BEFORE THE SELWYN DISTRICT COUNCIL

Under	the Resource Management Act 1991
In the matter of	Proposed Plan Change 72 to the Operative Selwyn District Plan: Prebbleton
And	Trices Road Rezoning Group (the Applicant)

BRIEF OF EVIDENCE OF LINDSAY MARSHALL BLAKIE (STORMWATER)

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QUALIFICATIONS AND EXPERIENCE

1. My name is Lindsay Marshall Blakie (BE Nat Res, M.E. Mgmt and CPEngNZ). I have 23 years experience as Civil Engineer and been a Charted Professional Engineer in Civil and Environmental practice fields for the past 16 years.

2. I am a Principal Engineer and Partner at e2 environmental Ltd and have worked at this employment for the past 13 years.

3. My relevant professional experience includes design of various land development projects, preparing environmental consenting for discharges, and design of civil services for various commercial developments. At the larger scale my experience includes managing the design of a 175 lot, 21ha subdivision in Woodend (2012-2014) and providing expert evidence on stormwater matters for a 12ha residential plan change development in Hanmer (2020).

4. I confirm that I have prepared this evidence in accordance with the Code of Conduct for Expert Witnesses Code of Conduct for Expert Witnesses contained in Part 7 of the Environment Court Practice Note 2014. The issues addressed in this statement of evidence are within my area of expertise except where I state that I am relying on the evidence or advice of another person. The data, information, facts and assumptions I have considered in forming my opinions are set out in the part of the evidence in which I express my opinions. I have not omitted to consider material facts known to me that might alter or detract from the opinions I have expressed.

5. I have been engaged by Trices Road Rezoning Group Ltd (TRRG) to provide Civil Engineering input for the proposed development, specifically on wastewater and stormwater matters.

6. I prepared a technical report for TRRG which was lodged with the application for Plan Change 72 (PC72) in November 2020. My original report was updated and relodged on 28 June 2021 in response to the Council Request for Further Information (RFI). The latest version of my assessment is attached as **Appendix A** to this evidence.

7. To inform the TRRG response to the RFI, dated 16 March 2021, I provided additional information on stormwater[1], wastewater servicing[2], and flooding[3]. The complete March RFI response is available on the Selwyn District Council website.

8. A flood hazard assessment was prepared by Zeean Brydon of e2 Environmental Ltd. I did not author the report, but supervised the matter, accept the findings, and consider it is within my

[1] RFI response prepared by Aston Consultants, 16 March 2021 at 28 available here: RFI-response-PC72.pdf (selwyn.govt.nz)
[2] Ibid at 27
[3] Ibid at 3

field of expertise. This assessment, dated 9 November 2020, is attached as **Appendix B** to this Evidence.

9. I do not depart from my assessments contained within **Appendices A and B**, but for completeness I have outlined my findings within this evidence.

SUMMARY STATEMENT

10. In summary, my servicing report (**Appendix A**) states that:
    a) The topography of Plan Change site grades naturally to the southeast where it concentrates in a farm drain on a neighbouring property.
    b) This drain is within the Huritini / Halswell River catchment and for stormwater discharges to surface water ECan requires attenuation of stormwater to the 50-year ARI 60 hr storm duration in this catchment.
    c) There are sandy clay bound gravels underlying the site. E2 environmental has tested these gravels at the proposed Stormwater Management Area (SMA) and I have determined the likely infiltration rates. I agree with Geotechnical Evidence which estimates that highest ground water table level is approximately 2.5m below surface.
    d) Discharging or soaking large volumes of stormwater runoff to land within a stormwater management area is not considered feasible. I recommend a discharge to surface water at this site.
    e) My calculations show that it is feasible to attenuate stormwater runoff within the proposed SMAs so that in the design event stormwater discharge rates are equal to or less than pre-development discharge rates.
    f) I conclude there will not be adverse effects on neighbour's drains or receiving surface waterways because peak flows experienced will not increase in the drain as a result of this development.
    g) The discharge of runoff to the east via the drain in the neighbouring Drinnan Property meets what I understand to be the definition of natural servitude, and in my opinion will not have cause and additional effect to their drain as compared to pre-development discharges.

11. As part of the March RFI response, I also stated that:
    a) It was feasible for the wastewater flows from 295 lots to drain to a new wastewater pumpstation (within the block) and pump via a new pressure main in Hamptons Road to a SDC Pumpstation at 612 Springs Road.
    b) Approximately 1.3km of high pressure rising main would need to be installed from the site to the gravity network near Springs Road / Hamptons Road to achieve a connection to SDC's sewer network.
    c) The stormwater discharge from the Plan Change site will be at pre-development discharge rates and not have any additional effect on the receiving drains in the Drinnan's property or downstream neighbouring properties.

d) As there is no change in concentration or peak flows experienced downstream the proposed discharges meet the principle of Natural Servitude and maintain existing flows of upstream properties.
e) A flood hazard assessment concluded there were no high hazard areas onsite, and a low risk to people (pedestrians) in a 1 in 500 yr ARI event.
f) I anticipate that the existing flood hazards can be mitigated during the detailed design phases of this development.

12. To further inform this evidence I have undertaken some additional calculations and confirm it is feasible to reduce the catchment discharging to optimise/reduce the footprint of the stormwater management area. With the proposed Living Z zoning approximately 7.7 – 8 hectares of roofs could be discharged to land within lots. This would reduce the overall catchment runoff coefficient and reduce the resulting stormwater runoff volumes to be "managed" at the SMAs – a reduction in predicted SMA volume from 10,000m^3 to less than 6,000m^3, which is less than pre-development peak discharge rates. This assumes a combination of rain attenuation tanks and soak holes are used to offset the low infiltration rates likely in some areas of the site. My calculations are comparative estimates only and will need to be further refined using stormwater modelling software at subdivisions design stage. These figures have assumed a density of 12hh/ha and demonstrate that there are on-site options available that will assist in reducing the total SMA volume – how this is implemented will need to be assessed at the detailed design stage.

13. A flood hazard assessment was prepared by E2 environmental Ltd (**Appendix B**). The report concluded there were no high hazard areas onsite, existing flow paths generally align with the proposed road networks and that there is a low risk to people (pedestrians) in a 1 in 500 yr ARI event as modelled flood depths are generally shallow.

14. It is uncertain if the Drinnan's land is to be included in the PC72 but if it were, it is likely to drain stormwater into Hamptons Road and possibly into the SMA servicing PC72 (as it is locally on a high point).

RESPONSE TO SUBMISSIONS

15. I have reviewed the submissions filed on PC72 and respond to those relating to infrastructure capacity. I discuss the relevant submissions below (categorising submissions under headings where possible):

Availability of Infrastructure

a) Various submitters[4] raise concern that additional infrastructure services will be required. It is acknowledged that additional infrastructure will be required, but technical solutions are available to service the development. I also refer to the Evidence of Mr Fox who provides assessment of key aspects of servicing for the development at both Living Z zone (approximately 12 dwellings/ha) and at Living 3 zone density (approximately 2 dwellings/ha).[5] There are various options that will need to be explored in greater detail, but infrastructure capacity is confirmed for this site.

Cost of Infrastructure

b) Hamish Crombie (PC72-0005) and Andrew Dollimore (PC72-0027) submit that cost of infrastructure should fall to the developer. I agree with the summation of Mr Fox[6] and the author of the 42A report[7] that the cost of providing infrastructure will be addressed at the time of development. It is appropriately assessed through development contributions or private agreement with Council.

Stormwater Quality

c) Matthew Crozier (PC72-0007) raises concern that the stormwater egress to Crosslands drain will contain contaminants. I refer to Fiona Aston's Planning evidence that the effects of contaminants discharged to the environment will be no more than minor.[8] I also understand that as part of the ODP stormwater management (and potential effects on ecological values) will be addressed at design stage (See Operative District Plan Rule 12.1.4.43). Mitigation Measures can also be implemented during construction to ensure that potential adverse effects from all engineering works are mitigated (See Operative District Plan Rule 12.1.4.46). I agree with the summation provided by Mr Fox[9] and the author of the 42A Report that effects from construction can be adequately addressed at the time of development (i.e. through consent conditions).

[4] Katrina Studholme (PC72-0001); Hamish Crombie (PC72-005); Matthew Crozier (PC72-007);Timothy Studholme (PC72-0012); Greg Orange (PC72-0013); Ali Orange (PC-0014); Laura Chisholm (PC72-024); Angus Chisholm (PC72-0025);Elizabeth Bradley (PC72-0030); Allan & Olwyn Mulligan (PC72-0040&0041);
[5] Evidence of Mr Fox at [11]-[26] and [43]-[47]
[6] Evidence of Mr Fox at [42](b)
[7] 42A Report at [83]
[8] Evidence of Mrs Aston at [182]
[9] Evidence of Mr Fox at [42](c) and (d) and 42A Report at [127]

RESPONSE TO THE 42A REPORT

16. I have reviewed Mr Fox's response to the concerns raised within the 42A Report. The 42A Report largely confirms the assessments undertaken by Fox & Associated and E2 consulting limited. Where there is disagreement I discuss below.

Staging of Consents (Regional and District)

17. I agree with Mr Fox that regional consents should not be required prior to subdivision consents being granted. From my experience, it is beneficial to consider the design of a development holistically which may require District Council and Regional Council consents being progressed conjunctively. I do not support the recommendation of the 42A Author in relation to staging regional and district Council consents. From experience, it is likely that changes and variations would be needed to ECan consents if these are obtained first.

Amendments to the ODP

18. The 42 Author has recommended adopting changes suggested within Urban Design and Traffic Peer Reviews Assessment. I have reviewed the updated ODP's attached as Appendix A3 and Appendix A4 to Mr Fox's evidence, and comment as follows:

    a) I am comfortable that the roading realignments, and inclusion of the Tuff land under the now preferred full Living Z rezoning option (A3 to Mr Fox's evidence) will not alter my earlier assessments with respect to drainage to the SMA.
    b) An additional indicative shared pedestrian/cycle path (off road) has been located in northwest corner of site. While I understand this is primarily to provide amenity and connectivity through the site, it will also serve as stormwater flow path necessary to direct stormwater from this location to the SMAs.
    c) Under the full Living 3 rezoning options (A4 to Mr Fox's evidence) the scale of the SMAs will reduce as there will be less collection from roading and roofs within the PC72 site. The SMAs will still be required (rather than drainage to ground) and the indicative location of the SMAs will remain the same.
    d) My conclusions on wastewater conveyance/ route/ system under both Living 1 and Living 3 zone options remains unchanged.

CONCLUSION

19. I consider that PC72 and the updated ODPs provided in Mr Fox's evidence are appropriate subject to further detailed modelling being carried out prior to subdivision to appropriately locate and confirm the extent of the SMA's. As noted above, resource consents will be obtained from ECan to authorise the stormwater discharge.

14 January 2022

Lindsay Blakie