BEFORE THE HEARINGS PANEL
FOR THE QUEENSTOWN LAKES DISTRICT COUNCIL

UNDER	the Resource Management Act 1991
IN THE MATTER	of a submission on the Queenstown Lakes Proposed District Plan
BY	**WILLOWRIDGE DEVELOPMENTS LIMITED** Submitter

STATEMENT OF EVIDENCE OF ANTONI FACEY ON BEHALF OF THE SUBMITTER

Dated: 28 May 2020

MAY IT PLEASE THE PANEL:

Introduction

[1] My name is Antoni Peter Facey. I am a Traffic Engineer with Avanzar Consulting Ltd. I am also the Director of the company.

[2] I hold the degree of Bachelor of Engineering (Civil) from Auckland University and I am a Chartered Member of Engineering NZ. I am a member of the Transportation Group of EngNZ. I am Chairman of the South Canterbury Automobile Association Council.

[3] I have been working in the field of Traffic and Transportation Engineering for more than 30 years working within Central Government, Local Government and private consultancies. I have prepared many traffic impact assessments for resource consents under both the Town and Country Planning Act and the Resource Management Act. I have carried out many intersection designs including sign controlled intersections, roundabouts and traffic signals and crash reduction studies. I have also safety audited designs of many different intersections and road alignments, both urban and rural.

[4] I have been appointed by Willowridge Developments Ltd to provide evidence on the District Plan review of the Three Parks Special Zone.

[5] Whilst this is not an Environment Court hearing, I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2014. This evidence has been prepared in accordance with it and I agree to comply with it. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

Scope of Evidence

[6] For this report, I will be considering the technical and safety aspects of constructing a new link from the proposed Three Parks development to Ballantyne Road. The structure plan for Three Parks in the Operative District Plan (ODP) currently has a collector road with an intersection to Ballantyne Road as shown in Figure 1 below that is some 340 metres south of Golf Course Road. The Proposed District Plan (PDP) shows

the same route as a fixed road in the new structure plan. Willowridge is seeking the road alignment and Ballantyne Road intersection to be in a new location as shown in Figure 2.

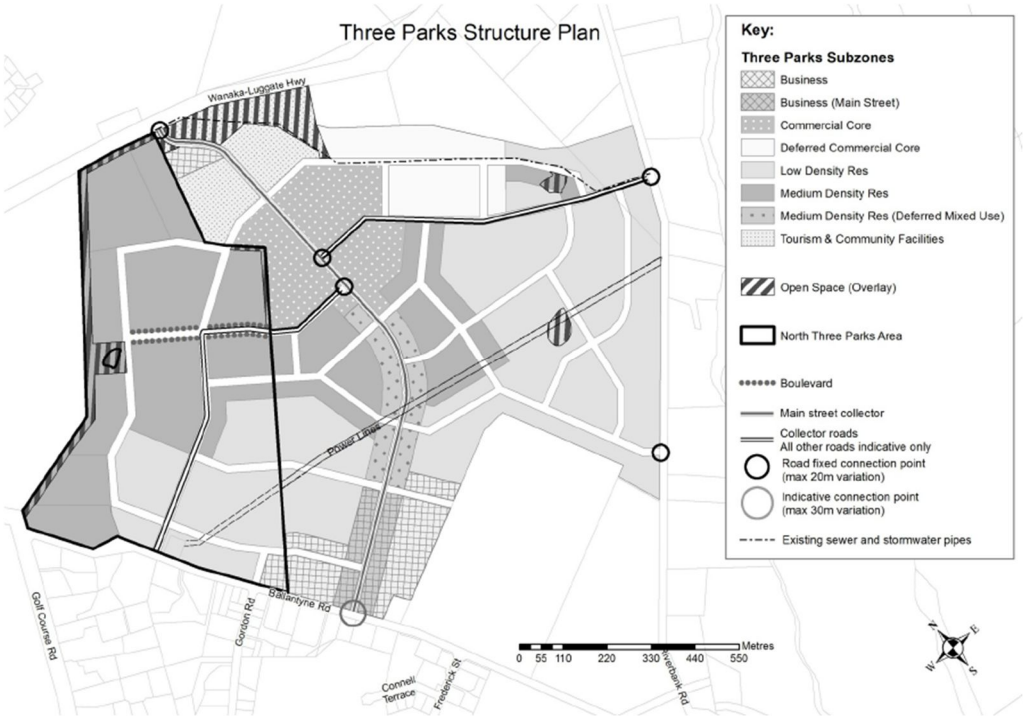

Figure 1: Structure plan from the ODP

Figure 2: Willowridge Proposed Structure Plan

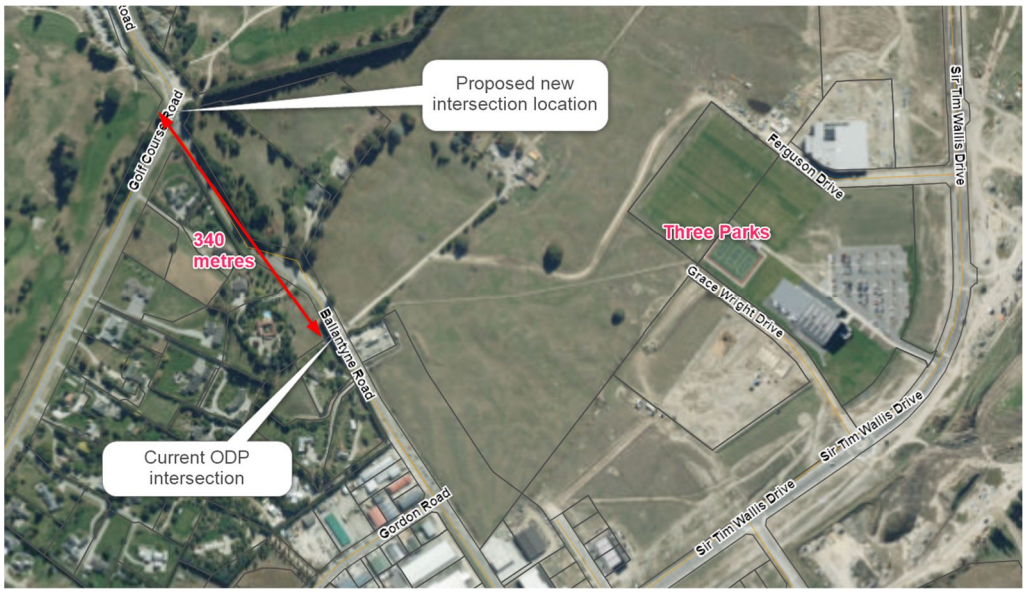

Figure 3: Proposed intersection location compared to ODP.

[7] My evidence considers only the effects of the proposed new Ballantyne Road/Proposed Structure Plan Road intersection as shown in Figure 2 above.

[8] The proposal for the new road is that it would create a new intersection with Golf Course Road and Ballantyne Road as shown in Figure 4 below. The alignment is along a narrow approximately 15 metre wide strip linking the bulk of the land with Ballantyne Road. The alignment would likely result in a left-right staggered cross roads intersection.

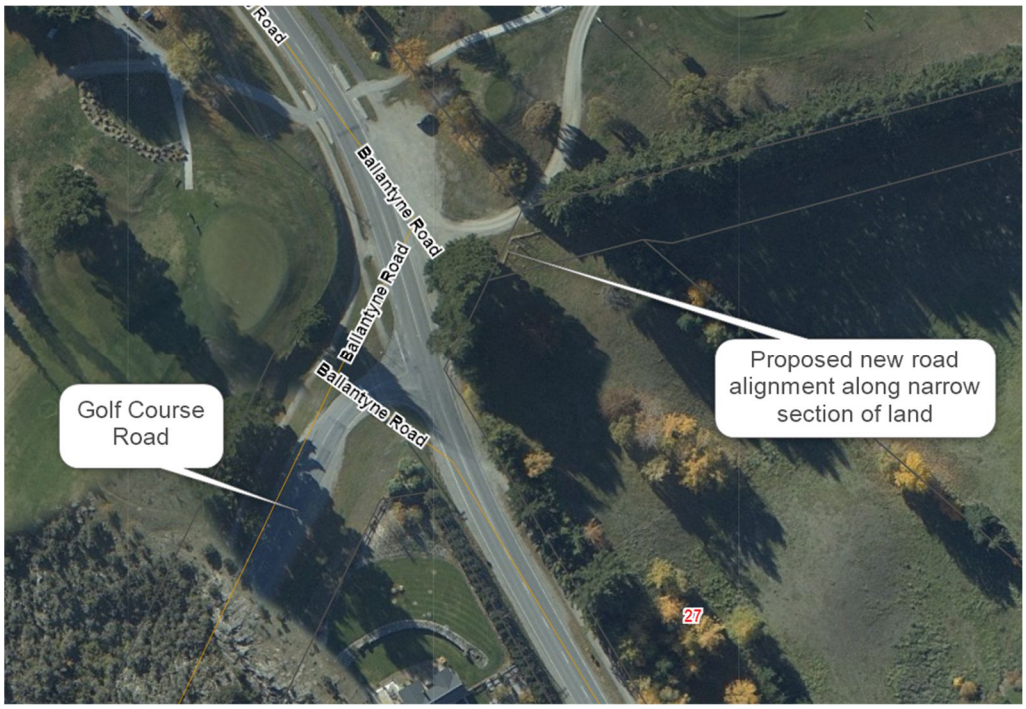

Figure 4: Aerial photo of the existing Golf Course Road/Ballantyne Road intersection.

Traffic Counts

[9] Traffic counts were sought from the QLDC for Ballantyne Road and Golf Course Road. The Council reports the latest estimated traffic count for Golf Course Road in February 2020 was 2,000 vpd. The traffic volume for Ballantyne Road in the vicinity of the intersection in January 2020 was 9,500 vpd from a 7 day traffic count. Both are Average Daily Traffic (ADT) counts.

[10] The Ballantyne Road count was the highest recorded along the road by a significant margin. Other counts have been taken in different locations along Ballantyne Road and at different times of the year so it is not possible to use these counts for any analysis of traffic growth or to convert them to Average Annual Daily Traffic (AADT) counts which are typically used for design. It is also difficult to have confidence in the count since they are so variable. It is likely that January is a peak school holiday period and the AADT would therefore be less than the recorded count.

[11] Note that the new roads being developed linking West Meadows directly with Ballantyne Road through Avalon Station Drive may reduce the traffic volumes on Golf Course Road and Ballantyne Road but the effect has not yet been seen.

[12] In 2017, the Wanaka Transport Model was investigated. The model produced the following PM peak hour results for the future year 2045 in Figure 5 below. The PM peak was considered to be the highest peak hour that should be designed for.

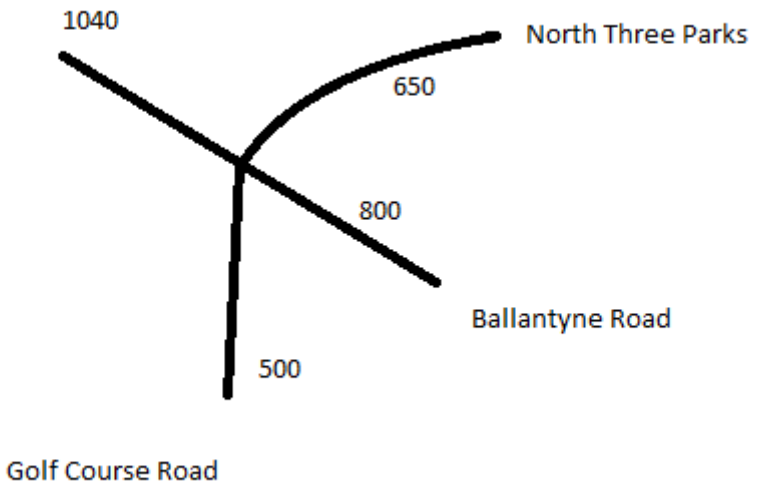

Figure 5: Two way PM peak traffic volumes on the links of the proposed intersection at Golf Course Road/Ballantyne Road/Three Parks in 2045.

Intersection capacity

[13] Due to the uncertainty of the traffic counts and the potential traffic generation from the Three Parks approach to the intersection, it is not possible to determine whether the cross roads intersection would have sufficient capacity at this stage. However, there are standard relationships available for higher levels of control such as roundabouts.

[14] Figure 6.7 of the AUSTROADS Guide to Traffic Management Part 3: Traffic Studies provides a typical assessment of a roundabout and is reproduced in Figure 6 below. The circulating flow for the roundabout is estimated to be 750 vph. This is based on there being 500 vph southbound on Ballantyne Road and 250 vph turning right from Golf Course Road circulating past the Three Parks link. The entry capacity for the Three Parks link is therefore about 650 vph. Given that the modelled two way volume on the Three Parks link is 600 vph, only about 300 vph will access a roundabout from Three Parks in the PM peak hour.

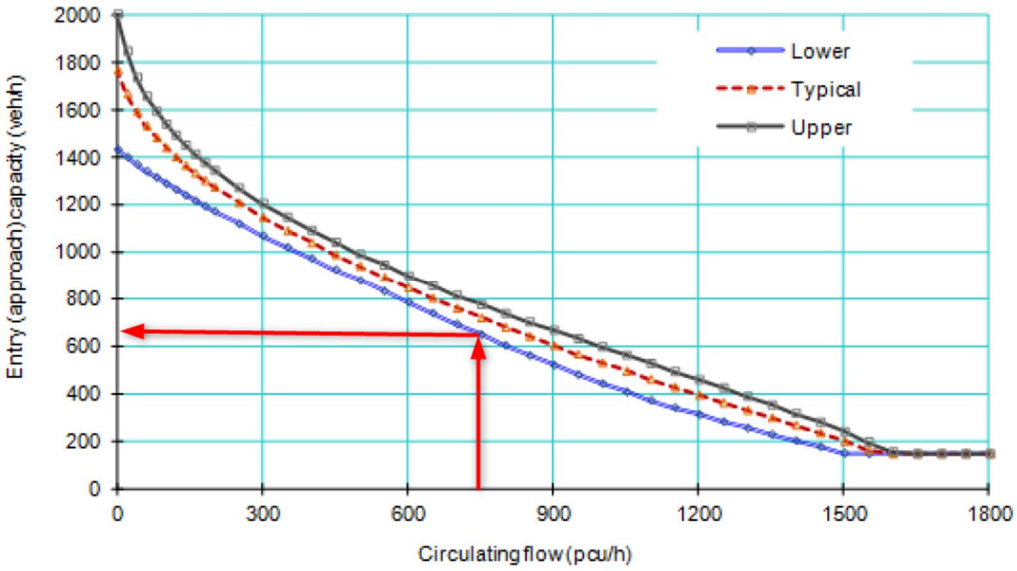

Figure 6: Roundabout entry capacity for single lane roundabouts (Figure 6.7 from AUSTROADS Guide to Traffic Management Part 3: Traffic Studies and Analysis)

[15] It is clear from the above analysis that the future modelled traffic volumes for the year 2045 can be accommodated within a roundabout

controlled intersection. While it is anticipated that a roundabout control will ultimately be required for the intersection, it is likely that a sign controlled cross roads may be an appropriate interim stage while the development occurs. Hence, the decision on the type of intersection control should be a matter for discussion and confirmation in a subdivision or land use consent when the details and timing of the development are known. All that needs to be acknowledged at this stage is that the traffic volumes generated by the development are able to be controlled safely and efficiently.

Road Safety

[16] The NZTA CAS database was searched for the crashes reported over the last 5 years from 2015 to the present day. There were a total of 3 reported crashes at the intersection in the 5 year period.

[17] One crash involved a vehicle turning right from Ballantyne Road into Golf Course Road being struck from behind. This crash resulted in no injuries.

[18] A second crash involved a vehicle from Golf Course Road attempting to turn left onto Ballantyne Road at speed and losing control. This resulted in a minor injury.

[19] A third crash involved a cyclist on Golf Course Road being struck from behind as he approached the Ballantyne Road intersection. This resulted in a minor injury.

[20] It is clear that there is not a significant underlying crash problem at the intersection.

Intersection design

[21] It is acknowledged that there is limited sight distance from Golf Course Road along Ballantyne Road. While the lack of sight distance has not contributed to a significant safety problem, this is likely to be due to the simple Tee intersection layout with few conflicts allowing the drivers to concentrate on only a maximum of two vehicle approaches at one time and decision making is quicker. It is considered that adding a fourth

leg to the intersection will create a more complex intersection and drivers will need more time to make decisions and consequently need more visibility.

[22] The intersection has been modelled by Pattrerson Pitts Group using LIDAR data provided by QLDC. The long sections including the design alternatives are appended to this evidence. The long section shows the intersection on the top of a vertical curve on Ballantyne Road that restricts visibility from the limit line in both directions.

[23] To address these sight distance problems, it is considered that the vertical curve on Ballantyne Road would need to be reconstructed to increase the curve radius to allow the appropriate sight distance to be achieved. The appropriate design standard for such an intersection on a vertical curve is the AUSTROADS Guide to Road Design Part 4A: Unsignalised and Signalised Intersections and Part 4B: Roundabouts.

[24] The critical design criteria for these intersection controls is sight distance. QLDC has confirmed that the speed limit for Ballantyne Road through the Golf Course Road intersection will be reduced to 40 km/hr so a design speed of 50 km/hr (40 km/hr plus 10 km/hr) will be applied to the design. Adding 10 km/hr to the speed limit is accepted as good design practice where there is no speed profile available. The 40 km/hr speed limit has not yet been applied so the speed profile in the future is unknown.

[25] To construct a roundabout requires an approach sight distance (ASD) to be applied. This is the distance from which a driver can see the limit lines for a roundabout. For a design speed of 50 km/hr, the ASD required is 55 metres (K value of the vertical curve is 13.8) assuming a reaction time of 2 seconds.

[26] For a cross roads, the critical sight distance required is the Safe Intersection Sight Distance (SISD). This is the distance from a drivers eye height of 1.1 metres to the top of a vehicle at 1.25 metres above ground level. For a design speed of 50 km/hr with a reaction time of 2.0 seconds, the SISD required is 97 metres (K value is 10).

[27] Since the two options require different vertical curve radii with the roundabout design being the more restrictive, it is considered that the intersection design should be based on the vertical curve of 1380 metres radius. This ensures that the intersection will be future proofed to allow the roundabout control to be constructed without further excavation. In the meantime, the SISD for the sign controlled cross roads would be greater than AUSTROADS requires.

[28] A draft long section has been prepared for both vertical curves and is appended.

[29] The long sections indicate that the curves can be constructed with minimal excavation to achieve the required K values for both options.

[30] The effect on approach sight distance along Golf Course Road will be minimal. The ASD will not change significantly from the current ASD and this has generally not proved to be a safety problem. The design would need to be confirmed at detailed design stage of the future intersection to assess the effects.

Conclusion

[31] It can be demonstrated that the sight distances recommended by AUSTROADS can be achieved for the proposed new link proposed by Willowridge from Three Parks to Ballantyne Road. The sight distances can be achieved for both a sign controlled cross roads and a roundabout. Based on the Wanaka Transport Model, it is demonstrated that the 2045 traffic volumes can be accommodated with spare capacity in a future roundabout design. Therefore, a safe and efficient intersection design including the link from Three Parks is possible. The form of the intersection should be determined at subdivision or land use consent stage when the actual traffic conditions at the time are known.

[32] It is my opinion that the PDP Structure Plan should be altered to include the link from Three Parks to Ballantyne Road as shown on the Willowridge Structure Plan.

Appendix

Intersection Design with Long Sections

NOTE:
Contours are from QLDC GIS web site
Heights are in NZVD16 datum
Coordinates are in Geodetic 2000 datum

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T 03 443 0110
E wanaka@ppgroup.co.nz

Client & Location:

Three Parks Properties Ltd
Wanaka

Purpose & Drawing Title:

Layout Plan
Ballantyne & Golf Course Roads
Intersection Design

Surveyed by:	xxx	Original Size:	Scale:
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Drawn by:	SJD		DO NOT SCALE
Checked by:	xxx		
Approved by:	xxx		
Job No: W4987	DWG No: 001	Sheet No: 100	Revision No: A / Date Created: 06/05/20

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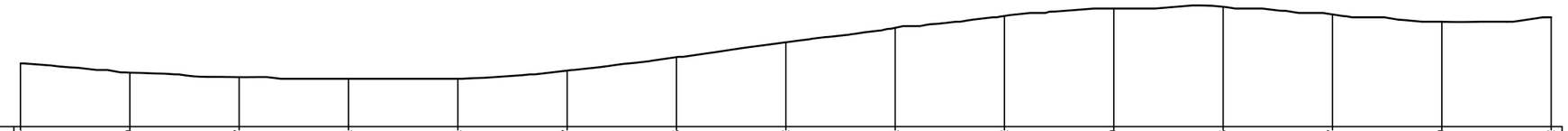
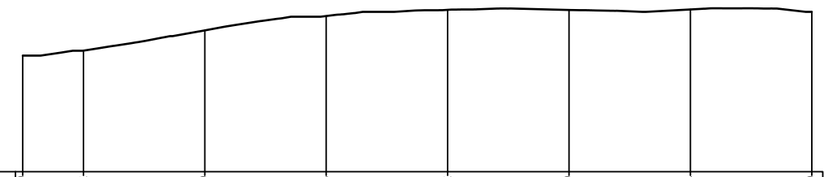


Datum 290

Existing Road Surface	304.4	302.29	301.27	300.91	300.91	302.77	305.83	309.22	312.51	315.2	316.9	317.3	315.57	313.9	314.92
Chainages	0.000	50.000	100.000	150.000	200.000	250.000	300.000	350.000	400.000	450.000	500.000	550.000	600.000	650.000	700.000

Ballantyne Road



Datum 290

Existing Road	313.9	314.92	319.09	322.05	323.32	323.29	323.4	322.9
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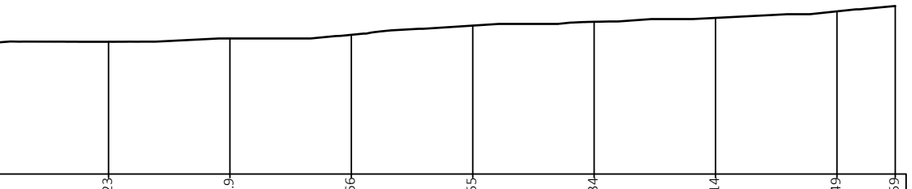
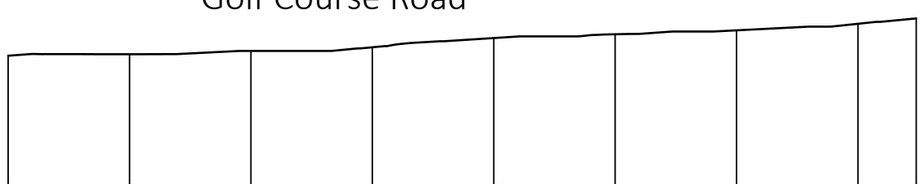
Ballantyne Road



Datum 290

Existing Road Surface	316.92	317.23	317.9	318.66	320.55	321.34	322.14	323.49	324.59
Chainages	0.000	50.000	100.000	150.000	200.000	250.000	300.000	350.000	374.000

Golf Course Road



Datum 290

Existing Road Ground Level	316.92	317.23	317.9	318.66	320.55	321.34	322.14	323.49	324.59
Chainages	0.000	50.000	100.000	150.000	200.000	250.000	300.000	350.000	374.000

Three Parks Road

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Client & Location:

Three Parks Properties Ltd
Wanaka

Purpose & Drawing Title:

Road Long Sections
Ballantyne & Golf Course Roads
& Three Parks Future Road

Surveyed by:	xxx	Original Size:	Scale:		
Designed by:	xxx	A3	1:4000 @ A3 Hz 1:2000 @ A3 Vt		
Drawn by:	SJD		DO NOT SCALE		
Checked by:	xxx				
Approved by:	xxx				
Job No:	DWG No:	Sheet No:	Revision No:	Date Created:	
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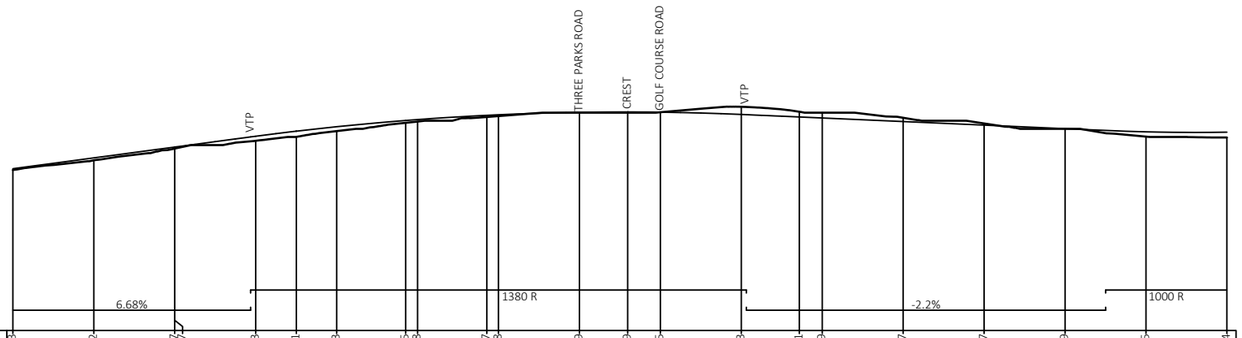
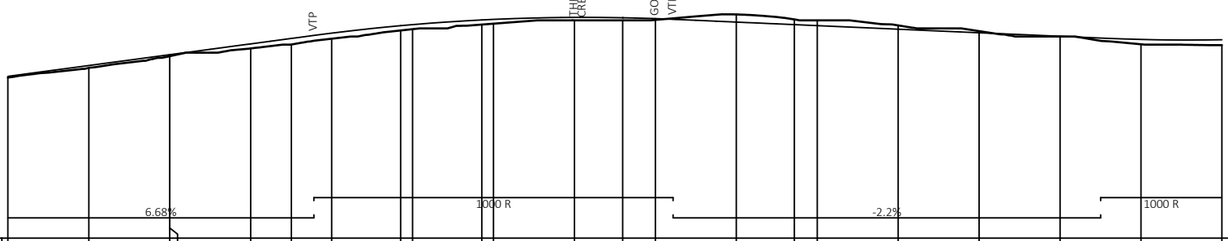


Datum 290

Existing Road	309.83	311.02	312.47	312.47	313.43	313.91	314.63	315.65	315.8	316.37	316.48	316.9	316.9	316.95	317.63	317.01	316.9	316.27	315.57	314.9	313.95	313.84
Depth	-0.150	-0.293	-0.185	-0.185	-0.562	-0.705	-0.537	-0.290	-0.243	-0.200	-0.157	-0.044	-0.087	-0.006	0.944	0.642	0.657	0.466	0.200	-0.025	-0.592	-0.658
Chainages	100.000	120.000	130.883	130.883	160.000	170.046	180.000	197.051	200.000	217.115	220.000	240.000	251.926	260.000	280.000	294.351	300.000	320.000	340.000	360.000	380.000	400.000



Datum 290

Existing Road	309.83	311.02	312.47	312.47	313.43	313.91	314.63	315.65	315.8	316.37	316.48	316.9	316.9	316.95	317.63	317.01	316.9	316.27	315.57	314.9	313.95	313.84
Depth	-0.150	-0.293	-0.185	-0.185	-0.563	-0.752	-0.691	-0.591	-0.563	-0.573	-0.532	-0.363	-0.321	-0.160	0.943	0.642	0.657	0.466	0.200	-0.025	-0.592	-0.658
Chainages	100.000	120.000	130.883	130.883	160.000	170.046	180.000	197.051	200.000	217.115	220.000	240.000	251.926	260.000	280.000	294.351	300.000	320.000	340.000	360.000	380.000	400.000

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Client & Location:

Three Parks Properties Ltd
Wanaka

Purpose & Drawing Title:

Road Long Sections
Ballantyne Road with Design CL

Surveyed by:	xxx	Original Size:	Scale:		
Designed by:	xxx	A3	1:1500 @ A3 Hz 1:750 @ A3 Vt		
Drawn by:	SJD		DO NOT SCALE		
Checked by:	xxx				
Approved by:	xxx				
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