

**BEFORE THE COMMISSIONERS APPOINTED BY:  
QUEENSTOWN LAKES DISTRICT COUNCIL**

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

**AND**

**IN THE MATTER** Of the Rezoning Hearing Stream  
18 – (Settlement zone, rural visitor  
zone and variations)

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**STATEMENT OF EVIDENCE OF NICHOLA JANE GREAVES ON BEHALF  
OF SOUTHERN VENTURES PROPERTY LTD (SUBMITTER 3190)  
STREAM 18**

**29 MAY 2020**

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LAWYERS  
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## STATEMENT OF EVIDENCE OF NICHOLA JANE GREAVES

### Introduction

1. My full name is Nichola Jane Greaves. I have a Bachelor of Engineering degree (natural resources with honours) from the University of Canterbury. I have 15 years' experience in civil engineering. I hold the position of Civil Engineer at Meyer Cruden Engineering Ltd based in Wanaka. I have been in this position since March 2019. I was previously employed as an Infrastructure Advisor at Rationale Ltd and prior to this I was employed as Three Waters Engineer at Queenstown Lakes District Council (QLDC), based in Wanaka.
2. I am a member of Engineering New Zealand MEngNZ, as a Chartered Professional Engineer (CPEng).
3. Throughout my engineering career I have specialised in 3-waters infrastructure including investigations, issues and options studies, and the design and construction of 3-waters reticulation, collection and onsite systems.
4. In my 3-water roles in the Infrastructure Department at QLDC I was involved in the design and construction of new 3-waters assets, 3-waters asset management and contract management of the Wanaka 3-waters operations and maintenance contract. I also provided 3-waters infrastructure advice to the resource management engineering team on subdivision developments. I am familiar with the QLDC 3-waters assets of the Wanaka area as a result of this experience.
5. Although this is a Council hearing, I confirm that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2014 and that I agree to comply with it. I confirm that I have considered all the material facts that I am aware of that might alter or detract from the opinions that I express, and that this evidence is within my area of expertise, except where I state that I am relying on the evidence of another person.

6. I have been asked by Southern Ventures Property Ltd. (Southern Ventures) to provide evidence in relation to infrastructure matters relating to the proposed zone change identified in their Submission, 3190.
7. The key documents relevant to my area of expertise I have used, or referred to, in forming my view while preparing this brief of evidence are:
  - (a) Southern Ventures Property Ltd submission on the proposed Queenstown Lakes District Council – Stage 3 including appendices. (section 32A report);
  - (b) Mr Richard Robert Powell’s Statement of evidence on behalf of Queenstown Lakes District Council (QLDC), Infrastructure – Three Waters – Rezoning requests, Stage 3 of the Proposed District Plan. 18 March 2020;
  - (c) Ms Rosalind Devlin’s Section 42A report on behalf of Queenstown Lakes District Council (QLDC), Settlement and Lower density suburban residential zones, mapping. Stage 3 of the Proposed District Plan. 18 March 2020;
  - (d) Land Development and Subdivision Code of Practice 2018 V1.1;
  - (e) Queenstown Lakes District Council, Long Term Plan 2018-2028; and
  - (f) Queenstown Lakes District Council, Three Waters Asset Management Plan 2018/19-2027/28, February 2018.
8. I have prepared my evidence based on my:
  - (a) Expertise as a three waters land development Civil Engineer,
  - (b) Familiarity with the application site and surrounding area, and
  - (c) Familiarity with the above-mentioned documents.
9. I have attached to this evidence the following:

- (a) **Appendix A** – Proposed rezoning and earthworks plans;
- (b) **Appendix B** – Calculations of wastewater capacity and water peak flows; and
- (c) **Appendix C** – Email from Mr Richard Powell confirming the additional information in this evidence satisfies the Property and Infrastructure department that the servicing of the proposed land is feasible.

### **SCOPE OF EVIDENCE**

- 10. I have reviewed the infrastructure evidence of Mr Richard Robert Powell dated 18 March 2020 which included an assessment of the submission by Southern Ventures Property Ltd (3190).
- 11. Within this report Mr Powell is satisfied that stormwater disposal for the development can be sufficiently provided for. I agree with this assessment. The focus of Mr Powell's evidence is on water and wastewater assets and I have tailored my response to address his concerns.
- 12. My evidence addresses the following matters:
  - (a) Water supply capacity, and
  - (b) Wastewater capacity.
- 13. Mr Powell's evidence referred to Willow Terrace wastewater pumpstation. I assume Mr Powell is referring to the nearest downstream pumpstation from this site, which is the Kingston St wastewater pumpstation.

### **SUBMISSION**

- 14. Southern Ventures has sought that approximately 4 ha of their site be rezoned from Rural Lifestyle to Lower Density Suburban Residential Zone (**LDSRZ**). The proposed rezoning and earthworks plans are attached as **Appendix A**. I understand at its maximum density this zone change could yield 65 residential lots.

## EXISTING INFRASTRUCTURE

15. The site sits at the south eastern extent of Albert Town in an area commonly referred to as old Albert Town. The site is bounded by Templeton Street to the west, Carlow Street to the north, Kinnibeg Street to the east and borders the Cardrona River to the south. The site is within the Council's infrastructure scheme boundary, although currently the site is not connected to any 3-waters reticulation. The site can connect to both existing water and wastewater reticulation within the adjoining road network.
16. The nearest wastewater manhole available for connection is SM11069 which is adjacent to the site on the southern corner of Kinnibeg St and drains to Kingston St wastewater pumpstation (**WWPS**). This WWPS is situated on the edge of the Clutha River at the Kingston Street and Wicklow Terrace intersection. Kingston St WWPS then pumps to Project Pure, Wanaka's wastewater treatment plant at the Wanaka airport via the Albert Town #1 WWPS and Albert Town #2 WWPS.
17. There are existing water mains adjacent to the site on Templeton St, Carlow Street, Arklow Street and Kinnibeg Street. These mains are all 100 mm diameter and connect to Kingston Street 150 mm diameter main. This supply is feed through Albert Town from the Beacon Point Reservoir and intake. Currently the site could be serviced from any of the adjacent water mains.

## ASSUMPTIONS

18. To assess the impacts of rezoning on the water and wastewater network, it is necessary to estimate the likely yield in terms of the number of residential lots. I have relied on the estimate of 65 residential lots from the submitters Section 32 report in the following assessment
19. As the site is within the infrastructure scheme boundaries for water and wastewater it is appropriate to expect that the site can and will connect to the existing water and wastewater reticulation.

*Water*

20. The water supply requirements for a new development have been based on the QLDC Land Development Code of Practice, where it states:

*“6.3.5 Design Criteria*

*6.3.5.1 Hydraulic design; The diameter, material type(s), and class of the water main shall be selected to ensure that:*

- (a) The main has sufficient capacity to meet peak demands while maintaining minimum pressure;*
- (b) All consumers connected to the main receive at all times an adequate water supply and pressure; and*
- (c) The appropriate firefighting flows and pressures can be achieved.*

*6.3.5.6 Minimum water demand.*

- (a) Daily consumption of 700 L/person/day (occupancy per residence = 3 people);*
- (b) Peak hour factor of up to 4.0 (Queenstown), 6.6 (Rest of District);*
- (c) Firefighting demands as specified in SNZ PAS 4509;*
- (d) The network should be designed to maintain appropriate nominated pressures for both peak demand (average daily demand in L/s x peak hour factor) and firefighting demand scenarios.*

*6.3.5.10 Design pressure shall be between 300 kPa and 900 kPa”.*

21. Firefighting flows for the adjacent existing zoned residential areas are defined by a proposed level of service in the QLDC three waters asset management plan, where it states;

*“Section 2.2.1 Water Supply for On Demand Supplies Only (as Defined by the QLDC Water Supply Bylaw).*

*Firefighting supplies in Council approved commercial, industrial and residential areas are designed to provide 60% of annual peak demand in addition to fire flow, on a zone by zone basis. As a minimum QLDC will provide FW2 for residential areas and FW3 for commercial/industrial areas.*

*Grading's above FW3 need to be investigated, priced and approved by the General Manager Property and Infrastructure or Council under Section 10A of the LGA. Refer Section 4.2 of national fire standards (SNZ PAS 4509:2008)".*

22. Based on Council's level of service it can be inferred that FW2 firefighting supply is currently provided in the adjoining water network.

#### *Wastewater*

23. The wastewater flow from a new development through the existing gravity reticulation has been based on the QLDC Land Development Code of Practice, where it states:

##### *"5.3.5 Design criteria*

##### *5.3.5.1 Design flow;*

##### *(a) Residential flows*

- (i) Average dry weather flow of 250 litres per day per person*
- (ii) Dry weather diurnal PF of 2.5*
- (iii) Dilution/infiltration factor of 2 for wet weather*
- (iv) Number of people per dwelling 3;*

##### *5.3.5.7 Gravity wastewater applications. The pipe shall be designed to:*

- (a) Have adequate capacity, grades, and diameters;*
- (b) Have adequate grade for self-cleaning;*
- (c) Be deep enough to provide gravity service to all lots;*
- (d) Comply with minimum depth requirements to ensure mechanical protection and safety from excavation;*
- (e) Avoid all underground services, while maintaining all the necessary clearances; and*
- (f) Allow for various drops and losses through MHs".*

## INFRASTRUCTURE ASSESSMENT

24. Based on the assumptions I have outlined in the preceding paragraphs I have prepared water and wastewater demand / flow calculations for the proposed zoning. These calculations are attached as **Appendix B** to this evidence. The proposed peak demands for water are calculated at 25 l/s at 100 kPa minimum pressure and 10.4 l/s at 300 kPa. The proposed peak flow for wastewater is calculated at 2.82 l/s.
25. Mr Powell's evidence referred to modelling of the water supply and wastewater pumpstation to confirm existing capacity or identify necessary upgrades to these networks. QLDC hold the hydraulic water and wastewater models that could provide this information. This modelling was not available at the time of writing this evidence.
26. **Appendix C** to this evidence provides confirmation that Mr Richard Powell has been given the opportunity to review this additional infrastructure information and Mr Powell has confirmed this satisfies the QLDC Property and Infrastructure department that the servicing of the proposed land is feasible.

### *Wastewater*

27. I understand that one of the requirements for this zone is the land will be raised up by 1 – 1.5m for flood risk mitigation. This level change will provide adequate gravity fall to the existing Council wastewater network in Kinnibeg Street for the proposed development. The earthworks plan confirming this is shown in Appendix A.
28. Appendix B to this evidence sets out the proposed peak wastewater flows that could be generated from the rezoning and assesses whether there is sufficient capacity for this increased flow within the existing network.
29. Based on a calculation of 2.8 l/s additional wastewater peak flow there is sufficient capacity in the existing wastewater network to service the proposed development with no requirement for any upgrades. This conclusion is reached because at its most critical point (corner of Kingston St and Kinnibeg Street) there is 12.6 l/s capacity within the



existing wastewater main and with additional flow added by the proposed rezoning a peak flow of 6.5 l/s will be generated, well below the capacity in the network.

30. Wastewater modelling was not available from QLDC to confirm the capacity at Kingston St WWPS. However, it is usual practice to check this at the time of subdivision. In the event that the modelling shows that an upgrade is necessary to Kingston St WWPS adding additional storage adjacent to the wet well is the typical solution at the time the land is developed. This type of upgrade is achievable and can be undertaken at the Developer's cost.

#### *Water*

31. Delivering adequate water pressure and water flow are the two key considerations to take into account when assessing available water capacity. I do not consider there will be any pressure issues based on the site being a similar elevation to the neighbouring serviced portion of Albert Town.
32. FW2 Firefighting flow requirements sets the peak flow for the LDSRZ that is being sought through this submission. The existing neighbourhood network has the same FW2 firefighting flow level of service. Based on this existing data I consider that adequate water flow can be supplied to service this development and that the possible requirement for upgrades is unlikely. However, in the event that an upgrade is required there would be different solutions such as a two-end supply between Templeton/Wexford and/or Kinnibeg Streets to increase available pressure and flow.
33. Water modelling was not available from QLDC at the point of supply for this site to confirm capacity or identify necessary upgrades. I draw the same conclusions with respect to water as I did with wastewater that water modelling can be reviewed at the time of subdivision when internal reticulation is designed and that any upgrades deemed necessary at that stage can be paid for by the Developer based on usage.

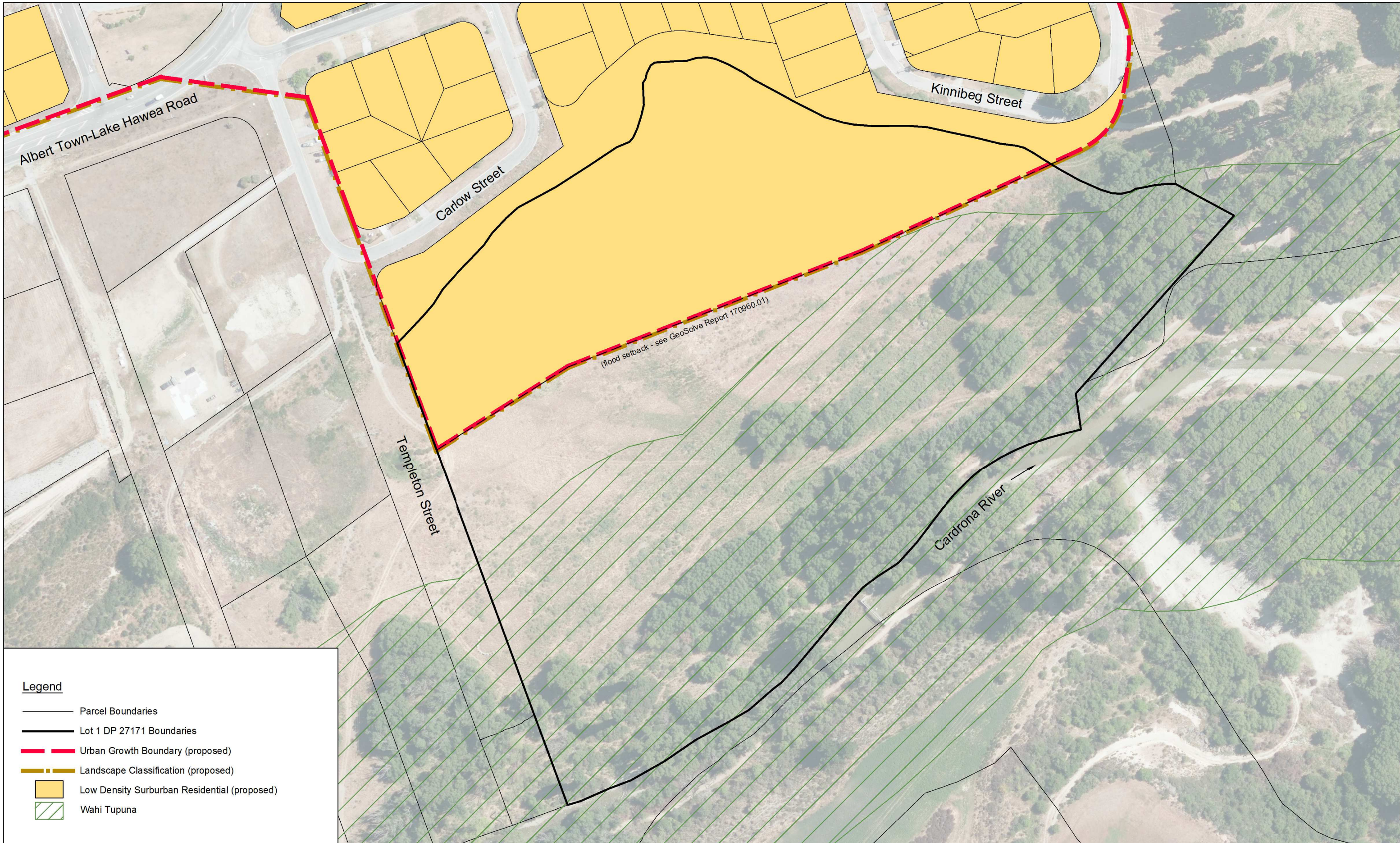
**CONCLUSION**

34. I consider that with the information available the proposed rezoning can be adequately serviced.
35. More specifically, the existing wastewater reticulation has sufficient capacity to service the proposed rezoning. The Kingston St WWPS can be upgraded if found to be necessary at the time of subdivision.
36. The existing adjacent water reticulation has suitable pressure and flow and the subject land is at a similar elevation to the existing network therefore upgrades are unlikely to be required to service this rezoning. This can be confirmed with modelling at the time of subdivision once internal reticulation has been designed.







Dated 29 May 2020

Nichola Jane Greaves

**Appendix A – Proposed rezoning and earthworks plans**



**Legend**

-  Parcel Boundaries
-  Lot 1 DP 27171 Boundaries
-  Urban Growth Boundary (proposed)
-  Landscape Classification (proposed)
-  Low Density Suburban Residential (proposed)
-  Wahi Tupuna

**MEASURED**  
LAND SURVEYS

www.measuredlandsurveys.co.nz info@measuredlandsurveys.co.nz

Rev	Description	Date
A	ORIGINAL	14/11/19

**Proposed LDSR Zoning**  
(Templeton Street - Albert Town)

Client:  
**Southern Ventures Property Limited**

Scale:  
1 : 1750 @ A3

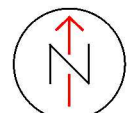
Surveyed:  
ST 24/05/18

Drawn:  
ST 14/11/19

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Datum:  
**Lindis Peak 2000/DVD 1958**



Sheet:  
**1 of 1**

Job #:  
18012\_S1

Rev:  
A



**Notes:**

- Bulk earthwork volumes shown are indicative to assist initial development scoping and subject to further engineering design.
- Design contours shown are 1.00m/0.25m.
- Design fill batter 1v : 3h used.

- Parcel Boundaries
- Lot 1 DP 27171 Boundaries
- (max Fill +2.05m)
- +2.0m to +2.5m (Fill)
- +1.5m to +2.0m (Fill)
- +1.0m to +1.5m (Fill)
- +0.5m to +1.0m (Fill)
- +0.0m to +0.5m (Fill)

Rev	Description	Date
A	ORIGINAL	13/11/19
B	TITLE	04/03/20

## Fill Area Plan

(Templeton Street - Albert Town)

Client:  
**Southern Ventures Property Limited**

Scale:  
**1 : 1750 @ A3**

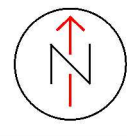
Surveyed:  
**ST 24/05/18**

Drawn:  
**ST 04/03/20**

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Datum:  
**Lindis Peak 2000/DVD 1958**

  
 Sheet:  
**1 of 1**

Job #:  
**18012\_S2**

Rev:  
**B**

**Appendix B** – Calculations of wastewater capacity and water peak flows

**EXISTING WASTEWATER MAIN CAPACITY CHECK**

Wastewater peak flow, from QLDC COP 5.3.5 Design residential flows.

Existing catchment plus proposed 65 lots from rezoning peak flow 2.82 l/s

All existing mains PVC n= 0.011

Manhole ID	Pipe diameter m	Pipe Invert m	Length m	Slope m/m	Pipe capacity Mannings l/s	Is peak flow less than pipe capacity
		276.13				
SM11069	0.1	274.86	41.70	0.03	10.65	OK
SM11067	0.15	274.12	140.60	0.01	13.06	OK
SM11035	0.15	273.51	124.50	0.005	12.60	OK
SM11037	0.15	272.23	9.00	0.14	67.88	OK

US Manhole ID	DS Manhole ID	Contributing lots	Peak flow, l/s
SM11069	SM11067	68	2.95
SM11067	SM11035	73	3.17
SM11035	SM11037	145	6.29
SM11037	SM11020	150	6.51

**WASTEWATER CHECK WITHIN PROPOSED REZONING**

From table 5.4 COP, min grade 150mm dia, %	From Earthworks plan fall across site, %	Is fall across site greater than COP min grade
0.55	0.73	YES, SITE CAN DRAIN UNDER GRAVITY

**WATER DEMAND**

From QLDC COP:	65 lots 700 l/person/day 3 people/dwelling 6.6 peaking factor 10 l/s	Peak demand @ minimum 300 kPa
Firefighting	25 l/s	FW2 demand @ minimum 100 kPa

Map showing catchment area calculated



Map showing lots that catchment size was calculated from





**Appendix C** – Email from Mr Richard Powell confirming the additional information in this evidence satisfies the Property and Infrastructure department that the servicing of the proposed land is feasible.

**From:** [Richard Powell](#)  
**To:** [Nichola Greaves](#)  
**Cc:** [Ulrich Glasner](#)  
**Subject:** RE: Rezoning Templeton St Albert Town Infrastructure requirements  
**Date:** Friday, 15 May 2020 1:15:34 PM  
**Attachments:** [image001.png](#)  
[Infrastructure Assessment Templeton.pdf](#)

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Hi Nichola,

Thank you for providing the additional information.

Based on your attached calculations I accept that the existing wastewater reticulation has sufficient capacity to service the proposed rezone. I can also confirm that the Kingston St WWPS is able to be upgraded if found to be necessary at the time of subdivision when lot numbers are confirmed and modelling can be undertaken.

I also accept your below argument that the existing water reticulation has suitable pressures and the subject land is at a similar level, upgrades are unlikely however I am happy for this to be confirmed at the time of subdivision once internal reticulation is designed and can be modelled.

Overall this satisfies Property and Infrastructure that the servicing of the proposed land is feasible.

Regards

Richard

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**From:** Nichola Greaves <nichola@mcengineering.co.nz>  
**Sent:** Friday, 24 April 2020 2:17 PM  
**To:** Richard Powell <richard.powell@qldc.govt.nz>  
**Subject:** FW: Rezoning Templeton St Albert Town Infrastructure requirements

Hi Richard,

To follow up on our conversation and email below, please see the attached wastewater calculations that confirm the proposed submission site can drain under gravity to the existing QLDC reticulation and no upgrades of the existing wastewater mains between the site and Kingston St WWPS are required because of the increased predicted flow. I'd like to confirm that at the time of subdivision after more detailed investigation has been completed if the existing water or wastewater reticulation requires upgrading because of this rezoning the developer will contribute to the proposed rezoning's fair and reasonable portion of this.

Please let me know if this satisfies the lack of information received in the original submission of site servicing and or if not what level of information is required and can Council provide more details to base an assessment on?

Kind Regards, Nichola

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**From:** Nichola Greaves  
**Sent:** Thursday, 19 March 2020 3:49 PM  
**To:** 'Richard Powell' <[richard.powell@qldc.govt.nz](mailto:richard.powell@qldc.govt.nz)>  
**Cc:** [mark.baker@qldc.govt.nz](mailto:mark.baker@qldc.govt.nz)  
**Subject:** Rezoning Templeton St Albert Town Infrastructure requirements

Hi Richard and Mark,

I have been engaged by Southern Ventures Property to review the infrastructure requirements for the rezoning of the Templeton Street, Albert Town site to low density residential (as part of the Stage 3 PDP Review). See attached the proposed rezoning plan. Richard, I am in receipt of your evidence on this submission.

I am following up on what is required in terms of water and wastewater servicing information to address the point that insufficient information was provided regarding the ability to service for the proposed rezoning. I note we have till the 6th April to respond to the evidence with additional information and I assume this isn't sufficient time to engage a QLDC modeller to formally hydraulically model the effects.

The site showing the extent of the rezoning from Templeton St in the west bounded by Kinnibeg and Carlow and extending towards the Cardrona River to the south is attached. The site is located in the Council's infrastructure scheme boundary. The proposed rezoning could allow up to 65 dwellings (maximum scenario).

With the existing QLDC infrastructure information available to me I can make the following assessment, see below. Is this sufficient or what level of information is required and can Council provide more details to base an assessment on? (Perhaps existing modelling data for water and wastewater and Kingston St PS details; details of the pumped flow, existing inflow and storage volumes etc).

- Water, can assume there is adequate pressure based on the site being similar elevation to the neighbouring serviced portion of Albert Town and FW2 can be provided based on it being provided to neighbouring portion of Albert Town (There is the ability to ring main the supply between Templeton/Wexford and or Kinnibeg if future modelling shows this is required)
- Wastewater, would expect to connect into the network at the south corner of Kinnibeg St which drains to Kingston St Pumpstation. I can check there is network capacity to get to the pumpstation and the site drains to the QLDC network under gravity.

Your evidence for this site is below for reference;

- **6.2 Water supply: infrastructure is available in the vicinity of the subject land, modelling of the network will need to be undertaken by the submitter prior to any rezoning to confirm capacity or identify necessary upgrades.**
- **6.3 Wastewater: Several possible wastewater connections are available to the site which flow to the Willow Terrace pump station. The capacity of the pump station will need to be confirmed by the submitter as able to take the expected flows before any rezoning can occur.**

6.4 Storm water: A natural water course runs along the southeast boundary of the subject site, with suitable treatment and attenuation storm water generated from the site could be discharged to this water course.

- 6.5 No upgrades to Council's infrastructure are programmed in this area however it is noted that the subject site is located within the existing Water Supply, Wastewater and Storm water scheme boundary.
- 6.6 From an infrastructure perspective I oppose the relief sought, until such time that sufficient information has been provided to ensure Council's infrastructure can service the subject site either as is (with appropriate connections) or with required upgrades that would need to be funded by the developer.

I'm available if it's easier to call to discuss.

Kind Regards,

Nichola Greaves  
Civil Engineer

**Ph: 03 445 0670 / 021 511 148**

**78 Ardmore Street, Wanaka**



[www.mcengineering.co.nz](http://www.mcengineering.co.nz)

**Hours of work: 7.30am – 2.45pm Tuesdays and Fridays**