

TRANSPORTATION REVIEW

5

APPENDICES

.....
EXPRESSION OF INTEREST

.....
JUNE 2016
.....



Mr Andrew Cavill
Winton Partners
Level 2
33 Shortland Street
Auckland 1010

TDG Ref: 13145
10 June 2016

Issued via email: andrew.cavill@wintonpartners.com.au

Dear Andrew

Waterfall Park: Arrowtown-Lake Hayes Road Access

Following your request, we have prepared a preliminary assessment of the access requirements onto Arrowtown-Lake Hayes Road for the proposed Waterfall Park subdivision development.

1. Proposed Development

Based on the plans provided, we understand that a new subdivision to be called “Waterfall Park” is proposed north of Speargrass Flat Road and west of Arrowtown-Lake Hayes Road. The subdivision will create about 150 new residential lots which will be accessed via a new intersection on Arrowtown-Lake Hayes Road about 160m north of the Speargrass Flat Road intersection. The existing homestead will be maintained on a separate access and title.

2. Existing Transport Environment

State Highway 6 (SH6) represents the main strategic road in the area linking Wanaka to the north with Queenstown (via State Highway 6A) to the south. Arrowtown is located about 2km north of the Waterfall Park site along Arrowtown-Lake Hayes Road. Arrowtown-Lake Hayes Road represents the shortest route between Arrowtown and Queenstown via SH6 and is classified as an Arterial Road within the Queenstown Lakes District Plan. Arterial Roads are defined as dominant elements of the transport network connecting major settlements within the district and are managed to minimise their local access function.

North of Speargrass Flat Road, Arrowtown-Lakes Hayes Road has been constructed as a rural two lane carriageway with 3.6m wide traffic lanes and 0.4m wide shoulders. The road reserve is about 20m wide and has a grassed berm on the western side of the road. There is a drainage ditch along the eastern side of the road. Arrowtown-Lakes Hayes Road has a straight and generally level alignment along the site frontage with a speed limit of 70km/h.

Photograph 1 shows a power line running along the western side of the road in the vicinity of subdivision site. The power poles are 2.0-2.5m from the edge of the sealed carriageway. Photograph 2 shows the ditch along the eastern boundary of the road reserve.



Photograph 1: View North on Arrowtown-Lake Hayes Road from Proposed Intersection Location



Photograph 2: View South on Arrowtown-Lake Hayes Road from Proposed Intersection Location

Speargrass Flat Road meets Arrowtown-Lake Hayes Road at a priority controlled cross-roads intersection with Hogans Gully Road. The shoulders of Arrowtown-Lake Hayes Road have been widened on the approaches to the intersection to accommodate turning movements and provide space for through traffic to pass turning vehicles.

Traffic count information obtained from QLDC indicates that the average daily traffic volume on Arrowtown-Lake Hayes Road north of SH6 was about 3,400 vehicle movements per day (vpd) in November 2013. Current traffic volumes would be expected to be about 3,600vpd based on an average annual growth rate of 2% per annum. The peak period was 5:00pm to 6:00pm with a peak hourly volume of about 300 vehicles per hour (vph). It has been noted



that traffic volumes during the winter season are significantly lower than during the summer. A traffic count in July 2015 recorded an average daily traffic volume of about 2,400vpd south of Speargrass Flat Road.

3. Expected Traffic Generation and Distribution

The concept subdivision plan shows 142 residential lots but it is understood that up to 150 lots could be created. The average daily traffic generation of the subdivision with 150 lots would be expected to be about 1,200vpd based on an average traffic generation rate of eight vpd per household. The NZTA Research Report No 453 “Trips and Parking Related to Land Use” indicates that the median peak hour traffic generation rate for rural residential activity is 1.1vph per dwelling. On this basis, the subdivision could generate about 165vph during the morning and evening peak hours.

In the morning commuter peak period, about 80% of all vehicle movements generated by the site would be expected to be outbound with the majority being towards workplaces and other activities within the wider Queenstown area. In the evening, about 65% of movements would be expected to be into the subdivision again with the majority originating from the Queenstown area.

The following table provides an indication of the expected turning volumes in the morning and evening peak hours based on 75% of movements being to / from Queenstown.

Period	Left-out	Right-out	Left-in	Right-in
AM	30	100	25	10
PM	15	45	75	30

Table 1: Indicative Movement Patterns at New Intersection on Arrowtown-Lake Hayes Road

An investigation of the expected intersection performance with these traffic volumes indicates that it will operate with a high level of service.

4. Intersection Configuration

The industry-standard Austroads Guide to Road Design Part 4A provides warrants for turn treatments at unsignalised intersections. Based on the holiday season traffic volumes on Arrowtown-Lake Hayes Road and the forecast turning volumes at the subdivision access, the warrants for basic left and right turn treatments would be met in the evening peak period and channelized treatments are therefore preferred. On this basis, it is recommended that the intersection be designed to include a right turn bay and left turn deceleration lane. The existing road reserve 20m width will be sufficient to accommodate the road widening required to accommodate the additional lanes, to about 14m excluding shoulders. This represents a higher standard of intersection design than is currently provided at the Speargrass Flat Road / Hogans Gully Road but reflects the higher peak hour traffic volumes that would be expected with the subdivision.

Since Arrowtown-Lake Hayes Road is generally straight, no issues are anticipated with providing adequate sight lines at the intersection. Photographs 1 and 2 show that sight distances in excess of 200m are available which is appropriate for the operating speed.

The power poles on the western side of the Arrowtown-Lake Hayes Road represent a safety hazard because of their proximity to the carriageway. It is recommended that the poles are



moved away from the carriageway when the new intersection is constructed. Similarly, the ditch on the eastern side of the road will also represent a hazard because of its proximity to the road when the new intersection is formed. It is recommended that the ditch is replaced by an underground pipe in the vicinity of the intersection.

The proposed location of the new intersection some 160m north of the Speargrass Flat Road intersection represents about seven seconds of travel time based on an operating speed of 80km/h. This is considered to be adequate to prevent any driver confusion and also provide sufficient space for appropriate advanced warning signage to be provided.

Since the subdivision is located off the bus route between Arrowtown and Queenstown, it is recommended that provision for bus stops is included as part of the intersection design. A footpath will also be required to link the bus stops with the residential development.

TDG has prepared a concept design for the new intersection based on the following design parameters:

- Comfortable deceleration distance for an operating speed of 80km/h is 100m;
- Right turn bay storage length of 20m;
- Right turn bay width of 3.5m;
- Taper length of 25m;
- Wide sealed shoulder areas to the north side of the intersection with sufficient space for a bus to stop.

The preliminary intersection design has been based on a 5.5m wide subdivision road with 1m wide shoulders to align with the recommended road cross-section for rural residential development set out in NZS4404:2010. The concept plan also shows a 2m wide footpath on the northern side of the road that would be suitable for low volume shared use with cyclists.

5. Conclusions

Following this preliminary assessment, it has been concluded that:

- (i) The proposed intersection location provides adequate separation from other intersections;
- (ii) The proposed development should be supported by an intersection constructed with a right turn bay and left turn deceleration lane;
- (iii) Power poles on the western side of Arrowtown-Lake Hayes Road should be relocated to increase clearance from the carriageway;
- (iv) The ditch on the eastern boundary should be replaced by an underground pipe; and,
- (v) Adequate sight distances can be provided to allow safe and efficient operation of the new intersection.



We trust that this report provides the information that you require but we would be happy to discuss any matters raised as necessary.

Yours sincerely

Traffic Design Group Ltd

Chris Rossiter

Principal Transportation Engineer

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Don McKenzie

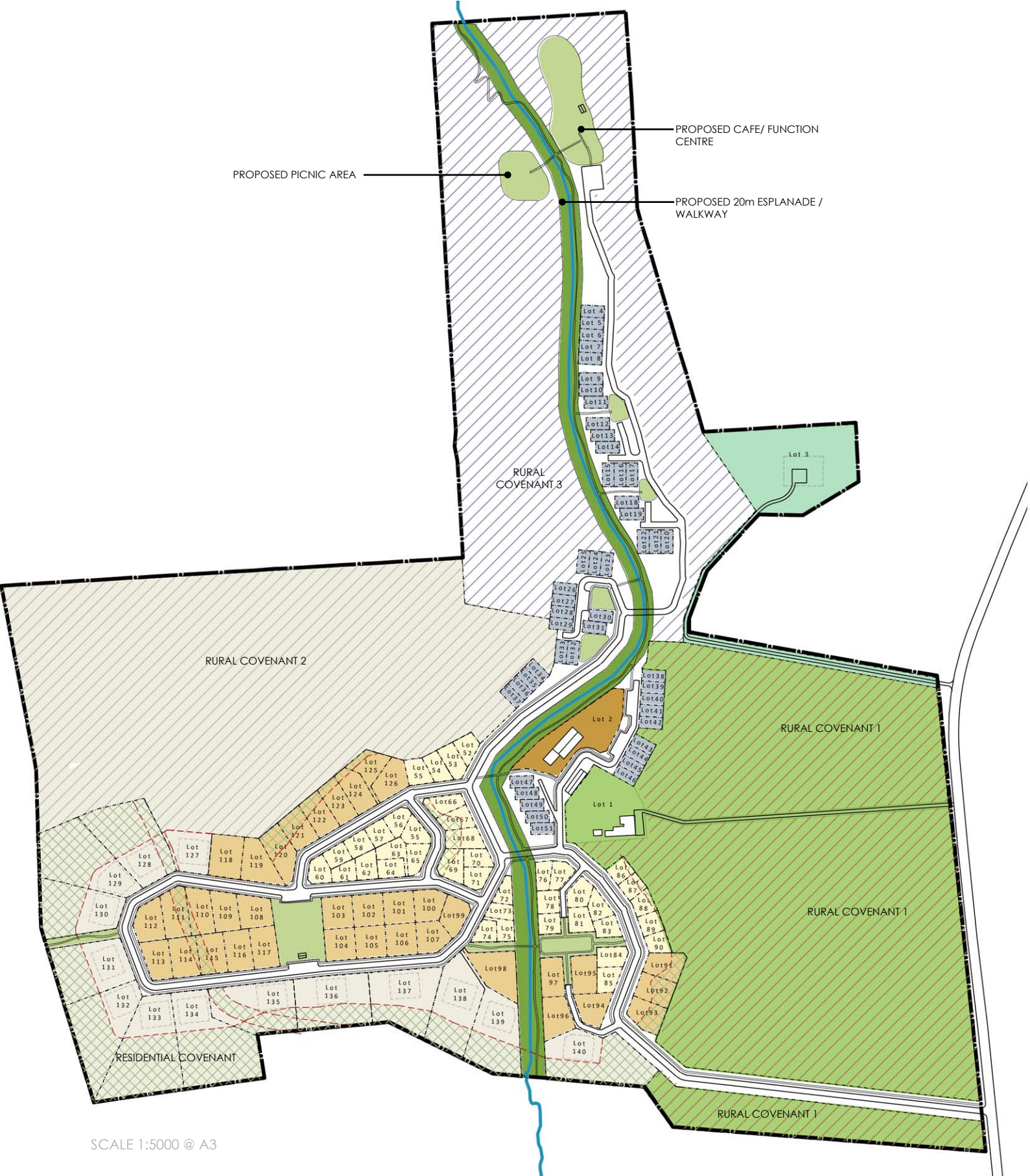
Technical Director

don.mckenzie@tdg.co.nz

enc: Subdivision Concept Plan
 Intersection Concept Design

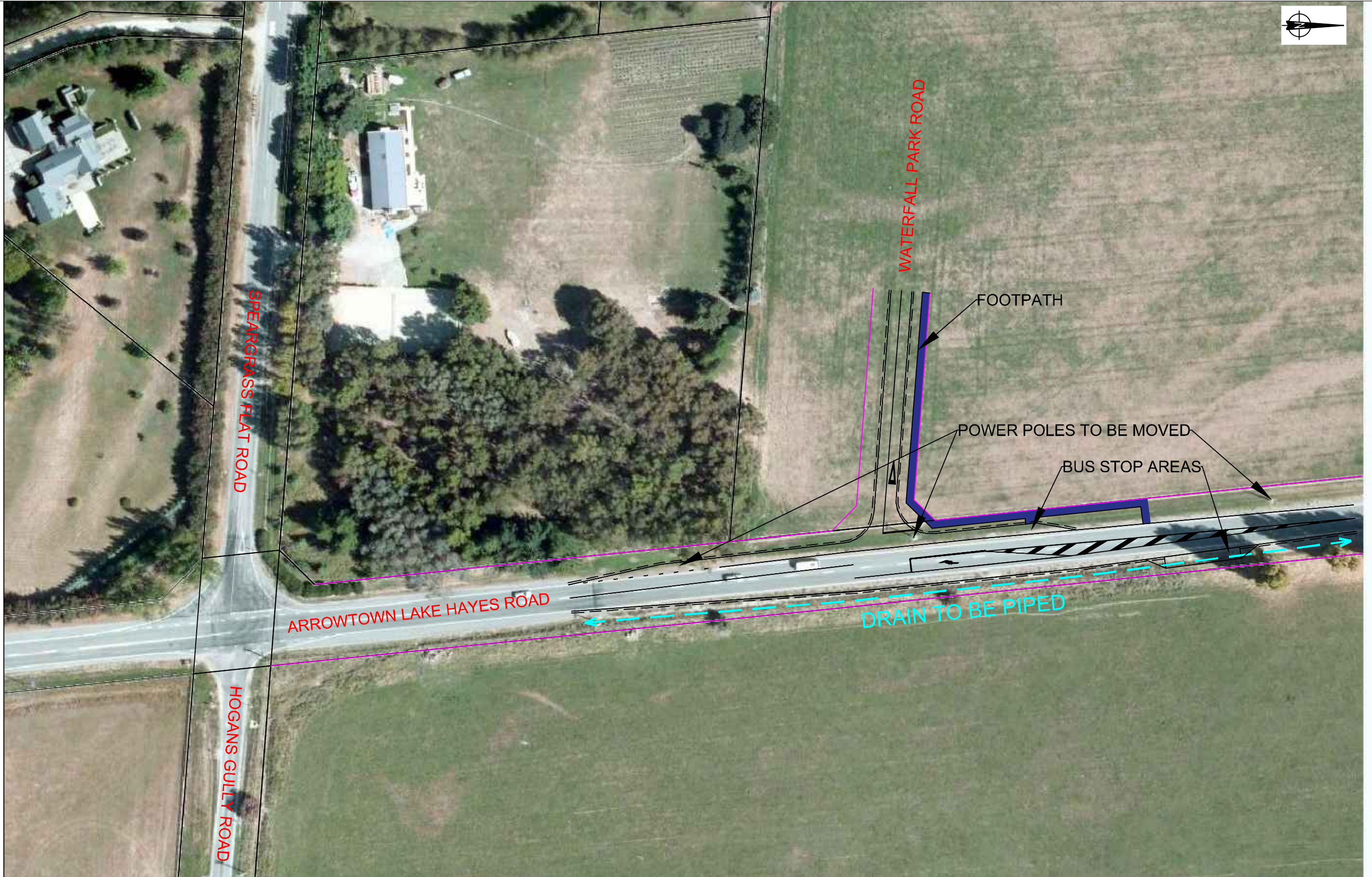
LOT SCHEDULE

<div></div>	Lot 1	
	Lot 1	149463 m ²
<div></div>	Lot 2	
	Lot 2	4281 m ²
<div></div>	Lot 3	
	Lot 3	13947 m ²
<div></div>	288m ² Lots	
	Lot 4 - 51	288 m ²
<div></div>	450-650m ² Lots	
	Lot 52	512 m ²
	Lot 53	634 m ²
	Lot 54	556 m ²
	Lot 55	596 m ²
	Lot 56	528 m ²
	Lot 57	526 m ²
	Lot 58	544 m ²
	Lot 59	475 m ²
	Lot 60	550 m ²
	Lot 61	457 m ²
	Lot 62	589 m ²
	Lot 63	596 m ²
	Lot 64	526 m ²
	Lot 65	574 m ²
	Lot 66	656 m ²
	Lot 67	645 m ²
	Lot 68	758 m ²
	Lot 69	762 m ²
	Lot 70	517 m ²
	Lot 71	532 m ²
	Lot 72	407 m ²
	Lot 73	408 m ²
	Lot 74	445 m ²
	Lot 75	464 m ²
	Lot 76	451 m ²
	Lot 77	525 m ²
	Lot 78	530 m ²
	Lot 79	482 m ²
	Lot 80	610 m ²
	Lot 81	616 m ²
	Lot 82	515 m ²
	Lot 83	510 m ²
	Lot 84	605 m ²
	Lot 85	567 m ²
	Lot 86	450 m ²
	Lot 87	450 m ²
	Lot 88	471 m ²
	Lot 89	479 m ²
	Lot 90	472 m ²
<div></div>	1000m ² Lots	
	Lot 91	1000 m ²
	Lot 92	1011 m ²
	Lot 93	1000 m ²
	Lot 94	970 m ²
	Lot 95	1000 m ²
	Lot 96	1142 m ²
	Lot 97	927 m ²
	Lot 98	1744 m ²
	Lot 99	870 m ²
	Lot 100	950 m ²
	Lot 101	1017 m ²
	Lot 102	1014 m ²
	Lot 103	1013 m ²
	Lot 104	1013 m ²
	Lot 105	1013 m ²
	Lot 106	1015 m ²
	Lot 107	950 m ²
	Lot 108	1088 m ²
	Lot 109	1054 m ²
	Lot 110	1163 m ²
	Lot 111	1295 m ²
	Lot 112	1114 m ²
	Lot 113	1034 m ²
	Lot 114	1165 m ²
	Lot 115	1141 m ²
	Lot 116	1120 m ²
	Lot 117	1114 m ²
	Lot 118	1416 m ²
	Lot 119	1361 m ²
	Lot 120	1278 m ²
	Lot 121	1034 m ²
	Lot 122	1012 m ²
	Lot 123	1066 m ²
	Lot 124	1066 m ²
	Lot 125	952 m ²
	Lot 126	1062 m ²
<div></div>	4000m ² Lots	
	Lot 127	114567 m ²
	Lot 128	4839 m ²
	Lot 129	4989 m ²
	Lot 130	4034 m ²
	Lot 131	4078 m ²
	Lot 132	4872 m ²
	Lot 133	6222 m ²
	Lot 134	6273 m ²
	Lot 135	4035 m ²
	Lot 136	4104 m ²
	Lot 137	4014 m ²
	Lot 138	4000 m ²
	Lot 139	4008 m ²
	Lot 140	5020 m ²
<div></div>	Rural Covenant 1	
		142622 m ²
<div></div>	Rural Covenant 2	
		112843 m ²
<div></div>	Rural Covenant 3	
		94427 m ²
<div></div>	Residential Covenant	
		39237 m ²
<div></div>	Mill Creek Esplanade	
		25053 m ²
<div></div>	Open Space	
		15212 m ²



SCALE 1:5000 @ A3

Thursday, 9 June 2016 5:41:45 p.m. 0 10mm@A3



REV	DATE	DRN	CHK	DESCRIPTION
1	10/06/16	VM	---	Initial Design
2	10/06/16	VM	---	Revised Design
3	10/06/16	VM	---	Final Design
4	10/06/16	VM	---	As Built

WATERFALL PARK
CONCEPT INTERSECTION DESIGN

DRAWN: VM	---	---
DATE: 10/06/16	STATUS: ---	
SCALE: 1:1000 @ A3		
DWG NO: 13145_C2A		

