Before the Independent Commissioner
Appointed by the Selwyn District Council

Under	the Resource Management Act 1991
In the matter of	a hearing on Plan Change 79 to the Operative Selwyn District Plan
	Birchs Village Limited
	Proponent

Statement of Evidence of Simon Ian Marshall

17 April 2023

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Qualifications and Experience

1 My full name is Simon Ian Marshall. I have a Bachelor of Engineering (Civil) from Auckland University in 2005 and I am a Chartered Professional Engineer.

2 I am a Senior Civil Engineer at Baseline Group Limited and have worked here for the past 6 months.

3 My experience includes 18 years as a civil engineer working in infrastructure design, consenting and supervision of land development projects. My previous projects have been based around the Northland, Auckland, Waikato and Canterbury regions working for Terra Group NZ and Airey Consultants. My previous work experience has predominantly included civil engineering services for rural, and low to high density residential projects up to 2,000 lots.

4 In preparing this statement of evidence I have considered the following documents:

(a) The officer comments provided by Mr. Murray England of Selwyn District Council for PC68[1] dated 17 December 2021;

(b) Summary Statement of Mr. Murray England of Selwyn District Council for PC68 dated 25 March 2022;

(c) PC68 Commissioner Minute dated 31 March 2022 – Response of Murray England;

(d) The officer comments provided by Mr. Murray England of Selwyn District Council for PC72[2] dated 15 December 2021;

(e) Engineering Servicing Report – Birchs Road, Prebbleton, prepared by Baseline Group, dated 12 March 2022;

(f) Geotechnical Assessment Report – Birchs Village Plan Change, prepared by Tetra Tech Coffey, dated 7 July 2022;

(g) The evidence of Mr. Andrew Jordan (Geotechnical), the evidence of Ms. Sally Elford (Planning), and the evidence of Mr Fraser Colegrave (Economic);

[1] PC68 Section 42A Report, Appendix A – Servicing, 17 December 2021

[2] PC72 Section 42A Report, Appendix A – Servicing, 15 December 2021

(h) Private Plan Change 79 by Birchs Village Ltd and NTP Development Holdings Ltd – Section 42A Report, dated 10 April 2023, prepared by Jonathan Clease on behalf of Selwyn District Council;

(i) Summary Statement of Hugh Blake-Manson of Waugh Infrastructure Management Limited for PC79, dated 2 April 2023.

Code of Conduct for Expert Witnesses

5 While this is not a hearing before the Environment Court, I confirm I have read the Code of Conduct for expert witnesses contained in the Environment Court of New Zealand Practice Note 2023 and I have complied with it when preparing my evidence. Other than when I state I am relying on the advice of another person, this evidence is within my area of expertise. 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

6 The scope of this evidence is to address the stormwater, wastewater, and water supply servicing for Plan Change 79 (**PC79**).

7 PC79 consists of approximately 37 hectares and is located to the South of the Prebbleton township on the corner of Hamptons and Birchs Road (**Site**). PC79 seeks to rezone the Site from Rural Inner Plains to Living Medium Density Prebbleton and Business 1.

8 I understand the overall yield of the Site varies from that at the time the original PC79 servicing report was prepared, which considered up to 1,500 residential dwellings. My evidence includes an updated assessment of potential servicing solutions considering these changes. As established by others, the new potential yield of the site can be considered under two scenarios as follows:

(a) Enabled Development: 856 residential allotments containing up to 2,568 residential units.

(b) Realistic Development: 527 residential allotments containing up to 1,581 residential units.

9 I consider it likely that development would proceed on site close to the Realistic Development scenario. Any further intensification with additional dwellings on a site would likely happen slowly over time and unlikely to occur on all sites in the foreseeable future. Developments of this size are also typically staged, which limits the growth and requirements for immediate infrastructure upgrades.

Stormwater

10 Flood mapping was undertaken by Selwyn District Council (**SDC**) to inform its Proposed District Plan Review in October 2020 and the results are available on Canterbury Maps. Mr. Clease has provided a figure from Canterbury Maps of the 1 in 500 year flooding at the Site[3]. The mapping shows flooding occurs on the Site for the 500-year Annual Return Interval (ARI) storm event. I have inferred the following from the flood mapping:

(a) There is a north-west to south-east fall over the PC79 Site which is the direction of the overland flow through the Site.

(b) There are two overland flow paths through the Site. The first is located near the northern boundary of 57 Hamptons Road and 142 Birchs Road. The second is located near the southern boundary of 212A & 214B Birchs Road and through 214A Birchs Road.

11 Canterbury Maps also contains imagery taken of previous flood events. The photos in the vicinity of the site indicates the most significant ponding occurs within 57 Hamptons Road, and at 214A & 214B Hamptons Road. Other localised ponding areas are located within the PC79 Site.

12 A revised Outline Development Plan (**ODP**) for PC79 has been produced to address this as follows:

(a) Provision for overland flow paths can be made within the edge treatment areas in the ODP. These can be designed to allow passage of the existing upstream flood flows through the Site.

(b) A utility reserve area for stormwater management at the southern corner of the Site. This area can be sized to accommodate options for stormwater attenuation and treatment.

(c) The orientation of the primary road network and green spine aligns with the topography of the Site. This allows these road areas to be used as overland flow paths to direct flood flows to a stormwater management area within the Site.

13 Tetra Tech Coffey undertook groundwater monitoring in April 2022 and Mr Jordan has provided evidence to support these reports. Their investigation found groundwater between 3.5 and 5.25 metres below ground level. Their report considers a conservative groundwater depth to be 3.5 metres below ground level.

[3] PC79 Section 42A Report, dated 10 April 2023, Paragraph 76

14 Well records on Canterbury Maps show the measured groundwater to be greater than 4 m below ground level.

15 Based on Mr. Jordan's findings and well data I can confirm there is sufficient depth to groundwater to allow for stormwater soakage across the Site.

16 Primary stormwater disposal can be to ground provided appropriate soakage rates are available, which are most appropriately determined at the time of subdivision consent to ensure they reflect the actual volumes of stormwater generated from the site.

17 Ponding can be managed on the Site though earthworks typically associated with subdivision projects. This includes forming the roads with the subdivided sections elevated above road level. This allows stormwater runoff to be directed away from houses, towards overland flow paths and stormwater management areas.

18 Secondary stormwater can be directed to a proposed stormwater management area with attenuation provided up to the 100-year (ARI) storm event. This would be located in the Utility Reserve area in the PC79 Outline Development Plan and provide mitigation for the development from flooding on Site and the downstream receiving catchment.

19 The servicing report for PC79 suggests that approximately 37,000 m^3 of stormwater storage would be required to satisfy attenuation requirements and will vary depending on the density of development proposed. With changes to the potential yield arising from changes in legislation, this area may need to be increased. However, given there is adequate soakage in the Site, and given this is a greenfield development allowing the opportunity to design and size a stormwater solution commensurate with the scale of development, a stormwater solution can be provided for on this Site. The officers report for PC79 did not have any concerns around the provision of stormwater services[4].

20 Resource Consent is required from Environment Canterbury under the Canterbury Land and Water Regional Plan prior to undertaking any discharge, and in my experience, this can be achieved subject to appropriate design. The final volume and area required for attenuation within the PC79 Site is most appropriately determined at the subdivision stage of the development process when the density scenario is confirmed to ensure the needs of the future development are met.

21 I consider an acceptable stormwater solution for the future development of the Site is available and can be provided.

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[4] Summary Statement of Hugh Blake-Manson – dated 2 April 2023, Paragraph 63

Wastewater

22 The Servicing Report provides expected peak wet weather wastewater flows for the PC79 Site. These flows have been updated based on a new version of Selwyn District Council's Engineering Code of Practice which was released in July 2022. Wet weather flows are used as they represent the worst-case scenario for wastewater flows within the pipe network and allow for leakage into pipes, manholes and gully traps in wet weather. The maximum peak wet weather wastewater flows expected in accordance with Part 6 of the updated code of practice are as follows:

(a) Realistic Development = 26 l/s (based on 527 houses)

(b) Realistic Development = 65 l/s (based on 1,581 houses – 3 houses per lot)

(c) Enabled Development = 106 l/s (based on 2,568 houses – 3 houses per lot)

A future densification factor was not applied where there are three households per lot as these scenarios already allow for maximum densification.

23 The Summary Statement of Mr. Blake-Manson dated 2 April 2023, provides an assessment of the capacity of the Pines Wastewater Treatment Plant and identifies there is sufficient capacity to provide for the wastewater disposal needs of PC79. Mr. Blake-Manson's statement for Plan Change 79 commented that the treatment plant has a capacity for a total of 60,000 people with future expansion plans to 120,000 people[5]. I agree with Mr Blake-Manson's assessment and consider that wastewater from PC79 can therefore be treated at the Pines Wastewater Treatment Plant in Rolleston

24 A new reticulated gravity wastewater network is able to provide wastewater connections to each lot in the PC79 Site. A new wastewater pump station will be required to serve the development as there is no existing gravity wastewater connection available that can be extended to serve the PC79 Site.

25 Presently wastewater in Prebbleton drains to the Prebbleton Terminal Pump Station which is located in Springs Road. This pump station conveys wastewater through a rising main to the Selwyn Road Pump Station in Rolleston. The Selwyn Road Pump Station collects wastewater from Prebbleton, Lincoln and Rolleston and conveys it to the Pines Wastewater Treatment Plant.

26 Mr Blake-Manson's Summary Statement mentions that there is limited remaining capacity in the Prebbleton Terminal Pump Station and that this capacity is

[5] Summary Statement of Hugh Blake-Manson – dated 2 April 2023, Paragraphs 43-46

anticipated to be reached between 2030 and 2036[6]. PC68 and PC72 have proposed upgrades to the pump station to maximise the capacity.

27 Mr England comments that the proposed upgrades to the Prebbleton Terminal Pump Station would be capable of accommodating 400 households from the PC79 area[7]. This is less than the realistic development scenario however would enable development within the PC79 area to proceed up to 400 households with the pump station capacity upgrades.

28 I have spoken to Mr. Blake-Manson regarding the current conveyance capacity and understand there are concerns with the capacity of both the Prebbleton Terminal Pump Station and the Selwyn Road Pump Station. There is further work being undertaken to confirm the future growth and wastewater servicing within the region however the solutions and timeframes around when additional capacity would be provided have not yet been confirmed.

29 Mr Blake-Manson's Summary Statement also mentions that there is wastewater modelling work being undertaken to confirm the capacity requirements for future growth which may be available from May 2023[8]. This would indicate and clarify the future infrastructure requirements for wastewater servicing.

30 To summarise the above, there is currently capacity available within the Prebbleton Terminal Pump Station with capacity expected to be reached (with upgrades to the pump station) in 2030 at the earliest. Constraints around current capacity consider PC68 and 72 being fully developed and intensified pursuant to the MDRS which instead would be expected to occur over time. This is also supported in the evidence provided by Mr Fraser Colegrave[9].

31 Potential solutions to address the wastewater servicing to the fully developed PC79 area are as follows:

(a) Connection to the existing Prebbleton Pump Station could be made for the PC79 area until the ultimate capacity of the pump station was reached. Once capacity had been reached there would be no further development available in Prebbleton until an additional pump station or any further wastewater upgrades were in place.

(b) Wastewater storage tanks could be provided on the Site to manage the peak flows from the PC79 area. Conveyance to the Prebbleton Terminal Pump

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[6] Summary Statement of Hugh Blake-Manson – dated 2 April 2023, Paragraphs 48 & 50

[7] PC68 Commissioner Minute 31 March 2022 – Response of Murray England

[8] Summary Statement of Hugh Blake-Manson – dated 2 April 2023, Paragraph 14

[9] Statement of Evidence of Fraser James Colegrave – dated 17 April 2023

Station would be controlled so that the PC79 area would only convey wastewater during off-peak periods. Details of this potential option would need to be considered further at the subdivision resource consent stage.

(c) Similar to the above option, the development could be serviced with a low-pressure sewer discharging to the existing network in Prebbleton. A low-pressure sewer has individual pumps and wastewater storage for each lot which provides a buffer to the peak flows. Additionally, low-pressure sewer systems are less prone to infiltration from surface water and groundwater which reduces the peak flow during wet weather events. These benefits in the peak flows would reduce the effects on the existing Prebbleton Terminal Pump Station. The operation of the individual pumps can be centrally controlled to avoid pumping when the Prebbleton Terminal Pump station is at capacity. Details of this potential option would need to be considered further at the subdivision resource consent stage.

(d) A new terminal pump station and rising main conveying wastewater to the Pines Wastewater Treatment Plant could be provided for the PC79 area. I've considered indicative costs of this per section, and I understand it is achievable financially, it but would represent a worst-case scenario for wastewater servicing. A closer indication of costs is currently being sought from SDC in relation to recent pump station projects undertaken. There is also the potential for coordination with adjacent developments to reduce the cost per lot further. A new pump station could also provide additional capacity that SDC is expected to need in the future so there is also the potential for a cost sharing arrangement to accommodate this.

32 The applicant is willing to work with SDC and adjacent developers to provide wastewater infrastructure upgrades to serve the PC79 and surrounding area.

33 Therefore, I have concluded there are a range of options to ensure the future development on the Site can be appropriately serviced for wastewater.

Water Supply

34 The site is not serviced by SDC's potable water network and existing houses are primarily supplied from privately owned bore supplies.

35 The publicly reticulated water supply network is proposed in the PC79 Servicing Report to be extended to supply water to the PC79 Site.

36 I have considered updated peak water supply design flow rates from the Servicing Report to include the new dwelling numbers expected. The peak water supply design flow rates based on SDC Engineering Code of Practice Part 7 are as follows:

(a) Realistic Development = 527 x 0.14 = 74 l/s

(b) Realistic Development = 1,581 x 0.12 = 190 l/s (3 dwellings per lot)

(c) Enabled Development = 2,568 x 1.1 = 282 l/s (3 dwellings per lot)

37 There are two 150 mm diameter water supply pipes in the vicinity of the PC79 Site that can be extended to provide water supply to serve the initial phases of development. The nearest connection is approximately 300 m to the north in front of 100 Birchs Road. The second connection is approximately 420 m to the west on Hamptons Road at the intersection with Taylor Place.

38 Selwyn District Council's master plan for the Prebbleton water supply notes a new 200 mm diameter watermain planned to be installed along Hamptons Road in front of the PC79 Site. A larger watermain may need to be installed to accommodate the Enabled Development scenario in the future should this eventuate.

39 Mr. Blake-Mansons comments state the maximum total water take consented from the Prebbleton scheme is 1,576,800 m^3 per year, with a maximum instantaneous take of 300 l/s[10]. A daily water take limit is not specified. In terms of demand, Mr Blake-Manson notes over the period of 1 July 2017 to 30 June 2021 the maximum demand was 5,352 m^3 per day. 742,348 m^3 was used in the 2020-2021 year equating to approximately 1.2 m^3 per connection per day with a residual capacity of 834,452 m^3/yr. The following expected annual demand from the PC79 area is as follows:

(a) Realistic Development = 527 x 1.2 = 230,826 m^3/yr

(b) Realistic Development = 1,581 x 1.2 = 692,478 m^3/yr (3 dwellings per lot)

(c) Enabled Development = 2,568 x 1.2 = 1,124,784 m^3/yr (3 dwellings per lot)

This demonstrates there is sufficient capacity in the annual water take limits (834,452 m^3/yr residual) to serve the PC79 area for the realistic development scenario. Should higher density development eventuate in the future then additional water sources can be provided.

40 Mr. England comments upgrades are proposed including additional water sources and pipe capacity upgrades to accommodate the future growth of Prebbleton[11].

[10] Summary Statement of Hugh Blake-Manson – dated 2 April 2023, Paragraph 23

[11] Officer Comments for PC72 (paragraph 12)

41 The instantaneous water take requirement could be accommodated either by additional water sources or the provision of storage to buffer the peak flows.

42 The water supply network can also be designed to ensure that the required firefighting flows and pressures are available. This can be achieved by providing watermains with a sufficiently large diameter to reduce the pressure loss through the PC79 area.

43 Given the above assessment I consider the PC79 Site can be fully serviced with adequate water supply from the reticulated network subject to anticipated upgrades to the existing water supply network.

Officer Report

44 A Summary Statement has been prepared by Hugh Blake-Manson for PC79 dated 2 April 2023. The statement generally concludes that servicing can be provided for water supply and stormwater however there are capacity concerns regarding the conveyance of wastewater between Prebbleton and the Pines Wastewater Treatment Plant. It is my opinion that there are solutions available for the conveyance of wastewater from the PC79 site in the short-medium term.

Submissions

45 Submissions have indicated concerns around high groundwater levels and ponding after storm events. The groundwater measurements taken by Tetra Tech Coffey and provided by Canterbury Maps indicate the groundwater levels within the Site are sufficiently deep.

46 Submissions indicate that flooding occurs during and after storm events. I agree that this occurs however it can be managed as part of the development of the Site by providing stormwater management areas and secondary flow paths.

47 Submissions have mentioned concerns regarding infrastructure servicing. It is my opinion that the PC79 area can be serviced with upgrades and/or additions to the existing infrastructure.

Conclusion

48 I conclude that, with respect to stormwater, wastewater and water supply services it will be practicable to develop the PC79 Site in accordance with the proposed Living Medium Density Prebbleton and Business 1 zoning. Water supply, wastewater disposal and stormwater disposal solutions exist that will not generate adverse effects on the receiving environment and any new infrastructure upgrades can be identified during the detailed design of any future subdivision and through the subdivision resource consent process.

49 The revised ODP now includes a narration that an application for subdivision shall include supporting infrastructure assessments with detailed design for the provision of sewer, and an assessment of any cumulative effects of demand on sewer infrastructure.

Simon Ian Marshall

Dated this 17th day of April 2023