

**BEFORE THE HEARINGS PANEL FOR THE PROPOSED QUEENSTOWN  
LAKES DISTRICT PLAN**

**IN THE MATTER** of the Resource  
Management Act 1991

**AND**

**IN THE MATTER** of the Hearing Stream 14  
– Wakatipu Basin

**STATEMENT OF EVIDENCE OF MR JOHN FRANCIS McCARTNEY ON BEHALF  
OF SPRUCE GROVE TRUST #2512 AND BOUNDARY TRUST #2444**

**INTRODUCTION**

1. My name is John McCartney. I am a consulting civil engineer and I am the owner and director of the consulting engineering company Civilised Limited, based in Queenstown.
2. I hold the qualifications of Bachelor of Engineering (Civil) from the University of Canterbury. I have 26 years of experience in the design and construction of civil infrastructure with particular expertise in site investigation and assessment along with the design and construction of development infrastructure including roading, water supply, wastewater and stormwater disposal systems. I have experience in the design and implementation of infrastructure works for both private companies and for Local Authorities throughout New Zealand.
3. Although this is a Council hearing, I confirm that I have read and agree to comply with the Code of Conduct for Expert Witness. This evidence is within my area of expertise except where I state that I am relying on what I have been told by another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

### **SCOPE OF EVIDENCE**

4. Civilised Limited (CL) has been engaged by the Spruce Grove Trust and the Boundary Trust to assess and report on engineering related matters involving potential rezoning of land.
5. The rezoning requests have been made as part of the review of the Queenstown Lakes District Council (QLDC) District Plan. The request is part of Stream 14 of the review process and the submission is numbered 2444 and 2512. The rezoning requests are to amend the zoning of the site to Millbrook Resort Zoning with a new activity area across the site. My evidence covers the area encompassed by the rezoning request in its entirety.
6. The land is contained in various certificates of title:
  - 113048 legally described as Lot 1 DP 327817 located at 9 Orchard Hill;
  - 113049 legally described as Lot 2 DP 327817 located at 461 Arrowtown-Lake Hayes Road;
  - OT13B/1382 legally described as Pt Lot2 and Lot 3 DP 19667 located at 459 Arrowtown-Lake Hayes Road;
  - OT19B/610 legally described as Lot 2 DP 27846 located at 9 Butel Road;
  - OT19B/609 legally described as Lot 1 DP 27846 located at 29 Butel Road.
7. The rezone request covers around 10.62 hectares in total.
8. QLDC staff and appointed consultants have assessed the rezoning requests and prepared evidence. Ms Andrea Jarvis does not oppose the rezoning due to the anticipated upgrades that Council already has planned for the Arrowtown Water Supply and the broader Wakatipu Wastewater scheme so long as the developer contributes to the cost via development contributions or similar<sup>1</sup>.
9. Civilised Ltd has been engaged to assess and detail appropriate servicing responses to the general development of the site.

---

<sup>1</sup> “Statement Of Evidence Of Andrea Therese Jarvis On Behalf Of Queenstown Lakes District Council Infrastructure - 28 May 2018” - paragraphs 78.7 and 78.8.

10. My evidence today is limited to infrastructure issues and in particular the feasibility of servicing the site with road access, stormwater, wastewater and water supply services.
11. From information supplied to me on behalf of the submitters, the likely lot yield from the development will be of the order of 90 additional residential units.

### **BACKGROUND**

12. The site subject to the proposed plan change is surrounded on three sides by Millbrook Resort Zoned land. The submitters wish to extend the Millbrook Zone onto their land.
13. The northern side of the site is bounded by Butel Road whilst the eastern side of the site is bounded by the Arrowtown – Lake Hayes Road and the western is bounded partially by Orchard Hill.

### **ROAD ACCESS**

14. Access to the future subdivision of the site could be gained in a number of locations. These include from Butel Road, from the Arrowtown – Lake Hayes Road or from Orchard Hill within the Millbrook Resort.

Orchard Hill is a private road owned by Millbrook Country Club Ltd and any access from this road would require their approval. Therefore, I have based my analysis on the assumption that the site will be accessed from Butel Road and/or the Arrowtown – Lake Hayes Road in the vicinity of the existing access to rapid numbers 459 and 461 Arrowtown – Lake Hayes Road. Butel Road is a public road and is currently a narrow, lowly trafficked road. The Arrowtown – Lake Hayes Road is an Arterial Road in the QLDC District Plan and as such has a high usage rate.

#### *Butel Road*

15. Upgrading an existing access or constructing a new access from Butel Road will require constructing a new intersection on to Butel Road along with upgrading part of Butel Road and possibly upgrading the Butel Road intersection with the Arrowtown – Lake Hayes Road.
16. Butel Road itself is relatively straight and flat and constructing a new intersection should be relatively straightforward as long as suitable

separation from the Arrowtown – Lake Hayes Road is achieved. In accordance with the current District Plan rules relating to separation distance, any new intersection on to Butel Road will have to be at least 100 metres from the Arrowtown – Lake Hayes Road. This separation distance can be achieved.

17. The Butel Road Reserve is 20m wide and this allows room to upgrade the road to meet the QLDC standards for increased usage.
18. Traffic generation projections will depend upon the total number of allotments developed. It is anticipated that the Butel Road intersection with the Arrowtown – Lake Hayes Road may need to be upgraded in accordance with the requirements of the Austroads Guide to Road Design. The geometry shown in Diagram 3 contained in Appendix 7 of the QLDC District Plan can be considered a minimum layout for the future intersection. This upgrade would be required at the time of subdivision or development of the site.
19. In accordance with Diagram 3, manoeuvrability will be increased for right hand turning traffic entering the access heading south from Arrowtown, by way of a pull over area on the east side of the Arrowtown – Lake Hayes Road.
20. Sight distances from the existing Butel Road intersection with the Arrowtown – Lake Hayes Road have been assessed in accordance with Table 3, Section 14 of the QLDC District Plan for a speed environment of 70km/hr. The required sight distance for Residential Activity in a 70km/hr speed environment is 85m and for Other Activities in a 70 km/hr speed environment is 140m. The drawing included with this evidence brief as Attachment A illustrates the sight distances surveyed on site and confirms that sight distances are in excess of 350m in both directions and will therefore comply with the design standard.

#### *Arrowtown – Lake Hayes Road*

21. As noted above, the subject site has road frontage with the Arrowtown – Lake Hayes Road. Should access to the site be from the Arrowtown – Lake Hayes Road, this could be constructed in a number of locations along the road frontage. One particular location has been assessed in order to prove feasibility and explore the issues associated with providing access to the subject site. This is discussed below.

22. Subject to detailed design, access to the future subdivision of the site may be gained by constructing a new road from an existing access point on the Arrowtown – Lake Hayes Road onto the site. This new road would provide access to all proposed lots. The access location assessed is at the current location for the driveway for rapid numbers 459 and 461 Arrowtown – Lake Hayes Road and will require constructing a new intersection on to the Arrowtown – Lake Hayes Road. Possible Arrowtown – Lake Hayes Road improvements are shown on the drawing included with this evidence brief as Attachment B.
23. The Arrowtown – Lake Hayes Road itself is straight and relatively flat in the vicinity of the proposed intersection. In accordance with the current District Plan rules relating to separation distance, any new intersection on Arrowtown – Lake Hayes Road will have to be at least 100 metres from the Butel Road. This separation distance is achieved.
24. The current Arrowtown – Lake Hayes Road Reserve is 20m wide and this allows room to create the proposed intersection to meet the QLDC standards.
25. Traffic generation projections will depend upon the total number of allotments developed. It is anticipated that the new intersection with the Arrowtown – Lake Hayes Road may be formed in accordance with the requirements of the Austroads Guide to Road Design. The geometry shown in Diagram 3 contained in Appendix 7 of the QLDC District Plan can be considered a minimum layout for the future intersection.
26. In accordance with Diagram 3, manoeuvrability will be increased for right hand turning traffic entering the access heading south from Arrowtown, by way of a pull over area on the east side of the Arrowtown – Lake Hayes Road.
27. Sight distances from the existing driveway location on to the Arrowtown – Lake Hayes Road have been assessed in accordance with Table 3, Section 14 of the QLDC District Plan for a speed environment of 70km/hr. The required sight distance for Residential Activity in a 70km/hr speed environment is 85m and for Other Activities in a 70 km/hr speed environment is 140m. The drawing included with this evidence brief as Attachment B illustrates the sight distances surveyed on site and

confirms that sight distances are in excess of 300m in both directions and will therefore comply with the design standard.

28. Internal access roads would be constructed in accordance with the Queenstown Lakes District Council Land Development and Subdivision Code of Practice and the specific requirements for road widths for Rural Live and Play areas given in Table 3.2.

### **WATER SUPPLY**

29. The Arrowtown water supply services land nearby to the site. This includes the Millbrook Resort and dwellings on MacDonnell Road.
30. The intake for the water supply is a series of bores near Bush Creek. The water is pumped to the treatment plant and reservoirs on Manse Road near the Arrowtown Cemetery before being distributed by the piped reticulation throughout Arrowtown.
31. I have reviewed the proposed QLDC 10 Year Plan 2018-2028 and note that there is an amount of capital expenditure proposed for the Arrowtown Water Supply. This includes \$3,802,000 for a new reservoir currently programmed to be spent in the years 2019 – 2021, \$1,544,000 for a water pump station and new bore currently programmed to be spent in the years 2018 – 2019, and \$564,000 for a water pump station and upgrade to existing bore currently programmed to be spent in the years 2025 – 2026. My understanding is that this expenditure is in order to provide further capacity in the water supply system. This additional capacity will enable the existing water supply reticulation to provide water to enable growth in areas in and around Arrowtown including the proposed rezoned area.
32. The expected potable water demand for the development is calculated as approximately 189 m<sup>3</sup>/day. This is based on 90 lots requiring 2,100 litres per day (the QLDC required amount per allotment).
33. The point of connection for the water supply to the development could be at either the existing 200mm diameter main in Butel Road or at the existing 300mm diameter main at the cemetery on Durham Street. These two options are shown on the drawing included with my evidence as Attachment C.

34. Due to Millbrook Country Club being serviced by a bulk services agreement, connection to Millbrook services has not been considered.
35. The developer will be responsible for the provision of all infrastructure necessary to service the development and furthermore will be required to pay developer contributions to cover their share of any upgrades to the system as a result of the growth in the area serviced by the Arrowtown water supply scheme<sup>2</sup>.

### **WASTEWATER**

36. As outlined in Ms Jarvis's evidence, there are upgrades to the broader QLDC wastewater scheme planned which should support further development of this area. Consequently, disposal of wastewater is proposed to be via connection to Council reticulation.
37. The site encompasses sloping and flatter land. The site generally slopes to the south and north with the lowest point being towards the southeast corner. Due to this topography, it is likely that a wastewater pump station will be required in order to discharge wastewater from the site. Wastewater pump stations are frequently a component of residential subdivisions.
38. Subject to detailed design, available pipe routes and Council preference, the wastewater flows could drain to an existing gravity manhole located on the Arrowtown – Lake Hayes Road south of the site. This possible connection point is shown on the drawing included with my evidence as Attachment D.
39. Due to the distance to the connection point and the topography, I expect that the entire site will need to drain to a least one pump station and this will connect via a rising main to the existing Council infrastructure. No extension of existing Council gravity drainage infrastructure is anticipated to be necessary.
40. The construction of a modern reliable wastewater pump station to the standards required by Council will minimise maintenance requirements. Furthermore, the establishment of a further 90 dwellings will generate more rates for Council and enable a more efficient overall network due to

the economies of scale. The amount of additional wastewater rates generated by the additional 90 residential units would be at least \$60,300 per annum. As the new network will be modern and relatively low maintenance, this amount is more than adequate to maintain the additional pump station along with making a considerable contribution to the wastewater maintenance of the overall Arrowtown scheme.

41. An alternative to a larger communal pump station could be the installation of individual pump stations on each allotment. This would consist of a grinder pump inside a relatively small pump chamber and a small bore rising main that connected to through a non-return valve to a rising main in the street. A similar small pump station arrangement is currently being implemented in Arthurs Point.
42. With the introduction of either a communal pump station or individual allotment pump stations on the subject land that would be reticulating the majority of the wastewater flows from the site, it will be possible to ensure that the pump stations are configured such that they will not pump into the reticulation at peak times. This will require some buffering storage at the communal pump station and large enough pump chambers for the individual allotment pump stations to ensure that the pump station did not operate during the busy morning period or during the peak evening period. Thus, the increase in flows through the existing network will be able to be managed in such a way that any negative impacts on the network are minimised and would not significantly contribute to the existing pipe capacity reaching capacity restraints.
43. Development contributions will be paid when allotments are created. These development contributions will allow QLDC to recover the cost of any future upgrades that are required to enable growth in Arrowtown. Should the continued growth of Arrowtown trigger an upgrade requirement for the elements of the existing wastewater reticulation network then this will be able to be added to the list of future works in subsequent LTP or Annual Plan processes and appropriate Development Contributions levied against the future allotments.

---

<sup>2</sup> “Statement Of Evidence Of Andrea Therese Jarvis On Behalf Of Queenstown Lakes District Council Infrastructure - 28 May 2018” - paragraphs 78.7 and 78.8.

## **STORMWATER**

44. As previously outlined, the site varies from hill slopes to flat land.
45. In order to prevent the concentration of runoff onto neighbouring land, and in the absence of any significant reticulation nearby the site, it is expected that the provision of stormwater drainage for the site will necessarily involve usage of Low Impact Design principles.
46. Low-impact development (LID) is a term used to describe a land planning and engineering design approach to manage stormwater runoff. LID emphasizes conservation and use of on-site natural features to protect water quality. This approach implements engineered small-scale hydrologic controls to replicate the pre-development hydrologic regime of watersheds through infiltrating, filtering, storing, attenuating and detaining runoff close to its source.
47. This approach has been used to some extent on recent subdivisions in Arrowtown. I am aware that it is being implemented and used elsewhere in Arrowtown and the District.
48. I would expect that this approach could be successfully implemented on the subject land following detailed investigations, analysis and design. The approach to stormwater runoff would be a key driver in developing an overall development plan for the site as runoff interception prior to flows departing site would be required. I note that there at least two points around the perimeter of the site where small ephemeral water courses are expected to form during a prolonged and heavy rainfall event. These will need to be managed to ensure that there is no concentration of flows onto neighbouring land following development. I do not envisage any difficulties achieving that.

## **CONCLUSIONS**

49. I confirm that it is feasible to implement the necessary access, water supply, wastewater disposal, and stormwater control for the proposed development and that the effects of the necessary utility services and development infrastructure on the environment are no more than minor.

50. The site can readily be accessed from Butel Road or directly from the Arrowtown – Lake Hayes Road. Development of the site will involve the construction of a new intersection on Butel Road, possible widening of Butel Road and upgrading the Butel Road intersection with the Arrowtown – Lake Hayes Road or the construction of a new intersection on the Arrowtown – Lake Hayes Road. The required works can readily be undertaken within the existing road reserves and can be done in accordance with appropriate road design standards.
51. A suitable water supply for the site is available and feasible. Upgrades already planned for the Arrowtown water supply network will ensure there is capacity in the network for the area of the proposed zone change. The developer will be responsible for connecting the site to the Council network and the point of connection will be determined in conjunction with Council.
52. Ms Andrea Jarvis, representing council, has confirmed that the site is able to connect to the Arrowtown water supply network on the assumption that the appropriate development contributions will be paid to enable the necessary upgrades programmed for the water supply scheme. These development contributions will be paid by the developer as new lots are created.
53. Wastewater drainage services required for the development of the subject land could be done in such a way as to not be a significant burden on existing ratepayers. Any new pump station required for the site would be funded by the developer and built to the high standards required by Council. The rates generated by the additional residential units would more than offset the cost of maintaining the wastewater pump station.
54. The inclusion of either a communal wastewater pump station or individual on-site wastewater pump stations would provide the ability to control the timing of wastewater flows into the Council network and further reduce the effect that the development of the site would have on the existing reticulation.
55. Ms Andrea Jarvis, representing council, has confirmed that the site is able to connect to the wastewater drainage network on the assumption that the appropriate development contributions will be paid to enable the

necessary upgrades programmed for the wastewater drainage scheme. These development contributions will be paid by the developer as new lots are created.

56. Stormwater is currently being managed using Low Impact Design principles nearby to the subject land and at other developments around the District. Subject to recommendations and appropriate evolution of lot layout concepts, I expect that this approach will be able to implemented on the subject land in order to adequately manage stormwater runoff.

Attachment A            Access – Butel Road Intersection Upgrade

Attachment B            Access – New Intersection

Attachment C            Water Supply Infrastructure

Attachment D            Wastewater Drainage Infrastructure

John McCartney

13 June 2018



REV	DATE	DESCRIPTION	APPROVED
A	21/05/2018	Initial Issue	JFM

CONSULTANT



CIVILISED LTD  
PO BOX 1461  
QUEENSTOWN 9348  
T: 027 223 3036  
E: john@mccartneys.nz

JFM	21/05/2018
DESIGN	DATE
JFM	21/05/2018
DRAWN	DATE
JFM	21/05/2018
CHECKED	DATE

CLIENT

**BOUNDARY TRUST  
&  
SPRUCE GROVE TRUST**

PROJECT/LOCATION

**PROPOSED LAND REZONING  
1124 MALAGHANS ROAD, ARROWTOWN**

TITLE

**ACCESS  
BUTEL ROAD INTERSECTION UPGRADE**

CONTRACT NUMBER	-
SCALE (AT A3)	<b>1:4,000</b>
DRAWING NUMBER	QS021-F-210
REVISION	<b>A</b>





REV	DATE	DESCRIPTION	APPROVED
A	21/05/2018	Initial Issue	JFM

CONSULTANT



CIVILISED LTD  
PO BOX 1461  
QUEENSTOWN 9348  
T: 027 223 3036  
E: john@mccartneys.nz

JFM	21/05/2018
DESIGN	DATE
JFM	21/05/2018
DRAWN	DATE
JFM	21/05/2018
CHECKED	DATE

CLIENT

**BOUNDARY TRUST  
&  
SPRUCE GROVE TRUST**

PROJECT/LOCATION

**PROPOSED LAND REZONING  
BUTEL ROAD, ARROWTOWN**

TITLE

**WATER SUPPLY INFRASTRUCTURE**

CONTRACT NUMBER	-
SCALE (AT A3)	1:5,000
DRAWING NUMBER	QS021-F-410
REVISION	A



REV	DATE	DESCRIPTION	APPROVED
A	21/05/2018	Initial Issue	JFM

CONSULTANT



CIVILISED LTD  
PO BOX 1461  
QUEENSTOWN 9348  
T: 027 223 3036  
E: john@mccartneys.nz

JFM	21/05/2018
DESIGN	DATE
JFM	21/05/2018
DRAWN	DATE
JFM	21/05/2018
CHECKED	DATE

CLIENT

**BOUNDARY TRUST  
&  
SPRUCE GROVE TRUST**

PROJECT/LOCATION

**PROPOSED LAND REZONING  
BUTEL ROAD, ARROWTOWN**

TITLE

**WASTEWATER DRAINAGE INFRASTRUCTURE**

CONTRACT NUMBER	-
SCALE (AT A3)	<b>1:5,000</b>
DRAWING NUMBER	<b>QS021-F-510</b>
REVISION	<b>A</b>