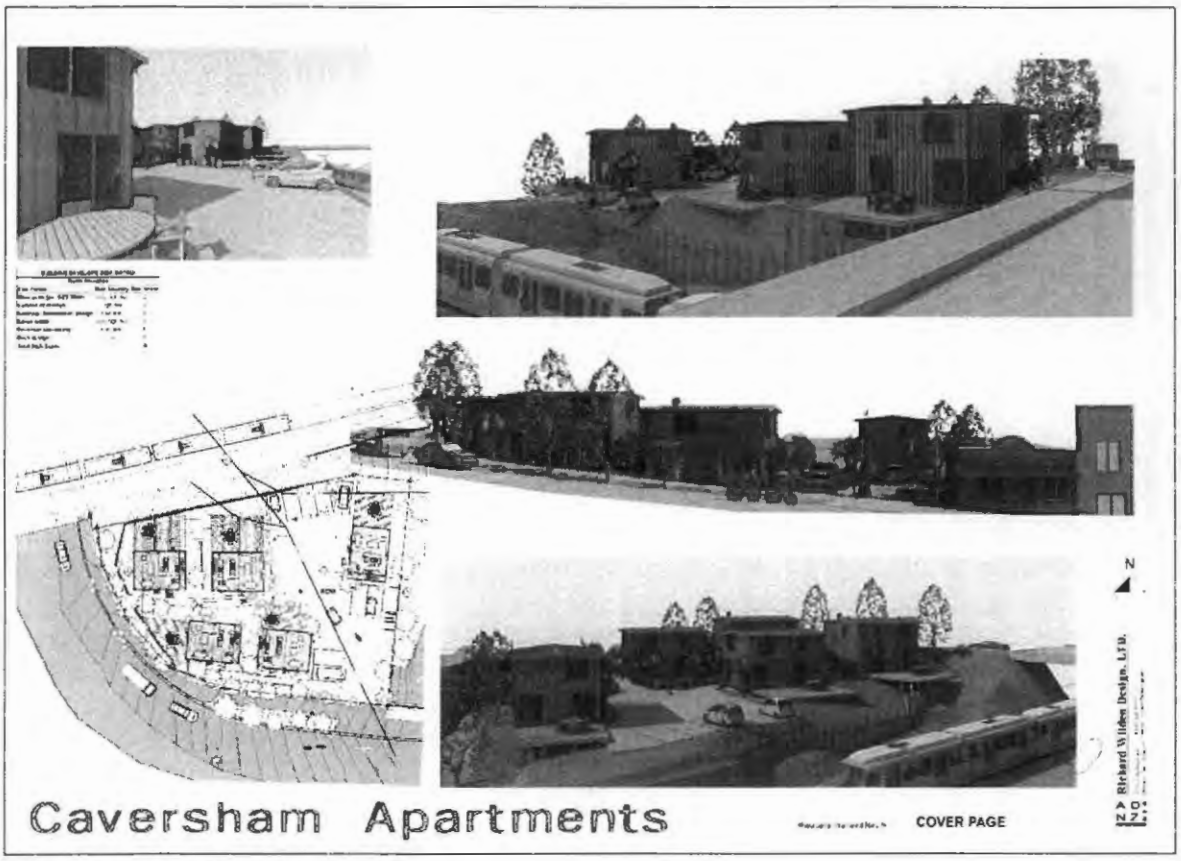


Figure 12: Site development proposal.

2.6 Potential for Contamination

The information reviewed during this PSI, as described above, has provided evidence of a HAIL land use occurring at the site. There is also a record of HAIL land use on land proximate to the site. The key consideration is the past use of the site as a hard-fill landfill. This activity post-dates other HAIL activities occurring on or adjacent to the site.

Table 1: Summary of HAIL Land Use and Potential Associated Contaminants

Land Use	HAIL Code and Description	Potential Contaminants
Electricity Transformer[1]	B2. Electrical transformers including the manufacturing, repairing or disposing of electrical transformers or other heavy electrical equipment	Polychlorobiphenyls (PCB's)
Hard-fill Landfill	G3. Landfill sites	Dependent on original waste composition, wide range of hydrocarbons and metals, organic acids, landfill gas, and ammonia
Adjoining Railway and Highway corridors	H. Any land that has been subject to the migration of hazardous substances from adjacent land in sufficient quantity that it could be a risk to human health or the environment	Dependent on contaminants associated with adjacent property

1. Note – this Code is listed as accurate, however is non-applicable due to the date of the land-use being after the phase-out of PCBs.

The photographic and the council historical records suggest that the landfilling HAIL land use occurred over a period of 1985 – 1990, and the exact nature of the fill material is unknown. The electricity transformer has only been on the site since 1990 or a little earlier. A utility building that the council records indicate was originally erected as a car garage in 1927 remained on the site until 1985 at least but its ongoing use history is unknown. The adjoining highway and railway corridors present a risk of deposition of lead from the highway and combustion wastes from the railway, however the surface landform during that era is now covered with up to 6m of more recent fill material.

Given the substantial history of HAIL land use at the site, a program of investigative sampling was undertaken as a part of this PSI. Sampling and analysis provides a reliable indicator of the presence of contamination from previous vehicle servicing activity. This provides an evidentiary basis from which to assess the site's status with respect to the HAIL and associated potential risks for human exposure, per the NES[8].

2.7 Integrity Assessment

There is a comprehensive photographic record extending over a period of approximately one hundred and thirty-five years (~1880 – 2015) that provides a good record of the activity on the site. The council record also provides a general record of activity on the site. Whether all past land use at the property has been discovered cannot be answered with confidence, but this consistency of the record of site use history, the extensive soil sampling undertaken provides an excellent degree of data integrity regarding site use and potential contaminants at site.

[8] https://www.mfe.govt.nz/publications/rma/users-guide-nes-for-assessing-managing-contaminants-in-soil/ and https://www.mfe.govt.nz/publications/hazardous/contaminated-land-mgmt-guidelines-no2/

3 Site Condition and Surrounding Environment

3.1 Site Inspection

A site walkover was undertaken by an EC Otago senior environmental planner on 22nd December 2015 in conjunction with the site sampling and the geotechnical investigation. The investigation included the excavation of eight pits to 2.8m depth to assess site ground conditions. The site comprises an area of approximately 400m^2 of sealed car parking, which is covered with a bitumen seal that overlies a 20cm+ layer of base-course, and the car parking is surrounded by a grass berm. Photo A in Figure 13 provides a view of the site from the south-western corner and shows the extent of the sealed parking area and the relationship of the site to the adjoining Caversham shops. The electricity substation is visible on the right hand margin of Photo A. Photo B in Figure 13 shows the site from its north-eastern corner. This shows the face of the fill adjoining the railway corridor that includes the remains of the southern abutment of the Sydney Street Bridge. The access to the rear of the properties to the east is evident in the left hand side of this photo.

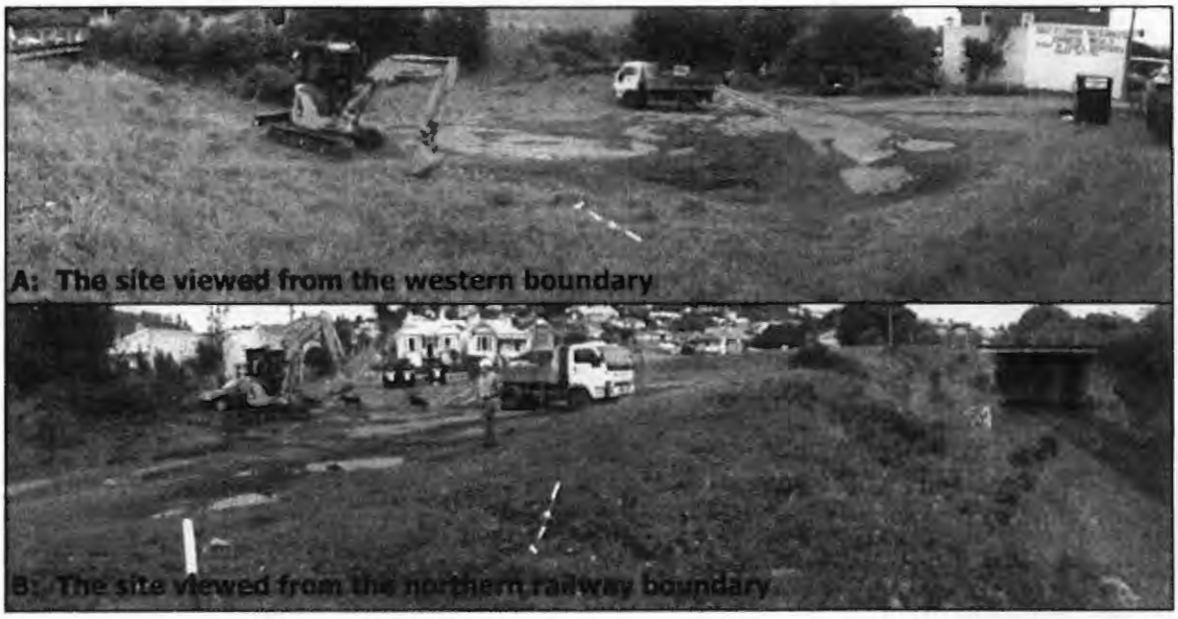


Figure 13: Site photos, December, 2015.

3.2 Conditions at Site Boundaries

The site environs are shown in the photos in Figure 14. Photo A shows the relationship of the site with South Road on its longest (southern) boundary. To the east, (left-hand side of Photo A in Figure 14) the site is bounded by the Caversham shops. Photo B in Figure 14 shows the relationship between the site and the railway corridor and also shows the land to the south across the site's southern boundary, which is a long-established residential neighbourhood.

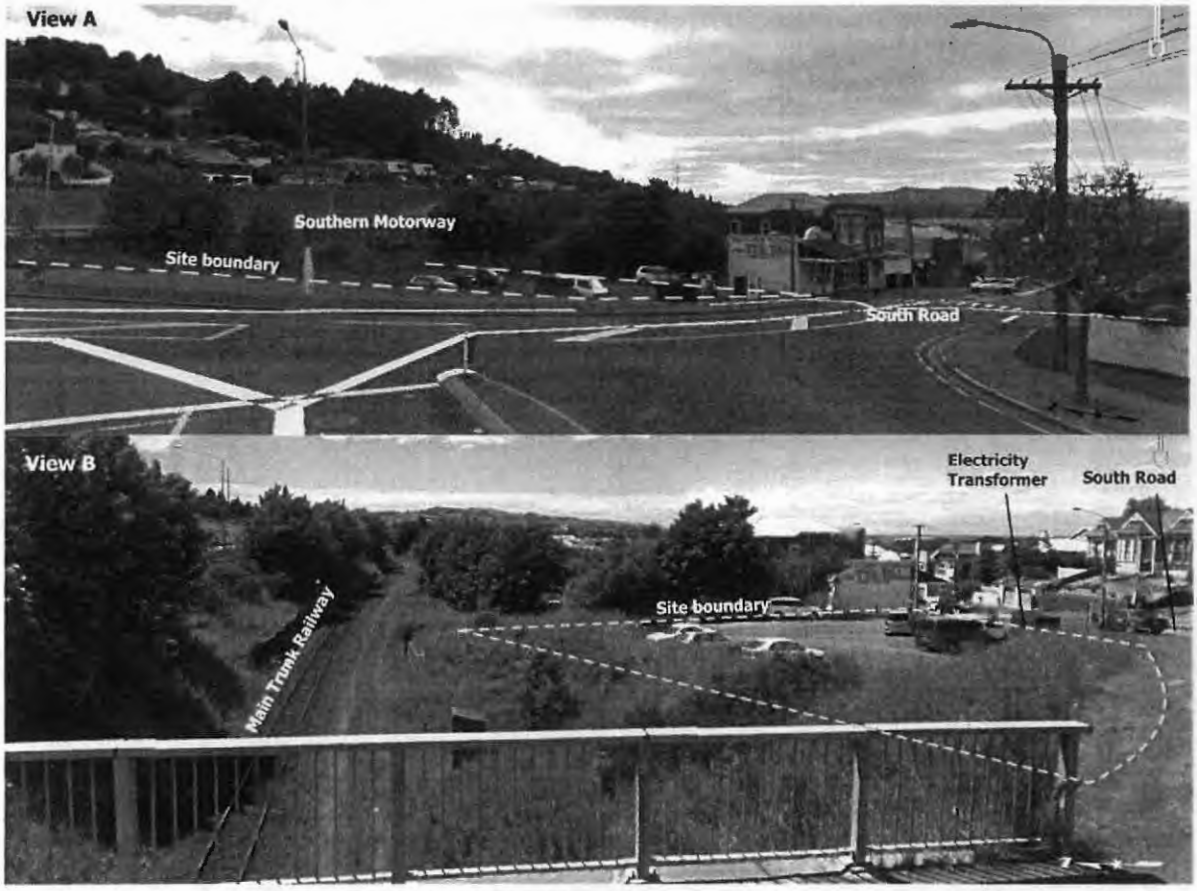


Figure 14: Photos of site boundaries from 2014 (Google Earth); Photo A is from the intersection of South Road and the Caversham SH1 on-ramp. Photo B is from the SH1 on-ramp rail over-bridge showing the relationship between the site and the railway and motorway and adjoining shops and residential area of Caversham.

3.3 Signs of Contamination

The site surface is largely clear of any indication of potentially contaminating activities. There are a number of indications both from the record (Section 2 above) and from visual inspection that site has been subject filling, and the geotechnical investigation pits that were instated on the date of site inspection provided an understanding of the top 2.8 metres of the site fill. This is described in detail in Section 3.4. Any other visible indications of potential site contamination was presumably obliterated by the fill placed on the site.

EC

3.4 Geology and Hydrology

The geology of the Dunedin area is dominated by volcanic rocks of basaltic to andesitic composition that were intruded through marine sediments during Miocene times. Extensive volcanism at that time produced lava flows and bedded volcanoclastic materials (e.g. ash, tuff etc.) were widely distributed by eruptions (Dunedin Volcanic Group). The generalized stratigraphic profile comprises schist at depth, overlain initially by thin non-marine sediments and then a thick accumulation of marine sediments including sandstones and mudstones. The volcanic rock types cross-cut these sediments where vents were present and extensively mantle them where lava flows or volcanic ejecta were deposited. Watercourses and tidal embayments such as Otago Harbour have locally deposited alluvial, estuarine and marine deposits and generally modified the volcanic landscape by deep incision and sedimentation.

Based on the findings of the geotechnical investigation undertaken by GeoSolve Ltd[9] concurrently with this investigation, the site is underlain by Caversham Sandstone. The site contains a water course that has been piped where it crosses the site as shown in Figure 15. The water course occupies an open channel to the east and the west of the site. The site is open and free draining with a slight gradient to the east to the city stormwater infrastructure to Otago Harbour, approximately 3.5 kilometres to the east. From the geotechnical investigation, shallow groundwater use in the vicinity of the site is considered unlikely based on the presence of the sandstone bedrock at the site. There is assumed to be a lack of a shallow groundwater aquifer in the vicinity of the site, however, this has not been verified.

[9] Geotechnical Report, 380 South Road.,GeoSolve ref: 150805 Mark Lambert February 2016

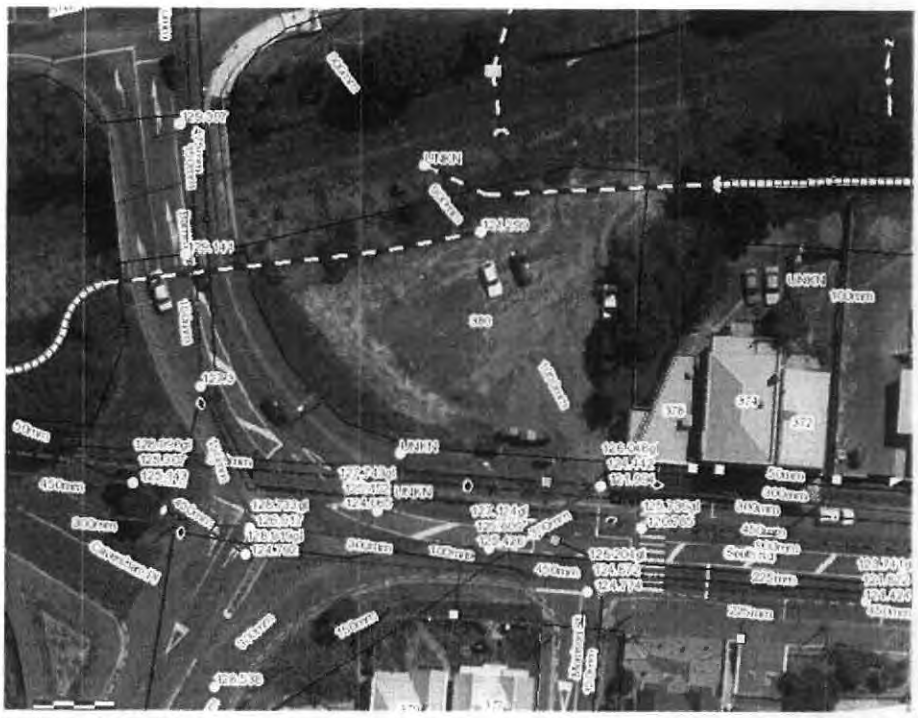


Figure 15: Piped and open drainage pathways in and adjacent to the site locale (Source DCC Water Services).

Geotechnical test pit excavations conducted concomitant to field work for this report extended to 2.8 metres below the site surface and did not reach the base of the fill layer. From test pitting, the fill material is from a number of sources and some of it contains minor inclusions of non-natural materials, such as bitumen, as is evident in Figure 16. In addition to bitumen, these inclusions comprise other material such as plastic, timber, brick and concrete. There was no odour associated with the fill in any of the test investigation pits. The deeper fill (2.5 metres and greater depth) at two locations had the character of harbour dredgings as it was of a coarser sandy character than the overlying clay fill and contained sea shells. This material was coloured black and had the appearance of being contaminated with fine combustion waste. Again this material did not possess any odour.

Figure 16: The fill showing the predominance of mixed clay subsoils and aggregate with minor inclusions of weathered bitumen.

EC

3.5 Sensitive Receptors

The site is located within a mixed commercial and residential neighbourhood and the site itself will become a high density residential development. The adjoining public roads are both subject to heavy vehicle use but only light pedestrian use. The primary potential for contact with any contaminants on the site will be to occupants of the dwellings on the site. There will be risk of exposure to site workers during site development from the excavation cartage and disposal of material excavated from the site.

4 Soil Sampling and Analysis for Contamination

4.1 Overview

According to the MfE's Guidelines for contaminated land investigations, sampling and analysis are considered to be optional in a PSI, with information on this to be provided "as available". Ultimately, however, the disposition of any contamination can only be confirmed with results from field sampling and analysis for contaminants. For this study sampling, analysis, and interpretation of results has been undertaken to provide an evidentiary basis from which to assess the site's status with respect to the HAIL and associated potential risks for human exposure, per the NES. As part of the process of assessing risk from potential contaminants, results from analysis must be compared to Soil Contaminant Standards (SCSs) or appropriate Soil Guideline Values (SGVs), which reflect appropriate levels of contamination in soil for different use scenarios[10].

4.2 Sampling and Analysis Plan

For this PSI, the sampling plan was based on a spatially distributed pattern of sampling locations distributed across the site as shown in Figure 17. This pattern was selected because deposition of fill was known to be an issue and because, on the basis of the site history, there was no identifiable pattern or locus of contaminating activity. EC Otago personnel collected a total of nine samples from eight locations, as described below, on December 22nd, 2015. For each of eight test pits, surface samples were collected at the surface of the fill body immediately beneath the hard-fill surface. A second sample was collected at one sampling location from 2m below ground level to assess the condition of the fill at this depth as it appeared to be of a significantly different character than the overlying material and showed evidence suggesting potential carbon staining.

[10] https://www.mfe.govt.nz/publications/rma/users-guide-nes-for-assessing-managing-contaminants-in-soil/ and https://www.mfe.govt.nz/publications/hazardous/contaminated-land-mgmt-guidelines-no2/

Information about the site indicates that HAIL associated use has occurred, hence HAIL compounds associated with this use were chosen for analysis (as outlined in Section 2.7). The relevant HAIL Codes are G3 (Landfill sites) and H (any land that has been subject to the migration of hazardous substances from adjacent land in sufficient quantity that it could be a risk to human health or the environment). These land uses are associated with a wide group of analytes, per the MfE Guideline. The range of analytes selected for this work represents those most likely to be relevant. All samples were analysed for arsenic, cadmium, chromium, copper, lead, nickel and zinc as heavy metals are the inorganic contaminants of greatest concern. Copper, zinc and nickel as soil contaminants are not as highly toxic to humans as other contaminants (e.g. arsenic, cadmium, chromium and lead), but are contaminants of concern as ecotoxins, and high levels of these metals may be an issue should offsite disposal be necessary. The samples from each sampling location were also analysed for polycyclic aromatic hydrocarbons (PAH) as indicators of possible aerial particulate contamination from the nearby road and railway and also from bitumen comprising coal tars that may have been deposited within the fill. All samples were analysed individually. The method of analysis scheduled for the contaminants of interest, as well as limits of detection and other relevant details, are included in the results for certified analysis, in Appendix B, and specific results are presented and discussed in Section 5 below.

Figure 17: Diagram showing sampling / test pitting locations (indicated by yellow stars) and sample numbers (indicated by black numerals).

EC

4.3 Sampling Methods

All shallow soil samples were collected with a freshly gloved hand from the wall of pits dug by an excavator at each of the eight sampling locations. The one deeper sample was collected from the material excavated from the base of each pit by breaking open the material and removing a sample from soil that had not been in contact with the excavator bucket. Clean contaminant free containers provided by the testing laboratory were filled with soil samples and immediately placed into a chilly bin cooled with icepacks. During sampling, photographic logs were taken of samples collected including their date and time of collection and their location was recorded on a field sampling plan. Containers labelled with sample name, date and time on both label and lid as the samples were taken. Chain of custody forms were completed during field operations, and samples were dispatched to the analytical laboratory on the day of collection.

5 Results from Sampling and Analysis

5.1 Soil Acceptance Criteria

As part of the process of assessing risk from potential contaminants, results from analysis must be compared to appropriate SCSs or SGVs, which reflect different levels of contamination in soil for different use scenarios[11]. As the proposed post-development land use is consistent with a High Density Residential use scenario, the SCSs/SGVs used here are chosen to reflect this proposed future use. For some analytes, the MfE has not established SCSs or SGVs; for such cases, SGVs from another source may be used according to an established hierarchy specified by the MfE. For all analytes or contaminants recognized as so-called priority contaminants by the MfE, i.e. contaminants with a high or specific toxicity of concern, recently developed SCSs that are targeted to human health risks in a New Zealand context must be used.

5.2 Results of Analysis

Results are summarised in Table 2 below. The results indicate that the site is generally well within the High Density Residential SCS/SGV's for the analytes with the exception of Sample 9, which shows a result at but not exceeding the High Density Residential SCS for PAHs, expressed as a benzo[a]pyrene (BAP-e) toxic equivalency (TEQ) of 24mg/kg. This result is not especially surprising given the fill history and the possibility of the inclusion of coal tar bitumen from road seal that is present in small amounts within in the fill. Coal tar was widely used as a petroleum bitumen substitute on roads throughout Dunedin. Based on the results in Table 2, the BAP-e value for Sample 9 exceeds the 95% upper confidence limit (UCL, which is 22 mg/kg, see Appendix B), a point which would be consistent with the idea that this result represents localised heterogeneity.

[11] https://www.mfe.govt.nz/publications/rma/users-guide-nes-for-assessing-managing-contaminants-in-soil/ and https://www.mfe.govt.nz/publications/hazardous/contaminated-land-mgmt-guidelines-no2/

Table 2: Results from Analysis of Samples from 380 South Rd.[1]

Sample Number	1 0.3m	2 0.5m	3 0.3m	4 0.3m	5 0.3m	6 2.0m	7 0.3m	8 0.3m	9 0.3m	High Density Residential[1]
Lab No.:	1524528.1	1524528.2	1524528.3	1524528.4	1524528.5	1524528.6	1524528.7	1524528.8	1524528.9	SCS/SGV
Arsenic	7	11	4	4	3	9	4	8	6	45 [2]
Cadmium	0.24	0.23	< 0.10	< 0.10	0.10	0.41	0.14	0.76	0.38	230 [2]
Chromium	19	14	31	20	19	16	25	20	20	1500 [2]
Copper	26	11	11	13	18	59	32	46	33	> 10,000 [2]
Lead	71	10.8	21	34	66	100	43	182	115	500 [2]
Nickel	27	19	11	14	16	22	21	29	19	1800 [3]
Zinc	79	46	69	68	64	280	90	230	195	7000 [4]
PAHs[4]										
BAP-e	3.5	0.34	0.24	1.45	0.92	1.38	2.3	6.5	**24**	24 [4]

1. All results in mg/kg; sample numbers are as marked in Figure 17.Results in Bold and with grey background are values that exceed the relevant SCS/SGV
2. MfE, 2012. Users' Guide, National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health. Wellington. Note: Soil contaminant standards (SCSs) reflect a High Density Residential use scenario. Cr SCS is reported as Cr VI.
3. DEFRA/UK Environment Agency, 2009. Soil Guideline Values for Nickel in Soil, Science Report SC050021.
4. NEPM/NEPC 2014. National Environment Protection Measures of Australia (http://www.scew.gov.au/node/941). Note: The Australian SGVs are under review for updating; this is a Health Investigation Level targeted at human health for a use scenario for Residential, with limited produce consumption, and is a SGV closely aligned with the New Zealand SCS approach, i.e. in kind. As a residential SGV, the value is lower than might be deemed acceptable for High Density Residential use.

6 Site Characterisation

6.1 Type of Environmental Contamination

Sampling and analysis for HAIL contaminants was conducted at the site as defined herein, and, by the terms of the New Zealand NES, based on the findings above, one sample, Sample 9, showed a level of BAP-e that is at the High Density Residential SCSfor PAHs, expressed as a benzo[a]pyrene equivalency (BAP-e). Overall, it is not possible to rule out that exceedances are not present at the site. While not exceeding the SCS, some values of lead in Table 2 may be indicative of an anthropogenic source, which would be consistent with the site's long history of traffic flow along its borders.

6.2 Extent of Environmental Contamination

The fill layer present across the site is variable in composition. The sampling density provides a reasonable coverage of the site, with only one of nine samples having a value at an SCS/SV. As noted above, and given the highly variable nature of the fill evident in the sampling pits, it cannot be ruled out that localised areas of environmental contaminants that exceed the High Density Residential SCSs/SGVs are not present.

6.3 Potential for Degradation and Interaction

Only one sample showed a result at one SCS, and this for BAP-e. PAHs generally are expected to be contained within any isolated fragments of road tar seal that might be present, and these PAHs may be limited in their ability to degrade within the host matrix. Due to the low levels, there is little potential relevance regarding degradation or interaction with other contaminants.

6.4 Exposure Routes and Risks to Exposed Populations

The NES prioritises human health, and hence this report focuses on the human receptors of primary regulatory concern. The potentially exposed human populations are those individuals that will be on the site during site development and those who dwell within or visit the dwellings post-development. PAH is present at one sampling location at depth of 0.3 metres at levels that meet but do not exceed the High Density Residential SCS criterion for BAP-e. The fill surface is already capped with a 2-30cm layer of crushed rock base course beneath the existing sealed surface and it is not proposed to remove that surface to expose any of the potentially contaminating material except during site development. The site will be restored to a higher level of impermeable surface cover post-development than exists on the site now. The measured level of PAH does not exceed the Outdoor Worker SCS.

7 Conclusions and Recommendations

7.1 Summary and Conclusions

Environmental Consultants Otago Ltd's preliminary investigation of the site concludes that historical evidence of HAIL land use was found. Our findings are summarized as follows:

- Relevant HAIL categories are; G3 (Landfill sites) and H (Any land that has been subject to the migration of hazardous substances from adjacent land in sufficient quantity that it could be a risk to human health or the environment) are confirmed to have reasonably occurred at or near the site;
- No record of previous sampling or analysis was found, and soil sampling and analysis were performed in the course of this investigation;
- Site soil sampling found that PAH is present in the site soil at a depth of 0.3 metres at one location at a level that reaches but does not exceed the High Density Residential SCS;
- By the metrics of evaluation in use, the level of PAH found does not represent a human exposure risk during development;
- The data suggest that it is possible that additional exceedances occur at site;
- Under a High Density Residential use scenario with a full coverage with structures, hardstand, and a minimal amount of landscaped clean-fill, risk of direct human exposure of site users would be minimised; and
- A soil management plan will be required if soil disturbance that exceeds the permitted activity limits in the NES is proposed during site development.

Based on the findings summarised above, EC Otago concludes that, at present, there is minimal potential for human exposure risk to contaminants at the site and thus the development might proceed as proposed.

7.2 Recommendations

Other than the proscription with respect to earthworks, as above, this report finds no actionable matters requiring recommendations at this time.

- **Appendix A DCC HAIL Site Property Report**
- **Appendix B Hill Laboratories Analysis Report**

Appendix A DCC Property Search

DUNEDIN CITY COUNCIL
Kaunihera-a-rohe o Otepoti

50 The Octagon, PO Box 5045, Moray Place
Dunedin 9058, New Zealand
Telephone: 03 477 4000, Fax: 03 4743488
Email: dcc@dcc.govt.nz
www.dunedin.govt.nz

5 October 2015

Paterson Pitts Group
PO Box 5933
Dunedin

Attn: Andrew Robinson

Dear Andrew

HAIL-2015-79 380 South Road Dunedin

Please find enclosed the results of the Hazardous Activities and Industries List (HAIL) Property Search lodged on 3 September 2015. This HAIL property search details the information which is documented on Council records for the site at 380 South Road, Caversham. Please note the attached documentation only includes information that is available on the Council's records and the Council does not necessarily hold comprehensive records of the historic land use of this site.

There is no evidence that the above site is a HAIL site.

Nevertheless the presence of an electricity transformer, currently in use, is noted on the South Road frontage. In addition the site may have been utilised for construction activities associated with the adjoining main trunk railway line.

It is recommended that further investigation of the historic land use be undertaken through other means including consulting with any former land owners and checking with the Otago Regional Council.

This information does not constitute a Preliminary Site Investigation in terms of the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.

Yours sincerely

P.R. Marshall

Phil Marshall
Senior Planner
474 3348

Phil Marshall

From: Alison Breese
Sent: Monday, 7 September 2015 02:59 p.m.
To: Phil Marshall
Subject: HAIL-2015-79, 380 South Road Dunedin, info from DCC Archives
Attachments: 1947 Aerial R46.jpg; 1957 Aerial R46.jpg; 1967 Aerial S25.jpg; 1978 Aerial J5.jpg; 1990 Aerial D1-16.jpg; 2000 Aerial 124 Run 24001.jpg; c1910 Railway construction Caversham.jpg

Hi Phil,

I have researched the property below and have found:

The site was originally had a grocer and produce store on the southern corner of Sydney Street circa 1880s. The property was required for the second track for the railway line in 1906 and became Railways property.

I have attached a c1910 photo showing the site in background at time the double track for the railway was being constructed.

I have searched through old City Engineers correspondence from 1914-1944 and have found no mention of anything on the land, other than what is in ECM.

Usual aerials are attached

Thanks

Alison Breese
Archivist, Business Information Services
Dunedin City Council

Visit DCC Archives photo collection at www.flickr.com/photos/dccarchives

50 The Octagon, Dunedin 9016; PO Box 5045, Moray Place, Dunedin 9058, New Zealand
Email: alison.breese@dcc.govt.nz; www.dunedin.govt.nz

DATE 1947

DATE 1957

N

DATE 1967

DATE 1978.

DATE 1990.

DATE 2000

c 1910

Phil Marshall

From: Warren Tweedie
Subject: Property disposal - 380 South Road.

Kim:
In responce to your memo of 20 May re City Property's proposal to dispose of the land at 380 South Rd, I advise that the roading department has no requirement for the retention of this section of land, however, there are a number of issues that need to be considered:

1) The site has an electricity package sub station on it. This area needs to have an easement or it needs to be surveyed off and dedicated as road.

2) Transportation Planning need to consider the question of retaining visibility around the curve. Possible building on the site out to the boundary would affect visibility around the corner considerably.

3) There is an existing mudtank out on South Rd. The Waste Services plan needs to be checked to see whether the Mudtank connection goes to a storm water sewer through the property or to a sewer within road reserve.

4) The property currently provides vehicular access to the rear of adjacent property and to the railway corridor. Is this to be preserved??.

Warren Tweedie
Programme Engineer
Roading Department
Dunedin City Council
50 The Octagon, PO Box 5045, Dunedin
Ph: +64-3-474 3705, Fax: +64-3-474 3789
Cell Phone 021 1140139
E mail: wtweedie@dcc.govt.nz
WWW: http://www.CityofDunedin.com

http://www.dcc.govt.nz/MapViewer/output/PMV_Photographic_A4L_FIDEAN3824370038.pdf

Building and Planning Consents for 380 South Road

Building Application	EDMS	OK	Status	Description	Lodge Date
H-1970-72020 GEMS ID AAB19701121		✓	Historical Record	AAB19701121 2697 - Advertising hoardings on the corner of South Road and Sydney Street, plan (New Zealand Railways)	23/07/1970
H-1946-3301		✓	Historical Record	AAB1946 3301 - Erect bus shelter, plan (Dunedin City Council)	10/02/1946
H-1927-12285 GEMS ID AAB19270515		✓	Historical Record	AAB19270515 9996 - Erect garage on leased railway land in Sydney Street, plan (Morris)	09/06/1927
H-1915-130588 GEMS ID AAD19150391			Historical Record	AAD19150391 Construct boundary drain in common A232, refer to Caversham Valley Road for fiche	30/08/1915

Planning Application	Dwx	OK	Status	Description	Lodge Date
LUC-2015-443 GEMS ID			Suspended Pending Combined Decision	land use consequential to a subdivision consent	24/09/2015
SUB-2015-78 GEMS ID			Assessment/Report	subdivision creating 5 lots	24/09/2015
HAIL-2015-79 GEMS ID			HAIL request lodged	380 South Road	03/09/2015

RESOURCE CONSENTS WITHIN 50 METRES OF 380 SOUTH ROAD DUNEDIN

106 R Barnes Drive Dunedin

LUC-2013-83 Land Use Consent temporary signage. There has been no outcome yet.

LUC-2011-545 Land Use Consent erect a sign for three weeks, advertising fund raising event. The outcome was Granted on 16/12/2011.

RMA-2005-369456 Resource Management Act (Historical Data) ERECT TEMPORARY SIGN (Non-Notified - Restricted Discretionary). The outcome was Granted on 05/10/2005.

RMA-1998-362134 Resource Management Act (Historical Data) ESTABLISH 23 SITES TO ERECT ELECTION SIGNS Hazards Comments: (Non-Notified - Non Complying). The outcome was Granted on 21/07/1998.

RMA-1996-360088 Resource Management Act (Historical Data) ERECT ELECTION SIGNS (Non-Notified - Unrestricted Discretionary). The outcome was Granted on 03/10/1996.

RMA-1991-350981 Resource Management Act (Historical Data) Subdivision Boundary Adjustment / App: M.D. Body PO Box 235 (Non-Notified - Non Complying). There has been no outcome yet.

1648 R South Road Dunedin

LUC-2015-65 Land Use Consent mural on telecommunications cabinet. The outcome was Granted on 27/03/2015.

LUC-2008-571 Land Use Consent install fourteen Bus Shelters. The outcome was Granted on 28/11/2008.

RMA-2004-367538 Resource Management Act (Historical Data) ERECT 4 BUS SHELTERS (Non-Notified - Unrestricted Discretionary). The outcome was Granted on 06/04/2004.

RMA-1999-363485 Resource Management Act (Historical Data) TO ERECT ELECTION SIGNS FOR THE NEW ZEALAND FIRST PARTY (Non-Notified - Unrestricted Discretionary). The outcome was Granted on 28/10/1999.

RMA-1998-362134 Resource Management Act (Historical Data) ESTABLISH 23 SITES TO ERECT ELECTION SIGNS Hazards Comments: (Non-Notified - Non Complying). The outcome was Granted on 21/07/1998.

RMA-1999-363508 Resource Management Act (Historical Data) TO CERTIFY THAT SO PLAN 24430 COMPLIES WITH DISTRICT PL AN REQUIREMENT UNDER SECTION 226 (1) (e) (ii) (Other). The outcome was Granted on 04/07/2000.

RMA-1996-359896 Resource Management Act (Historical Data) VARIOUS ELECTION SIGNS DBTR- DUNEDIN NORTH CAMPAIGN COMMITTEE (Non-Notified - Unrestricted Discretionary). The outcome was Granted on 05/08/1996.

RMA-1996-359995 Resource Management Act (Historical Data) ELECTION SIGNS (Non-Notified - Unrestricted Discretionary). The outcome was Granted on 29/08/1996.

RMA-1996-359930 Resource Management Act (Historical Data) ELECTION SIGNS (Non-Notified - Unrestricted Discretionary). The outcome was Granted on 15/08/1996.

RMA-1996-360090 Resource Management Act (Historical Data) ELECTION SIGNS NO FEE (Non-Notified - Unrestricted Discretionary). The outcome was Granted on 23/09/1996.

RMA-1996-360054 Resource Management Act (Historical Data) ERECTION OF GENERAL ELECTION SIGNS DBTR - NEIL BENSON (Non-Notified - Unrestricted Discretionary). The outcome was Granted on 23/09/1996.

RMA-1982-353487 Resource Management Act (Historical Data) ERECT FIVE OWNERSHIP UNITS Ownr:L M CRIMP / App: ANDREW HOUSING LTD TAY ST INVERCARGILL (Notified - Non Complying). The outcome was Declined on 17/06/1995.

RMA-1995-353440 Resource Management Act (Historical Data) ERECT 15 UNITS / App: ANDREW HOUSING SEE SOUTH ROAD FOR DETAIL (Notified - Non Complying). The outcome was Declined on 17/06/1995.

2244 R Caversham Bypass Motorway Dunedin

RMA-1996-359930 Resource Management Act (Historical Data) ELECTION SIGNS (Non-Notified - Unrestricted Discretionary). The outcome was Granted on 15/08/1996.

5108925 PT SEC 86 Dunedin - Tranzrail (N/R) Dunedin

LUC-2013-99 Land Use Consent mural on retaining wall. The outcome was Granted on 02/04/2013.

SUB-2011-61 Subdivision Consent amalgamation subdivision - subdivide railway land at Burnside into an industrial lot and a balance lot. The outcome was Granted on 15/07/2011.

RMA-2006-370524 Resource Management Act (Historical Data) construct and operate a self-service fuel facility. The outcome was Granted on 29/10/2007.

RMA-2001-364796 Resource Management Act (Historical Data) ESTABLISH CAR PARK (Non-Notified - Non Complying). The outcome was Granted on 06/06/2001.

RMA-2004-368439 Resource Management Act (Historical Data) CREATE A THREE LOT INDUSTRIAL 1 SUBDIVISION (Non-Notified - Restricted Discretionary). The outcome was Granted on 02/12/2004.

RMA-2001-365039 Resource Management Act (Historical Data) ALTER SIGNS/HOARDINGS (Non-Notified - Non Complying). The outcome was Granted on 11/10/2001.

RMA-2001-365038 Resource Management Act (Historical Data) ALTER SIGNS/HOARDINGS (Non-Notified - Non Complying). The outcome was Granted on 11/10/2001.

RMA-2001-365037 Resource Management Act (Historical Data) ALTER SIGNS/HOARDINGS (Non-Notified - Non Complying). The outcome was Granted on 11/10/2001.

RMA-2001-365036 Resource Management Act (Historical Data) ALTER SIGNS/HOARDINGS (Non-Notified - Non Complying). The outcome was Granted on 11/10/2001.

RMA-2001-365035 Resource Management Act (Historical Data) ALTER SIGNS/HOARDINGS (Non-Notified - Non Complying). The outcome was Granted on 11/10/2001.

RMA-2001-365034 Resource Management Act (Historical Data) ALTER SIGNS/HOARDINGS (Non-Notified Non Complying). The outcome was Granted on 11/10/2001.

RMA-2002-366126 Resource Management Act (Historical Data) CERTIFICATE OF COMPLIANCE (Other). The outcome was Granted on 04/12/2002.

RMA-1999-362972 Resource Management Act (Historical Data) MURAL FOR WILKIE ROAD/NEVILLE ROAD TRANZ RAIL BRIDGE Hazards Comments: (Non-Notified - Restricted Discretionary). The outcome was Granted on 20/08/1999.

RMA-1993-357917 Resource Management Act (Historical Data) Subdivision Ownr:NZ RAILWAYS CORP. / App: K.G. Harford Private Bag (Non-Notified - Non Complying). The outcome was Granted on 18/11/1993.

RMA-1997-361305 Resource Management Act (Historical Data) VARIATION TO SUBDIVISION CONSENT AND EXTENSION OF TIME Hazards Comments: (Non-Notified - Unrestricted Discretionary). The outcome was Granted on 13/10/1997.

RMA-1991-350984 Resource Management Act (Historical Data) Report Ownr:RAILWAYS (Non-Notified - Non Complying). The outcome was Granted on 24/05/1991.

RMA-1993-355755 Resource Management Act (Historical Data) / App: WORKS CONSULTANCY Hazard : CONSENT NOTICE (Non-Notified - Non Complying). The outcome was Granted on 25/06/1993.

Appendix B Hill Laboratories Analysis Report

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:	Environmental Consultants Otago Limited	**Lab No:**	1524528 SPv1
Contact:	Ciaran Keogh	**Date Registered:**	15-Jan-2016
	C/- Environmental Consultants Otago Limited	**Date Reported:**	21-Jan-2016
	PO Box 5522	**Quote No:**	73830
	Moray Place	**Order No:**	
	DUNEDIN 9058	**Client Reference:**	South380
		Submitted By:	Ciaran Keogh

Sample Type: Soil

Sample Name:		1 0.3m 13-Jan-2016 10:15 am	2 0.5m 13-Jan-2016 10:50 am	3 0.3m 13-Jan-2016 11:40 am	4 0.3m 13-Jan-2016 11:50 am	5 0.3m 13-Jan-2016 12:20 pm
Lab Number:		1524528.1	1524528.2	1524528.3	1524528.4	1524528.5
Individual Tests						
Dry Matter	g/100g as rcvd	83	85	86	83	84
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES	mg/kg dry wt	3.5	0.34	0.24	1.45	0.92
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	7	11	4	4	3
Total Recoverable Cadmium	mg/kg dry wt	0.24	0.23	< 0.10	< 0.10	0.10
Total Recoverable Chromium	mg/kg dry wt	19	14	31	20	19
Total Recoverable Copper	mg/kg dry wt	26	11	11	13	18
Total Recoverable Lead	mg/kg dry wt	71	10.8	21	34	66
Total Recoverable Nickel	mg/kg dry wt	27	19	11	14	16
Total Recoverable Zinc	mg/kg dry wt	79	46	69	68	64
Polycyclic Aromatic Hydrocarbons Screening in Soil						
Acenaphthene	mg/kg dry wt	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	mg/kg dry wt	0.11	< 0.03	< 0.03	0.07	0.05
Anthracene	mg/kg dry wt	0.23	0.03	< 0.03	0.11	0.08
Benzo[a]anthracene	mg/kg dry wt	1.66	0.20	0.09	0.70	0.49
Benzo[a]pyrene (BAP)	mg/kg dry wt	2.4	0.23	0.16	0.99	0.62
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	2.6	0.26	0.18	1.14	0.71
Benzo[g,h,i]perylene	mg/kg dry wt	1.52	0.15	0.13	0.62	0.41
Benzo[k]fluoranthene	mg/kg dry wt	1.06	0.12	0.09	0.51	0.29
Chrysene	mg/kg dry wt	1.61	0.20	0.09	0.73	0.47
Dibenzo[a,h]anthracene	mg/kg dry wt	0.33	0.03	< 0.03	0.14	0.10
Fluoranthene	mg/kg dry wt	2.9	0.38	0.15	1.39	0.99
Fluorene	mg/kg dry wt	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	1.59	0.15	0.13	0.64	0.43
Naphthalene	mg/kg dry wt	< 0.14	< 0.13	< 0.13	< 0.14	< 0.13
Phenanthrene	mg/kg dry wt	0.87	0.10	0.04	0.44	0.24
Pyrene	mg/kg dry wt	2.9	0.39	0.15	1.35	0.94

Sample Name:		6 2m 13-Jan-2016 12:35 pm	7 0.3m 13-Jan-2016 1:50 pm	8 0.3m 13-Jan-2016 2:12 pm	9 0.3m 13-Jan-2016 2:30 pm	
Lab Number:		1524528.6	1524528.7	1524528.8	1524528.9	
Individual Tests						
Dry Matter	g/100g as rcvd	89	85	82	80	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES	mg/kg dry wt	1.38	2.3	6.5	24	-

Sample Type: Soil						
Sample Name:		6 2m 13-Jan-2016 12:35 pm	7 0.3m 13-Jan-2016 1:50 pm	8 0.3m 13-Jan-2016 2:12 pm	9 0.3m 13-Jan-2016 2:30 pm	
Lab Number:		1524528.6	1524528.7	1524528.8	1524528.9	
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	9	4	8	6	-
Total Recoverable Cadmium	mg/kg dry wt	0.41	0.14	0.76	0.38	-
Total Recoverable Chromium	mg/kg dry wt	16	25	20	20	-
Total Recoverable Copper	mg/kg dry wt	59	32	46	33	-
Total Recoverable Lead	mg/kg dry wt	100	43	182	115	-
Total Recoverable Nickel	mg/kg dry wt	22	21	29	19	-
Total Recoverable Zinc	mg/kg dry wt	280	90	230	195	-
Polycyclic Aromatic Hydrocarbons Screening in Soil						
Acenaphthene	mg/kg dry wt	0.05	< 0.03	0.05	0.65	-
Acenaphthylene	mg/kg dry wt	0.09	0.17	0.50	5.0	-
Anthracene	mg/kg dry wt	0.20	0.18	0.64	9.1	-
Benzo[a]anthracene	mg/kg dry wt	0.71	1.15	3.9	17.1	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.93	1.58	4.2	15.8	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	1.10	1.82	5.5	16.5	-
Benzo[g,h,i]perylene	mg/kg dry wt	0.59	0.98	2.7	8.7	-
Benzo[k]fluoranthene	mg/kg dry wt	0.40	0.73	2.2	6.9	-
Chrysene	mg/kg dry wt	0.69	1.00	3.4	14.9	-
Dibenzo[a,h]anthracene	mg/kg dry wt	0.15	0.24	0.68	2.3	-
Fluoranthene	mg/kg dry wt	1.25	2.1	8.0	50	-
Fluorene	mg/kg dry wt	0.06	0.03	0.10	2.4	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.64	1.13	3.2	9.7	-
Naphthalene	mg/kg dry wt	0.17	< 0.14	< 0.14	0.26	-
Phenanthrene	mg/kg dry wt	0.80	0.40	2.0	59	-
Pyrene	mg/kg dry wt	1.23	1.85	6.7	44	-

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
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-9
Polycyclic Aromatic Hydrocarbons Screening in Soil	Sonication extraction, Dilution or SPE cleanup (if required), GC-MS SIM analysis (modified US EPA 8270). Tested on as received sample. [KBIs:5786,2805,2695]	0.010 - 0.05 mg/kg dry wt	1-9
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	1-9
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES	BaP Potency Equivalence calculated from Benz(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1 + Chrysene x 0.01 + Dibenz(a,h)anthracene x 1 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.002 mg/kg dry wt	1-9

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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Ara Heron BSc (Tech)
Client Services Manager - Environmental Division

units:	mg/kg	BAP in TEQ								avg	UCL	GV
Name:	1	2	3	4	5	6	7	8	9			
Lab #:	1524528	1524528	1524528	1524528	1524529	1524529	1524529	1524529	1524529			
Depth (m):	0.3	0.5	0.3	0.3	0.3	2	0.3	0.3	0.3			
BAP-e	3.5	0.34	0.24	1.45	0.92	1.38	2.3	6.5	24	4.5	22.0	24
As	7	11	4	4	3	9	4	8	6	6.2	12.5	45
Cd	0.24	0.23	0.05	0.05	0.1	0.41	0.14	0.76	0.38	0.26	0.79	230
Cr	19	14	31	20	19	16	25	20	20	20.4	31.9	1500
Cu	26	11	11	13	18	59	32	46	33	27.7	66.2	> 10,000
Pb	71	10.8	21	34	66	100	43	182	115	71.4	196	500
Ni	27	19	11	14	16	22	21	29	19	19.8	33.2	1800
Zn	79	46	69	68	64	280	90	230	195	125	324	7000

colored cells at 1/2 LOD

GEOSOLVE

Geotechnical Report for Building Consent

380 South Road

Caversham, Dunedin

Report prepared for:

Mark Lambert

Report prepared by:

GeoSolve Ltd

Distribution:

Mark Lambert

Richard Wilden Design Ltd

GeoSolve Limited (File)

February 2016

GeoSolve Ref: 150805

ACENZ
MEMBER

GEOSOLVE

Table of Contents

1 Introduction

1.1 General

This report presents the results of geotechnical investigations carried out by GeoSolve Ltd in order to determine subsoil conditions and provide geotechnical inputs for a proposed set of apartments at 380 South Road in Caversham, Dunedin. Geotechnical design parameters for retaining wall design are also provided.

Photo 1 – Proposed building site, 380 South Road

The investigations were carried out for Mark Lambert in accordance with GeoSolve Ltd's proposal dated 10 December 2015, which outlines the scope of work and conditions of engagement.

1.2 Development

We understand the proposed development is for construction of five two-storey residential units on the 0.13ha site. We are in receipt of undated conceptual plans by Richard Wilden Design Ltd (ref Caversham Apartments, Resource Consent Rev B) indicating the approximate extents of the proposed development. Some ground retention of earthworks cuts are expected to be required adjacent to the westernmost units.

There are no current plans for placement of the excavated soils, however these soils could be distributed as fill elsewhere on the property. There are no plans for engineered fills at this stage.

Figure 1a, Appendix A shows the intended building footprints and Figures 2a and 2b show cross sections of the site.

2 Site Description

2.1 General

The subject property is located at Caversham which is situated approximately 3km southwest of central Dunedin. The property is accessed from South Road and lies adjacent to the Main South railway line and the Caversham Bypass motorway.

The site is currently undeveloped and being used as a carpark, having been extensively modified during the reconstruction and realignment of the railway between 1906 and 1914, and again in the late 1960s during motorway construction. The remnants of a concrete bridge abutment which formerly supported a railway overpass lie just north of the site boundary.

South Road bounds the site to the south, with retail premises to the east and Kiwirail land to the north, with the Barnes Drive access ramp bounding the western extents of the site.

2.2 Topography and Surface Drainage

The building site has been surveyed and the site topography has been provided by Richard Wilden Design Ltd (ref Caversham Apartments, Resource Consent Rev B).

The majority of the building site is gently sloping towards the east at about 3°, with steep slopes between 20 and 30° occupying the northwestern to southwestern margins.

The difference in elevation between the highest and lowest surveyed parts of the site is approximately 6m.

The site is naturally free draining and no spring flows are evident on the site.

3 Geotechnical Investigations

An engineering geological site appraisal has been undertaken with confirmatory subsurface investigations. GeoSolve Ltd visited the subject property on 22 December 2015 and 13 January 2016, undertaking geotechnical investigations comprising eight test pits which were advanced to a maximum depth of 2.8m. Heavy-duty Dynamic Cone Penetrometer (HDCP) tests were undertaken in the centre of each proposed building platform location advancing to refusal.

Test pit and HDCP locations and logs are contained in Appendices A and B respectively.

4 Subsurface Conditions

4.1.1 Regional Geology

The geology of the Dunedin area is dominated by volcanic rock types of basaltic to andesitic composition that were intruded through pre-existing marine sediments during Miocene times. Extensive volcanism at that time produced lava flows and bedded volcanoclastic materials were widely distributed by eruptions. The generalized stratigraphic profile comprises schist at depth, overlain by a Cretaceous to Tertiary-age sequence; initially by thin non-marine sediments and then a thick accumulation of marine sediments including sandstones and mudstones. The volcanic rock types cross cut these sediments where vents were present and extensively mantle them where lava flows or volcanic ejecta were deposited.

More recently (Pleistocene times), the hills of Dunedin have been extensively mantled by windblown loess to depths of up to several metres, with some aeolian sand deposition in coastal areas.

Watercourses and tidal embayments such as Otago Harbour have locally deposited alluvial, estuarine and marine deposits and generally modified the volcanic landscape by deep incision and sedimentation.

More recently (Pleistocene times), sea level changes have modified the low-lying areas.

Drainage and infilling of low-lying estuarine and back-beach environments in much of the South Dunedin area has been undertaken since European settlement. Fill and refuse has been placed at various sites throughout the district and this is frequently uncompacted and uncontrolled.

4.1.2 Seismicity

Dunedin has traditionally been considered to have lower than average seismic activity when compared to other areas in New Zealand, however nearby active faults are known and strong shaking is certain to occur periodically, with potential for liquefaction and settlement where land is reclaimed or contains susceptible natural alluvium, estuarine deposits or marine infill. Earthquake shaking also has the potential to destabilise slopes (e.g. where slopes are over-steepened, unfavourably oriented or comprise susceptible soil types such landslide debris, softened/organic soils or fill).

McCahon et al (1993)[1] states that the earthquake hazard in Dunedin is dominated by relatively infrequent moderate to large earthquakes (magnitude up to M_w 7.5) in eastern Otago, and large to very large earthquakes in the much more seismically active Fiordland and Westland regions.

The nearest active faults with demonstrated Late Quaternary movement history are the Green Island Fault and the Akatore Fault. The Green Island Fault is currently considered to be the cause of the 1974 earthquake that caused damage in Dunedin. It is mapped approximately 5km to the southwest of the subject site, but its projection is believed to continue through South Dunedin and may run northeast up the harbour in which case it would pass within about 2km of the site. The Akatore Fault has also been projected beneath South Dunedin; the nearest mapped trace of the fault is truncated about 600m southeast of the site, but the fault likely continues beneath South Dunedin and may run northeast up the harbour as well. Sheared fault rocks have been identified in recent drilling near Portsmouth Drive indicating that continuation of fault traces up the harbour is very probable. It should be noted the fault terminations shown on fault trace maps are often approximations (owing to lack of data) and the presence of other active faults may be unknown because they may be obscured by overburden soils. Both of these faults are likely to be capable of generating magnitude 7.5 earthquakes in Dunedin. Other known faults that have some potential to cause strong shaking in Dunedin are the Titri Fault and the North Taieri Fault, located roughly 7km and 10km northwest of the site, respectively.

The above faults are not included in Table 3.6 of NZS 1170.5:2004 as a major fault requiring near fault factors when assessing structural design actions. Recent events in Canterbury have highlighted the issue that previously unidentified faults may be very significant factors in the actual future risk that applies to any particular site.

Strong ground shaking throughout the South Island is likely to be associated with a rupture of the Alpine Fault, located along the West Coast of South Island. There is a high probability that an earthquake with an expected magnitude of over 8 will occur along the Alpine Fault within the next 50 years.

Estimated average return periods for shaking intensity are: MM 7 = 100 years, MM 8 = 450 years and MM 9 = >2,500 years. The most recent major earthquake to affect Dunedin occurred in 1974 and produced damage consistent with MM 7 intensity.

[1] The Earthquake Hazard in Dunedin I F McCahon, M D Yetton, D R L Cook (EQC funded report 91/56 - June 1993)

4.2 Site Stratigraphy

A geological model for the site is shown in Figure 2, Appendix A. More detailed geological description of soils is provided in the test pit logs contained in Appendix B.

Apart from a thin layer of surficial topsoil or asphalt, the site is underlain by variable consistency uncontrolled fill, which is interpreted to overlie Caversham Sandstone, to a depth of approximately 6 to 7.5m bgl (below ground level) across most of the site. The natural ground surface at depth is interpreted to slope gently towards the south and east.

Topsoil comprises soft organic SILT with organic rootlets.

Underlying this surficial topsoil layer (or in some cases, a surficial layer of asphalt and well-graded gravelly basecourse) is variable **uncontrolled fill** which comprises soft to firm SILT with some/trace sand, loose gravelly SAND with some silt, or units of intermediate consistency. In most locations, the fill includes cobbles and boulders up to 300mm, and significant quantities of rubbish including tabular or columnar blocks of concrete up to 1.0m, bricks, wood/timber, crockery, asphalt, glass & plastic bottles, glass fragments, PVC irrigation-type pipe, plastic rubbish bags, plastic bags, ceramic pipes & fragments, crockery & fencing. In three of the test pits, reworked Caversham Sandstone was identified comprising medium dense to very dense fine SAND.

The exact date of the uncontrolled fill placement is unknown, however available aerial photographs suggest that fill had been recently placed in an image dated 1990. Older images, such as 1978, appear to show the site occupied by lower-lying land with a crest adjacent to South Road, with possibly some hummocky topography, probably indicative of earlier fill soils.

The uncontrolled fill is interpreted to be underlain by in-situ **Caversham Sandstone** bedrock (based on historical geological mapping, HDCP testing and nearby outcrops). HDCP tests met refusal at depths generally ranging from 5.9 to 7.7m bgl. One test (HDCP2) met refusal at 4.7m bgl, but this is interpreted to have met refusal on a large boulder or rubbish (e.g. concrete) as opposed to bedrock. It should be noted that in most cases the HDCP results indicate a rapid improvement from relatively soft soils to refusal and that this transition most likely represents the base of the fill. The rapid refusal is likely to relate to earlier earthworks for the railway cutting which may have removed any original weathered bedrock or overburden soils.

A detailed ground model for the site can be found in Appendix A, Figure 2.

Full details of the observed subsurface stratigraphy can be found within the test pit logs contained in Appendix B.

4.3 Groundwater

No groundwater seepage was observed in any of the test pits during investigations. The soils observed were predominantly dry to moist in condition. Perched groundwater may develop on the contact between the Caversham sandstone bedrock and overlying fill during times of high rainfall however this contact is likely to be well below any cuts proposed.

4.4 Slope Stability

The uncontrolled fill tapers to the north of the site on a steep (20°) slope, which steepens up to 28° in part. This slope is partly retained adjacent to the northeastern site boundary by the remnants of an historic concrete bridge abutment on neighbouring Kiwirail land. Portions of this slope are oversteepened and may experience instability, particularly during moderate to large seismic events or periods of heavy rainfall due to the variable, loose/soft nature of the uncontrolled fill. However

no evidence of slope instability was noted and the precedent performance of the slope appears to have been favourable to date despite the occurrence of several severe storm events in recent years.

Details of the concrete bridge abutment design are not known, however it is likely the remaining portions of the structure were not designed to retain the fill soils upslope in the absence of the demolished parts of the bridge abutment.

5 Engineering Considerations

5.1 General

The recommendations and opinions contained in this report are based upon ground investigation data obtained at discrete locations and historical information held on the GeoSolve database. The nature and continuity of subsoil conditions away from the investigation locations is inferred and cannot be guaranteed.

5.2 Geotechnical Parameters

Table 5.1 provides a summary of the recommended geotechnical design parameters for the soil materials expected to be encountered during construction of the proposed dwelling.

Table 5.1 – Recommended geotechnical design parameters

Unit	Thickness (m)	Bulk Density γ (kN/m^3)	Effective Cohesion c' (kPa)	Effective Friction ϕ' (deg)	Elastic Modulus E (MPa)	Poissons Ratio ν
Topsoil (soft-firm organic SILT)	0.1-0.2	16	NA	NA	NA	NA
Uncontrolled fill* (highly variable)	> 2.8m	16	NA	NA	NA	NA
Caversham Sandstone (highly to slightly weathered, weak to moderately strong SANDSTONE)	Not proven	20	5	32	50	0.25

* Uncontrolled fill – proven to a depth of 2.8m but likely to be continuous to between 6 and 8m.

5.3 Site Preparation

During the earthworks operations all topsoil, organic matter, fill and other unsuitable materials should be removed from the construction areas in accordance with the recommendations of NZS 4431:1989. Fill soils can remain in place below structures provided piled foundations area adopted (see section 5.8).

Owing to the moderately erodible nature of some of the soils present across the site, sediment control measures should be instigated during earthworks construction.

Water should not be allowed to pond or collect near or under a foundation slab. Positive grading of the subgrade should be undertaken to prevent water ingress or ponding.

Owing to the existing deep fill soils on site, engineered fill is unlikely to required, however all fill that is utilised as bearing for foundations should be placed and compacted in accordance with the recommendations of NZS 4431:1989 (including verification of adequate subgrade conditions) and certification provided to that effect. Such a proposal would most likely require significant under-cutting of existing fill. An earthfill specification could be provided on request.

We recommend topsoil stripping and subsequent earthworks be undertaken only when a suitable interval of fair weather is expected, or during the earthworks construction season.

5.4 Liquefaction

Liquefaction occurs when susceptible, saturated soils attempt to move to a denser state under cyclic shearing.

Soils susceptible to liquefaction have the following characterises:

- Saturated. Below the ground water level;
- Have "sand like" behaviour[2]; and
- Are in loose or medium dense condition.

At this site, the unsaturated uncontrolled fill is not considered to be susceptible to liquefaction.

5.5 Excavations

Site plans provided by Richard Wilden Design Ltd show the natural site contours in the vicinity of the proposed building platform. Cross section B-B' (Figure 2b, Appendix A) indicates cuts of up to approximately 1.6m in depth are required along the western and southwestern portions of the site in order to construct the proposed building platforms. As floor elevations are unknown at this stage, the depth of cut could vary somewhat.

No seepage was encountered during test pitting and hence groundwater is unlikely to be encountered during excavations. However a geotechnical practitioner should inspect any seepage, spring flow or under-runners that may be encountered during construction.

It is recommended permanent batters in the uncontrolled fill and topsoil on site are formed at angles no greater than 2.5 : 1 (Horizontal to Vertical) in dry ground, for slopes less than 2m.

We recommend all excavations be inspected by a geotechnical practitioner during earthworks construction.

The subsurface materials will be relatively easy to excavate by conventional methods. Caversham Sandstone bedrock rock is expected at shallow depth but excavations are unlikely to encounter this.

5.6 Ground Retention

Owing to the cuts required for proposed units 2 and 3, some ground retention is likely to be required. Any retaining wall proposed should be designed by a chartered professional engineer.

Walls retaining cuts up to 1.5m in height bounding the western and southwestern parts of the site (adjacent to the proposed units 2 and 3) should be designed using a bulk density of 18kN/m^3 and a friction angle of 25°.

Due allowance should be made during the detailed design of all retaining walls for any additional loads upslope of the wall (i.e. surcharge due to backslope). Due to the variable nature of the uncontrolled fill and likely differential in bearing capacity across the length of any retention structure, flexible gravity walls such as gabion baskets or timber crib walls should be used in preference to cantilevered walls and it will be important to consider the condition of the underlying uncontrolled fill subgrade in design.

[2] "Geotechnical earthquake engineering practice: Module 1 Guideline for the identification, assessment and mitigation of liquefaction hazards", Rev 0, July 2010. New Zealand Geotechnical Society. This document states that soil with: Fc <30%, or; Fc >30% and PI < 7% (where Fc= percent passing a 0.075mm sieve and PI=plasticity index) is considered as "sand-like" and is susceptible to liquefaction.

Temporary cuts can be advised when earthworks design has been developed, particularly if large cuts are proposed, however temporary slopes for retaining wall construction less than 1.5m high should be battered at 1 : 1. Where these batter slopes cannot be achieved temporary support may be required and further geotechnical engineering advice should be sought.

Groundwater was not identified in the test pits but has the potential to develop following completion of the earthworks, in particular as a result of heavy or prolonged rainfall. To ensure potential groundwater seeps and flows are properly controlled behind the retaining walls, the following recommendations are provided:

- A minimum 0.3m width of durable free draining granular material should be placed behind all retaining structures;
- A heavy duty non-woven geotextile cloth, such as Bidim A14, should be installed between the natural ground surface and the free draining granular material to prevent siltation and blockage of the drainage media; and
- A heavy-duty (TNZ F/2 Class 500) perforated pipe should be installed within the drainage material at the base of all retaining structures to minimise the risk of excessive groundwater pressures developing. This drainage pipe should be connected to the permanent piped storm water system.

5.7 Groundwater Issues

The watertable is expected to lie well below the indicated finished floor levels. Dewatering or other groundwater-related construction issues are therefore unlikely to be required. It is important that GeoSolve be contacted should there be any seepage, spring flow or under-runners encountered during construction.

5.8 Slope Stability

No instability was identified during the time of inspection and the slope performance to date appears to have been satisfactory, however this should be re-assessed following vegetation removal and the excavation should proceed only under geotechnical supervision. The finished subgrade should be inspected by a geotechnical practitioner to ensure that no shear surfaces or other unstable features are exposed.

Owing to the oversteepened slope on the northwestern portion of the site, care will be required to ensure the development does not promote slope instability. It is expected foundations will be designed to bear entirely on in-situ Caversham Sandstone (discussed in section 5.9 below), which will effectively prevent the new structures from imparting a surcharge to the slope. Any ancillary structures (e.g. timber decking) constructed on site should be cantilevered or detached from the main units unless they are designed with foundations which also bear on in-situ Caversham Sandstone.

Care will be required to ensure the development does not promote slope instability on the steeper parts of the site. No steepening, cutting or loading of the fill slope should be carried out unless design checks have been carried out. Placement of uncontrolled side-cast fill should be avoided on the slope and adequate setbacks should be defined for structures and areas of surcharge adjacent to moderate or steep slopes. No stormwater or wastewater should be discharged to these slopes and all potential sources of slope saturation should be piped to the stormwater system.

All cuts should be subject to inspection during construction and if higher than 2 metres should be subject to specific design checks or geotechnical supervision.

5.9 Foundation Considerations

Foundation selection will primarily be governed by the presence of large quantities of uncontrolled fill on the site. Typical slab-on-grade shallow foundations without treatment of the existing fill are not recommended due to the high potential for differential settlement in the highly variable uncontrolled fill, particularly due to its thickness (expected to be greater than 6m in most cases), its soft consistency/low density, and the presence of some organics and large timbers. The fill will also likely settle non-uniformly under seismic loading or if it becomes saturated.

The options are to transfer the foundation loads to competent soils below the fill (i.e. piling) or to improve the condition of the fill by replacement and/or recompaction.

It is unlikely that removal and replacement/recompaction of the fill would be economical due to the depth and variability of fill and the limited site footprint.

Piles bearing on Caversham Sandstone bedrock will provide a robust solution at the site and would significantly reduce the risks associated with settlement.

5.9.1 Piling

Geotechnical inspection of the pile sets/holes or foundation excavations should be carried out and the contractor should be instructed to note any holes where voids or particularly soft soils are encountered.

A structural engineer should design the piling system with reference to this report. Piles will need to be designed for both vertical and lateral loads, taking account of negative skin friction effects due to consolidation of the uncontrolled fill under static loading..

We estimate that the negative skin friction on the piles within the fill will increase from 0 kPa at the surface at a rate of 5kPa/m depth (i.e. at 3m depth the NSF will be 15kPa) A load factor of 1.5 should be applied to the downdrag loading.

5.9.1.1 Bored piles

Bored concrete piles could be considered and moderate end bearing is expected to be available on the bedrock contact beyond approximately 6-8m depth (subject to construction inspection).

Specialist rigs will be required for this option which will likely make it expensive.

Preliminary ultimate geotechnical end bearing of 5MPa is estimated in the sandstone based on HDCP results. Higher values are likely to be achievable but would require confirmation by cored boreholes and laboratory testing of cores. A strength reduction factor of 0.5 should be used in conjunction with the above value.

Geotechnical inspection is required to ensure that the fill has been fully penetrated and that adequate end bearing is available.

5.9.1.2 Driven piles

A trial would be required to confirm feasibility of a driven pile solution, including confirmation that these can be placed vertically (or at least within construction tolerances) as obstructions within the fill may cause premature refusal or deflection of piles. Pre-augering or spiking pile locations can help mitigate this issue.

These piles require no concrete footing and can be installed by contractors with pile driving capability. If favoured, then round H5 treated timber piles of 200mm diameter are relatively standard and are likely to be appropriate. Alternatively steel H piles could be considered. The driven

depth of the piles is likely to be variable depending on fill thickness and would need to be confirmed by measurement of pile sets and comparison with available geotechnical information.

It is likely the set can be rapidly attained at the inferred bedrock contact. Depths are likely to vary from 6 to 8 metres and hence specialised equipment (available locally) would be required. We can advise on a specification for pile driving and the pile sets if the structural engineer can provide the loadings for each pile. Following this a trial should be arranged to confirm methodology.

There is some risk to the neighbouring retail shops east of the site from vibrations during driving of piles and this will need to be considered prior to trial piling if this method is selected.

The piles should be driven to achieve a set determined using appropriate pile driving formula (e.g. wave equation analysis or Hiley formula).

The ultimate capacity that the piles are to be driven to should also include the effects of the negative skin friction (NSF) over the upper 6 metres. It should be noted that "positive skin friction" (PSF) will resist driving and so the target driving resistance should take this into account. At this site rapid refusal of piles on bedrock is expected.

The relationship between the various loads is presented below:

$$R_{ult} = \frac{ULS + NSF}{\phi_g}$$

$$R_{Drive} = R_{ult} + PSF$$

Where R_{ult} = Geotechnical Ultimate Capacity (kN)
ULS = Ultimate Limit State Load (kN) excluding NSF
NSF = Negative Skin Friction (kN)
PSF = Positive Skin Friction (kN)
ϕ_g = strength reduction factor, 0.5 recommended
R_{Drive} = Capacity pile is to be driven to achieve (kN)

Set requirements can be confirmed once structural loadings and the pile hammer details are confirmed.

5.9.1.3 Screw Piles

A screw pile consists of a steel circular hollow section with a helix welded on the tip and is installed by screwing it tip first into the ground. This piling method is advantageous as minimal vibration and noise is caused during construction, and it can be designed for both tension and compression forces. The design of screw pile is specialist and typically undertaken by the contractor who will be installing the piles. Obstructions within the fill may cause some issues and will need to be considered.

Specialist contractors should be contacted to ascertain feasibility and cost of this option. They may require cored boreholes to confirm their design.

5.10 Site Subsoil Category

For detailed design purposes it is recommended the magnitude of seismic acceleration be estimated in accordance with the recommendations provided in NZS 1170.5:2004.

The site is Class C (Shallow soil site) in accordance with NZS 1170.5:2004 seismic provisions. The soil parameters for static conditions given above require no downgrading for seismic bearing. (The materials are not subject to liquefaction or other strength loss on cyclic loading.)

6 Neighbouring Structures/Hazards

Natural Hazards: Provided the recommendations within this report are adopted, the site is unlikely to be subject to damage from erosion, falling debris, subsidence, slippage or inundation from any source.

Fill Site: Ground contamination inputs are beyond the scope of this report. We understand an environmental engineering consultant has been engaged to advise further on possible requirements of the National Environmental Standard (Soil) owing to the fill on site.

Distances to adjoining structures: Providing adequate retention is provided for any cut slopes, no adverse geotechnical implications apply for neighbouring properties during construction of the proposed units. Checks should be carried out when design is at the detailed stage.

Aquifers: No aquifer resource will be adversely affected by the development.

Erosion and Sediment Control: The site presents some potential to generate silt runoff and this would naturally drain downslope. Effective systems for erosion control are runoff diversion drains and contour drains, while for sediment control, options are earth bunds, silt fences, hay bales, vegetation buffer strips and sediment ponds. Only the least amount of subsoil should be exposed at any stage and surfacing established as soon as practical. Details for implementation are given within the following link:

http://ecan.govt.nz/publications/General/FullErosionandSedimentControlGuideline.pdf

Noise: Rock-breaking and/or blasting is unlikely to be required.

Dust: Regular dampening of soil materials with sprinklers should be effective if required.

Vibration: The effects of pile driving vibrations on neighbouring structures should be considered.

7 Conclusions and Recommendations

- The site is underlain by highly variable uncontrolled fill which extends to at least 2.8m (and most likely deeper) beneath the surface in the area of the proposed building platforms. Caversham Sandstone bedrock is expected to underlie this fill at moderate depths of approximately 6 to 8m across most of the site.
- Retention design directly adjacent (west of) the proposed units 2 and 3 should adopt the geotechnical parameters outlined in section 5.6 for a retaining wall less than 1.5m in height.
    - This retaining wall should be of the flexible gravity type to help accommodate any differential settlement occurring due the likely variability of available bearing capacity in the founding soils, such as gabion baskets or timber cribs. Cantilevered retention structures should be avoided.
    - Due to the highly variable nature of the fill on site, any additional or alternative retention design should be subject to specific investigation and design.
- Permanent dry cut batters should be formed at no greater than 2.5 : 1 (Horizontal to Vertical) if cuts are less than 2m. Specific design will be required for larger cuts.
- All temporary slopes for retaining wall construction should be battered at 1 : 1 if less than 1.5m high. Where these batter slopes cannot be achieved temporary support may be required.
- The proposed earthworks design should be agreed with GeoSolve prior to construction.
- A geotechnical practitioner should inspect all excavations and additionally any seepage, spring flow or under-runners that may be encountered during construction.
- Bearing on the site (at depth) will be governed by Caversham Sandstone, which generally provides excellent end bearing for piled foundations.
- Typical slab-on-grade shallow foundations are not recommended due to the high potential for differential settlement in the highly variable uncontrolled fill.
- There are a number of pile options available at the site. Driven timber piles are likely to be the lowest cost option, although there may be issues due to obstructions within the fill. Bored or screw piles are available as alternative options.
- Construction considerations should take into account the buried stormwater infrastructure on site and potential for vibration damage to neighbouring structures so that damage is prevented.

8 Applicability

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

It is important that we be contacted if there is any variation in subsoil conditions from those described in this report.

Report prepared by:

.....

Rob Stuff

Engineering Geologist

Reviewed for GeoSolve Ltd by:

.....

Mark Walrond

Senior Engineering Geologist

Authorised for GeoSolve Ltd by:

.....

Colin Macdiarmid

Senior Geotechnical Engineer

Appendix A: Site Plans & Cross Sections

Key

= Heavy-duty Dynamic Cone Penetrometer Test Location (HDCP)

= Test Pit Location

= Section Facing and Location

= Provisional Location of Proposed Apartments 1 through 5

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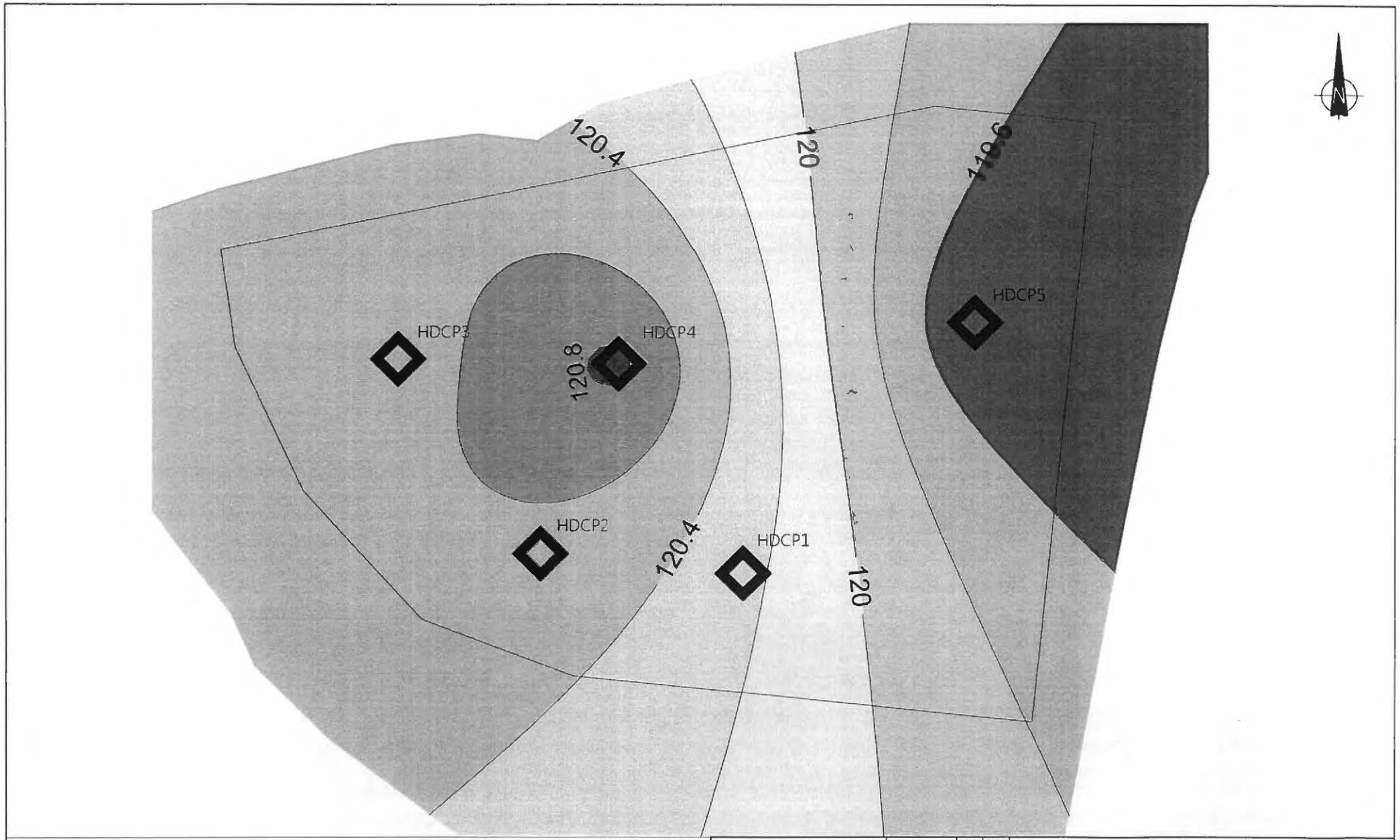
DRAWN	RS	01/2016
DRAFTING CHECKED	RS	01/2016
APPROVED	MTW	01/2016
CADFILE: Site Plan.ai		
SCALES (AT A3 SIZE): AS SHOWN		
PROJECT No: 150805		
FIG No: Figure 1a		
REV: 1		

Mark Lambert
Proposed Caversham Apartments
380 South Road, Dunedin
Site Plan



GEOSOLVE

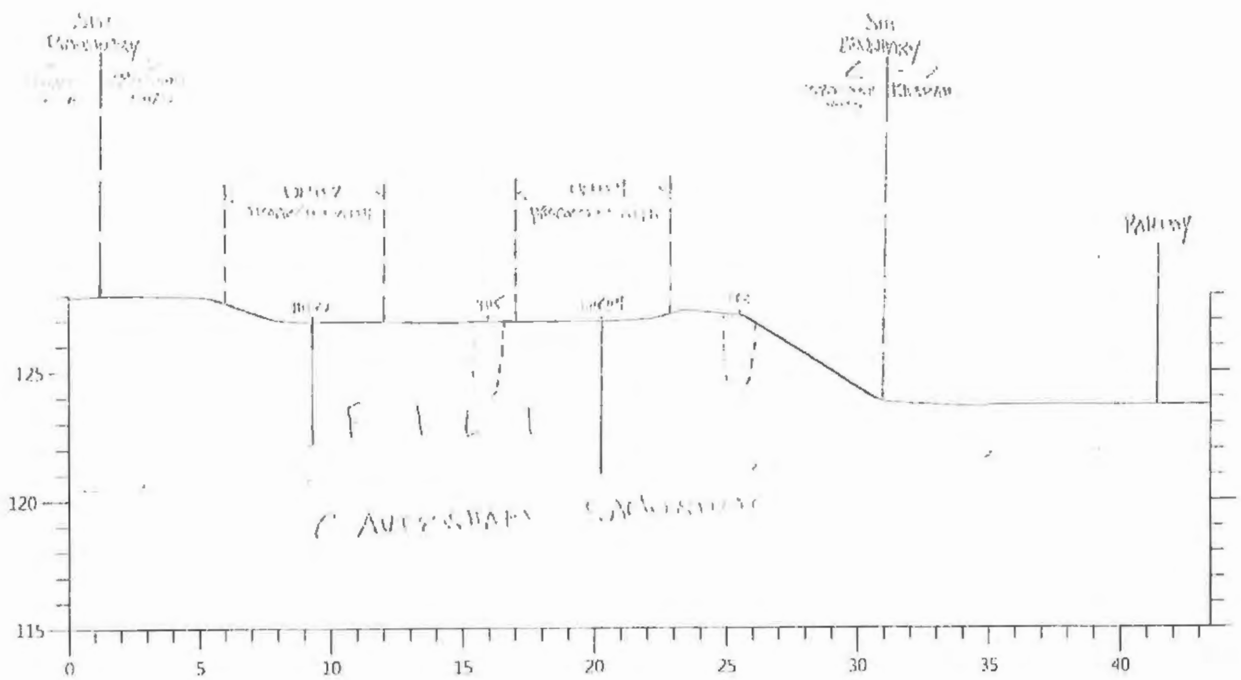
Level 1, 70 MacAndrew Road, South Dunedin
www.geosolve.co.nz

DRAWN	WCG	01/2016
DRAFTING CHECKED	RS	01/2016
APPROVED	MTW	01/2016
CADFILE: Base of fill.pdf		
SCALES (AT A3 SIZE): AS SHOWN		
PROJECT No: 150805		

Mark Lambert
Proposed Caversham Apartments
380 South Road, Dunedin
Site Plan - RL at Base of Fill

FIG No: Figure 1b

REV: 1



SCALE 1:200

0 2 4 6 8 10 (m)

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AS SHOWN

150805

Mark Lambert

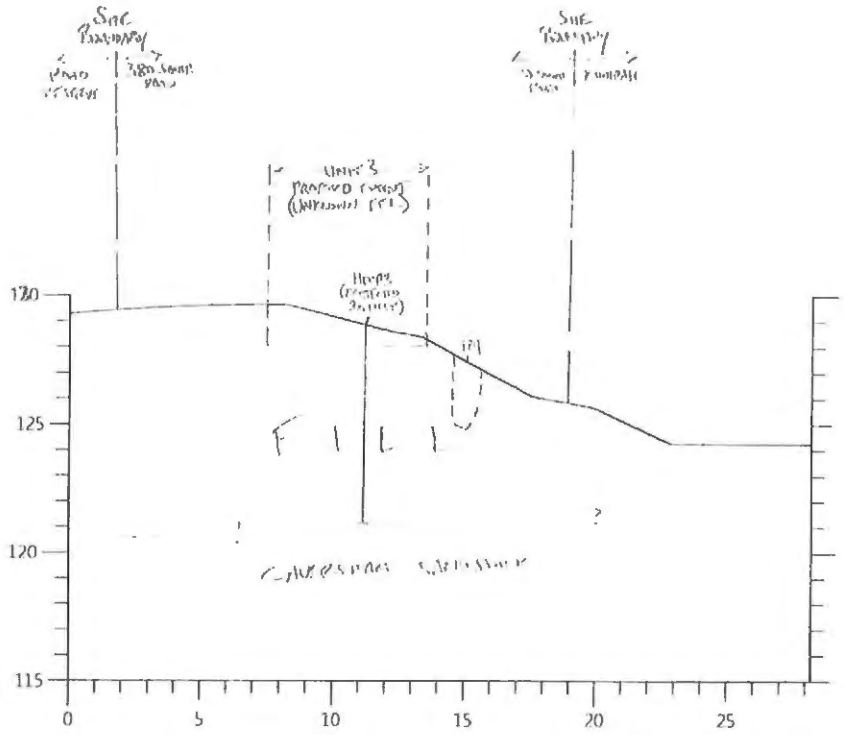
380 South Road, Caversham

Geotechnical Investigations

Cross Section A - A'

Figure 2a

1



SCALE 1:200

0 2 4 6 8 10 (m)

GEOSOLVE

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DRAWN	MCG	01/08/15
CHECKED	ES	01/10/15
APPROVED	MRC	01/10/15

SCALE (AT A1 SIZE): AS SHOWN

JOB NO: 150805

Mark Lambert

Proposed Caversham Apartments

380 South Road, Dunedin

Cross Section B-B'

FIG NO: Figure 2b

REV: 1

Appendix B: Investigation Data

GEOSOLVE

GeoSolve Ltd
EXCAVATION LOG

EXCAVATION NUMBER: **TP 1**

PROJECT: SOUTHROAD380-2015		Job Number: 150805
LOCATION: See Site Plan	Inclination:	Direction:

EASTING:	mE	EQUIPMENT: 3.5t excavator	OPERATOR: Brent
NORTHING:	mN	INFOMAP NO.	COMPANY: Mason Quality Excavation
ELEVATION:	m	DIMENSIONS:	HOLE STARTED: 13-Jan-16
METHOD:		EXCAV. DATUM: GL	HOLE FINISHED: 13-Jan-16

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.9		Grey, gravelly SAND with some silt. Gravel is fine to coarse, angular. Sand is fine to coarse, subangular. Some cobbles up to 150mm. Some rubbish including plastic, brick fragments. Well graded. Loose.	Dry to moist	FILL
		1.3		Light brown & light grey, SILT with some sand. Sand is fine to coarse, subangular. Some cobbles up to 100mm. Non-plastic. Soft.	Moist	FILL
		1.9		Grey, gravelly SAND with some silt. Gravel is fine to coarse, angular. Sand is fine to coarse, subangular. Some cobbles up to 150mm. Some rubbish including plastic, brick fragments, large (400mm) tabular chunks of concrete. Well graded. Loose.	Moist	FILL
	NO SEEPAGE	2.7		Mottled light brown, grey & orange, SILT with trace sand. Mottled texture, not in-situ. Could be cleanfill. Non-plastic. Firm.	Moist	FILL

Total Depth = 2.7 m

COMMENT:	Logged By: RS
	Checked Date: 15-Jan-16
	Sheet: 1 of 1

GEOSOLVE

GeoSolve Ltd
EXCAVATION LOG

EXCAVATION NUMBER: **TP 2**

PROJECT: SOUTHROAD380-2015			Job Number: 150805
LOCATION: See Site Plan		Inclination:	Direction:

EASTING:	mE	EQUIPMENT: 3.5t excavator	OPERATOR: Brent
NORTHING:	mN	INFOMAP NO.	COMPANY: Mason Quality Excavation
ELEVATION:	m	DIMENSIONS:	HOLE STARTED: 13-Jan-16
METHOD:		EXCAV. DATUM: GL	HOLE FINISHED: 13-Jan-16

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.05				ASPHALT
		0.15		Black/grey, sandy GRAVEL. Medium dense.	Dry	BASECOURSE
	NO SEEPAGE	2.6		Grey, gravelly SAND with some silt. Gravel is fine to coarse, angular. Sand is fine to coarse, subangular. Some boulders up to 300mm. Some rubbish including plastic, bricks & brick fragments, ~1980s fizz can. Well graded. Loose.	Dry to moist	FILL

Total Depth = 2.6 m

COMMENT:

Logged By: RS
Checked Date: 15-Jan-16
Sheet: 1 of 1

GEOSOLVE

GeoSolve Ltd
EXCAVATION LOG

EXCAVATION NUMBER:
TP 3

PROJECT: SOUTHROAD380-2015		Job Number: 150805
LOCATION: See Site Plan	Inclination:	Direction:

EASTING:	mE	EQUIPMENT: 3.5t excavator	OPERATOR: Brent
NORTHING:	mN	INFOMAP NO.	COMPANY: Mason Quality Excavation
ELEVATION:	m	DIMENSIONS:	HOLE STARTED: 13-Jan-16
METHOD:		EXCAV. DATUM: GL	HOLE FINISHED: 13-Jan-16

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.1		Black, organic SILT.		TOPSOIL
	NO SEEPAGE	2.8		Black & grey/brown, SILT with some sand and gravel. Gravel & sand are fine to coarse, subangular. Cobbles and boulders up to 300mm. Extensive rubbish including bricks, large ~1m tabular and columnar blocks of concrete, wood, ceramic pipes & fragments, crockery. Non-plastic. Soft.	Dry to moist	FILL

Total Depth = 2.8 m

COMMENT:	Logged By: RS
	Checked Date: 15-Jan-16
	Sheet: 1 of 1

GEOSOLVE

GeoSolve Ltd
EXCAVATION LOG

EXCAVATION NUMBER:
TP 4

PROJECT: SOUTHROAD380-2015		Job Number: 150805
LOCATION: See Site Plan	Inclination:	Direction:

EASTING: mE	EQUIPMENT: 3.5t excavator	OPERATOR: Brent	
NORTHING: mN	INFOMAP NO.	COMPANY: Mason Quality Excavation	
ELEVATION: m	DIMENSIONS:	HOLE STARTED: 13-Jan-16	
METHOD:	EXCAV. DATUM: GL	HOLE FINISHED: 13-Jan-16	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.1		Black, organic SILT.		TOPSOIL
	NO SEEPAGE	2.5		Black & grey/brown, SILT with some sand and gravel. Gravel & sand are fine to coarse, subangular. Cobbles and boulders up to 300mm. Rubbish includes asphalt, bricks, glass & plastic bottles, glass fragments, PVC irrigation-type pipe, plastic rubbish bags, ceramic pipes & fragments, crockery. Non-plastic. Soft.	Dry to moist	FILL
		2.6		Light brown/tan, SAND. Reworked Caversham Sandstone. Sand is fine. Some large boulders, mostly cobble sized in weathered matrix. Very dense.	Dry to moist	FILL

Total Depth = 2.6 m

COMMENT:	Logged By: RS
	Checked Date: 15-Jan-16
	Sheet: 1 of 1

GEOSOLVE

GeoSolve Ltd
EXCAVATION LOG

EXCAVATION NUMBER: **TP 5**

PROJECT: SOUTHROAD380-2015		Job Number: 150805
LOCATION: See Site Plan	Inclination:	Direction:

EASTING:	mE	EQUIPMENT: 3.5t excavator		OPERATOR: Brent	
NORTHING:	mN	INFOMAP NO.		COMPANY: Mason Quality Excavation	
ELEVATION:	m	DIMENSIONS:		HOLE STARTED: 13-Jan-16	
METHOD:		EXCAV. DATUM: GL		HOLE FINISHED: 13-Jan-16	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.1				ASPHALT
		0.25		Black/grey, sandy GRAVEL. Medium dense.	Dry	BASECOURSE
		0.9		Light brown & light grey, SILT with some sand. Sand is fine to coarse, subangular. Some cobbles up to 100mm. Non-plastic. Soft.	Moist	FILL
		1.4		Mottled light brown & grey, SILT with trace sand. Mostly cleanfill with bits of wood and iron. Low plasticity. Soft to firm.	Moist	FILL
		2.5		Black & grey/brown, SILT with some sand and gravel. Gravel & sand are fine to coarse, subangular. Cobbles and boulders up to 300mm. Extensive rubbish including bricks, large ~1m tabular and columnar blocks of concrete, wood/timber, crockery, asphalt, glass & plastic bottles, glass fragments, PVC irrigation-type pipe, plastic rubbish bags, plastic bags, ceramic pipes & fragments, crockery & a chicken wire fence. Non-plastic. Soft.	Dry to moist	FILL
	NO SEEPAGE	2.8		Black, gravelly SAND. Sand & gravel are fine to coarse, angular. Some shells and shell fragments. Rubbish includes bits of crockery, iron, concrete, coal. Well graded. Loose.	Moist	FILL

Total Depth = 2.8 m

COMMENT:

Logged By: RS
Checked Date: 15-Jan-16
Sheet: 1 of 1

GEOSOLVE

GeoSolve Ltd
EXCAVATION LOG

EXCAVATION NUMBER: **TP 6**

PROJECT: SOUTHROAD380-2015		Job Number: 150805
LOCATION: See Site Plan	Inclination:	Direction:

EASTING:	mE	EQUIPMENT: 3.5t excavator	OPERATOR: Brent
NORTHING:	mN	INFOMAP NO.	COMPANY: Mason Quality Excavation
ELEVATION:	m	DIMENSIONS:	HOLE STARTED: 13-Jan-16
METHOD:		EXCAV. DATUM: GL	HOLE FINISHED: 13-Jan-16

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.1		Black, organic SILT.		TOPSOIL
		2.1		Light brown & light grey, SILT with some sand. Sand is fine to coarse, subangular. Some cobbles up to 100mm. Non-plastic. Soft.	Moist	FILL
	NO SEEPAGE	2.6		Light brown/tan, SAND. Reworked Caversham Sandstone. Sand is fine. Some boulders >300mm, mostly cobble sized in weathered matrix. Medium dense.	Dry to moist	FILL

Total Depth = 2.6 m

COMMENT:	Logged By: RS
	Checked Date: 15-Jan-16
	Sheet: 1 of 1

GEOSOLVE

GeoSolve Ltd
EXCAVATION LOG

EXCAVATION NUMBER: **TP 7**

PROJECT: SOUTHROAD380-2015		Job Number: 150805
LOCATION: See Site Plan	Inclination:	Direction:

EASTING:	mE	EQUIPMENT: 3.5t excavator		OPERATOR: Brent	
NORTHING:	mN	INFOMAP NO.		COMPANY: Mason Quality Excavation	
ELEVATION:	m	DIMENSIONS:		HOLE STARTED: 13-Jan-16	
METHOD:		EXCAV. DATUM: GL		HOLE FINISHED: 13-Jan-16	

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.8		Grey, gravelly SAND with some silt. Gravel is fine to coarse, angular. Sand is fine to coarse, subangular. Some cobbles up to 150mm. Some rubbish including plastic, brick fragments. Well graded. Loose.	Dry to moist	FILL
		1.1		Light brown/tan, SAND. Reworked Caversham Sandstone. Sand is fine. Some large boulders, mostly cobble sized in weathered matrix. Medium dense.	Dry to moist	FILL
	NO SEEPAGE	2.8		Black, gravelly SAND. Sand & gravel are fine to coarse, angular. Some shells and shell fragments. Rubbish includes bits of crockery, iron, concrete, coal, crockery, glass bottle fragments. Well graded. Loose.	Moist	FILL

Total Depth = 2.8 m

COMMENT:	Logged By: RS
	Checked Date: 15-Jan-16
	Sheet: 1 of 1

GeoSolve Ltd

EXCAVATION LOG

EXCAVATION NUMBER: **TP 8**

PROJECT: SOUTHROAD380-2015		Job Number: 150805
LOCATION: See Site Plan	Inclination:	Direction:

EASTING:	mE	EQUIPMENT: 3.5t excavator	OPERATOR: Brent
NORTHING:	mN	INFOMAP NO.	COMPANY: Mason Quality Excavation
ELEVATION:	m	DIMENSIONS:	HOLE STARTED: 13-Jan-16
METHOD:		EXCAV. DATUM: GL	HOLE FINISHED: 13-Jan-16

SCALA PENETRATION	GROUNDWATER / SEEPAGE	DEPTH (m)	GRAPHIC LOG	SOIL / ROCK CLASSIFICATION, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, WEATHERING, SECONDARY AND MINOR COMPONENTS	WATER CONTENT	GEOLOGICAL: SOIL / ROCK TYPE, ORIGIN, MINERAL COMPOSITION, DEFECTS, STRUCTURE, FORMATION
		0.05				ASPHALT
		0.15		Black/grey, sandy GRAVEL. Medium dense.	Dry	BASECOURSE
		0.8		Black & grey/brown, SILT with some sand and gravel. Gravel & sand are fine to coarse, subangular. Cobbles and boulders up to 300mm. Extensive rubbish including bricks, large ~1m tabular and columnar blocks of concrete, wood, ceramic pipes & fragments, crockery. Non-plastic. Soft.	Dry to moist	FILL
	NO SEEPAGE	2.7		Mottled light brown, grey & orange, SILT with trace sand. Mottled texture, not in-situ. Could be cleanfill. Non-plastic. Firm.	Moist	FILL

Total Depth = 2.7 m

COMMENT:	Logged By: RS
	Checked Date: 15-Jan-16
	Sheet: 1 of 1

Depth (m)	DPN_{100}	Corrected Equiv. $SPTN_{300}$	Torque
0.1	7.00	10.5	
0.2	11.00	17.3	
0.3	8.00	12.2	
0.4	7.00	10.4	
0.5	5.00	7.2	
0.6	5.00	9.1	
0.7	4.00	6.4	
0.8	4.00	7.1	
0.9	3.00	5.7	
1.0	2.00	4.5	1
1.1	2.00	3.6	
1.2	2.00	3.6	
1.3	2.00	3.8	
1.4	1.00	2.3	
1.5	1.00	1.6	
1.6	1.00	2.3	
1.7	2.00	2.3	
1.8	1.00	1.9	
1.9	0.50	0.9	
2.0	0.50	0.8	1.3
2.1	0.50	0.9	
2.2	0.50	0.8	
2.3	1.00	1.8	
2.4	2.00	3.1	
2.5	1.00	2.7	
2.6	2.00	2.9	
2.7	1.00	2.0	
2.8	1.00	1.3	
2.9	1.00	0.6	
3.0	9.00	17.3	2.2
3.1	17.00	21.0	
3.2	7.00	18.2	
3.3	5.00	8.6	
3.4	3.00	10.4	
3.5	10.00	12.9	
3.6	5.00	14.0	
3.7	5.00	10.5	
3.8	5.00	7.8	
3.9	5.00	7.4	
4.0	5.00	6.5	2.2
4.1	4.00	6.3	
4.2	5.00	6.7	
4.3	6.00	7.8	
4.4	6.00	8.9	
4.5	7.00	9.9	
4.6	8.00	11.0	
4.7	8.00	12.8	
4.8	10.00	14.5	
4.9	11.00	16.3	
5.0	11.00	17.3	15.7
5.1	12.00	19.2	
5.2	14.00	21.7	
5.3	15.00	25.6	
5.4	16.00	26.7	
5.5	14.00	20.6	
5.6	18.00	31.1	
5.7	17.00	33.3	
5.8	21.00	34.9	
5.9	22.00	34.0	
6.0	18.00	33.2	20
6.1	20.00	36.0	
6.2	19.00	30.7	
6.3	19.00	41.3	
6.4	24.00	40.2	
6.5	31.00	55.0	
6.6			
6.7			
6.8			
6.9			
7.0			
7.1			
7.2			
7.3			
7.4			
7.5			
7.6			
7.7			
7.8			
7.9			
8.0			
8.1			
8.2			
8.3			
8.4			
8.5			
8.6			
8.7			
8.8			
8.9			
9.0			
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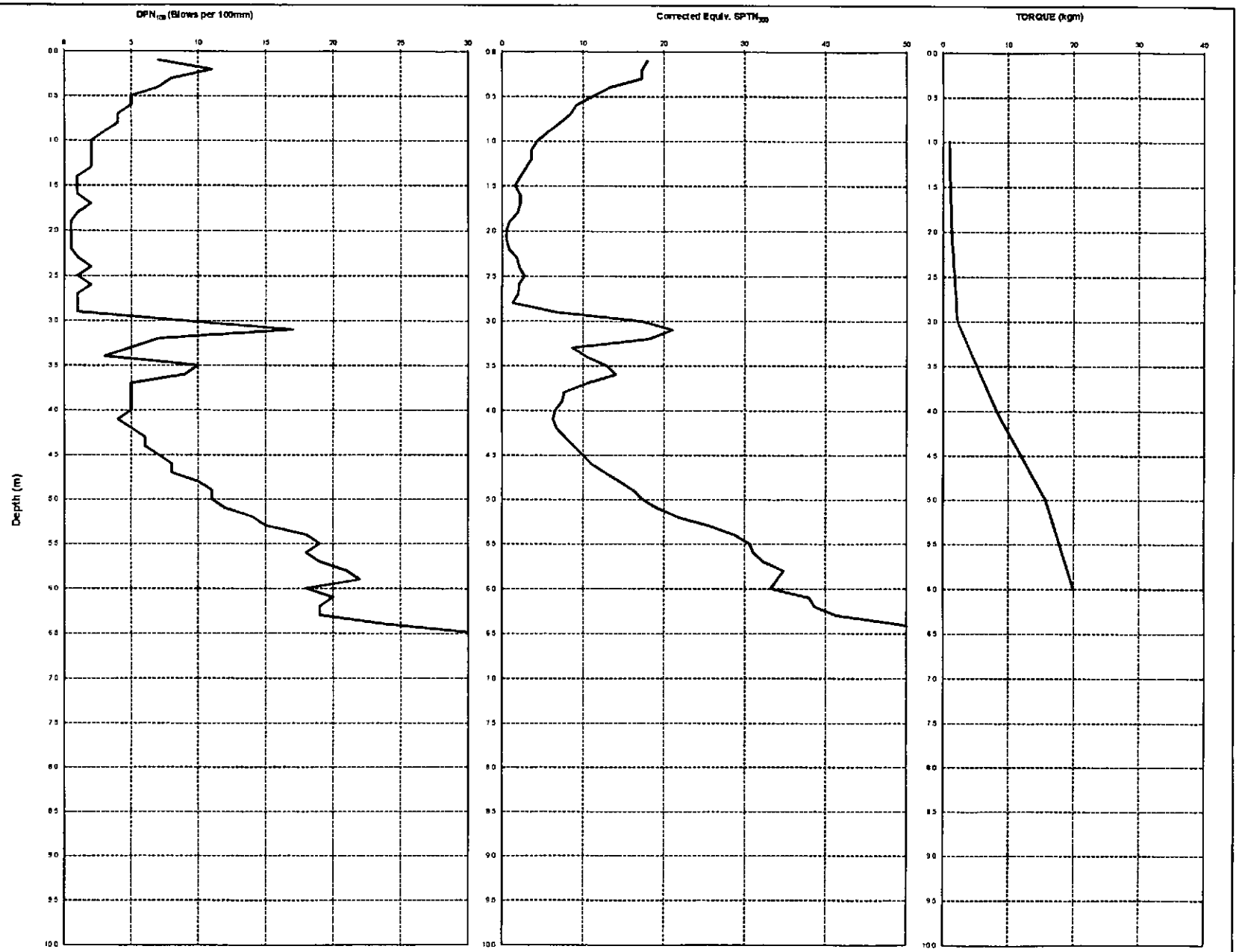

GEOSOLVE

CLIENT	Mark Lambert
PROJECT	380 South Rd, Dunedin
DESCRIPTION	HDCP results 0-10m

LOCATION	HDCP1
JOB NUMBER	150805

DATE	22/12/2015
LOGGED BY	RC
ANALYSED BY	RC
CHECKED BY	D

Depth (m)	DPN100	Corrected Equiv. SPTN	Torque
0.1	3.00	100	
0.2	7.00	89	
0.3	5.00	168	
0.4	4.00	92	
0.5	5.00	78	
0.6	3.00	71	
0.7	3.00	58	
0.8	3.00	51	
0.9	2.00	44	
1.0	2.00	37	1
1.1	2.00	43	
1.2	3.00	55	
1.3	4.00	61	
1.4	3.00	60	
1.5	3.00	39	
1.6	1.00	25	
1.7	1.00	38	
1.8	5.00	84	
1.9	8.00	130	
2.0	9.00	155	33
2.1	9.00	169	
2.2	10.00	169	
2.3	8.00	149	
2.4	9.00	109	
2.5	4.00	68	
2.6	5.00	97	
2.7	5.00	88	
2.8	5.00	116	
2.9	9.00	126	
3.0	9.00	135	35
3.1	5.00	88	
3.2	2.00	47	
3.3	2.00	37	
3.4	2.00	37	
3.5	2.00	37	
3.6	2.00	26	
3.7	2.00	26	
3.8	2.00	26	
3.9	2.00	25	
4.0	2.00	37	44
4.1	3.00	53	
4.2	3.00	67	
4.3	4.00	73	
4.4	4.00	93	
4.5	6.00	133	
4.6	10.00	207	
4.7	20.00	400	
4.8			
4.9			
5.0			
5.1			
5.2			
5.3			
5.4			
5.5			
5.6			
5.7			
5.8			
5.9			
6.0			
6.1			
6.2			
6.3			
6.4			
6.5			
6.6			
6.7			
6.8			
6.9			
7.0			
7.1			
7.2			
7.3			
7.4			
7.5			
7.6			
7.7			
7.8			
7.9			
8.0			
8.1			
8.2			
8.3			
8.4			
8.5			
8.6			
8.7			
8.8			
8.9			
9.0			
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9.8			
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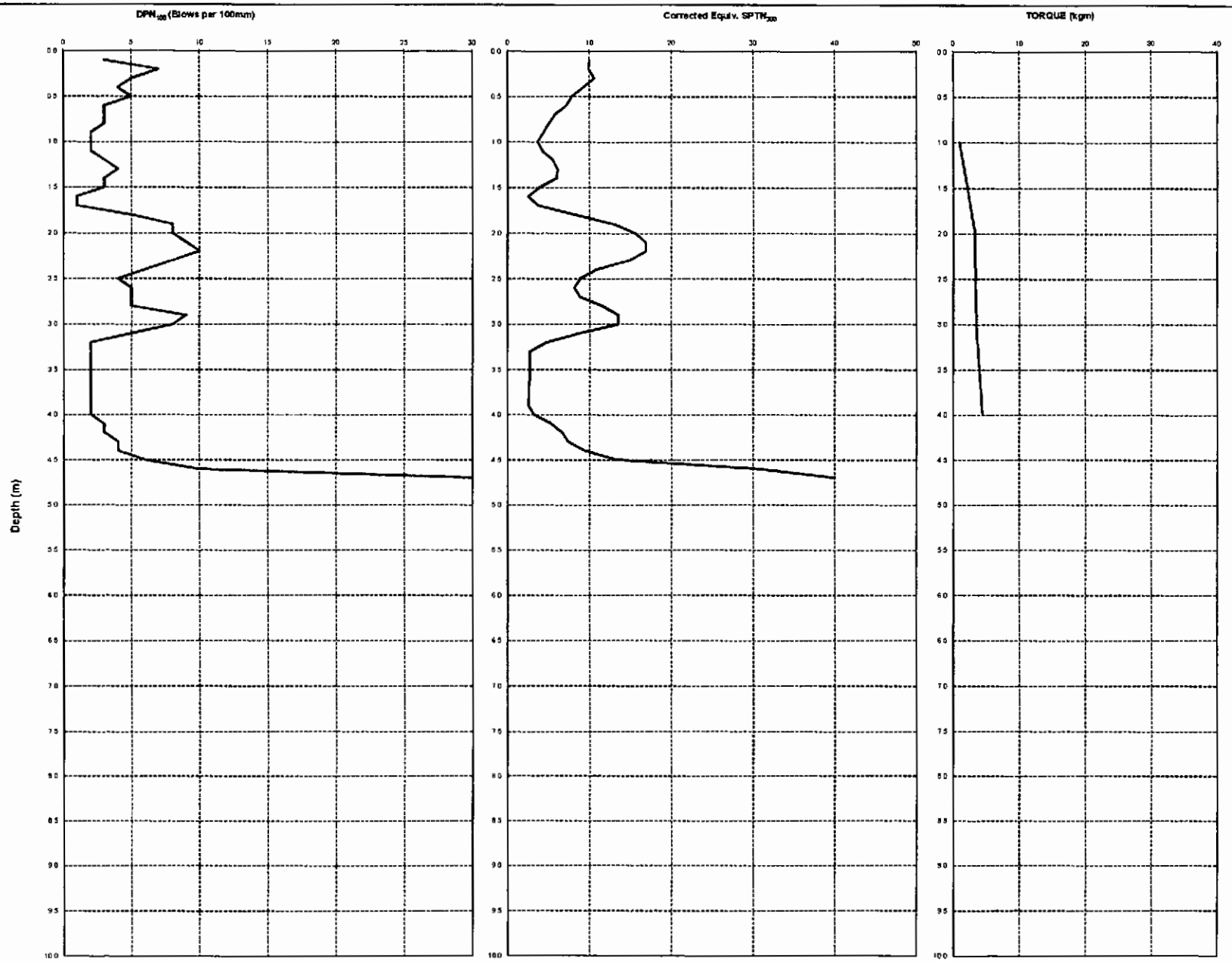
10.0			



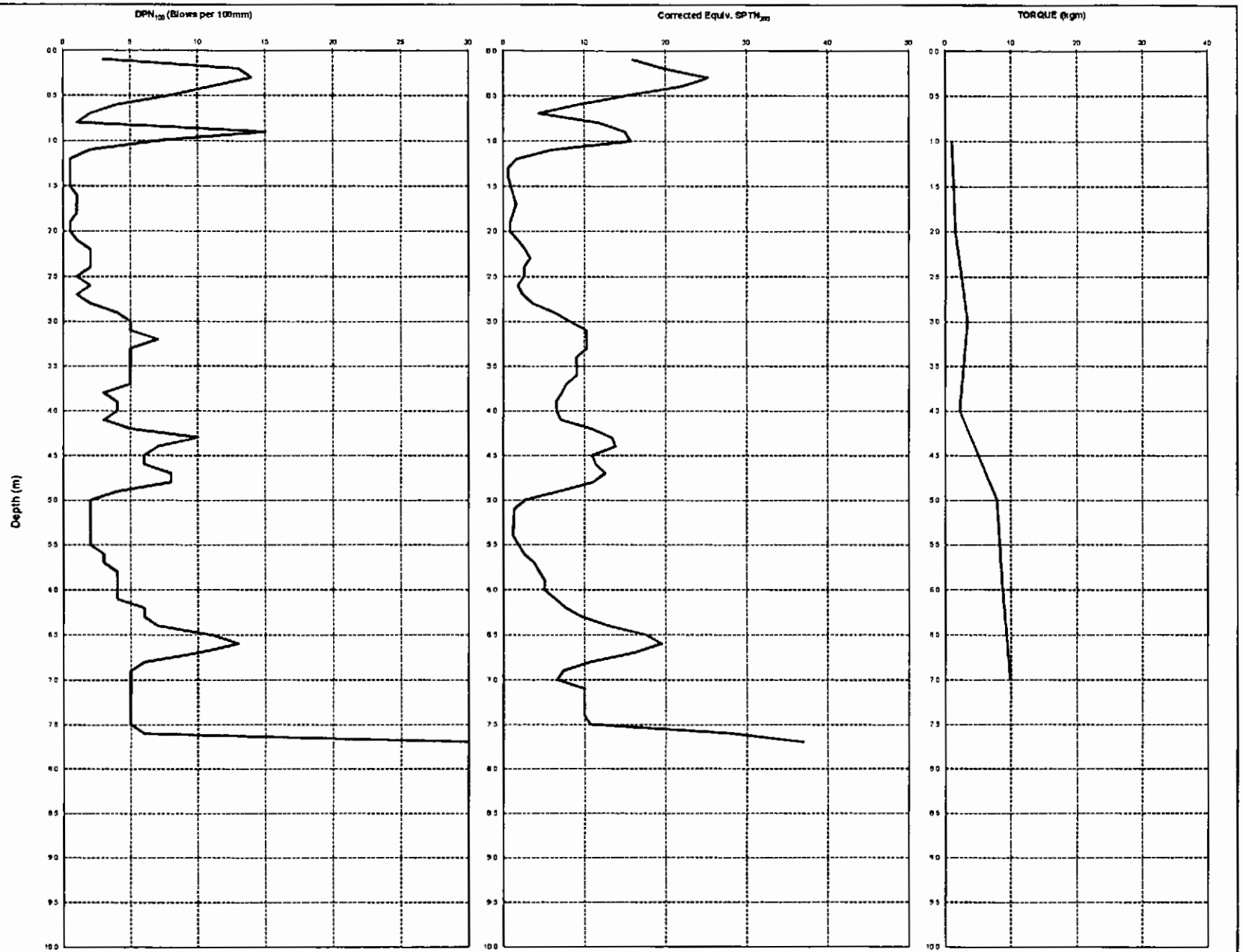
GEOSOLVE

CLIENT	Mark Lambert
PROJECT	380 South Rd, Dunedin
DESCRIPTION	HDCP results 0-10m

LOCATION	HDCP2
JOB NUMBER	150805

DATE	22/12/2015
LOGGED BY	RC
ANALYSED BY	RC
CHECKED BY	D

Depth (m)	DPN cm	Corrected Equiv. SPT N	Torque
0.1	3.00	18.0	
0.2	13.00	19.9	
0.3	14.00	25.2	
0.4	11.00	21.9	
0.5	9.00	19.2	
0.6	2.00	9.1	
0.7	2.00	4.4	
0.8	1.00	11.7	
0.9	15.00	15.0	
1.0	7.00	19.7	7
1.1	2.00	8.8	
1.2	0.50	1.8	
1.3	0.50	0.9	
1.4	0.50	0.6	
1.5	0.50	0.9	
1.6	1.00	1.2	
1.7	1.00	1.5	
1.8	1.00	1.2	
1.9	0.50	0.8	
2.0	0.50	0.8	15
2.1	1.00	1.8	
2.2	2.00	2.7	
2.3	2.00	3.1	
2.4	2.00	2.6	
2.5	1.00	2.5	
2.6	2.00	1.6	
2.7	1.00	2.4	
2.8	2.00	2.8	
2.9	2.00	6.7	
3.0	5.00	8.2	34
3.1	5.00	10.2	
3.2	7.00	10.3	
3.3	5.00	10.3	
3.4	5.00	9.8	
3.5	5.00	9.0	
3.6	5.00	9.1	
3.7	5.00	7.8	
3.8	3.00	7.2	
3.9	4.00	6.5	
4.0	4.00	6.6	32
4.1	3.00	7.1	
4.2	5.00	10.9	
4.3	10.00	13.3	
4.4	7.00	13.0	
4.5	6.00	10.9	
4.6	6.00	11.4	
4.7	8.00	12.6	
4.8	8.00	11.0	
4.9	4.00	9.9	
5.0	7.00	9.6	79
5.1	2.00	1.3	
5.2	2.00	1.3	
5.3	2.00	1.2	
5.4	2.00	1.2	
5.5	2.00	1.8	
5.6	3.00	2.5	
5.7	3.00	3.8	
5.8	4.00	4.4	
5.9	4.00	5.1	
6.0	4.00	5.0	87
6.1	4.00	6.2	
6.2	6.00	7.8	
6.3	6.00	9.5	
6.4	7.00	14.9	
6.5	11.00	17.6	
6.6	13.00	19.5	
6.7	10.00	16.1	
6.8	6.00	10.7	
6.9	5.00	7.3	
7.0	5.00	8.6	98
7.1	5.00	10.0	
7.2	5.00	10.0	
7.3	5.00	10.0	
7.4	5.00	10.0	
7.5	5.00	10.7	
7.6	6.00	28.0	
7.7	31.00	37.8	
7.8			
7.9			
8.0			
8.1			
8.2			
8.3			
8.4			
8.5			
8.6			
8.7			
8.8			
8.9			
9.0			
9.1			
9.2			
9.3			
9.4			
9.5			
9.6			
9.7			
9.8			
9.9			
10.0			



GEOSOLVE

CLIENT	Mark Lambert
PROJECT	380 South Rd, Dunedin
DESCRIPTION	HDCP results 0-10m

LOCATION	HDCP3
JOB NUMBER	150805

DATE	22/12/2015
LOGGED BY	RC
ANALYSED BY	RC
CHECKED BY	0

Depth (m)	DPN_{100}	Corrected Equiv. $SPTN_{300}$	Torque
0.1	11.00	52.0	
0.2	21.00	22.9	
0.3	18.00	23.9	
0.4	9.00	15.2	
0.5	8.00	10.5	
0.6	3.00	9.1	
0.7	3.00	9.1	
0.8	2.00	3.7	
0.9	1.00	2.4	
1.0	1.00	2.4	1
1.1	2.00	4.2	
1.2	4.00	4.7	
1.3	2.00	5.2	
1.4	4.00	5.6	
1.5	4.00	5.7	
1.6	2.00	3.6	
1.7	1.00	1.5	
1.8	1.00	1.3	
1.9	2.00	3.2	
2.0	4.00	5.6	4.6
2.1	5.00	7.7	
2.2	5.00	6.9	
2.3	5.00	6.1	
2.4	4.00	4.7	
2.5	5.00	5.2	
2.6	4.00	4.5	
2.7	3.00	4.4	
2.8	3.00	3.8	
2.9	3.00	3.5	
3.0	3.00	2.7	7.7
3.1	2.00	4.1	
3.2	5.00	4.1	
3.3	3.00	4.8	
3.4	3.00	3.5	
3.5	2.00	4.2	
3.6	4.00	4.2	
3.7	3.00	3.8	
3.8	2.00	4.3	
3.9	5.00	5.6	
4.0	5.00	6.3	6.9
4.1	3.00	4.2	
4.2	2.00	2.7	
4.3	1.00	2.6	
4.4	3.00	2.6	
4.5	2.00	2.4	
4.6	3.00	2.3	
4.7	5.00	3.5	
4.8	6.00	4.9	
4.9	6.00	4.6	
5.0	6.00	5.1	10.4
5.1	9.00	10.0	
5.2	9.00	11.3	
5.3	9.00	12.0	
5.4	9.00	12.7	
5.5	7.00	14.0	
5.6	8.00	15.3	
5.7	8.00	16.0	
5.8	8.00	30.7	
5.9	50.00	36.0	
6.0			
6.1			
6.2			
6.3			
6.4			
6.5			
6.6			
6.7			
6.8			
6.9			
7.0			
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7.8			
7.9			
8.0			
8.1			
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9.0			
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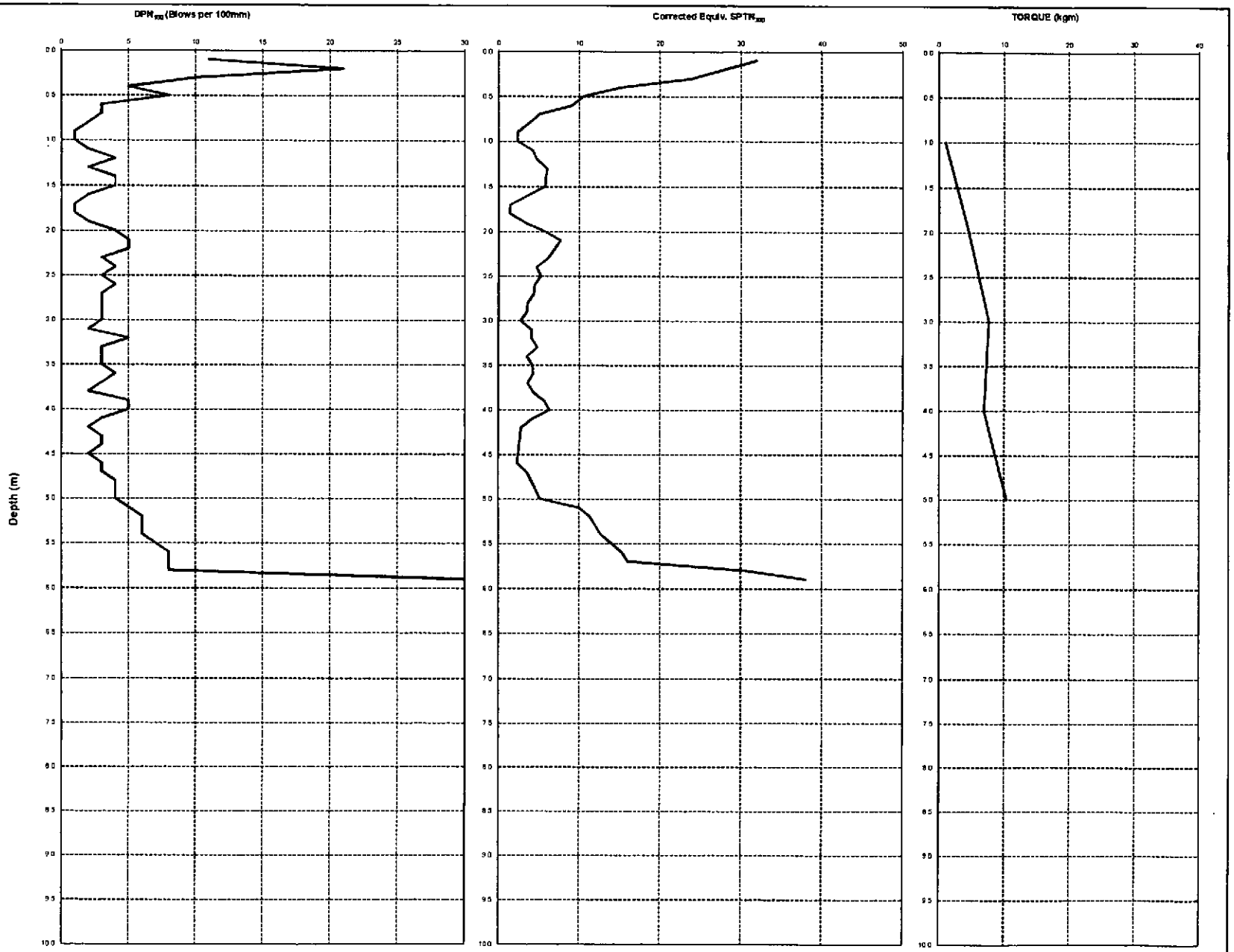
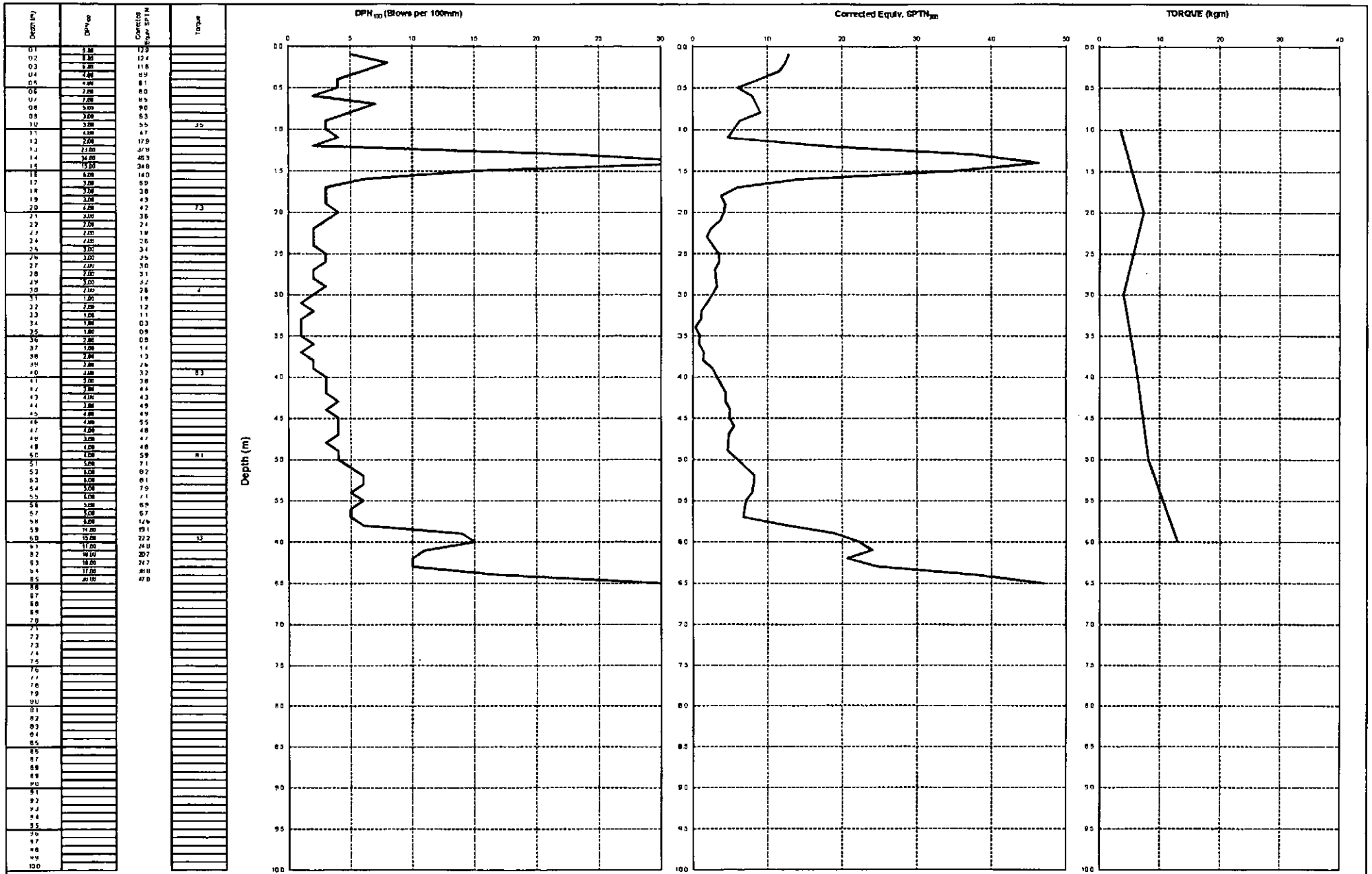


GEOSOLVE

CLIENT	Mark Lambert
PROJECT	380 South Rd, Dunedin
DESCRIPTION	HDCP results 0-10m

LOCATION	HDCP4
JOB NUMBER	150805

DATE	22/12/2015
LOGGED BY	RC
ANALYSED BY	RC
CHECKED BY	0



GEOSOLVE

CLIENT	Mark Lambert
PROJECT	380 South Rd, Dunedin
DESCRIPTION	HDCP results 0-10m

LOCATION	HDCP5
JOB NUMBER	150805

DATE	22/12/2015
LOGGED BY	RC
ANALYSED BY	RC
CHECKED BY	O