

Annexure E

Infrastructure Report

Prepared by Verrall and Partners Ltd

APPLICATION
TO THE
TASMAN DISTRICT COUNCIL
FOR
RESOURCE CONSENT

OLIVE ESTATE LIFESTYLE VILLAGE

Fairose Drive & Hill Street, Richmond

INFRASTRUCTURE REPORT

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APPLICATION FOR RESOUECE CONSENT UNDER THE RESOURCE MANAGEMENT ACT 1991

INFRASTRUCTURE REPORT

OLIVE ESTATE LIFESTYLE VILLAGE – FAIROSE DRIVE & HILL ST, RICHMOND

1. INTRODUCTION

This report is to support a resource consent application by Integrity Care Group Ltd to vary the existing adjacent consent for Olive Estates under RM 130346v1 and to extend that existing development by way of new consents onto the Hill Street block adjoining to the south. Olive Estate Lifestyle Village is already under construction and is connected to all necessary infrastructure and services and this report will address the infrastructure and serving needs of the Hill Street Block.

2. LAND DESCRIPTION

The subject land is described as Lot 2 DP 511511 and is located on the western side of Hill Street just opposite Hillplough Heights with Brenda Lawson Way immediately to the east. The total title area is some 3.3876 ha.

The land to the north is land owned by the applicant and already consented for this type of development. To the east there are residential properties fronting Fawdan and Brenda Lawson Ways and to the west; Fairrose Dr and Jonathan Pl.

Topography falls to the NW down the property at a reasonably constant grade of 4 to 5% with the contour lines generally parallel to Hill Street with a slight up drop off closer to the eastern side and with a hollow over in the SE area that includes an old irrigation storage pond. The Northern boundary is some 12m lower than Hill Street

3. ACCESS & ROADING

Hill Street and Fairrose Drive are well formed existing legal roads with Kerb and channel and foot paths. The indicative roads herein will link Fairrose Drive to Hill Street.

Further internal private roading will also interconnect the applicant's existing development to the north with this site so as to be a seamless continuation.

The proposed road carriageway widths and legal extents for the Fairrose Dr connection is proposed to be to the same or similar standard as for Langdale Dr within the applicants existing holding to the north. Further detail on the access and roading aspects are provided in the Traffic Impact Assessment Report prepared by Traffic Concepts.

4. STORM WATER

4.1 EXISTING OLIVE ESTATES RETICULATION

Olive Estate Lifestyle Village is being developed with provision for some of the Hill Street block stormwater to be included in its reticulation and detention as per the Envirolink Report dated 2013 submitted as part of RM 130346v1. That report is attached for clarification (refer appendix 1).

4.2 HILL STREET BLOCK CATCHMENTS

This site has three stormwater outfall points which in combination allows reticulation to all parts of the land irrespective of contour.

Accordingly a catchment plan has been prepared (refer appendix 2) showing those three distinct zones as A, B & C. The line dividing A & B is relative to current contours

/catchments whereas C includes lots 7 and 8, the proposed Fairrose Drive formation as well as the neighbour's small rural residential parcel sandwiched between lots 7 & 8.

Zone A is to be reticulated via future 450 dia pipes from the current Olive complex to the north. Zone B will utilise the current 300 dia pipe that links via a 375 pipe to Wilkinson Place while zone C will be via the 600 pipe available where Fairrose Dr abuts the site on the western side.

Zone A outfall has provision for 2.25 ha of the Hill Street block and an allowance of some 386 l/s capacity. This capacity and catchment was determined as part of RM 130346 for the existing Olive development as noted above and the supporting report by Envirolink from 2013.

Zone B has a pipe capacity of 232 l/s but following consultation with Council Engineering dept, it would appear that downstream of Wilkinson Place the existing reticulation is up to capacity and thus zone B may need to be restricted to pre development flows and detention required for any additional run off.

Zone C outfall allowance is based not so much on the 600 pipe capacity but rather the detention storage provided in or off Fairrose Dr as per the figures on the TDC files for the adjoining development of Trek Holdings which allocated some 346 l/s for this site.

4.3 PROPOSED STORM WATER MANAGEMENT

At present zone B would have pre development flows of 85 l/s. The envisaged developed flows for zone B will be more like 171 l/s. If we were to detain this additional 85 l/s allowing for a 10 minute duration we would require 51,000 l of detention with a restricted out fall. However between zones A & C there is some 95 l/s of unallocated flow capacity (71 l/s in zone A & 24 l/s in zone C) which is more than the detention that would otherwise be required for zone B. We would therefore propose the best solution is to reticulate a sufficient portion of zone B into future pipe work draining into zones A & C respectively and reduce the extent of zone B so only an area

with the developed flow of 85 l/s uses the existing out fall out to Wilkinson Place. Accordingly no detention would then be required at all.

Secondary flow paths would be constrained primarily to be within existing or proposed road corridors.

5. SANITARY SEWER

There is an existing 150mm main connection available within stage 4A of the existing Olive complex to the North that will be extended up to serve the lower portion of this site. Ancillary thereto is another main sewer connection at the blind end of Fairose Drive just past Jonathan Place which will serve any portion of the subject land at or above the level of where Fairose Drive abuts. Between these two connections the whole of the site can be serviced and it has already been allowed for in design and planning for both the connection points.

6. WATER

There are internal 150 water mains within the existing stages 4A & 3B of Olive Estates that can be used to serve the lower portions of the subject land. There is also 150mm mains located in the blind end of Fairose Dr where this road ends at our boundary just past Jonathan Place that can be extended up to join onto the existing mains in Hill St. This is all high pressure zone reticulation. Metering will be in a similar fashion for new villas and or the care facility as so installed on prior stages of the existing Olive complex with connection points kept to a minimum. Fire supply requirements will be achieved.

7. EARTHWORKS

There will be earth works required on this site for various facets of the development as confirmed in the Tasman Consulting Engineers report dated 12th June 2019 (ref appendix

3). There will be site strip of topsoil in areas where roads, buildings or cut to fill will occur and we expect surplus topsoil will primarily be cut to waste. To base up roads there will be undercut of clays and gravels to an acceptable subgrade before pavement metal is imported, placed and compacted but the two main areas of larger or deeper earthworks will be the existing irrigation pond and the central care unit building foot print.

Generally roading would be slightly lower than the surrounds so they will act as the secondary surface flow route but given that the residents would be older it is not proposed to dig the road in more than 1m as is often the case in a subdivision as this is a different scenario where the foot and scooter traffic around the greater complex needs relatively gentle grades. Accordingly to build the road(s) there may be initial cut to subgrade of 1m+. On green field subdivisions such minor cuts have not specifically required an earth works consent unless they are substantially greater. The only real reason you would expect to be above 1 m + cut in the roads on this site would be due to softer ground conditions that necessitated removal of unsuitable material and additional road pavement back fill to achieve finished design level.

In regards to the latter main areas of earthworks, the removal of the irrigation pond near Hill Street, this will involve the existing pond being filled using on site cut material where possible. The existing pond bund walls will most likely be removed, any soft material in the base of the pond excavated to a good sub grade and then the area shaped up to final design levels. Such earth works will be under the supervision and instruction of a qualified civil engineer.

8. POWER & TELEPHONE

There is existing mains cabling in Fairrose Drive that can be extended to link through the subject land to the Hill Street reticulation AND within the current Olive complex to the NW there is internal private infrasture that will also form the basis of power and media reticulation to new villas and or the central care unit in combination. The applicant will have no issue making provision for all their connection needs and or those of any other or potential users adjoining.

9. ENGINEERING STANDARDS

For continuity and constancy with conditions under RM 130346 for the existing Olives development and the subject land; we wrote to the Engineering Manager on the 28th May 2019 to request that the Engineering Standards 2013 be applied to this consent rather than the new combined NCC/TDC Land Development Manual which becomes operational on the 1st July 2019 (ref appendix 4). Council engineering staff have agreed to this approach (ref Appendix 5).

10. CONCLUSION

This report has addressed all reticulation matters and following consultation with Engineering staff, Council should be more than comfortable that the applicants can develop this site in the fashion they intend.

The extension of the Olives Lifestyle Village onto this adjacent Hill Street block will be seamless with no foreseeable servicing issues.

It is expected Council will ask for an indicative site services plans. The preferred approach given scale of the development and the multiple service points is that an indicative services plan be a condition of consent once the final layout of all villas/buildings and in particular the proposed stormwater management is approved.

ATTACHMENTS:

Appendix 1 – Envirolink Report dated 2013

VERRALL & PARTNERS LIMITED
SURVEYORS, RESOURCE MANAGEMENT
& LAND DEVELOPMENT CONSULTANTS

Appendix 2 – Catchment Plan ref 12039-6a

Appendix 3 – Tasman Consulting Engineers report dated 12/6/2019

Appendix 4 – Letter to Engineering Manager dated 28/5/2019

Appendix 5 – Reply from Engineering Manager dated 17/6/2019

Prepared by

Mike Verrall
18th June 2019

Appendix 1 – Envirolink Report dated 2013



Olive Estates, Wensley Road, Richmond Stormwater Management

prepared for

Integrity Care Group Limited

by

Tony Hewitt

17 April 2013

Information contained within this report should not be used without the prior consent of the client

Envirolink Report: Olive Estate 130401
Date: 17 April 2013
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1. Introduction

The purpose of this report is to provide stormwater calculations and a stormwater management strategy for the proposed Olive Estate Lifestyle Village off Wensley Road. It is prepared from information received and as a result of various discussions and meetings with Tasman District Council personnel, leading to two key aspects which impact on design considerations:

1. The Wensley Road Culvert (WRC) has a maximum allocation of 600 l/sec, so the design will endeavour to direct most if not all post development stormwater to Hart Stream except in the event of failure or design exceedence in which case stormwater will be directed over land down the original access road to Wensley Road.
2. A piped primary stormwater network was preferred so infiltration swales will not now form part of the stormwater management other than some smaller areas for water quality improvement. This is as a result of discussions with TDC engineering staff.

Under the provisions of the RMA and TRMP stormwater has to be considered as a total system, i.e., future upstream potential development must be incorporated. In this instance there are also downstream implications with the WRC capacity being capped at 600 l/sec, to account for ongoing limitations further down in the receiving network. Therefore, there is a need to include potential future residential development at the front of the site by Wensley Road Developments Ltd (WRDL) in the assessment. There is also a need to consider the upstream Nicoll neighbour.

2. Setting & Drainage

Olive Estate Lifestyle Village is a proposed residential development at 109 Wensley Road, Richmond. Legal description is Lots 2, 3 & Pt 4 Deeds 1763. The property is zoned residential. The subject block derives from the original 16ha horticultural property extending from Wensley Road east to about 100m below Hill Street, and almost from Chelsea Ave towards Hart Stream. Recent residential developments Bramley Estates and Calla Estates lie between Olive Estates and Hart Stream. Trek Holdings joins the southwest boundary of Olive and Nicoll (refer Figure 1). This report compares stormwater runoff pre-development with projected stormwater runoff under the Olive Estate proposal, and provides a preferred management option.

The development is situated between Wensley Road and Hill Street. The property has a northwest aspect and a gently sloping contour ranging from 34.5m at the northwest boundary to 50m at the upper southeastern boundary. The property overlies outwash material from the Richmond foothills with loam soils of about 1m depth. The property was previously a berry farm with many remnant post holes and depressions providing relatively high surface retention considering its slope. A walk over inspection on 8 August 2012 immediately after a prolonged wet period revealed little visible surface runoff and it was quite dry underfoot. The site can therefore be considered naturally free draining in its present form.

A significant feature of the original property is the two existing ponds, which would have had some influence on drainage patterns. The main pond has surface area dimensions of approximately 105m x 35m x 2.5m deep full depth, or approximately 8,000 cubic metres (m³) capacity. This pond borders the northwest boundary of the Olive block. There appears to be only minor surface runoff into this pond, with most of the water entering from groundwater infiltration. This can be clearly seen seeping into the pond along the upstream bank margins following rain. The pond has been constructed into the sloping surface such that it 'daylights' at mid width, with the northwest half contained above ground level by a half perimeter bund wall. It is expected that the



pond will be modified to form a landscape feature and be part of the stormwater management system. The second smaller pond is on the adjoining WRDL land downstream of Olive Estate. The future of this pond is uncertain.

From observed storm events, rainfall presently runs down slope along discrete drainage channels between old berry rows, undergoing a process of infiltration into the free draining soils with minimal surface runoff evident. At no time during rain events has the WRC been observed by the writer to carry more than a small flow, though no doubt during a significant event when conditions are fully saturated and the ponds are full, surface flows would increase. Obviously surface flows will be potentially more significant post development. One such event occurred 13-15 December 2011 when 283mm fell over the three days and the pond reportedly over flowed.

The total drainage area of the Olive Estate property including Lots 2 & 3, and the small upstream neighbouring drainage area below Hill Street, is 11.32ha. According to the contours, 3ha of the upstream Nicoll block also reports to the WRC so the combined Nicoll-Olive-Wensley Developments catchment area to the culvert is $3.0 + 8.47 + 4.19 = 15.66\text{ha}$.

The various locations are shown in Figure 1.



Figure 1: Location of Olive Estate Proposal

3. Objective

Tasman District Council (TDC) Engineering Standards (2008) set out the requirements for stormwater management and disposal. Section 3 (Stormwater Drainage) describes the various components and disposal options and prescribes a number of techniques and methods available to meet these standards. The methods used in this report follow these requirements where possible. Initially, constructed infiltration swales and soakage pits were to be an integrated part of stormwater management but as mentioned earlier this is no longer the case except for water quality improvement at strategic locations. An attenuated piped system is proposed as the only practical option.

In general, and as stated in the standards, stormwater runoff should be dealt with in the catchment in which it occurs. All systems shall be designed to accept the flow from upstream and shall be of sufficient capacity to provide for maximum flow from possible future development indicated by zoning in the Resource Management Plan. All systems shall be designed to accept flows from above a proposed development, and shall be of sufficient capacity to provide for maximum flows from possible future development (as indicated by zoning in the TRMP). Any mitigation measures must be designed so that flows in the entire downstream network are attenuated for the appropriate design event(s). Pipe sizes to match that of the pre-developed state, will only be accepted if appropriate detention structures are constructed by the developer and approved by Council (Engineering Standards 2008, Section 7.6.1). Accordingly, the Olive Estate stormwater design must account for future residential development of the Nicoll property above. Because this is a green field development there are no pre-development systems to consider other than the WRC.

Rules for stormwater disposal are set out in the TRMP Chapter 36.

4. Options

A TDC meeting (11 February 2013) discussed possible drainage routes and management options. Swales were ruled out as not being a preferred option by engineering staff (John Karaitiana).

1. 2.0ha of Nicoll stormwater could be diverted through the future Trek system to Hart Stream via a proposed link road alignment.
2. Other options were suggested, all involving apportioning flows to Hart Stream via link roads and Fairrose Drive.

5. Preferred Option

The area of the Nicoll block below the future link road (33% or 1ha) and the entire Olive Estate (8.49ha) is to be directed to Olive Estate's pond via a small wetland where a controlled outlet structure will direct flows to Hart Stream via a pipe under Fairrose Drive. This was arrived at after initial indications suggested the expected flow rates should be able to be managed through the pond. Final calculations and modelling have now confirmed this. At time of writing, an agreement between Olive Estate and WRDL results in the land under Villas 101 to 106 being transferred to WRDL. This results in approximately 0.2 ha of runoff area no longer reporting to the pond. For the purposes of this report no adjustment in flows is considered necessary.

6. Stormwater Management

From TRMP Chapter 7:

- Stormwater generated by a 2% Annual Exceedence Probability (AEP) (Q_{50}) storm event shall be accommodated within the secondary stormwater management system in a way that does not cause damage to or nuisance effects on people and property (7.1.1 (a));
- Stormwater generated by more frequent, but less significant, rainfall events (Q_2 , Q_5 , Q_{10}) shall be accommodated within the primary stormwater management system in a way that does not cause damage to or nuisance effects on people and property (7.1.1 (b)).

7. Design Runoff Calculations

Design runoff calculations were carried out in accordance with NZ Building Code Verification Method E1/VM1, and with reference to TDC Engineering Standards (2008) Section 7 (Appendix 2). Results are summarised in Table 1. Calculation details are given in Appendix 1. The development is planned on a staged basis, but for the purpose of this assessment the fully developed proposal is considered.

Table 1: Stormwater peak flows

Development area	Q_{20} (litres/sec) primary	Q_{50} (litres/sec) secondary	T_c (mins)
Pre-development Olive Estate including Nicoll and WRDL	785	916	30
Pre-development WRDL	209	245	10
Post-development 3ha Nicoll	505	616	10
Post development Olive Estate	1273	1556	17
Post development WRDL	704	860	10
Total post development	2249	2747	

Tasman Consulting Engineers (Ron O'Hara) attenuation model and reticulated flows to Hart Stream are included in Table 2. Design settings are:

- Permanent pond level to be managed at 34.5m
- Maximum design level 36.0m
- Invert level Hart Stream end of pipe 32.4m

Table 2: Stormwater Routing (refer Figure 2)

AEP	Area (ha)	To Hart Stream via Trek		To Olive Pond			To Hart Stream via Olive Pond		
		Q ₂₀ (l/sec)	Q ₅₀ (l/sec)	Q ₂₀ (l/sec)	Q ₅₀ (l/sec)	Q ₁₀₀ (l/sec)	Q ₂₀ (l/sec)	Q ₅₀ (l/sec)	Q ₁₀₀ (l/sec)
2 ha Nicoll	2.0	338	412	0	0	0	0	0	0
1 ha Nicoll + entire Olive	9.49	0	0	1440	1760	1853	347	386	396
Storm Volumes (m ³)		0	0	1945	2376	2502	0	0	0
Maximum Depth above 34.5m		0	0	0.95	1.14	1.19	0	0	0
Maximum RL		0	0	35.45	35.64	35.69	0	0	0
WRDL		Q ₂₀ = 704 l/sec and Q ₅₀ = 860 l/sec managed to WRC (attenuation through pond?).							

8. Smaller Events

In addition to the design floods considered above, Q₅ and Q₁₀ and the 24-hour event of December 2011 were also modelled. The result of this was that all of these events are well accommodated within the pond release mechanism. Tasman Consulting Engineers report on these flows is appended.

9. Reticulation

From the pond a 600mm diameter culvert would be laid under Calla Lot 15 via an easement and on under Fairrose Drive to Hart Stream. The pond end of the discharge system will comprise a 1.5m diameter manhole chamber set in the bed at the south west corner of the pond, extending to 35.7m. The 600mm pipe will be keyed into the bottom of the chamber at 33.9m, and twin 300mm orifice plates will control the flow from the chamber to the pipe. The invert level of the pipe discharging into Hart Stream will be 32.37m. A schematic is shown in Figure 3 and a profile in Figure 4. Key components are:

- The management system provides for flows up to Q₁₀₀.
- The 600mm pipe at 88.9m long is laid at average grade of 1:56.
- Velocity in the pipe is 2.5 m/sec.
- Maximum capacity of pipe in these conditions is approximately 700 l/sec.

- In the event the inlet structure over tops due to excessive rainfall the pipe has approximately 300 l/sec additional capacity.
- Otherwise the detention pond can accommodate up to Q_{100} without over topping. However a 'catastrophic' flow path will be provided down the proposed road to Wensley Road.
- An outfall structure under the road head will direct flows from the piped stormwater system within the development initially to the small head pond from where flows will continue on to the main pond (refer site plan appended).

10. Wensley Road Culvert

Stormwater calculations show a pre-development Q_{20} design flow of 785 l/sec from the natural catchment reporting to it. This means there is already a theoretical 185 l/sec shortfall at WRC requiring on-site management.

Under the above management strategy it will not be necessary for Olive Estate stormwater to be directed to the culvert, except possibly a small area below 36.5m contour in the northern corner. If it is not possible to raise this area stormwater from this small area of six villas may need to be directed to the culvert (now transferred to WRDL).

WRDL will therefore be able to access the full 600 l/sec capacity.

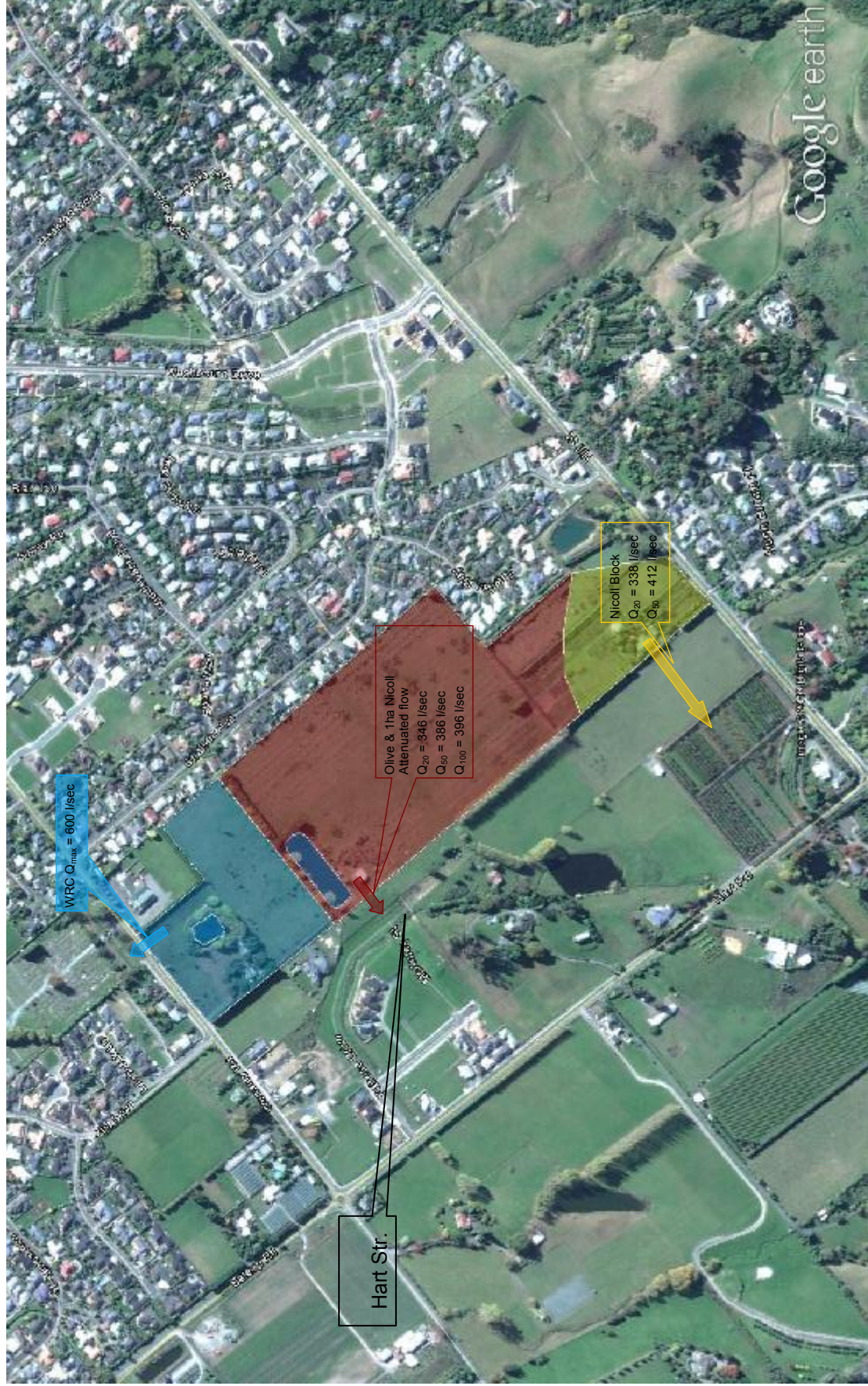


Figure 2: Stormwater distribution

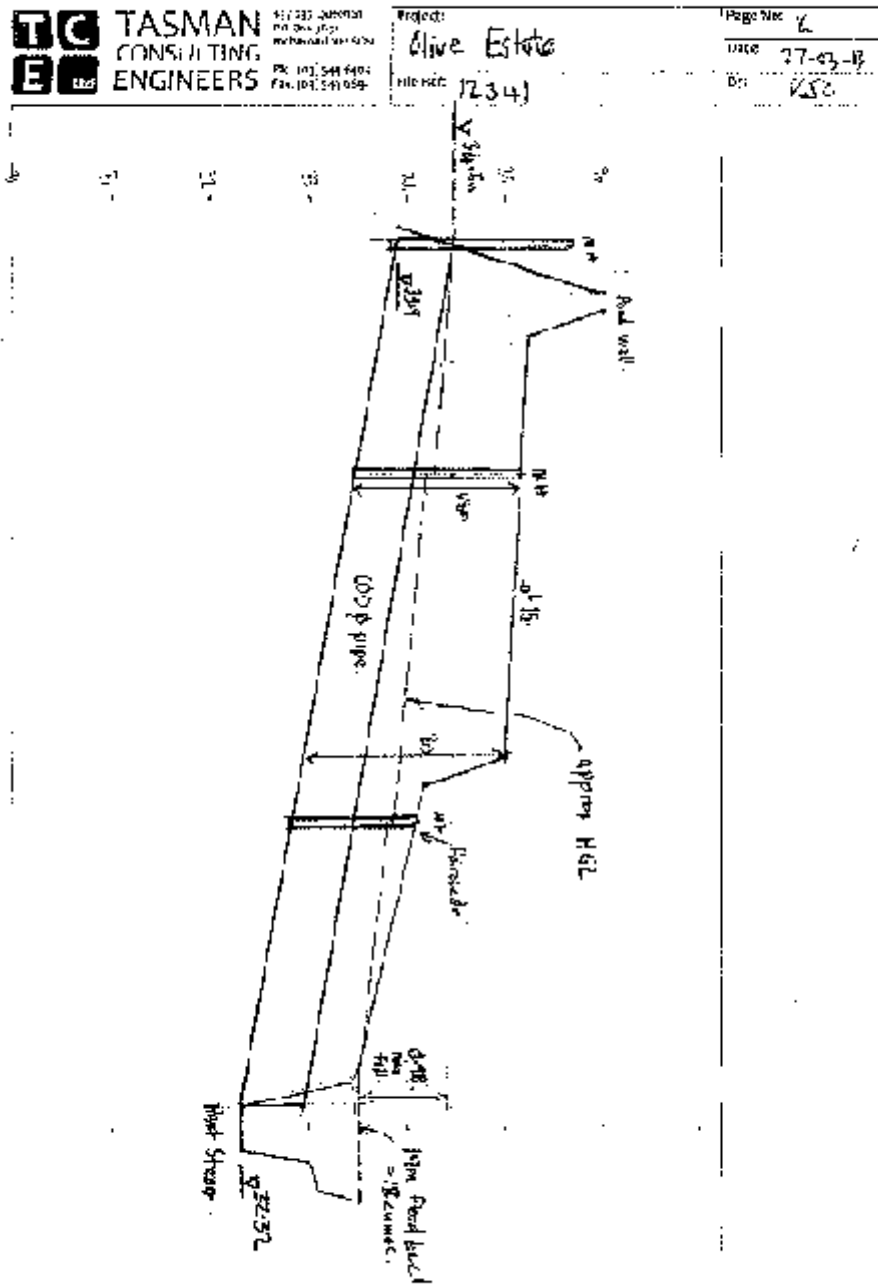


Figure 3: Pond release to Hart Stream

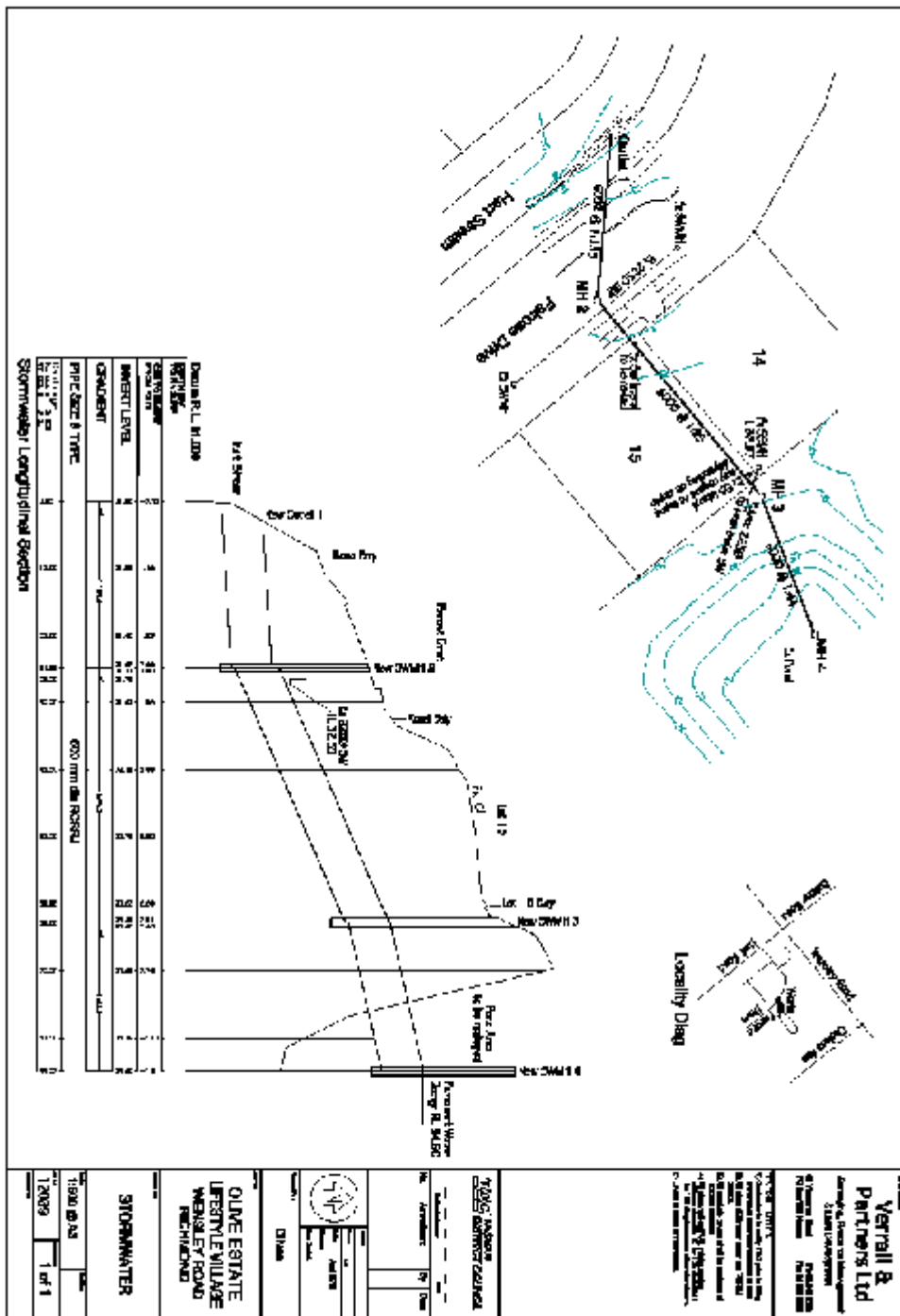


Figure 4: Pipe route to Hart Stream

11. Climate Change

There is general acceptance that climate change will cause increased rainfall in the Nelson-West Coast regions. Rainfalls in Appendix 3, Table 3 have been adjusted to take account of current climate change projections (D.Ley, TDC pers com). Accordingly, no further adjustment for climate change is necessary.



12. Discussion & Conclusion

Stormwater flow calculations and various management issues have been discussed in this report. Calculations show that projected flows up to Q_{100} (100 year flood) can be managed through the modified pond before discharging to Hart Stream via an outlet structure and piped system with approximately 300 l/sec spare capacity. It will not be necessary to direct any stormwater from Olive Estate to Trek's attenuation pond. There will be no stormwater discharging to Wensley Road Culvert except possibly from a small area (six villas) in the northern corner. This would be avoided if this area were raised above 36.5m. A catastrophic flow path will be provided for in the proposed road to Wensley Road.

13. References

Stormwater Management Course Notes, 2007. Proceedings from 2-day course conducted by Opus International Consultants.

Tasman District Council: Engineering Standards and Policies, 2008.

Department of Building and Housing New Zealand amended 2010: Compliance Document for NZ Building Code. Clause E1. Surface water



Tony Hewitt

17 April 2013

14. Appendix 1: Runoff Calculations

Existing Stormwater to WRC 15.7ha (3.0ha N, 8.47ha OE, 4.19ha WRDL)

From the Rational Formula: Runoff (Q) = C.I.A/360 cumecs.

Where A = catchment area ha, C is runoff coefficient, I is rainfall intensity.

Both 2% AEP (1 in 50 years) and 5% AEP (1 in 20 years) design storms are considered.

Runoff Coefficient C

Runoff coefficient 'C' is applied as prescribed in Table 7-4 of the TDC Engineering Standards (2008)

Pre-development: C = 0.30 (pasture and grass covered soil of medium soakage)

Note, C = 0.45 is often used, but based on inspection and discussion with neighbour, 0.30 appears justified.

Rainfall Intensity (mm/hour), I

Time of concentration (t_c) is necessary to determine storm duration and rainfall intensity.

The time to be used in selecting a rainfall intensity is the "time of concentration" (T_c), or the time taken for water to travel from the farthest part (in time) of the catchment to the outlet (refer Figure 7).

For pre-development, Bransby Williams method for T_c is considered appropriate:

$$T_c = \frac{57.18 L^{1.2}}{A^{0.1} H^{0.2}}$$

L = Flow path in km (0.60 km, Hill St to north western end of development area)

A = catchment area in km² (0.157 km²)

H = Total channel fall in metres (15.5 m)

$$T_c = 57.18 \times 0.60^{1.2} / 0.113^{0.1} \times 15.5^{0.2}$$

= 31.7, say 30 minutes for pre-development.

Rainfall Intensity

Interpolating from TDC Table 7-3:

I for 30 minute 20-year return period storm duration = 60mm/hr.

I for 30 minute 50-year return period storm duration = 70mm/hr.

Peak Flow Calculations

A = Total catchment area 15.7ha

Therefore from Runoff (Q) = C.I.A/360 cumecs:

$$Q_{20} \text{ (pre-development)} = 0.30 \times 60 \times 15.7/360 = 0.785 \text{ cumecs or } 785 \text{ l/sec.}$$

$$Q_{50} \text{ (pre-development)} = 0.30 \times 70 \times 15.7/360 = 0.916 \text{ cumecs or } 916 \text{ l/sec.}$$

Future Stormwater from Nicoll Development

3.0ha is to be accounted for in the WRC catchment. Indications from TDC are that 2.0ha is likely to be integrated into the proposed Trek development and on to Hart Stream. The remaining 1.0ha flows to a pond to the north and is not part of the WRC drainage. A notional post- development stormwater can be similarly calculated.

Catchment area: 3.0ha.

Assumptions are made that:

- Development density 33 lots overall (3.03/8.45 x 98).
- Maximum hard standing cover = 34% = 9690 say 10000m².
- In addition each lot has a 60m² sealed driveway = 35 x 60 = 2100m².
- Total asphalt roading = 438m long (1300 x 3.03/8.45) x 6m wide = 2631 say 2700m².
- A standard reticulated underground storm water system, maximum length 200m

Total hard standings 14800m² or 1.48ha.

Runoff Coefficient C

Runoff coefficient 'C' is applied as prescribed in Table 7-4 of the TDC Engineering Standards (2008)

Roofs: 34% @ 0.90 = 0.31

Asphalt: 9.5% @ 0.85 = 0.08

Gardens, lawns, verges: 56.5% @ 0.30 = 0.17

Thus weighted C = 0.56

Time of concentration, T_c = T_e + T_f

where: T_e = time of entry, including time of overland flow, time of gutter flow and entry into the drainage system = 7 minutes for developments where the impervious area exceeds 50% of the gross area.

T_f = time of flow in piped and open channels to the design point.

The main stormwater pipe will run down the road reserve from the top corner parallel to Chelsea Ave, and then down the central 'proposed road' shown on the adjoining block to the WRC. A second pipe would run down and around the sweeping road to join the main pipe at the boundary. Secondary lateral drains to either of the main lines would drain the cul-de-sacs.

The length of the main pipes are assumed to be 200m each to the design point at the boundary, and the longest lateral is taken as 100m.

From E1/VM1 Figure 3, a travel time of 60 seconds is derived for 100m of lateral drain.

Thus, $T_f = 3.0$ minutes.

Thus $T_c = 7 + 3 = 10$ minutes.

Rainfall Intensity

Interpolating from TDC Table 7-3:

I for 10 minute 20-year return period storm duration = 108mm/hr.

I for 10 minute 50-year return period storm duration = 132mm/hr.

Peak Flow Calculations

A = Total catchment area to be considered 3.0ha

Therefore from Runoff (Q) = C.I.A/360 cumecs:

$$Q_{20} \text{ (post-development)} = 0.56 \times 108 \times 3.0/360 = 0.504 \text{ cumecs or } 504 \text{ l/sec.}$$

$$Q_{50} \text{ (post-development)} = 0.56 \times 132 \times 3.0/360 = 0.616 \text{ cumecs or } 616 \text{ l/sec.}$$

15. Appendix 2: Olive Estate Stormwater

The site plan (Figure 4) shows the layout for the 8.49a Olive Estate property.



According to the plan:

- Development area = 8.49ha = 84900m².
- Building (roof) coverage = 27.6% = 23,432m²
- Roads & footpaths = 23.8% = 23,453m²
- Therefore soft landscaping = 48.6% = 41,261m²

Runoff Coefficient C

Runoff coefficient 'C' is applied as prescribed in Table 7-4 of the TDC Engineering Standards (2008)

Roofs: 27.6% @ 0.90 = 0.25

Roads & Footpaths: 23.8% @ 0.85 = 0.20

Landscaped areas, lawns, verges: 48.6% @ 0.30 = 0.15

Thus weighted C = 0.60

Time of concentration, $T_c = T_e + T_f$

where: T_e = time of entry, including time of overland flow, time of gutter flow and entry into the drainage system = 7 minutes for developments where the impervious area exceeds 50% of the gross area.

T_f = time of flow in piped and open channels to the design point.

Because Nicoll s/w is contained, it is appropriate to calculate T_f from the Nicoll entry point to Olive Estate. Thus $T_c = 7 + 10 = 17$ minutes.

Rainfall Intensity

Interpolating from TDC Table 7-3:

I for 17 minute 20-year return period storm duration = 90mm/hr.

I for 17 minute 50-year return period storm duration = 110mm/hr.

Peak Flow Calculations

A = Total catchment area 8.49ha

Therefore from Runoff (Q) = C.I.A/360 cumecs:

$$Q_{20} \text{ (post-development)} = 0.60 \times 90 \times 8.49/360 = 1.273 \text{ cumecs or } 1273 \text{ l/sec.}$$

$$Q_{50} \text{ (post-development)} = 0.60 \times 110 \times 8.49/360 = 1.556 \text{ cumecs or } 1556 \text{ l/sec.}$$

$$Q_{100} \text{ (post-development)} = 0.60 \times 115 \times 8.49/360 = 1.627 \text{ cumecs or } 1627 \text{ l/sec}$$

Wensley Developments Post Development

On a unit area notional basis, Wensley Developments post development stormwater flows are as follows:

$$Q_{20} \text{ (post-development)} = 704 \text{ l/sec.}$$

$$Q_{50} \text{ (post-development)} = 860 \text{ l/sec.}$$

16. Appendix 3 (Engineering Standards referred to)

TDC Engineering Standards 2008 (relevant parts)

7.5.2 Soakbeds and Soakage Trench Design

In new subdivisions a pipe system is the preferred solution; however Council may permit a combination of soakage and reticulation on approved soil classifications and with specific design.

- a) Approval of soakage for stormwater is at Council's discretion. Grounds for refusal of soakage may include:
- i. potential groundwater contamination;
 - ii. high groundwater levels;
 - iii. slope stability concerns;
 - iv. compatibility with the built environment and Council's existing assets; and
 - v. lack of secondary flowpaths.
- b) Specific design of soakage solutions is required, due to the variation of soil types and shallow groundwater levels throughout the district. Refer NZBC/E1 for site testing regime.
- c) Soakage systems shall have a capacity adequate for a 5% AEP (20-year) event. This capacity shall be proven through field testing.
- d) Continued maintenance is required for soakage systems, as silting up of the soakage media may occur over time. This maintenance must be specifically addressed by the Designer. A maintenance period of between 2-6 years plus a Bank Bond shall apply for any soakage asset vested in Council.
- e) Particularly rigorous flood risk analysis and overland flow design will be required where soakage is chosen as a preferred disposal option. When assessing flood risk and overland flow, no allowance for soakage capacity shall be assumed.
- f) The effectiveness of soakage may be maximised with the reuse, storage, or detention of stormwater on site through means such as tanks, rain gardens (areas of gardens planted in trees and shrubs that soak up water) and irrigation areas. In such instances a reduction of soakage capacity may be accepted in conjunction with other low-impact design solutions.
- g) A typical soak pit / trench / rain garden concept is shown on TDC Drawing 725. This drawing is intended as a guide and specific proposals will require the Engineering Manager's approval.
- h) Soakbeds and soakage trenches shall be kept clear of secondary over land flow paths with vehicle access for maintenance purposes.
- i) Disposal of stormwater by soakage on a private right-of-way will require specific design. The right-of-way shall initially drain via a standard sump and then to a soak bed as shown on TDC Drawing 723. The ongoing maintenance of this soakage shall lie with the properties served by the right-of-way and Council will require this to be recorded on the title of each property.

7.5.9 On-Site Retention of Stormwater

a) Water is a valuable resource and land owners are encouraged to retain and reuse stormwater collected on their site. This also reduces off-site adverse effects by restricting stormwater flows in Council's pipe systems until after a high intensity storm has passed.

b) Retention of stormwater can be achieved via holding tanks on site. The lower two-thirds of a tank can be used for stormwater reuse and the top one-third of the tank for detention and slow discharge to Council's reticulation system if available. TDC Drawing 725 gives a working example for stormwater retention design.

Low Impact Design (LID) is a method that may be used to achieve multiple stormwater management requirements efficiently and effectively. The approach promotes the use of stormwater management methods and solutions which protect, incorporate or mimic natural drainage processes of a given site or catchment. It is anticipated that the LID design approach will include:

- a) Understanding existing and/or natural drainage patterns within the catchment;
- b) Maintaining or enhancing natural drainage systems where possible;
- c) Minimising impervious surface cover within developments;
- d) Preventing, rather than mitigating, adverse effects by managing stormwater at source (on-site);
- e) Using natural systems and processes, such as soil infiltration and vegetation, in the management of flow and quality treatment of stormwater.
- f) Integrating stormwater design into the early stages of design and planning of development proposals;
- g) Integrating stormwater management and disposal with other urban values, such as open-space retention, recreation and amenity values;

Council encourages the use of LID in the management of stormwater within every development. However, Council also recognises that LID approaches may not be suitable under all circumstances such as (but not limited to) the following:

- a) Where the proposed development is located within an urban area that has a high percentage of impervious surface cover and, where the existing stormwater systems rely on piped infrastructure;
- b) Where the development is located on land that has poor natural drainage and/or a high water table, especially during high rainfall periods;
- c) Where the soil or naturally occurring ground surface has poor permeability, preventing infiltration;
- d) Where local conditions (such as total land area available, surface slopes or access issues) limit the effective operation and ongoing maintenance of a proposed system

7.5.10 Detention Basins

Detention basins that are to be vested in Council must have the prior approval of the Engineering Manager. Detention basins may be needed for the control of stormwater flows should downstream stormwater systems be substandard. Because of long-term maintenance costs, large basins are preferred by Council over a series of smaller ones.

Council may consider smaller basins if they are incorporated into local purpose reserves and have other benefits for the public.

If detention basins are approved they should be designed to the following standard:

- a) The 10-year, 20-year and (where required) 50-year return period peak flood flow from the developed catchment shall be no greater than would have occurred from the undeveloped catchment at the critical downstream location(s) in the network. This requirement may result in design for a number of duration rainfall events.
- b) A design and construction certificate shall be provided for each structure by a suitably qualified Chartered Professional Engineer stating that the basin has been designed and constructed in accordance with the appropriate standards.
- c) A 500mm freeboard shall be provided above the maximum design storage level to the spillway crest in most cases. Council reserves the right to vary the freeboard requirement on discussion with the Designer.
- d) The spillway shall be capable of passing the 1% AEP (Q100) event without risk of over-topping the dam structure or eroding the spillway.
- e) In locations where the majority of the flow into the structure would be via overland flow the discharge into the downstream stormwater system shall be through a standard stormwater intake (TDC Drawing 702).
- f) In dry detention basin locations where the majority of the flow into the structure would be via piped systems, the piped systems shall be extended through the basin with surcharging capabilities to allow:
 - Multi-use options for the basin area;
 - Peak flood flows to bubble up via a sump out of the pipe system into the storage basin;
 - Stored water to drain once the flood peak has passed;
- g) For detentions dams within continually flowing catchments, swale drains and landscaped drains may be more appropriate.
- h) In all cases a secondary intake shall be provided terminating 500mm below spillway crest level (or at an approved alternative level as per (e) above). An acceptable example is shown on TDC Drawings 701, 702 and 703
- i) An all-weather access track shall be provided from a legal road reserve to the basin of the detention dam and intake structures. The track shall be no steeper than 1-in-7, have a physical width of not less than 3.0m and be provided with stormwater control.

j) Detention pond design shall mitigate any actual or potential adverse effects by addressing the following points:

- side slope stability and safety considerations;
- ease of maintenance, including mowing and silt cleanout;
- shape and contour for amenity value;
- the effectiveness of the outlet structure;
- secondary overflow options;
- dam or bank failure;
- silt traps;
- fish passage habitats and birdlife enhancements;
- pedestrian links to other reserves;
- safety fencing; and
- vegetation islands, shading.

k) Detention ponds shall vest as “utility reserves” and not form part of a reserve fund calculation trade-off, unless previously agreed with the Reserves Manager.

17. Appendix 4: Design Check

During the significant storm of 13-16 December 2011 the dam was over topped to some extent (anecdotal).

Rainfall records (gauge at TDC Richmond Office) show that 283mm of rain fell in this period (refer attached)

Applying the pre-development runoff coefficient of 0.30 would indicate a runoff volume of $0.283 \times 11.3 \times 100 \times 100 \times 0.30 = 9594\text{m}^3$ over the 3 day storm, or an average flow rate of around 37 l/sec.

The peak 30-minute rainfall was only 10mm during this event. Thus the estimated peak average flow rate was in the order of $0.010 \times 11.3 \times 100 \times 100 \times 0.30 = 188 \text{ l/sec}$.

Had the drainage system at that time been directed to the pond, and the outflow operating as proposed, the stormwater should have been well contained within the system.

According to HIRDS Ver. 3, the 3-day rainfall over 13-15 December 2011 was a 1:100 year event.

However the 30-minute peak of 10mm was less than annual event.

18. Appendix 5: Groundwater Seepage to Pond

A water level recorder was installed in Olive pond from 9 August to 4 October 2012. Rainfall records were obtained from gauge at TDC office. The two records are over-plotted in Figure 4. 240mm of rain fell in the period. Maximum daily rainfalls were 38mm and 35mm. It can be seen that rainfall rates less than 15mm/day do not appear to affect pond levels. To estimate seepage rates and hence the influence of groundwater flows on stormwater design, four storm events were considered. These are summarised in Table 3.

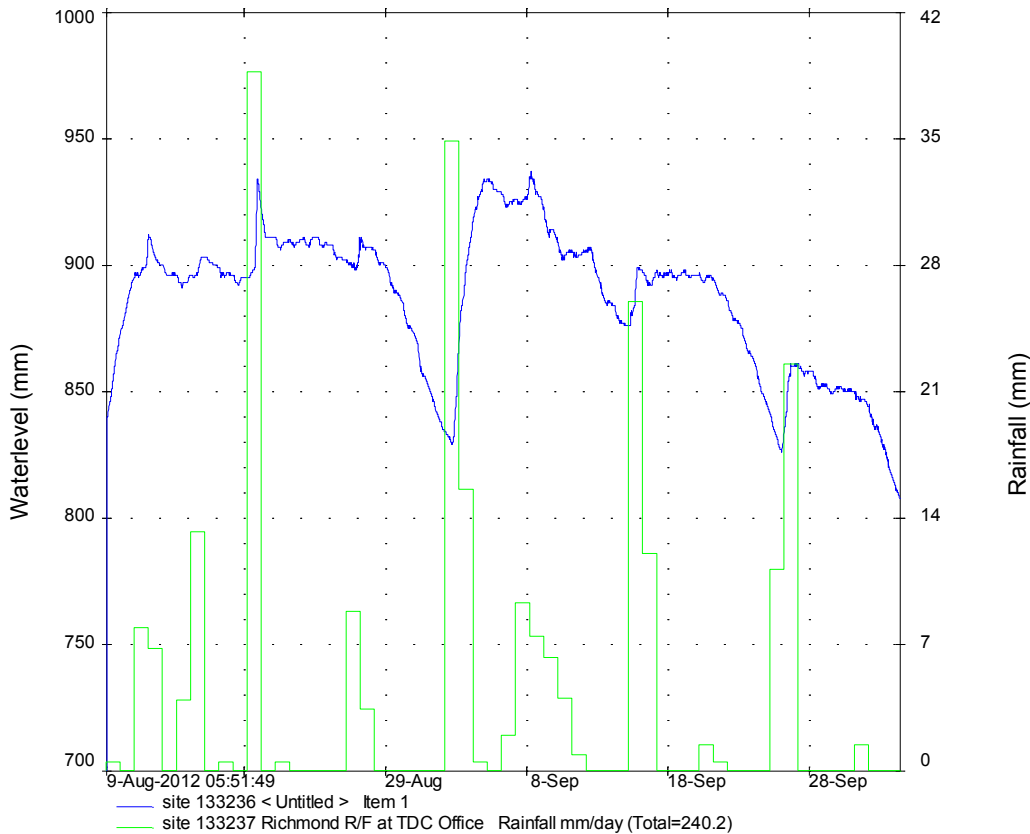


Figure 5: Olive Pond water levels v TDC Rainfall (Water level in mm on Y1 axis, rainfall in mm on Y2 axis)

Table 3: Seepage calculations

Date	Rainfall Total (mm)	Max 30min RF	Volume captured M ³	Direct interception M ³	Net seepage M ³	Average seepage rate (l/sec)
19 Aug 2300 to 20 Aug 0100	38	5.5	115	128	0	0
3 Sep 1200 to 6 Sep 0600	50	<3	356	169	187	<1
15 Sep 0920 to 15 Sep 2045	21	<3	71	72	0	0
26 Sep 0300 to 26 Sep 1818	34	<3	112	115	0	0

Maximum seepage from groundwater <1 l/sec. As a check, between 27 Aug and 2 Sep when there was no rain, the pond leakage was 80mm, which equates to an average leakage rate of <0.5 l/sec. From this information and taking the lag of at least 1 hour into account, groundwater inflows should not affect stormwater design flows.



19. Appendix 6: Smaller Flood Calculations



File: 12341

19th April 2013

The Consents Officer
Tasman District Council
Private Bag
Richmond
NELSON 7050

Dear Sir,

STORMWATER DETENTION DESIGN – ADDITIONAL INFORMATION – OLIVE ESTATES – 109 WENSLEY RD, RICHMOND, NELSON

Tasman Consulting Engineers Limited (TCEL) have carried out additional stormwater detention calculations to assess the capacity of the proposed detention pond and restricted orifice outlet under storms of various return period and duration.

The performance of the proposed system has been assessed in the following storm conditions:-

- Q₅ / 6-hour rain event
- Q₁₀ / 6-hour rain event
- The rainfall profile for the Nelson storm of 13th to 15th December 2011.

Stormwater flow for Q₅ / 6-hr

The rainfall intensity for the Q₅ / 6-hr event was provided by Tony Hewitt.

The parameters used in the design were:-

- Rainfall intensity = 12 mm/hr
- Catchment Area = 8.59 ha
- Run-off Coefficient = 0.6

The maximum storm flow is 172 L/s

Ron O'Hara BE (Civil)
David King MC (Civil) MIPENZ CPENG IntPE

PC Box 3631, Richmond
Nelson 7050, New Zealand

Phone +54 3 544 6404
Fax +54 3 544 6694
Email admin@tcel.co.nz



Stormwater flow for Q_{10} / 6-hr

The rainfall intensity for the Q_5 / 6-hr event was provided by Tony Hewitt.

The parameters used in the design were:-

- Rainfall intensity – 14 mm/hr
- Catchment Area = 8.59 ha
- Run-off Coefficient – 0.6

The maximum storm flow is 200 L/s

Stormwater flow for December 14th – Nelson Dec 2011 Rainfall Event

The rainfall intensity was determined from TDC records of 15 minute rainfall depths provided by Tony Hewitt.

The maximum 15minute rainfall depth was recorded at 3:00am on the 14th December (4.2mm). This is equivalent to a rainfall intensity of 17 mm/hr.

The parameters used in the design were:

- Rainfall intensity = 17 mm/hr
- Catchment Area – 8.59 ha
- Run-off Coefficient = 0.6

The maximum storm flow is 240 L/s

Detention Pond Characteristics

The detention pond reaches a maximum capacity when the depth in the pond is approximately 1.2m above the static water level. The maximum outflow through the proposed orifice system (2 orifices each of 300mm diameter) is calculated using the orifice formula

$$\text{Orifice Flow } Q = C_d * (D_o^2 * \pi / 4) * \text{Sqrt}(2.0 * g * H)$$

Where C_d = Orifice Coefficient (0.62), D_o = Diameter of Orifice (0.3m), g = Gravitational Constant (9.81), and H = The depth from the water surface to the centre of the orifice (1.05m).

Orifice Flow $Q = 190$ L/sec. Thus 2x orifices have a combined flow of 380 L/sec.

Summary

It can be seen that all the cases investigated (Q5, Q10, and the Nelson Storm) have peak inflow rates (172 L/s, 200 L/s, and 240 L/s) that are well below the maximum calculated outflow rate from the proposed detention pond (380 L/s). There is thus *no possibility* that a long duration storm with a return period of 5 to 10 years will exceed the capacity of the detention pond.

The proposed 600mm diameter pipe from the pond to Hart Stream has a capacity of 700 L/s, and thus also comfortably exceeds the peak inflow rates for long duration Q₅ and Q₁₀ storms or the 2011 Nelson storm (240 L/s) (172 L/s, 200 L/s, and 240 L/s respectively).

Yours faithfully

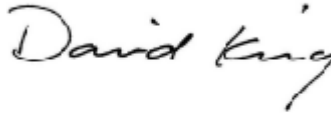
Tasman Consulting Engineers Limited

per:



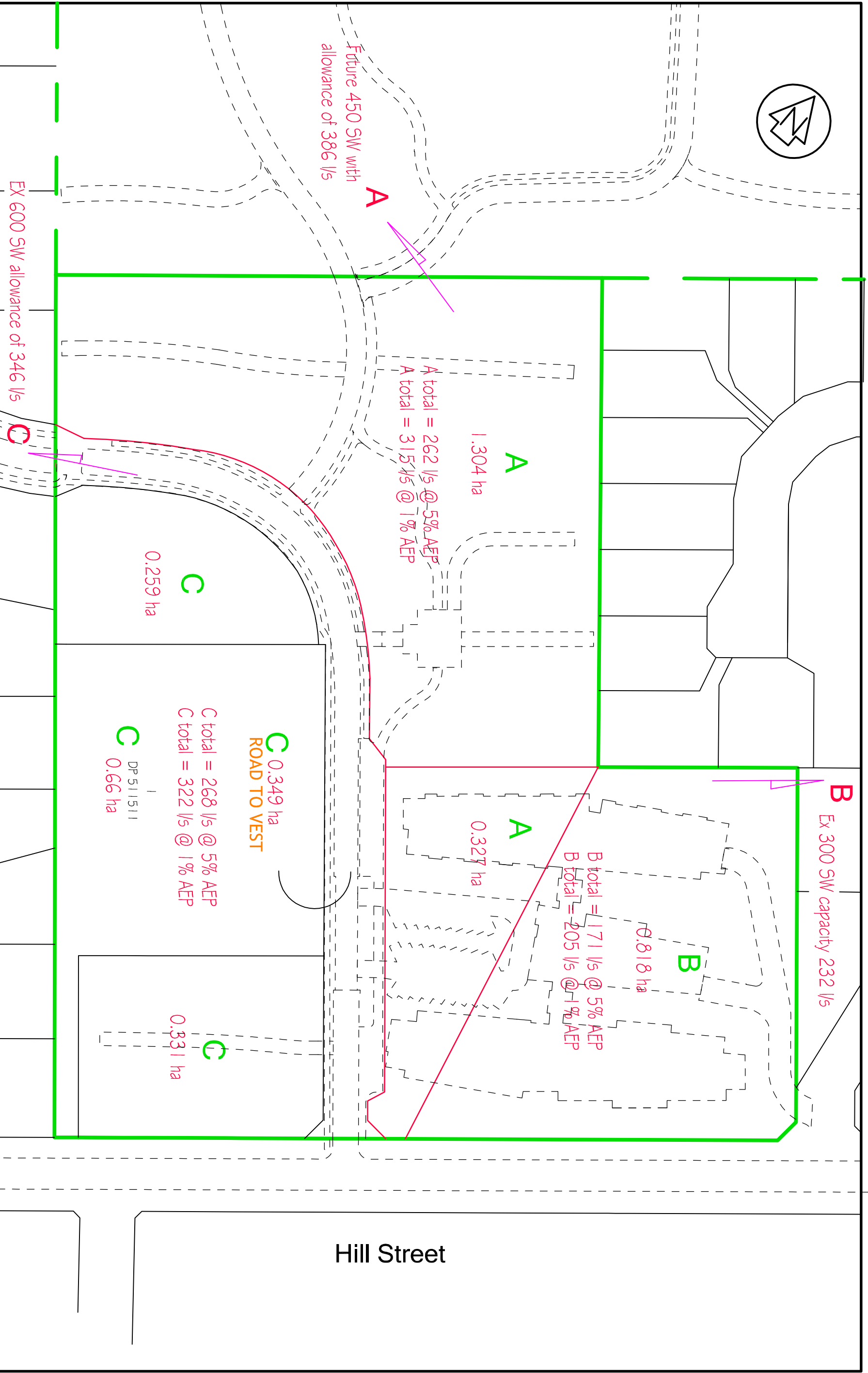
Ron O'Hara
BE (Civil), MIPENZ
Senior Engineer

Reviewed:



David King
ME(Civil) MIPENZ (Structural) CPEng IntPE
Senior Engineer

Appendix 2 – Catchment Plan ref 12039-6a



<p>Verrall & Partners Ltd Surveying, Resource Management & Land Development Ph 03 548 3358 Fax 03 548 3308</p>		<p>Applicant: Olives</p>	
<p>Date: June 2019</p>		<p>Catchment Plan for Proposed Bdy Adjmt, Hill Street, Richmond Being Lot 2 DP 511511 (comprised in CT 785433)</p>	
<p>Scale: 1:1000</p>		<p>Job No: 12039 - 6a</p>	

Appendix 3 – Tasman Consulting Engineers report dated
12/6/2019

Date: 12th June 2019

The Consents Officer
Tasman District Council
Private Bag 4
Richmond
NELSON 7050

Dear Sir / Madam,

RE: OLIVE ESTATE LIFESTYLE VILLAGE EXTENSION CIVIL WORKS

This letter serves as confirmation that Tasman Consulting Engineers Ltd (TCEL) will provide civil engineering consultation for the Olive Estate Lifestyle Village extension. The works will entail a continuation of the works as stipulated in the original Olive Estate Village project, which includes: -

- Access road pavement investigation, design and construction inspections.
- Building platform investigation, design and construction inspections.
- Stormwater investigation and design. If required this may include investigation, design and construction inspections for stormwater detention systems.

In addition to these works, TCEL will also provide civil engineering services to construct a suitable building platform for the proposed new Care Facility, situated in the vicinity of the existing pond as shown in Image 1 below. It is expected that this will include: -

- Empty pond
- Investigate, Design inspect construction of Erosion and Sedimentation control measures in compliance with TDC guidelines.
- Divert incoming stormwater
- Investigate the adequacy of the existing dam embankment and if required provide for the removal and disposal of the soil in the embankment.
- Investigate stormwater pipe from Hill St. It is understood this pipe is no longer functional. It is expected that the pipe will be removed.

- Investigate, design and inspect the construction of sub-soil drains below filling.
- Design and inspect the construction of the certified earth fill for the proposed building platform. Fill is to comply with the requirements of NZ4431:1989.
- Investigate, design and inspect the construction rear cut face to building platform downslope from Hill St.
- The preliminary estimated earthworks will comprise 13 000m³ cut and 8000m³ fill, over an area 8500m², with a maximum cut height of 5m.

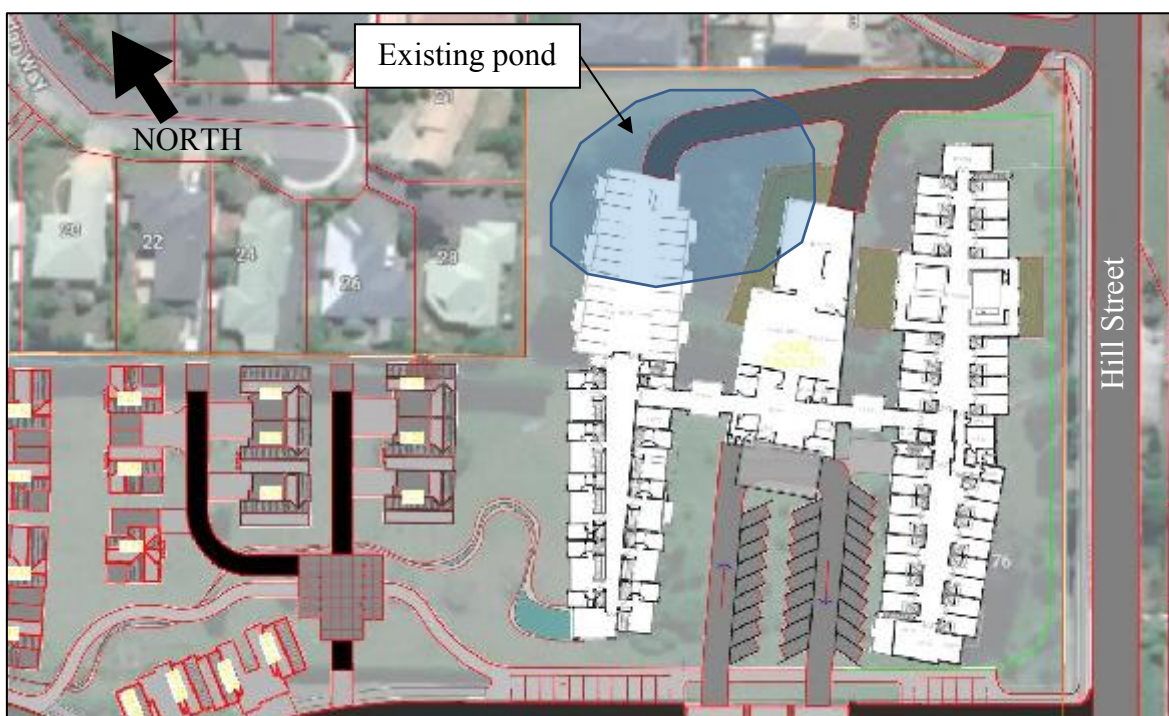


Image 1: Proposed extension to Olive Estate Village

If you have any further queries please do not hesitate to contact the undersigned.

Yours faithfully,

Tasman Consulting Engineers Limited

per:

Ron O'Hara
BE (Civil), CMEngNZ
Senior Engineer

Reviewed:

Oliver Greeff
BE (Civil), BSc (Hons), PrEng (NM)
Senior Engineer

Appendix 4 – Letter to Engineering Manager dated
28/5/2019

Verrall & Partners Ltd

Surveying - Resource Management - Land Development

PO Box 152, Nelson 7010

Email: admin@v-p.co.nz

Office: 03 548-3358

A/H mob: 029 548-3358

The Engineering Manager
Tasman District Council
Private Bag 4
RICHMOND 7050

28th May 2019

Attention: Richard Kirby

Proposed Extension Olive Estates, Langdale Drive, Richmond

Dear Richard

I have been engaged by Olive Estate Lifestyle Village to assist in the engineering and infrastructure design work for a resource consent application for expansion of the facility onto an adjacent 3.9 ha block of land (Lot 2 DP 511511) fronting onto Hill Street, Richmond.

Design and planning for this extension has been progressing since 2017 when the land was purchased, and our client has been in consultation with Council officers for some time. This has included several meetings with planning and engineering staff, and a meeting with the Urban Design Panel.

In this regard we are aware that the combined Nelson Tasman Land Development Manual is due to become operable on 1 July this year. At our most recent Council consultation meeting last week, Alex Grigg and Jeff Cuthbertson suggested it would be appropriate to apply the current TDC 2013 Standards to this new application, to maintain consistency and continuity with the previously consented development of Olive Estate (RM 130346V1).

We have since 2017 been designing the proposed extension assuming those standards would continue to apply, and would like to be able maintain consistency with this approach. There are engineering conditions under the 2013 standards on the existing Olive Estates consent that relate to this additional piece of land, and to change requirements for a new consent could cause anomalies.

The engineering staff requested that we should write to you in this regard in case our impending application is not able to be lodged until shortly after the implementation of the new LDM. They suggested this will provide the applicant, and the staff, with certainty as to which standards will apply.

28/5/2019 Olive Est


Verrall & Partners Ltd

If you can please confirm that the 2013 standards can continue to be applied to our development this would be most appreciated, and will allow us to finalise the engineering design and assessments for the application.

I look forward to your reply. Please contact me if you would like any further information.

Yours faithfully



MIKE VERRALL for
Verrall & Partners Ltd

Appendix 5 – Reply from Engineering Manager dated
17/6/2019

17 June 2019

Verrall & Partners
PO Box 152
Nelson 7010

Attention: Mike Verrall

Dear Mike

Proposed Extension Olive Estates, Langdale Drive, Richmond

I am responding to your letter of 28 May 2019 requesting that the engineering works associated with Olive Estate Lifestyle Village on Lot 2 DP 511511 be undertaken as per the current Tasman District Council Engineering Standards 2013.

We have reviewed this request and the Engineering Services Manager has agreed to allow the current standards to be used for this development for the following reasons:

1. There are existing Engineering Conditions that have been placed on Lot 2 DP 511511 that are in terms of the Engineering Standards 2013
2. Significant amounts of design work have been undertaken in terms of the Engineering Standards 2013 to support the new resource consent application.
3. The new resource consent application will be made prior to 1 July 2019.

Yours sincerely



Dwayne Fletcher
Activity Planning Manager

Copy to: Alex Grigg, Leif Pigott

Annexure F

Detailed Site Assessment

Prepared by Contract Environmental

**Detailed Site Investigation
Hill Street
Richmond**

Olive Estate Lifestyle Village

February 2018



Contract Environmental is a Trading Division
of CLL Service and Solutions Ltd

CLL Service and Solutions Ltd
14 Wookey Kumeu, Auckland
PO Box 577, Kumeu 0841
Ph: 09 412 7048
Fax: 09 412 7410
www.cll.net.nz

Quality Assurance

Title: Detailed Site Investigation
Hill street, Richmond

Client: Olive Estate Lifestyle Village

Version: 2

Date: February 2018

Prepared By: Martyn O'Cain
MSc (hons) Environmental Science
PG Dip Business Management
CEnvP (Contaminated Land)

Reviewed By: Kristel Franklin
Geologist/Environmental Scientist
BSc (Geology)
MSc (Hazard and Disaster Management)



This document has been prepared for the benefit of Olive Estate Lifestyle Village and Tasman District Council. No liability is accepted by this company or any employee or sub-consultant of this company with respect to its use by any other person.

Should anyone wish to discuss the content of this report with Contract Environmental, they are welcome to contact us on 027 277 3566.



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Appendix A: Hill Laboratories Reports

1.0 INTRODUCTION

Contract Environmental (CE) has been commissioned by Olive Estate Lifestyle Village (Olive Estate) to complete a Detailed Site Investigation (DSI) on an area of land that has historically been used for horticultural purposes. The site is located on Hill Street, in south Richmond. Olive Estate are already established on land immediately northwest of the Hill Street property, but are intending to extend their operation, which includes the land under investigation. The future use of the land will be 'high density residential'. The location is shown on Figure 1

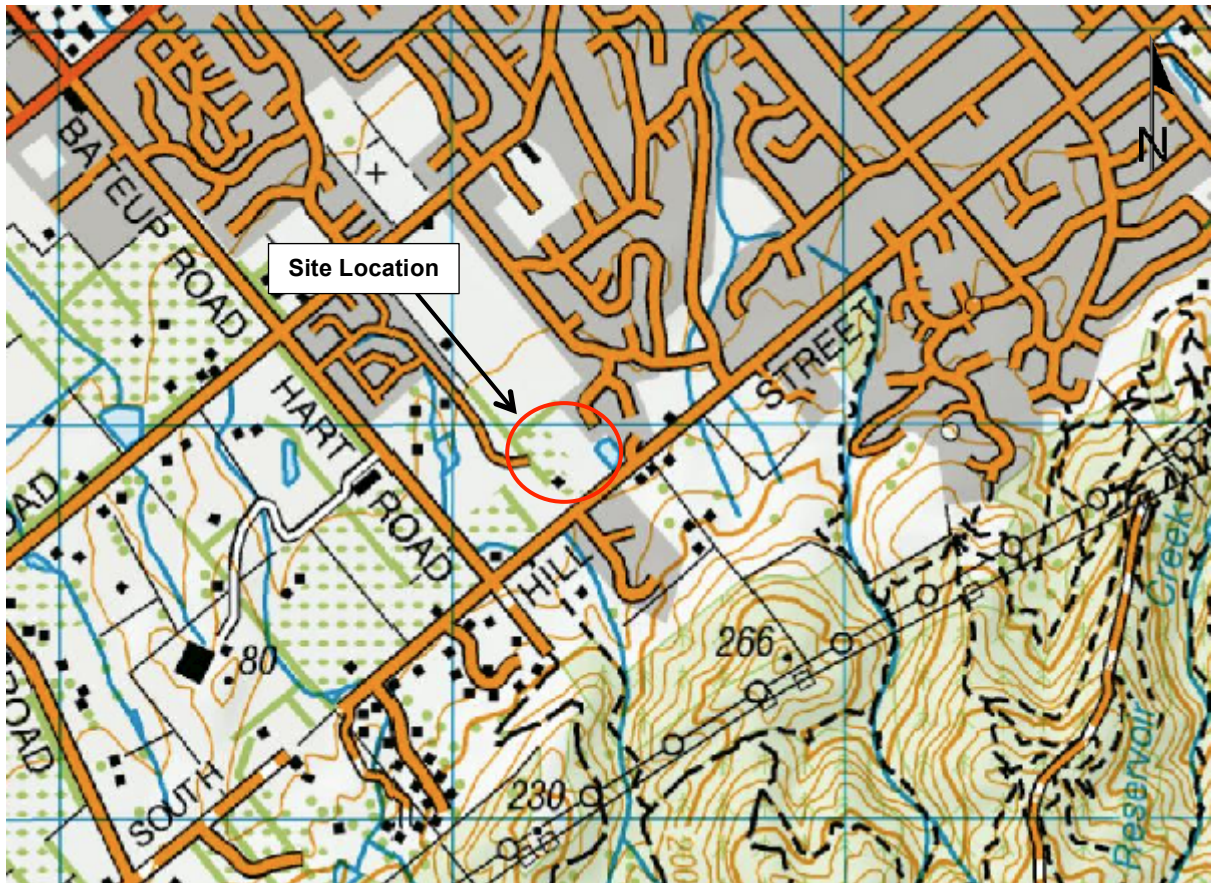


Figure 1: Site location (approximate). Base topographic map sourced from GNS Science Web Map, scale is a 1km grid.

The National Environmental Standard (NESCS) for Assessing and Managing Contaminants in Soil to Protect Human Health (2011) requires a site investigation to be undertaken on properties that are undergoing a subdivision, change of land use or where significant earthworks are to be undertaken. Before the local Council can authorise such activities an assessment of the site should be carried out.

This report will review historical aerial photographs and assess the area within the property associated with horticulture, describe the methodology for collecting soil samples and show the analytical results compared to the NESCS trigger values and other relevant resource management documents. The area being investigated is shown in Figure 2.



Figure 2: Site location highlighted in yellow. Base aerial photograph sourced from Top of the South Maps.



2.0 OBJECTIVE AND SCOPE OF WORK

The land included in this investigation will be developed for high density residential purposes. The objective of the DSI is to identify and assess land within the investigation area that has been used for horticultural purposes.

The following scope of work was undertaken to meet the objective of the investigation:

- Review of historic aerial photographs;
- Site walkover and inspection;
- Collection of soil samples for analysis;
- Reporting of analytical results;
- Assessment of the potential effects to human health and the environment.

The results of this investigation will accompany any resource or building consent applications that are required.



3.0 SITE CONDITIONS AND SURROUNDING ENVIRONMENT

Site address:	Hill Street
Locality:	Richmond
Legal description/CT:	Lot 2 DP 511511 (CT 785433)
Area:	3.38 ha
Map reference:	Long: 173.183156; Lat: -41.353968
District Plan Zoning:	Residential

The Hill Street property is a former farm lot that was once part of 376 Hill Street. The original farm homestead was recently subdivided from the main farm area to allow the sale to Olive Estate. The location and subdivided area of the homestead are visible in Figure 2.

The site is relatively flat with just a slight gradient from southeast to northwest across the property. At present, the land is predominantly being used for grazing however there are some remnant fruit trees that are picked by locals for personal consumption, and scatterings of iris plants that were once grown commercially. The site is not being used as a commercial operation.

Following the subdivision of the homestead and associated buildings there are no structures located on the property being investigated. There is a constructed irrigation pond on the eastern boundary of the property that collects stormwater from the adjacent Hill Street. Three large piles of natural wood from the removal of old orchard trees are located in the centre of the property. The piles observed did not appear to have domestic rubbish included.

The surrounding land uses are a mix of rural, rural residential and residential. This area of Richmond is rapidly being developed for standard residential purposes. Immediately adjacent to the site on the northeast and southwest sides are recent residential subdivisions whereas to the northwest is a large area of bare land that will be part of the Olive Estate development. To the southeast of the site is residential land use. Rural and rural residential land is still predominant 300 m southwest of the site. Richmond CBD is approximately 1.5 km north and the foothills of the Barnicoat Range are approximately 50 m southeast.

The GNS Sciences geology web map (1:250,000) shows the site as being predominantly underlain by Holocene river deposits described as '*poorly sorted gravels forming alluvial fans*



screes and colluvial deposits'. A small area of the property along the western boundary intersects Moutere Gravel formation being '*poorly to moderately well sorted clay bound gravel containing up to boulder sized clasts of quartzfeldspathic sandstone*'. Shallow test pits identified a dark silty gravelly topsoil to a depth that exceeds 300 mm below the surface. Groundwater was not investigated as part of this report however the previous owner commented that a hole¹ dug to 3 m on the site did not intercept the water table.

¹ The hole (1 m x1 m x 3 m deep) was backfilled with concrete and fence wire. A 20 L plastic container was also observed.

4.0 SITE HISTORY

The history of the site has been established through reviewing historic aerial photographs.

The following aerial photos (Figures 3, 4, 5, and 6) show the site in 1948, 1969, 1989 and 2003 respectively. The photos have been sourced from Top of the South Maps, Google Earth and Retrolens.

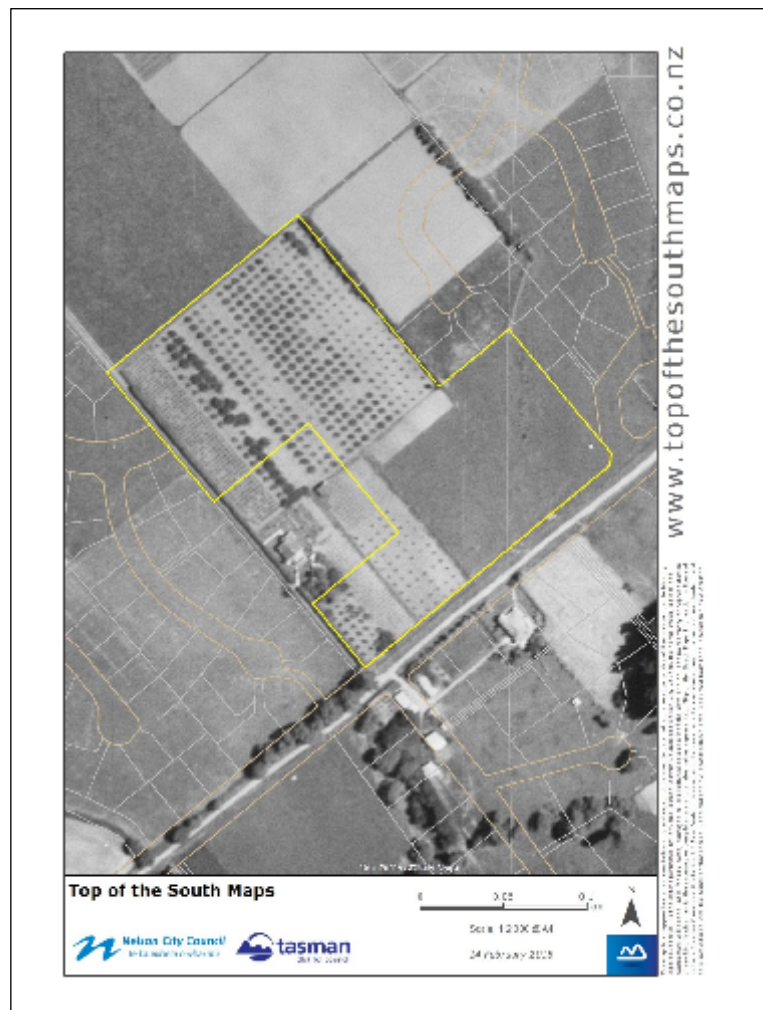


Figure 3: Site location 1948. Investigation area shown as yellow highlight. Base aerial photograph sourced from Top of the South Maps.



Figure 4: Site location 1969. Investigation area shown as yellow highlight. Base aerial photograph sourced from Retrolens.

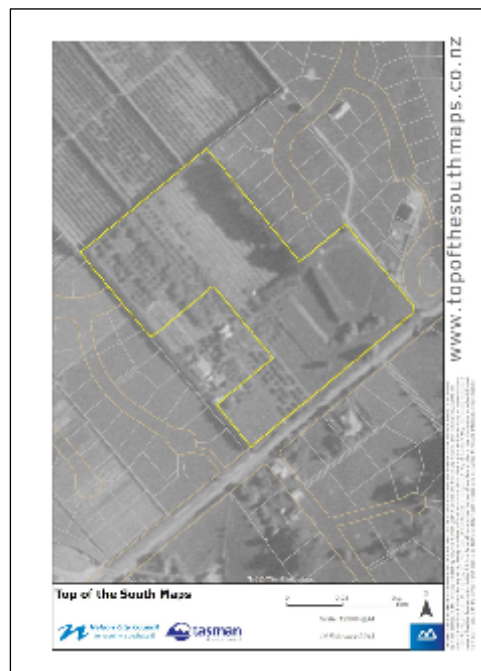


Figure 5: Site location 1989. Investigation area shown as yellow highlight. Base aerial photograph sourced from Top of the South Maps.



Figure 6: Site location 2003. Investigation area shown as yellow highlight. Base aerial photograph sourced from Google Earth.

A review of the historic aerial photographs and discussions with the former longtime owner of the property (Mr Nicholl) identified that the orchard trees visible in all of the historical photographs are predominantly stone fruit (peaches and plums). According to Mr Nicholl, the crop along the southwest boundary visible in the 1948 aerial photograph are Proteas. He also mentioned that in the mid 1990's he grew peas for a short period and late in the farms history he grew Iris's; some of which are still growing today. He constructed the irrigation pond in the late 1980's.

No structures are evident within the subject area (excluding the existing dwelling area that has been subdivided and retained by the previous owners).

5.0 CONCEPTUAL SITE MODEL

A conceptual site model (CSM) helps to identify whether or not a complete exposure pathway exists. An exposure pathway must include a contaminant source, a transport mechanism and a receptor. If one of these components does not exist, or can be removed, then the exposure pathway is incomplete. If the exposure pathway is incomplete then there is little risk to human health at the specified location.

Table 1 shows a basic conceptual site model associated with the property and based on the future land use being high density residential. It lists activities included in the HAIL that are associated with agricultural land uses and may potentially cause elevated concentrations of soil contaminants.

Table 1: Conceptual site model		
Contaminant Sources (HAIL activities)	Transport Mechanism	Receptor
<ul style="list-style-type: none"> A10. Persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glass houses or spray sheds; 	<ul style="list-style-type: none"> Inhalation of fugitive dust; Ingestion of soil and dust; Dermal contact with soil; Migration via saturated and unsaturated zone. 	Site occupiers and the surrounding environment.

Contaminant sources

The possible sources of ground contamination at the site are activities associated with the agricultural industry given that the site has primarily been used for horticulture. The activity described above can be associated with the historical use of the property (A10).

Transport mechanism

The primary transport mechanism is the potential exposure of contaminated particulate via inhalation, ingestion or dermal absorption by residents once the development is complete.

Receptor

In this situation, the likely receptors are the future residents that will be occupying the land when it is fully developed for high density residential purposes.

Given that horticulture was introduced to the property prior to 1948 it could not be demonstrated from the desktop study documented above that contaminants are not present in the surface soils as a result of the previous land use activities. A detailed site



investigation was therefore carried out in areas of the property that have been used for horticulture. The priority contaminants associated with horticulture are arsenic, copper, and lead.

6.0 ASSESSMENT METHODOLOGY

A combination of composite subsampling and discrete sample analysis was used to assess the horticultural areas identified within the property. The areas being assessed were selected based on the historical photograph review that identified where orchard trees were clearly evident.

Using a stainless-steel soil corer, 10 soil cores were collected along a 'Z' shaped transect line² within a one-hectare area (or part thereof) where the orchard trees were located and placed into a single container to be mixed and analysed by the laboratory. Eight discrete soil samples were also collected from within the two composite areas. In addition, three control samples were collected from an area within the property that did not appear to be associated with horticulture prior to 1980.

Soil samples were collected to a depth between 75 mm to 100 mm from the surface. Each sample was analysed for contaminants of concern (arsenic, copper and lead). Figure 7 shows the approximate soil sample locations.

The analytical results from the composite samples (10 subsamples) provides an average concentration of the soil contaminants across the entire site. The discrete soil sample results are reconciled with the composite result to determine whether the soil contaminant concentrations are relatively consistent and that there are no 'hotspot' areas of concern.

² As described in the TDC / NCC soil sampling and assessment guidelines (2003; reviewed 2012)



Figure 7: Soil sample locations within the horticultural area



7.0 QUALITY ASSURANCE

Soil samples were collected on 24 January 2018. Each sample was collected using a stainless-steel soil corer or trowel. Samples were placed directly into clean resealable bags. All sampling equipment was cleaned in Decon 90 and rinsed in freshwater between each sample location. Field staff wore clean disposable gloves when collecting each sample to minimise the potential for cross contamination.

Samples were delivered to Hill Laboratories Ltd in Hamilton by overnight courier. Hill Laboratories Ltd are an internationally recognised laboratory that is endorsed by International Accreditation New Zealand (IANZ).

One field duplicate soil sample was submitted for laboratory analysis. The data quality of the duplicate sample collected for quality control purposes is evaluated by reference to the Relative Percentage Difference (RPD). RPD is used to determine the precision / reproducibility of the results. Table 2 shows the original results and RPD for the duplicate samples collected during the investigation.

The precision of the laboratory analytical results is deemed to be suitable if RPD values fall within the recommended range of 30% RPD where one or both values were greater than 10 x laboratory limit of reporting or 50% RPD where one or both values are less than 10 x laboratory limit of reporting. The RPD values for the soil samples collected as part of this investigation are within those limits and therefore considered acceptable.

Table 2: RPD results for the field duplicate samples			
HS9	As	Cu	Pb
Original	4	16	13.2
Duplicate	3	17	12.4
Average	3.5	16.5	12.8
RPD	28.5	-6	6.25



8.0 BASIS FOR TRIGGER VALUES

Soil sample results are compared to the trigger values listed in Tables B2 (soil contaminant standards for health for inorganic substances) of the NESCS (2011). The land use trigger values that are provided are for high density residential.

The analytical results are also compared to the local background concentrations (99th percentile) and cleanfill acceptance criteria as listed in the 'Background concentrations of trace elements and options for managing soil quality in the Tasman and Nelson Districts' (Cavanagh 2015).

9.0 RESULTS

Analytical results for the horticultural area are summarised in Table 3 with the full laboratory report included in Appendix A.

No adjustment has been provided to the results with regard to the compositing of the samples. The average concentrations provide sufficient analytical data.

Table 4: Analytical results for the horticultural area			
mg/kg	As	Cu	Pb
Block 1			
HSC1	5	<u>84</u>	13.6
HS1	6	42	15.2
HS2	7	<u>144</u>	12.6
HS3	5	<u>114</u>	11.9
HS4	5	27	12.2
Block 2			
HSC2	4	<u>91</u>	16.2
HS5	5	<u>154</u>	20
HS6	5	77	13.6
HS7	4	<u>118</u>	17
HS8	3	<u>121</u>	11.5
Control			
HS9	4	16	13.2
HS10	4	19	10.8
HS11	4	20	13.8
Trigger Value (NESCS)	80	>10,000	880
Cleanfill Criteria	12	83	86
Background	11	41.6	48.6

Notes

Bold = exceeds the human health protection trigger value for a residential (10% produce) land use

Underlined = exceeds the Nelson Tasman cleanfill acceptance criteria

Italics = exceeds background concentrations (99th per centile)



The soil sample results show all determinands to be well below the NESCS trigger value for a high density residential land use. Arsenic and lead results are below the Nelson Tasman cleanfill criteria however copper concentrations are consistently above it in the former orchard areas, but not in the control area. The elevated copper concentrations were detected in the area used for growing stone fruit.



10.0 SITE CHARACTERISATION AND RECOMMENDATIONS

Olive Estate Lifestyle Village are proposing to extend their operation on to land that they have purchased adjacent to 376 Hill Street in Richmond. The land will be used for high density residential purposes.

Historical aerial photographs showed that land within the property was used for commercial horticultural purposes from the 1940's until around the 1990's. The type of orchard trees within the property were predominantly stone fruit according to a former owner of the site. After the 1990's, remnant orchard trees remained, and other forms of farming were tried, for example commercially grown Iris's. Because of the long-term association with horticulture, a detailed site investigation was undertaken. The investigation concentrated on the land that had been used for horticulture. Control samples were also collected from an area that was not used for horticulture between the 1940's and 1980's for comparison.

While the soil sample results from the investigation showed elevated concentrations of some heavy metals, all of the results are below the NESCS standard for a high density residential land use for the protection of human health. Therefore, based on the conceptual site model discussed in Section 5, the exposure pathway is incomplete as there is no contaminating source that will have an adverse effect on human health.

Copper concentrations are consistently above the listed cleanfill criteria for the Nelson Tasman region in the area that was used for orchard purposes (Figure 8). Copper based sprays were, and still are, a common pesticide spray used on stone fruit. Based on copper concentrations, any material that is required to be removed from within the orchard areas shown in Figure 8 must either be retained on site to be reused for landscaping purposes or be disposed at York Valley Landfill under a special waste manifest approved by the landfill operators.

Material within the investigation area not used for orchard purposes did not show elevated copper concentrations therefore can be disposed off-site without restriction.



Figure 8: Highlighted in red is the area that will require disposal to landfill if it cannot be reused on-site.

Under the NESCS regulations if the proposed development does not meet the permitted activity conditions for disturbing land within a HAIL site³ then the earthworks associated with the proposed development will be a controlled activity and require a resource consent (Regulation 9). The matter over which control is reserved are as follows:

- 9(2) (a) *the adequacy of the detailed site investigation, including—*
- (i) *site sampling:*
 - (ii) *laboratory analysis:*
 - (iii) *risk assessment:*
- (b) *how the activity must be—*
- (i) *managed, which may include the requirement of a site management plan:*
 - (ii) *monitored:*
 - (iii) *reported on:*
- (c) *the transport, disposal, and tracking of soil and other materials taken away in the course of the activity:*
- (d) *the timing and nature of the review of the conditions in the resource consent:*
- (e) *the duration of the resource consent.*

The key matter of control in this situation is *the transport, disposal and tracking of soil and other materials taken away in the course of the activity*. The results of the analytical testing show that soil from within the horticultural area cannot be disposed at a cleanfill site as the copper concentrations exceed the cleanfill criteria therefore, as discussed above, it must be disposed of at York Valley Landfill under a special waste manifest approved by the landfill operators.

An alternative suggestion is that topsoil being excavated within the entire site as part of the earthworks phase of the development, is initially placed in a stockpile. Any excess material, after landscaping is completed, is re-tested. The natural mixing that will occur during the excavation and stockpiling may be enough to reduce the concentrations to levels suitable for disposal as cleanfill or for general reuse (below the background concentration level). This option would require further discussion to assess the associated 'risks and rewards'.

It is also recommended that the proposed disposal location and methodology is discussed with TDC prior to proceeding with any significant earthworks.

³ Regulation 8(3) of the NESCS provides a number of conditions that if met the activity can be considered 'permitted' and not require a resource consent. The main condition is that no more than 25m³ per 500m² is disturbed during the development and no more than 5m³ per 500m³ is removed from the site. It also requires that all material removed from the site must be disposed at a facility authorised to accept it.



11.0 REFERENCES

Cavanagh, J., (2015). Background concentrations of trace elements and options for managing soil quality in the Tasman and Nelson Districts. Envirolink Advice Grant: 1555-TSDC110.

National Environment Protection (Assessment of Site Contamination) Measure 1999 (revised 2013). Schedule B1 Guideline on Investigation Levels for Soil and Groundwater.

TDC / NCC (2003; reviewed 2012). Nelson Tasman Soil Sampling and Assessment Guidelines for Horticulture Sites in TDC and NCC prepared by the joint working group on historic pesticide contamination (TDC/NCC/PHS)



12.0 LIMITATIONS

This report has been prepared based on site conditions as they exist at the time of the investigation. If subsequent investigations or remedial actions are undertaken from the date of this report then certain aspects of this report may no longer be relevant or require amendment. In addition, if HAIL activities occur on the site after the date of this report then the conclusions and recommendations presented in this report may no longer be relied on.

This report has been prepared solely for the purposes of Olive Estate Lifestyle Village and Tasman District Council. The information contained herein is confidential, and shall not be passed on to any third party without prior written permission of Contract Environmental. No responsibility is accepted for any use outside the scope of this report.

This investigation has primarily focused on the land being used for horticultural purposes as being the reason for the property being listed on the local council Contaminated Sites Register. If other potentially contaminating activities are identified or discovered during the processing of any resource consents or the development of the property, then further investigation may be required.

Discussion on the sampling methods and results in this report are based on current recognised guidelines and trigger values. These methods and assessment criteria may change and concentrations of a contaminant, which are currently deemed acceptable, may in the future become subject to new or updated standards. This may cause the contaminant concentrations to become unacceptable and require further management or remediation to enable the site to be deemed suitable for existing or proposed land use activities.

It is not practicable for any investigation to be so complete that it can accurately detect all contaminants and establish a detailed record of their concentrations throughout a site. However, the current investigation has been carried out to provide a level of characterisation commensurate with an acceptable assessment of site conditions.

This investigation was carried out solely for the purpose of assessing contaminants in the soil associated with the land being suitable for human occupation only. It has purposely not assessed the possible impacts of contaminants on ecological values associated with the site. Any other investigations that are required to determine the suitability of this property are outside the scope of this report.



Appendix A
Hill Laboratories Report

Annexure G

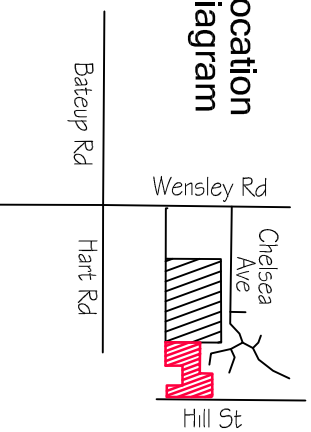
Subdivision Plan

Prepared by Verrall and Partners Ltd

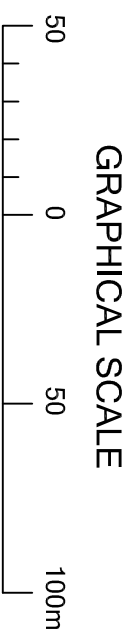
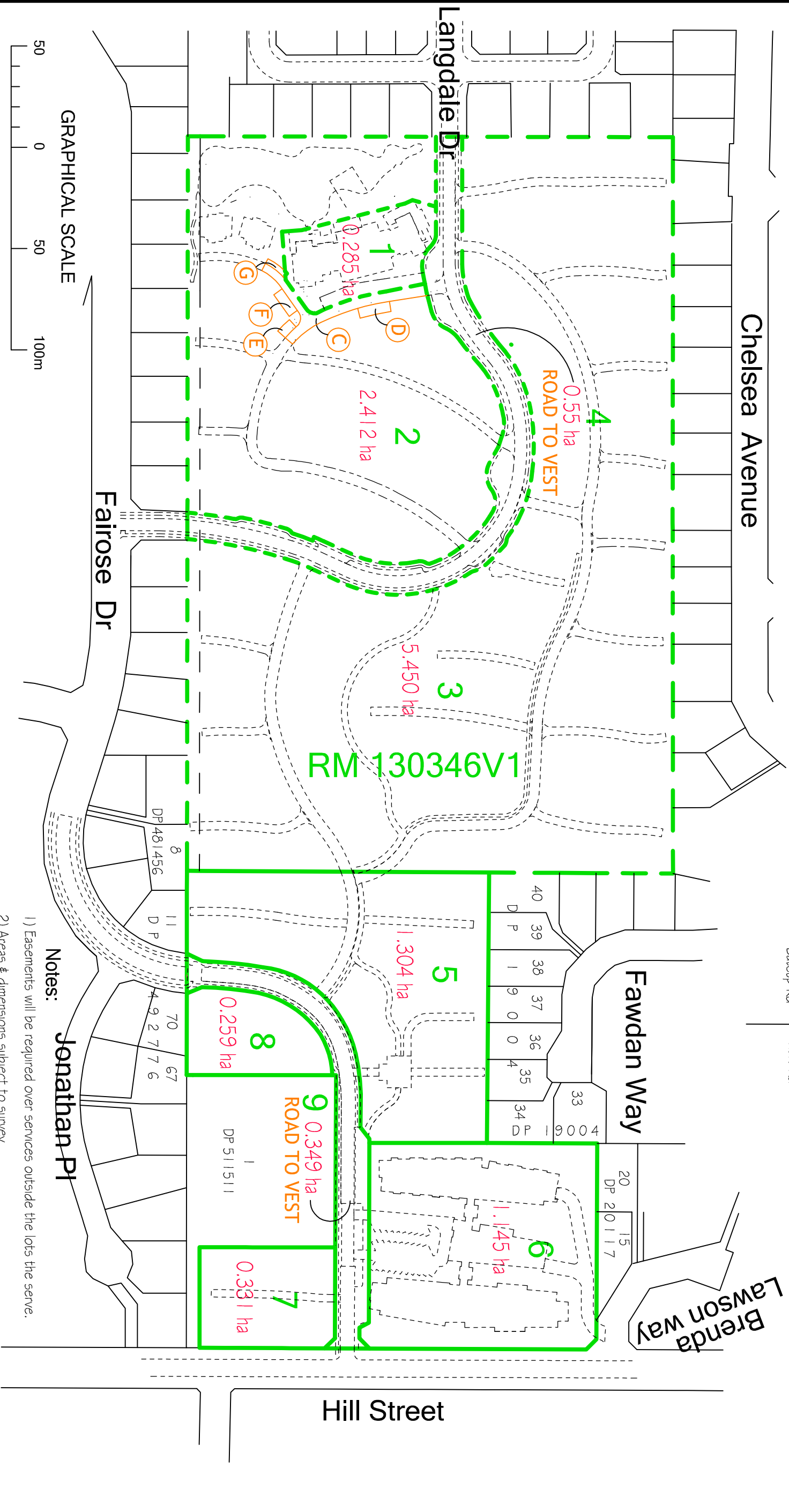


AMALGAMATION CONDITION
 Lots 5, 7 & 8 heron to be amalgamated with Lots
 2 & 3 RM 130346V1 and 1 certificate of title issued.
 (Lot 9 will vest in stages, & final stage will invoke the amalgamation)

Location
 Diagram



Memorandum of Easements			
Purpose	Serv Ten	Shown	Dom Ten
PRIVATE ROW	Lot 6	H	Lot 5



- Notes:**
- 1) Easements will be required over services outside the lots the serve.
 - 2) Areas & dimensions subject to survey.

<p>Verrall & Partners Ltd Surveying, Resource Management & Land Development Ph 03 548 3358 Fax 03 548 3308</p>	<p>Applicant: Olives</p> <p>Date: June 2019</p>
<p>Proposed Boundary Adjustment Hill Street, Richmond being Lot 2 DP 511511 (comprised in CT 785433)</p>	
<p>Scale: 1:2000</p> <p>Job No: 12039 - 6</p>	

Annexure H

Assessment of Environmental Noise Effects

Prepared by Acoustic Engineering Ltd

File Ref: AC19155 – 02 – R3

27 June 2019

Mr L. Porter
Canopy NZ Ltd
Level 1 B2
51 Halifax Street
NELSON 7010

Email: luke@canopy.co.nz

Dear Luke,

**Re: Proposed Care Facility, Olive Estate Lifestyle Village, Richmond
Assessment of Environmental Noise Effects**

As requested, we have undertaken a review of the expected noise emitted from the proposed Care Facility as part of the Olive Estate Lifestyle Village, in Richmond. The Applicant requires an assessment of the environmental noise emitted by this activity, with regard to section 104 (1) of the Resource Management Act 1991 (RMA), which requires the actual and potential effects of the activity on the environment to be considered.

Our analysis is based on the following documentation:

- Masterplan titled *Olive Estate Lifestyle Village, Development Extension Masterplan Richmond*, as prepared by Canopy NZ Ltd, and dated the 15th of May 2019.
- Care Facility Plan titled *Olive Estate Lifestyle Village, Hill St Proposal*, as prepared by Weir Architecture, and dated the 10th of May 2019.

Please find our analysis and recommendations below.

1.0 SITE AND PROPOSAL

The proposed Care Facility is to be located in the southeast portion of the overall Olive Estate Lifestyle Village, adjacent to Hill Street. The proposed building comprises of three wings joined by a central corridor. The site slopes down from Hill Street to the northwest, and therefore while each of the wings are two stories, they are at different levels.

The site and those to the northeast, northwest, and southwest are located within the Residential zone under the Tasman Resource Management Plan (TRMP), with those to the southeast on the opposite site of Hill Street within the Rural Residential and Rural Residential Serviced zones. The site and surrounding area are shown in figure 1.1 below.

We understand that Affected Parties Approval (APA) has been received from 376 Hill Street, and therefore the associated noise effects at this property do not need to be considered.



Figure 1.1 – Site and surrounding area

Access to the site is provided by two driveways off Hill Street – one to the south of the Care Facility leading to a 29-space car park and main entrance, and one to the north leading to a carpark on the lower level of the northwest wing, and to a service / loading area adjacent to the central wing.

The ground floor of the central wing contains a dining room for the residents of the Care Facility and their visitors to the northeast. The dining room includes large glazed sliding doors which open onto an outdoor deck, which wraps around the two spaces.

1.8 metre high acoustic fencing is proposed in the locations shown in figure 1.2 below. In order to be effective, each of these fences would need to conform to the following standards:

- Height – 1.8 metres
- Surface Mass – 10 kg/m² (for example, 21 mm plywood or 25 mm timber)
- The fences must be continuous, and maintained with no gaps or cracks. This will require timber palings to be well overlapped (25 mm minimum) or a “board and batten” system, and a sleeper rail connecting the base of the palings to the ground.

The proposed Care Facility is shown in figure 1.2 below.



Figure 1.2 – Proposed Care Facility and acoustic fencing

2.0 ACOUSTIC CRITERIA

Various guidance is available which is useful in considering the significance of the potential noise effects of the proposal.

2.1 District Plan noise limits

As stated above, the site is within the Residential zone as defined in the TRMP, with the neighbouring sites within the Rural Residential and Rural Residential Serviced zones. The noise limits which apply at the neighbouring sites are outlined in the TRMP, *Part II Land, Chapter 17 Zone rules, Section 17.1 – Residential zone rules, 17.1.2 Land use, 17.1.2.1 Permitted activities*, and are as follows:

- (m) *Except in the Richmond West Development Area, noise generated by the activity, measured at or within the boundary of any site within the zone, other than the site from which the noise is generated, or at or within the notional boundary of a dwelling within any other zone, does not exceed:*

	Day	Night
L_{eq}	55 dBA	40 dBA
L_{max}		70 dBA

N.B. Day = 7.00 am to 9.00 pm Monday to Friday inclusive and 7.00 am to 6.00 pm Saturday (but excluding public holidays).

Night = All other times plus public holidays.

Noise must be measured and assessed in accordance with the provisions of NZS 6801:2008 *Acoustics – Measurement of Environmental Sound* and NZS6802:2008 *Acoustics – Environmental Noise*.

2.2 New Zealand Standard 6802

NZS 6802:2008 *Acoustics – Environmental noise* outlines a guideline daytime limit of 55 dB $L_{Aeq(15\text{ min})}$ and a night-time noise limit of 45 dB $L_{Aeq(15\text{ min})}$ and 75 dB L_{AFmax} for “the reasonable protection of health and amenity associated with the use of land for residential purposes”. This standard recommends a 15 minute measurement interval for fluctuating continuous sound.

If there are no timeframes otherwise specified, then NZS 6802:2008 suggests that the daytime period is 0700 to 2200 hours, and the night-time period 2200 to 0700 hours.

The standard also describes how a 3 dB adjustment may be applied to sound received for less than 50 % of the daytime period, and a 5 dB adjustment may be applied to sound received for less than 30 % of the daytime period.

2.3 World Health Organisation

*Guidelines for Community Noise*¹, a document produced by the World Health Organisation based on extensive international research recommends a guideline limit of 55 dB $L_{Aeq(16\text{ hours})}$ to ensure few people are seriously annoyed in residential situations. A guideline limit of 50 dB $L_{Aeq(16\text{ hours})}$ is recommended to prevent moderate annoyance.

A guideline night-time limit of 45 dB $L_{Aeq(8\text{ hours})}$ and 60 dB L_{Amax} is recommended to allow occupants to sleep with windows open.

The daytime guidelines relate to ongoing noise at the stated level over a 16 hour period with no distinction between days of the week.

2.4 Other District Plan noise limits

We are familiar with existing noise rules for many other District Plans throughout New Zealand, and consider these to provide some context.

In particular, the specified hours for the daytime and night-time varies considerably between districts. However, the period between 0700 and 2200 hours Monday to Sunday is most commonly used to define daytime, and 2200 hours to 0700 hours for night-time.

Therefore, the current TRMP noise rules for all zones are more restrictive in terms of the hours assigned to the day, being 0700 to 2100 hours Monday to Friday and 0700 to 1900 hours on Saturdays, whereas most District Plans, NZS 6802 and the WHO anticipate or provide for 16 hours of daytime on all days of the week, where the more lenient noise limits apply.

2.5 Discussion regarding appropriate noise levels

The TRMP limits are in line with current best practice in terms of the standards referenced, and metrics used. However, when compared to the WHO and NZS 6802:2008 guidelines, the TRMP limits are more stringent with regard to the night-time noise level at residential properties and extent of the day and night-time periods, with a longer night-time period, and the fact that the night-time limit applies all day on Sundays and Public Holidays.

In general, where noise levels comply with the TRMP daytime noise limits we would expect noise effects to be minimal. In addition, if noise from the Care Facility remained below the TRMP daytime limits (55 dB L_{Aeq}

¹ Edited by Berglund, B *et al. Guidelines for community noise*. World Health Organization 1999.

at residential properties) on any day of the year (that is, including Saturday afternoons, Sundays, and Public Holidays) we would also expect noise effects to be minimal (recognising that whilst appropriate residential amenity should be maintained, protection from sleep disturbance during the daytime period is not essential).

In addition, for unoccupied areas of neighbouring sites, a higher level of noise may also be acceptable.

3.0 NOISE FROM THE ACTIVITY

We expect the main noise generating activity on the site to be the following:

- Noise from vehicles
- Noise from the use of the dining room
- Noise from mechanical plant

We have considered each of these noise sources below.

3.1 Noise from vehicles

3.1.1 Noise from cars

As stated above, the northwest wing of the development includes a 21-space ground floor car park, with access via the northern driveway. There is an additional 29-space uncovered car park to the south of the central wing, with access via the southern driveway.

Based on correspondence from the traffic engineer, we understand that there may be up to 60 vehicle movements on a worst-case day, with approximately eight movements during a worst-case hour. The peak hour would occur between 1000 hours and 1500 hours. We have considered a worst-case scenario of the peak hour vehicles travelling on both the north and south driveway separately.

Assuming the vehicles during the peak period are spread evenly over the hour, we have based our calculations on two cars travelling at 10 km/hr between Hill Street and the covered car park to the north, and two cars travelling at 10 km /hr between Hill Street and the uncovered car park to the south, with each car having a sound power of 90 dB L_{WA} . Based on the above (including the acoustic fence), the following noise levels are expected at the neighbouring properties:

Northwest (Residential zone – 21 Fawdan Way)

31 dB L_{Aeq} (15 mins)

Northeast (Residential zone – 3 Brenda Lawson Way)

46 dB L_{Aeq} (15 mins)

Northeast (Residential zone –5 Brenda Lawson Way)

38 dB L_{Aeq} (15 mins)

Southeast (Rural Residential zone – 369 & 373 Hill Street)

35 dB L_{Aeq} (15 mins)

Southeast (Rural Residential zone – 5 Hillplough Heights)

39 dB L_{Aeq} (15 mins)

Southwest (Residential zone – 376 Hill Street (APA))

50 dB L_{Aeq} (15 mins)

As discussed above, this level of activity is expected to occur between 1000 and 1500 hours. The District Plan noise limits would therefore be met at all sites if this occurred Monday to Saturday. However, if this

level of activity was to occur on a Sunday (where the District Plan night-time noise limits apply), the District Plan night-time noise limits would be exceeded at both 3 Brenda Lawson Way, and 376 Hill Street.

As above, 376 Hill Street has provided affected parties approval and as such the associated noise effects on this property cannot be considered.

In regards to 3 Brenda Lawson Way, we note that the peak noise levels are expected in the eastern corner of the property adjacent to the existing road way. This is currently used as a garden, without any identifiable outdoor seating areas. Noise levels received in the vicinity of the house are significantly reduced, with peak noise levels of 43 dB L_{Aeq} expected at the south western façade of the house, and less than 40 dB L_{Aeq} in the western outdoor area. As discussed above, if this level of activity occurred on the site between 1000 and 1500 hours Monday to Sunday, we would only expect the associated noise effects to be minimal.

While we understand that there will still be vehicle movements outside of 1000 and 1500 hours, they will be less frequent. We have been advised that outside of these times it is expected that there will be minimal vehicle movements on the site. We have therefore considered a worst-case 15-minute period with 1 vehicle movement on each driveway which is expected to occur infrequently between 2100 and 0700 hours. Based on the above (including the acoustic fence), the following noise levels are expected at the neighbouring properties:

Northwest (Residential zone – 21 Fawdan Way)	38 dB L_{Aeq} (15 mins)
Northeast (Residential zone – 3 Brenda Lawson Way)	43 dB L_{Aeq} (15 mins)
Northeast (Residential zone – 5 Brenda Lawson Way)	35 dB L_{Aeq} (15 mins)
Southeast (Rural Residential zone – 369 & 373 Hill Street)	32 dB L_{Aeq} (15 mins)
Southeast (Rural Residential zone – 5 Hillplough Heights)	36 dB L_{Aeq} (15 mins)
Southwest (Residential zone – 376 Hill Street (APA))	47 dB L_{Aeq} (15 mins)

As stated above, 376 Hill Street has provided affected parties approval and therefore the noise effects cannot be considered.

Noise levels of up to 43 dB L_{Aeq} are expected within the garden / driveway area of 3 Brenda Lawson Way, with noise levels reduced to 40 dB L_{Aeq} when received at the southwest façade of the dwelling. This noise is in line with guidance that suggests it is appropriate to allow occupants to sleep with their windows open. As above, we expect this to occur infrequently, and we would also expect noise from a single vehicle on the driveway to be similar in noise level and character to the noise from the vehicles that travel on Brenda Lawson Way. We would therefore only expect the associated noise effects to be minimal.

3.1.2 Noise from deliveries and rubbish / recycling removal

The goods and service vehicles will use the northern driveway to access the central loading / services bay. Based on correspondence with the traffic engineer, we understand that truck movements would result from the following:

- 2 trucks per week for general rubbish
- 1 per week for each type of recycling (one for glass, plastics, cardboard)

- 2 trucks per day for general food and delivery

These vehicle movements will only occur between 0900 and 1700 hours Monday to Saturday, with a peak flow of one truck visiting the site per hour.

We have therefore considered a worst-case 15-minute period where one truck travels on the northern driveway to the central loading bay at 10 km/hr, with a sound power of 100 dB L_{WA} .

Based on the above, the following noise levels are expected at the neighbouring properties:

Northwest (Residential zone – 21 Fawdan Way)

33 dB L_{Aeq} (15 mins)

Northeast (Residential zone – 3 Brenda Lawson Way)

49 dB L_{Aeq} (15 mins)

Northeast (Residential zone – 5 Brenda Lawson Way)

38 dB L_{Aeq} (15 mins)

Southeast (Rural Residential zone – 373 Hill Street)

39 dB L_{Aeq} (15 mins)

Based on the above, we expect full compliance with the District Plan noise limits at all of the neighbouring property boundaries, and the associated noise effects to be minimal.

3.2 Noise from dining activities

As described above, there is a dining room located within the central wing of the building, with an outdoor deck wrapping around the northwest and northeast portion of this space. From the architectural plans, it appears that there are large glazed sliding doors connecting the indoor and outdoor spaces. We have therefore considered the expected noise emissions from both the outdoor deck, and break-out from dining activities within the building.

We understand that this dining room is primarily for the residents of the Care Facility to have a meal or catch-up, potentially with visitors. This would be a low-key communal area (needing to cater to people with hearing difficulties) where any music playing through speakers would be at a background level. Therefore, we expect the noise within the dining room to be mainly from occupant conversation. Based on this use, we have assumed in our analysis that reverberant internal noise levels within the indoor space of up to 80 dB L_{Aeq} may be experienced on occasion from full occupancy.

The architectural plans indicate that there are two main seating areas on the outdoor deck – 12 seats to the northeast, and 36 seats to the northwest. We understand that there will be no speakers in the outdoor areas, and therefore the dominant noise source will be the patrons. Expected noise levels due to the conversation of people in the outdoor deck have been calculated based on the American National Standards Institute Standard ANSI S3.5 – 1997 *Methods for calculation of the Speech Intelligibility Index*, which contains information on the typical speech levels for both male and female speakers. Based on average values, for a normal voice effort, the sound power of a speaker may be deduced to be 71 dB L_{WA} . We have considered a worst-case 15-minute period of 48 people on the deck, with half of the occupants speaking at a normal voice level.

We understand that based on the nature of the associated dining room, and the people who use the space, the outdoor deck is not expected to be used frequently. The Client has therefore proposed to limit the use of the outdoor deck for dining activities, and to keep the sliding doors closed outside of these times, as follows:

- Monday to Friday 0700 to 2100 hours
- Saturday 0700 to 1800 hours

Based on the above, we expect the following worst-case noise levels at the closest neighbouring boundaries:

Northwest (Residential zone – 21 Fawdan Way)

44 dB L_{Aeq} (15 mins)

Northeast (Residential zone – 3 & 5 Brenda Lawson Way)

48 dB L_{Aeq} (15 mins)

Noise levels of less than 40 dB L_{Aeq} are expected at all other neighbouring boundaries. Full compliance with the District Plan noise limits is therefore expected at all neighbouring properties, and the associated noise effects expected to be minimal.

3.3 Noise from mechanical plant

Due to the stage of the design, the mechanical plant design is still being progressed; however, we have been advised that it is likely that the main pieces of mechanical plant will be located centrally on the roof.

Based on the type of equipment which may be associated with a development of this nature, we expect it to be realistic that the mechanical plant can be designed, installed and operate in accordance with the District Plan daytime and night-time noise limits.

Ultimately noise levels will depend on final plant selections and location, and the physical and operational mitigation implemented. Mitigation options include the use of lower noise or silenced equipment, the use of varying noise operational modes at different times of day or night, and screening provided by the facility or dedicated acoustic screens. However, we do anticipate that mechanical plant noise when received at neighbouring boundaries will be minimal, and expect compliance with the District Plan limits can be realistically achieved.

Based on the above, if it was deemed appropriate, the following could be adopted as a condition of, or as an advice note to, the Resource Consent as a way to allay any concerns that may be raised by neighbours:

- *An appropriately qualified Acoustic Engineer shall review the developed Mechanical Services design of all proposed external plant installations associated with the building, as part of the Building Consent process, to ensure that the noise emissions comply with the District Plan noise limits, when received at the boundaries of neighbouring properties.*

4.0 CONCLUSIONS

Noise from the main noise generating activities associated with the proposed Care Facility development at Olive Estate Lifestyle Village, in Richmond has been considered.

Based on the above analysis, full compliance is expected with the District Plan noise limits at all neighbouring sites which have not provided affected parties approval, apart from at 3 Brenda Lawson Way when a car travels on the driveway during the defined 'night' hours. We expect the noise from this source would be of a similar character and level to that received from a vehicle travelling on Brenda Lawson Way, and would still allow the occupants to sleep with their windows open. We would expect any associated noise effects to be minimal.

To give confidence that noise emissions associated with the development are maintained at appropriate levels, we recommend the following:

- The outdoor deck is only open for dining activities between 0700 to 2100 hours Monday to Friday, and 0700 to 1800 hours Saturday.
- The external sliding doors of the dining room are kept closed outside of the hours that the outdoor deck is able to be used for dining.

- Deliveries and service vehicles are limited to between 0900 and 1700 hours Monday to Saturday.
- Mechanical plant should be reviewed in due course

Please do not hesitate to contact us to discuss further as required.

Kind Regards



Clare Dykes
MBS, MASNZ
Senior Acoustic Engineer
Acoustic Engineering Services Ltd

Annexure I

Urban Design Assessment

Prepared by Canopy Landscape Architects Ltd



OLIVE ESTATE LIFESTYLE VILLAGE

URBAN DESIGN ASSESSMENT

28 June 2019

CANOPY NZ LTD

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OLIVE ESTATE URBAN DESIGN ASSESSMENT

INTRODUCTION

1. Canopy Landscape Architects (Canopy) has been involved in the master planning of the Olive Estate Lifestyle Village (the Village) for several years. The Village gained resource consent in 2014 and construction has been underway on a mix of villas, townhouses and a community hub featuring commercial spaces for the local and surrounding residents. The consented Village is on an 8ha site and is situated close to the center of Richmond, Nelson¹.
2. In 2017, Olive Estate purchased the adjacent block of land that extends from the current site boundary to Hill Street, which has enabled the Village to continue beyond its original boundary. The proposal to continue the Village to Hill Street was presented to the Nelson City Council and Tasman District Council's Urban Design Panel (UDP) on 4 April 2019. Positive comments were received as well as suggestions, which have been incorporated into the overall design.
3. This assessment considers the following:
 - changes to the existing consented site; and
 - the proposed Hill Street Block.
4. This assessment should be read in conjunction with the following documents:
 - Landscape and Visual Assessment prepared by Canopy, dated 28 June 2019.
 - Plan Set Volume: Masterplan Set prepared by Canopy, dated 27 June 2019; and
 - Plan Set Volume: Architectural Set prepared by Weir Architecture, dated 12 June 2019.
 - Planning context is provided within the AEE.
5. As the land is within the Richmond South Development Area, the TRMP's Urban Design Guide² would normally apply. However as the development is not a subdivision, the application of the Guide is not triggered. The master plan and design of Olive Estate have sought to match the Guide criteria as far as possible as it has several residential components, creating an area of housing that will provide for a range of ages and stages in a very high amenity environment. Thus this assessment considers the proposed development in light of the principles set out in the Guide. The TRMP also contains a number of useful assessment criteria to guide high quality urban design issues and where relevant these have also been incorporated into this assessment.
6. The unique aspect of the development is that the land remains in one ownership, and thus the level of control over the quality of the houses, other built development and the establishment/maintenance of the grounds can be maintained as is evidenced by visiting the existing established stages of Olive Estate. This will ensure that the vision for Olive Estate Lifestyle Village is maintained throughout its life. This enables a very high degree of integration

¹ Refer to Plan Set Volume: Masterplan Set Plans 03 - 04

² TRMP Part II Appendix 2 Urban Design Guide

to be achieved. A design guide has been incorporated into the resource consent package to provide Council with an understanding of how the landscape and urban streetscape will tie in with the existing development as well as be progressively and comprehensively developed in an ongoing manner. This level of detail also provides certainty for neighbouring properties, the Council and future residents of the Olive Estate Lifestyle Village.

7. The design vision is based on placing Olive Estate in a park-like environment as well as to create a strong landscape framework within the site and a green network which is both functional for pedestrian use and active or passive recreation.

THE SITE

8. The proposed Hill Street Block is located on an adjacent southern block of land to the existing village. The site is approximately 3.4ha and is located 1.7 kilometers from Queen Street in Richmond. To the north-west, the site is bound by the existing village and to the south-east the site fronts Hill Street. To the north-east and south-west, the site is bound by traditional urban subdivided residential developments. Site context plans are included in the Masterplan Set 03-04³, which illustrate how the site relates to Richmond Town Centre, surrounding roads and residential areas. The Hill Street Block is accessed from Hill Street.
9. The site is zoned Residential and sits on Greenfield land that is at the edge of the existing residential boundary of Richmond with an overlay for compact density provisions.

THE PROPOSAL

10. There are two parts to the proposal (refer to Masterplan Set Plans 014 - 017⁴):
 - The **existing consented site (RM120928)**: the consented Care Facility building has been replaced by a greenway featuring a swale and cycle/walking trail, 25 villas and 12 terrace houses. The road network also connects into the proposed Hill Street Block to provide access through the entire site.
 - The **proposed Hill Street Block** development will include a newly designed Care Facility, 36 villas and 11 terrace houses. Allowance for RV parking has also been included in the western corner of the site.
11. As part of the proposed Hill Street Block development, the Care Facility has been moved approximately 200m to the south-east to front Hill Street. The relocation of the Care Facility has resulted in a redesign of the layout, form and bulk to better suit its new location and to reduce its overall impact on the receiving environment. The newly designed Care Facility also addresses the Hill Street streetscape by providing permeable fencing, screens and a mix of vegetation to enhance amenity. This change in location is shown on Masterplan Set Plan 014⁵.
12. The two-storey terraced Care Facility will contain⁶:
 - a dining room for Olive Estate residents with outdoor dining in addition to several sitting rooms;
 - a dementia ward with 70 dementia units; and
 - 20 apartments with either an outdoor terrace or balcony for those who prefer a smaller living footprint within the village. An underground garage will also be provided for parking within this portion of the facility.

³ Refer to Plan Set Volume: Masterplan Set Plans 03 - 04

⁴ Refer to Plan Set Volume: Masterplan Set Plan 014 – 017

⁵ Refer to Plan Set Volume: Masterplan Set Plan 014

⁶ Refer to Plan Set Volume: Architectural Set Plans Sk 8 - 14

13. The proposal has design features such as seating areas scattered throughout the Village and a cycle/walking trail that follows the central swale. The swale transverses the Village from Hill Street through to the Lakehouse and functions as a secondary stormwater management solution. Extensive planting has been provided along the internal roads to create a street hierarchy as well as numerous gardens and open green spaces available for public use. These provide additional amenity within the site as well as adding character to the Village.
14. The site has been designed considering the topography and context of the landscape whilst acknowledging the past use of the site. Trees and hard landscape features within the site will add to the landscape aesthetic giving reference to the horticultural history of the site. Raised thresholds have been introduced on road intersections as calming measures, which has the added benefit of providing level access to pedestrian walkways.

Urban Design Panel Feedback

15. The proposed Hill Street Block design has been through the UDP where feedback relating to urban design matters was incorporated into the proposal. **Appendix 1** describes the design response to the UPD meeting minutes and **Appendix 2** contains the matters raised during the meeting.
16. Overall the UDP responded positively to the proposal and considered that it has achieved very high quality streetscapes, open spaces and building outcomes. The following section of the assessment addresses the urban design criteria that are contained in the TRMP Urban Design Guide. Any relevant feedback from the UDP will be referred to under the headings below.

URBAN DESIGN GUIDELINE ASSESSMENT (TRMP)

A. ALLOTMENT LAYOUT

A1 GREENWAYS AND RESERVES RELATIONSHIP

17. The villas, townhouses and apartments have been oriented towards green spaces and parks to provide passive surveillance within the development. This interaction benefits the safety of residents as well as providing amenity for them. The Care Facility has green outlooks into gardens and public green spaces.

A2 NEIGHBOURHOOD CENTRE PROVISION

18. While there is not a neighbourhood centre provision within the proposed Hill Street Block, the community hub provided in the north-west corner of the Village will still provide the necessities required. The 'heart' is within a 10-minute walk for the residents living in the Village.
19. A pedestrian network has been provided to facilitate walking to the community hub through the site. Comfortable walking distances from one side of the site to the other are shown on Masterplan Set 05⁷. This relates to the usability of the site for pedestrians who may not have a car, as this matter is more likely to occur with elderly residents and also relates to best practice urban design principles.⁸
20. Other focal points (in the form of gardens, a plaza and fruit trees near the river) provide further opportunities for social interaction.

A3 TOPOGRAPHY

21. Topographically, the site has a natural fall along its length trending northeast/southwest. The top of the site (at the Hill Street end) sits at 50masl, with 15 metres change of height from the top of the site to the bottom of the site at 35 metres above sea level (closer to Wensley Road).

⁷ Refer to Plan Set Volume: Masterplan Set 05

⁸ Based on MFE Guidance for the average person (www.MFE.govt.nz)

22. This sloping gradient creates an opportunity to provide for views within the development out to the Mt Arthur Range and to the Waimea inlet throughout the site. These views will be complemented by the internal amenity proposed through lot layout, roading/pedestrian linkages and streetscape planting.
23. The existing topography has been retained as much as possible allowing the opportunity for a water feature to run through the site for stormwater and amenity purposes.

B. DWELLING SIZE

B1 DWELLING SIZE MIX

24. There is a mix of building types⁹ on the site which are outlined below:

Existing Consented Site

Residential:

- 12 terrace houses: three bedroom, two-three storey terrace houses; height 7.2m.
- 25 villas: Two and three bedroom, single storied terrace houses; height range from 4.2m – 6.4m.

Proposed Hill Street Block

Residential:

- 11 terrace houses: three bedroom, two-three storey terrace houses; height 7.2m.
- 36 villas: Two and three bedroom, single storied terrace houses; height range from 4.2m – 6.4m.

Other building types:

- Care Facility: will contain 70 dementia units, a dining room for Olive Estate residents only and 20 apartments in a two-storey complex with underground basement garaging. A majority of the building is 7m above existing ground level with the exception of the central portion of the dementia ward, which reaches 10.5m in height.

25. The different building types provided within the proposed Hill Street Block creates a variety of living environments that accommodate active residents through to those that need an increasing level of care. There is the ability for residents to change house types within the Village to gain more help as required should their independence levels decrease. This limits the disruption of individuals and allows them to live within the community for an extended period.
26. The urban design principles promoted within the TRMP have been at the forefront of the comprehensive design for the site. Street and building layout are dictated by the underlying topography with the underlying goal of achieving a safe and desirable living environment.
27. Opportunities have been taken to maximise use of the green space and promote compact urban form. This is achieved through the use of multi-level buildings to increase the efficient use of the land resource both by building up and by locating car parks under the apartments.

THE CARE FACILITY

28. The Care Facility has been positioned in the north-east corner of the site on Hill Street to maximise access for those requiring the facility or living near it. The Care Facility includes a

⁹ Refer to Plan Set Volume: Architectural Set Sk1 – Sk14

dementia ward, dining room for use by Olive Estate residents only and apartments. A service entrance is provided from Hill Street to access the apartment garage and dining room. The main entrance into the site is provided from Fairrose Drive. Parking is also provided between the apartments and dementia ward for staff and visitors.

29. The facility is terraced and surrounded by extensive planting consisting of trees and shrubs to provide amenity for those in the facility as well as screening for privacy from adjacent neighbours.

APARTMENTS

30. The apartments have been incorporated into the Care Facility to provide a smaller living footprint for those who want to live in smaller areas with less maintenance required. Twenty apartments have been provided in a two-storey complex. There are 6 two-bedroom apartments and 14 one-bedroom apartments. The overall height of the apartment building is 7m. These have been designed and orientated to gain the most sun access with gardens and planting surrounding the building to provide amenity. Parking is provided on the underground.

TERRACE HOUSES

31. The terrace houses are three bedroomed and two storied¹⁰. These have been co-located together, in two different neighbourhoods within the site¹¹ along the collector roads (Fairrose Drive and Olive Terrace). These are larger units than the villas with a height of 7.2 metres; therefore their bulk is incorporated into the site in the areas that can absorb the scale proposed. This is a deliberate design approach, which enables integrating larger and taller buildings to maximise open space for passive and recreational use.

VILLAS

32. There are seven different villa designs proposed within the site¹². All villas are single storied residential units, ranging in height from 4.5 metres to 5.2 metres depending on the design. This is the most common housing type within the site. These are located throughout the site, but are concentrated along the boundaries. From the adjoining land, the villas and streets will be consistent in bulk, scale and appearance with a suburban streetscape of high amenity. This single storied suburban landscape will be the most commonly perceived character when viewing the site from the neighbouring properties, due to the positioning of the bulkier buildings centrally within the site with the exception of the Care Facility along Hill Street. The villas effectively form a buffer and screen the larger built form.

B2 COMPATIBILITY

33. The building forms are compact, allowing for an efficient use of the surrounding landscape. Building types have been grouped together to create recognisable precincts within the site, which link in to the street hierarchy network¹³. All buildings relate to each other through design features (i.e. the rectangular window in the roof gable); and through a palette of common materials. The Care Facility is the exception to this, and is designed to cater for its institutional use, while relating in height and detail to residential apartment character to fit into the suburban streetscape of Hill Street. The Care Facility has been designed to respond to its suburban location as a three building complex which is terraced down the landscape to work with the slope of the site. This has minimised the buildings overall height along Hill Street and kept it within character of the surrounding residential context. The Care Facility is also setback by at least 14.3m from the adjacent dwellings to allow for privacy and screening for both the neighbours and those living within the facility.
34. There are seven different residential design options¹⁴ proposed which create variety in the streetscape and neighbourhood identity, which is enhanced by the landscape treatment. As

¹⁰ Refer to Plan Set Volume: Architectural Set Plans Sk1 – Sk14

¹¹ Refer to Plan Set Volume: Architectural Set Plans Sk1 – Sk14

¹² Refer to Plan Set Volume: Architectural Set Plans Sk1 – Sk14

¹³ Refer to Plan Set Volume: Masterplan Set Plan 017

¹⁴ Refer to Plan Set Volume: Architectural Set Plans Sk.01-Sk.7

seen in the Architectural Set¹⁵ and the Design Guide included in the Masterplan Set¹⁶, there is a common material palette that reflects traditional residential design, whilst also creating individual neighbourhood character.

35. The site borders Hill Street (south-eastern border) for approximately 195m, and borders existing residential for 283.7m along the north-eastern boundary and 372.3m along the south-western boundary. The impact of a comprehensive development of the size and scale of the Village has been considered in terms of the Hill Street streetscape, with a mixture of fencing designs to break up both the bulk and form of the Care Facility, and to add interest to the boundary treatment. The setbacks along the residential boundaries are varied to create a more organic boundary treatment. These setbacks are in keeping with TRMP provisions relating to daylight angles and setbacks.

B3 ENABLE FURTHER SUBDIVISION

36. Olive Estate is a comprehensive development that does not involve a comprehensive subdivision, as is explained in the AEE and in the introduction to this assessment.

C. STREET NETWORK

C1 STREET TYPE¹⁷

37. The site is accessed from Hill Street along the south-eastern boundary via a 7 meter 'collector road' (Fairose Drive) which links the remaining development to a 6 meter 'collector road' (Olive Terrace). Both of these collector roads provide links into adjacent residential developments. The carriageway features 1.4m footpaths on either side of Fairose Drive and is framed by large avenue plantings that will provide a strong canopy structure. Olive Terrace has 1.4m footpaths on one-side of the street.
38. The villas are accessed via the smaller 5m access roads and 4m access places. These roads will feature smaller feature trees that are specific to these particular roads.
39. Additional elements used in the design have been developed to slow traffic through the site, identify the roading network hierarchy and to assist in way finding. These elements include raised thresholds at all intersections and the selection of tree species.
40. Green open spaces have been aligned with roads wherever possible to accentuate the sense of open space throughout the village while further enhancing the park-like setting of the development.

C2 STREET CONNECTEDNESS

41. The street hierarchy within the site is clear and interconnected to the existing village and surrounding road networks.¹⁸ The collector roads, access roads and access places each have a specific character, use and legibility within the site. This is emphasized by the use of avenue trees along the collector roads and smaller street trees along the access roads and places.
42. The site is gently sloping, making it well suited to a lifestyle village. Walkability of the Village has been an important part of the brief, with a pedestrian network included throughout the development. Walkability is made possible by providing reasonably direct routes between along the feature swale (2.4m walking/cycling trail) and community hub, etc.

C3 STREET SWALES

43. Above ground green engineering solutions were investigated thoroughly in relation to stormwater collection. After many discussions and options were investigated, it was found that the Council preferred a reticulated stormwater solution for primary stormwater flows. This

¹⁵ Refer to Plan Set Volume: Architectural Set Plans Sk.01-Sk.10

¹⁶ Refer to Plan Set Volume: Masterplan Set Plans 030 - 037

¹⁷ Refer to Plan Set Volume: Masterplan Set Plans 011 - 012

¹⁸ Refer to Plan Set Volume: Masterplan Set Plan 029

reticulated system is not a preferred option from a landscape perspective, but was deemed necessary and has been therefore adopted by Olive Estate Limited.

44. The secondary flow path for storm water is not however reticulated and forms an important design feature within the site. A feature swale will be used as a secondary stormwater system absorbing water overflowing during major events. The swale will be a planted feature that displays some riparian varieties of the native planting palette.

C4 STREET TREES

45. A well-defined hierarchy of street trees has been promoted on the site, which creates clear way finding through design¹⁹. The species are outlined in the Masterplan Set²⁰ and have been chosen from the Tasman District Council list of approved street trees on the basis of both their amenity and their robustness. A larger avenue species and increased road width, with generous footpaths, help delineate the primary ROW road that curves through the site. The secondary road system is defined by a smaller species of tree, with individual neighbourhoods defined by the park trees and private plantings to create distinct landscape variations.
46. The street trees will be clear stemmed with at least 2m between ground level and canopy to allow for street surveillance and safety. CPTED²¹ principles (providing for safety through design) have been considered with regard to both the street trees and roadside planting.
47. Both street trees and the green space around the buildings have permeable surfaces designed to absorb surface water and reduce the flow into the stormwater system.

D. GARAGE AND CARPARKING

D1 GARAGES AND PARKING

48. Garages have been set back from the street frontages to reduce their street dominance, and in some instances (such as the apartment building) will be located underground, therefore freeing up the landscape for increased site amenity and recreational or aesthetic use.
49. All residences have windows and living spaces fronting out onto the street to allow for passive surveillance of the street from the house. Minimal car parking has been provided on-street and where it is provided, trees and planting soften the edges, provide amenity and blend it into the surrounding park-like setting of the village.
50. The underground garage for the apartments has been relocated to the other side of the building as per the UDP²² recommendation. This has provided the garage to be accessed from the service access rather than Fairrose Terrace and provide the apartments in a prime location overlooking open green space.

E. ON-SITE AMENITY

E1 OUTDOOR LIVING SPACE

51. On site amenity has been a focus of the design and layout of the proposed Hill Street Block given that it is likely that the occupants of the residences will spend a lot of time in their immediate environment. The design vision is based on placing Olive Estate in a park-like setting, with an emphasis on green space and passive recreational amenity²³. Pedestrian connections through the site also offer opportunities to link the major public spaces, community hub and the Care Facility through safe and pleasant walking and cycling tracks.
52. As shown on Masterplan Set Plan 028, the villas, terrace houses and ground floor of the apartments have a 6m-diameter circle indicating their outdoor private living space.

¹⁹ Refer to Plan Set Volume: Masterplan Set Plan 029

²⁰ Refer to Plan Set Volume: Masterplan Set Plan 033

²¹ Crime Prevention Through Environmental Design

²² Refer to Appendix 2: Urban Design Panel meeting report Point 7: Reconsideration and development of care facility planning

²³ Refer to Plan Set Volume: Masterplan Set Plan 028

53. Residential units are orientated in most instances to maximise solar gain and the indoor living areas have been located to ensure privacy between dwellings, while also providing passive street surveillance. The landscape plan has focused on creating useable high amenity outdoor space that is also private.²⁴
54. The landscape is designed in layers that differentiate between the overall park-like plantings of the street network, the fruit tree network through the site and the species used to delineate shared and private green spaces.²⁵
55. Overall, the amount and quality of outdoor private space provided within the proposed Hill Street Block goes above and beyond what would normally be required in a similar type of development. The planting scheme not only provides amenity for the residents but also provides a level of screening and privacy between the residences while also maximizing sunlight access where possible.

E2 FUNCTIONALITY

56. Low concrete walls have been provided at the end of access places or on the street frontage to screen and store rubbish and recycling bins. This design solution ties in the concrete wall material and colour with the building exteriors as well as providing communal and stand alone screening options depending on the street type.
57. The provision for letterboxes has been provided as a stand-alone option or grouped communally. For residences fronting an access street or collector road, single stand-alone letterboxes are located along the footpath for each resident. For the grouping of villas or townhouses, a communal approach has been taken to use space efficiently and encourage interaction between residents.
58. There is space outside each residential unit for hanging washing behind a timber screen.

E3 PRIVACY FOR INTERNAL SPACES

59. A mix of timber screens, planting and a change in level has provided adequate privacy for the main internal spaces of the residences.

F. FRONTAGES

F1 INTER-VISIBILITY

60. The mix of villas and townhouses mostly interact with the street on which they are located or gain access from. Generally, a kitchen or lounge overlooks the street.
61. High solid fences fronting streets have been avoided and only permeable timber screen panels have been used where necessary to provide privacy for outdoor living spaces or internal spaces.
62. A balance of suitable size planting and appropriately designed spaces fronting streets has encouraged inter-visibility between people on streets and people in buildings. Given the intimate scale of the development, a sense of community will be enhanced through the careful design of these private and public interfaces- continuing the design solutions that have already been applied in the Olive Estate Village to date.

F2 FRONTAGES

63. As mentioned previously, houses address the street (where layout allows) and are not on an angle. The interior living spaces such as the kitchen and lounge areas are positioned on the street side of the buildings with front doors facing out to the street frontage.²⁶ Fences are kept to a minimum, which provides for a greater feeling of spaciousness whilst also increasing surveillance of areas around the residential units.

²⁴ Refer to Plan Set Volume: Masterplan Set Plan 027

²⁵ Refer to Plan Set Volume: Masterplan Set Plan 017

²⁶ Refer to Plan Set Volume: Masterplan Set Plan 017

64. Along the site boundary, houses have been staggered, to create a more organic line between existing suburban areas and the Olive Estate Lifestyle Village. Trees have been located along the site boundaries to integrate the new neighbourhood in to the existing neighbourhoods and to provide privacy between dwellings.

G. PUBLIC OPEN SPACE

65. Open green space to be used by the public is a strong design component in the proposed Hill Street Block, which has been designed to benefit and be accessible to not only village residents but also the wider community. Open space areas designed to be available for public use have been created including near the Care Facility and along the swale near the entrance to the site from Hill Street.²⁷
66. After receiving feedback from the UDP²⁸, the open space now near the Care Facility was reorganised to bring the green space closer to Fairose Drive in order for it to be more effectively used by those in the Care Facility. This change in location allows the open green space to be more accessible for public use, usable and an attractive space. The facility has been located some distance from the open space to enable visual access from Fairose Terrace (a public road).
67. The proposed Hill Street Block contains 8,600m² of open green space and the existing consented site contains 8,500m². In total, 17,100m² of open green space is provided across the entire 11.4 ha Olive Estate Village.

G1 FUNCTION

68. Greenways are provided throughout the site which function as a pedestrian/cycle network and provide internal amenity value. The main design feature and greenway in the development functions as stormwater management as well as positively contributing to residential amenity. A range of trees are scattered along the greenway to provide character while still retaining a sense of openness and safety when using this space.

G2 CONNECTIONS

69. Olive Estate has been designed with pedestrian and traffic flow in mind. When entering the site from Hill Street (southern boundary), 1.4m wide pedestrian pathways have been located on both sides of Fairose Drive to either link up to the greenway or Olive Terrace. All pathways have been designed to accommodate a mobility scooter, with space for a pedestrian to pass safely.
70. The greenway (walking and cycling pathway), which follows the majority of the swale through the site, is 2.4m in width. This pathway also connects the various neighbourhood open spaces and amenity areas together while also linking in with the surrounding street network.
71. The numerous varieties of pedestrian networks through the site offer different amenity experiences and purposes. The entire site is within comfortable walking distance from one end to the other. Pedestrian routes have been located where possible away from driveways in most instances, for user safety. These pedestrian networks will add another layer to the surveillance of the street networks.
72. Public spaces within the village are wider than 5m and contribute to the value of the properties and enjoyment of the residents and visitors to the site.

²⁷ Refer to Plan Set Volume: Masterplan Set Plan 027

²⁸ Refer to Appendix 2: Urban Design Panel meeting report Point 3: Reorganisation of open space

CONCLUSION

73. The purpose of the Design Guide in the TRMP is to create a quality residential environment through careful design which is an iterative process involving many skills. As outlined below:

*"Creating a place where people can live comfortably, and particularly where this is more closely together, requires attention to overall layout and details. Accordingly, this design guide sets out some specific matters for attention."*²⁹

74. Consideration has been given to the scale and bulk of the larger Care Facility building, boundary treatments and how the development is perceived from neighbouring properties. Mitigation methods have been built into the design such as providing a variety of fencing options, placing trees and landscaping along the boundaries, staggering built form along these boundaries and by placing the larger Care Facility building along Hill Street. The landscape and visual assessment prepared by Canopy considers the effect of the development on the existing suburban fabric.

75. Safety and passive surveillance has been a consideration in the layout of the development, as has a high level of amenity for members of the public visiting and for those that reside within Olive Estate Lifestyle Village.

76. The design process of creating an integrated and comprehensive development for Olive Estate has considered the principles of good urban design as outlined in Council's Urban Design Guide³⁰. The outcome is a development of high amenity value that is in keeping with the principles of this document. The future community will be set within a park like setting, with a clear road hierarchy, an excellent pedestrian network and individual neighbourhoods that have their own identities while being part of a wider community.

SIGNED



.....
Amanda Anthony
Senior Landscape Architect

CANOPY LTD

28 June 2019

REVIEWED BY



.....
Liz Gavin
Director & Landscape Planner

CANOPY LTD

28 June 2019

²⁹ TRMP PART II Appendix 2 page 1

³⁰ TRMP PART II Appendix 2 page 1

APPENDIX 1: RESPONSE TO URBAN DESIGN PANEL REPORT

77. The process of attending the Urban Design Panel (the Panel) for feedback on the master planning and design of the Olive Estate Lifestyle Village was a positive and valuable process. The Panel have expressed support on the following matters:

Urban Design Panel Support:³¹

78. The Panel has endorsed the continuation of the current development philosophy that has achieved very high quality streetscapes, open spaces and building outcomes, including the villas and townhouses proposed³².

Consideration of Recommendations:

79. The Panel has made several suggestions, which they consider would contribute to the value and amenity enhancement of the development. The areas are listed below and commentary has been included on the changes incorporated or an explanation behind the decision not to incorporate these changes.

- a. Reorganisation of open space³³

The proposed orchard area and related landscape/stormwater feature with paths has been relocated closer to Fairose Drive to make this space more readily accessible for care facility residents and their visitors. This relocation also provides greater visibility for street users and other residents to utilise this asset.

- b. Reconsideration and development of care facility planning³⁴

The apartments and their garages have been switched to allow the apartments to be located in the south-west corner of the building rather than the south-east corner. This allows access to these apartments from the eastern boundary of the site rather than from the entrance on Fairose Drive. The change in apartment orientation has also allowed for opportunities to get better sun access to the apartments located on the ground floor.

The facility roofline has been updated to include staff quarters on the top of the dementia building. This has been achieved through a pop-up located centrally in the building, which breaks the continuous roofline and provides variation.

- c. Hill Street entrance invitation³⁵

The entrance into Hill Street will be visually inviting and welcoming by an entrance sign. The entry sign will feature the name of Olive Estate and be constructed using corten steel and a rock wall. Along the boundary, a timber fence will provide variation by

³¹ Refer to Appendix 2: Urban Design Panel (UDP) Meeting minutes dated 4 April 2019

³² Refer to Appendix 2: Points 1-2 in the UDP minutes

³³ Refer to Appendix 2: Point 3 in the UDP minutes

³⁴ Refer to Appendix 2: Points 4-11 in the UDP minutes

³⁵ Refer to Appendix 2: Point 12 in the UDP minutes

stepping in/out with differing plant types. Street trees will also line Hill Street to provide amenity along the streetscape.

d. On site visitor and staff car parking³⁶

Parking has been provided between the apartments and dementia ward as shown on the masterplan. This allows easy and clear access into the care facility for visitors and staff. An additional 16 parking spaces have been provided on Fairrose Drive amongst planting and trees.

CONCLUSION REGARDING URBAN DESIGN PANEL REPORT

80. All of the urban design recommendations have been taken on board and changes have been made to the buildings and layout as discussed above. The panel have endorsed the continuation of the development as it provides high quality streetscapes, open spaces and a variety of housing types.
81. The design vision is based on placing Olive Estate in a park-like environment as well as to create a strong landscape framework within the site and a green network which is both functional for pedestrian use and active or passive recreation. Good urban design principles have been incorporated where appropriate to provide the village with the best design outcomes possible as well as amenity for those living within or near the village. Overall, the extension of the village, the care facility and the open space provided for visitors and residents in the village positively contributes to the surrounding environment.

³⁶ Refer to Appendix 2: Point 13 in the UDP minutes

APPENDIX 2: URBAN DESIGN PANEL MEETING REPORT

Project initiator	Integrity Care Group
Project	Olive Estate – Hill Street extension
Address	Hill Street, Richmond (Lot 2 DP 511511)
Description	Extension of Olive Estate Lifestyle Village into the adjacent greenfield site on Hill Street
Meeting date	4 April 2019
Panel members	Graeme McIndoe (chair), Grant Edge, Russel Bengé
Applicant	Robert Weir (architect), Luke Porter (landscape architect), Gary Rae (planner), Kristen Nimmo (applicant), Shoshona Galbreath (lawyer), Tim Stewart (project manager).
Council staff	Alastair Jewell, Katrina Lee

Intro

1. We endorse the continuation of the current development philosophy that has achieved very high quality streetscapes, open spaces and building outcomes, including the villas and townhouses proposed. For this reason we will not comment on these details.
2. We consider there is scope for value and amenity enhancement as identified in a number of areas below.

Reorganisation of open space

3. The proposed orchard area and related landscape / stormwater feature/ paths are a valuable amenity. However, we consider the main open space here would be better located closer to Fairose Drive where it would be more readily accessible for care facility residents and their visitors and with greater visibility for street users and more residents including the apartment residents. Currently it is planned to be in a rear location which will inherently limit its visibility, likely use and benefits.

Reconsideration and development of care facility planning.

4. The formal arrangement of the care facility plan and breakdown of building form is in principle very positive.
5. The slight splaying between the wings enhances how these quite narrow spaces formed by the wings open out to the garden areas, and the splays provide a sense of spatial dynamism.
6. The entrance space and car park is clearly indicative and should be developed to a much higher standard of landscape amenity, while still providing the necessary parking and vehicle functions.
7. Residents' garages at the south west corner of the apartment block occupy a prime residential location, and an association with proposed servicing function is a poor edge to

the open space to the north, the street, and the entrance space. At the same time the south west corner of the rest home is located well below the level of Hill Street and thus residents facing south east will have seriously limited outlook. Considering these factors together, there is an opportunity to relocate servicing and parking to under the south east of the rest home block where it would remain readily accessible to the street system.

8. The unbroken horizontal roofline of the rest home block contributes to perception of great length, and should a part of this block extend higher, then the visual mass of the building would be broken down. We appreciate the architectural modulation along the facades of the rest home facilities to break down the scale; however these minor formal and aesthetic variations alone may be unsuccessful in achieving that. If greater variation of building form and increased building height were to be explored, we consider it should be at the southern end of the rest home block where the current roofline is less than one storey above Hill Street. That is currently an under-scaled and visually weak building form at the corner and would be enhanced by further building height in combination with good quality landscape treatment. We make this recommendation having viewed this part of the site and considered its relationship with the properties on the other side of Hill Street.
9. There is potential to create a raised roof line over part of the central club room / restaurant area. This would contribute to the further variation of roofscape across the development which is a positive feature of the development so far. It would also contribute to a memorably high interior space which would benefit the residents and their visitors and would also help to visually mark the main entry to the care facility.
10. A related minor detail is that the entrance facade is dominated by facilities which demand privacy, such as toilets and massage facilities. Some investigation of how the internal functions might better address the entrance space is desirable.
11. We question whether there is an opportunity to get better sun access to the south east facing apartments in that block, and potentially that may be by skylights for the top floor of the apartments.

Hill Street entrance invitation

12. The street entrance from Hill Street seems somewhat understated and needs to consider a more visually open entrance / threshold treatment.

On site visitor and staff car parking

13. We are unclear as to how and where and how much parking is provided or required for visitors and staff. Placing all the parking in the entrance space will compromise the quality of that. If required, there is an opportunity to explore street side parking set between street trees along the eastern side of Fairrose Drive.