

Before an Independent Hearings Panel
appointed by Christchurch City Council

under: the Resource Management Act 1991

in the matter of: the hearing of submissions on Plan Change 14 (Housing
and Business Choice) to the Christchurch District Plan

and: **Cashmere Land Developments Limited**
Submitter 257

Memorandum of counsel on behalf of the Cashmere Land
Developments Limited as to scope of the Canterbury Regional
Council's submission on the Port Hills Stormwater Qualifying
Matter

Dated: 7 May 2024

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MAY IT PLEASE THE INDEPENDENT HEARINGS PANEL

INTRODUCTION

- 1 This memorandum of counsel is filed on behalf of Cashmere Land Developments Limited (*CLDL*) (submitter #257).
- 2 At *CLDL*'s hearing presentation on 18 April 2024, there was some confusion as to the series of events leading to the final position taken by *CLDL*. The purpose of this memorandum is to clarify that background and position for the Independent Hearings Panel (*Panel*).
- 3 There are two issues that we wish to highlight at the outset:
 - 3.1 the Canterbury Regional Council (*ECan*) submission seeking a qualifying matter to address stormwater in the Port Hills (*Port Hills Stormwater QM*) is not within the scope of PC14 as affected persons did not have a reasonable opportunity to participate; and
 - 3.2 regardless, the evidence produced by *ECan* to support the Port Hills Stormwater QM is wholly insufficient in the context of the Amendment Act.

Background

- 4 *CLDL*'s submission relates to land identified in the operative Christchurch District Plan as the Cashmere and Worsleys Outline Development Plan (*ODP*), known as 'Cashmere Estate' (*CLDL site*).
- 5 Following the exchange of rebuttal evidence, the application of two qualifying matters (*QM*) to the *CLDL* site was made apparent for the first time. In particular, the Port Hills Stormwater QM proposed by *ECan* was not considered to be relevant to the *CLDL* site until *CLDL* reviewed the rebuttal evidence of Mr Kleynbos for CCC.¹ At that stage, the formal evidence and rebuttal evidence exchange period had passed.
- 6 On 27 October 2023 counsel was instructed by *CLDL* and contacted Mr Carranceja for CCC raising *CLDL*'s concerns. A copy of that email and Mr Carranceja's response is included in the timeline at **Appendix A** to this memorandum.
- 7 Ms Pia Jackson attended planning conferencing on the following issues:²
 - 7.1 Low Public Transport Access Area QM (*LPTAA QM*) – agreed on the applicability of the *LPTAA QM* to the *CLDL* site if it

¹ Dated 16 October 2023.

² See Ms Pia Jackson's summary statement dated 18 April 2024.

should be applied, but disagreed on the application of the LPTAA QM in principle.

7.2 Port Hills Stormwater QM proposed by ECan – disagreed on the basis for the Port Hills Stormwater QM and disagreed on its applicability to the CLDL site.

8 Ms Buddle’s summary statement, dated 22 April 2024, includes a timeline in relation to the Port Hills Stormwater QM. Appendix A to this memorandum sets out a timeline from CLDL’s perspective in relation to the Port Hills Stormwater QM and the LPTAA QM.

9 CLDL’s overall position is that neither the LPTAA QM nor the Port Hills Stormwater QM should apply to the CLDL site.

Scope of ECan’s submission

10 Counsel for ECan explained during its hearing presentation on 24 April 2024 that scope considerations for PC14 are slightly different because of clause 99(2) of the Amendment Act. We acknowledge that the Amendment Act provides the IHP with much wider powers to make recommendations than the typical Schedule 1 plan change process. However, submissions must still be “on” the plan change.³

11 We have previously addressed matters of scope in our memorandum dated 21 December 2023.⁴ Below we emphasise particularly relevant points in the context of the proposed Port Hills Stormwater QM.

12 The Court in *Clearwater* established a two-limb test (our emphasis):⁵

1. A submission can only fairly be regarded as “on” a variation if it is addressed to the extent to which the variation changes the pre-existing status quo.

2. But if the effect of regarding a submission as “on” a variation would be to permit a planning instrument to be appreciably amended without real opportunity for participation by those potentially affected, this is a powerful consideration against any argument that the submission is truly “on” the variation.

³ Clause 6, Schedule 1 of the RMA applies to the IPI process.

⁴ *Memorandum of counsel on behalf of LMM Investments 2012 Limited (and various other clients) regarding scope of Plan Change 14*, dated 21 December 2023.

⁵ *Clearwater Resort Ltd and Canterbury Golf International Ltd v Christchurch City Council HC Christchurch AP34/02, 14 March 2003* at [66].

13 The Court elaborated that (our emphasis):⁶

It is common for a submission on a variation or proposed plan to suggest that the particular issue in question be addressed in a way entirely different from that envisaged by the local authority. It may be that the process of submissions and cross-submissions will be sufficient to ensure that all those likely to be affected by or interested in the alternative method suggested in the submission have an opportunity to participate. In a situation, however, where the proposition advanced by the submitter can be regarded as coming out of "left field", there may be little or no real scope for public participation. Where this is the situation, it is appropriate to be cautious before concluding that the submission (to the extent to which it proposes something completely novel) is "on" the variation.

14 The Court in *Motor Machinists* elaborated on the two-limb test established in *Clearwater*. In relation to the second limb (our emphasis):

A core purpose of the statutory plan change process is to ensure that persons potentially affected, and in particular those "directly affected", by the proposed plan change are adequately informed of what is proposed. And that they may then elect to make a submission, ... thereby entitling them to participate in the hearing process. It would be a remarkable proposition that a plan change might so morph that a person not directly affected at one stage ... might then find themselves directly affected but speechless at a later stage by dint of a third party submission not directly notified as it would have been had it been included in the original instrument. ⁷

To override the reasonable interests of people and communities by a submissional sidewind would not be robust, sustainable management of natural resources.⁸

15 ECan's legal submissions state that the "*Regional Council's original submission raised concerns about intensification on the Port Hills, because of lack of stormwater attenuation capacity and sediment loss into the City's waterways...*".⁹ The relevant extract from ECan's original submission is included in the timeline at Appendix A to this memorandum. While ECan raised stormwater concerns in a general sense, it did not specify the corresponding QM that was sought and it in no way alerted CLDL of its applicability to the CLDL site.

⁶ At [69].

⁷ *Palmerston North City Council v Motor Machinists Ltd* [2013] NZHC 1290, [2014] NZRMA 519 at [77].

⁸ At [82].

⁹ Paragraph 5

- 16 The Port Hills Stormwater QM proposed by ECan has only arisen through ECan's evidence and CCC's rebuttal evidence. There has been no opportunity for submitters, including CLDL, to formally engage with and address ECan's proposal as it was not sufficiently developed until the evidence stage. Even then, CLDL only realised it was intended to apply to the CLDL site after reviewing the rebuttal evidence of Mr Kleynbos for CCC.
- 17 We highlight paragraph 72 of the Hearings Procedures which state (our emphasis):
- Regardless of whether providing expert or lay evidence, submitters must not extend beyond the scope of their original submissions in terms of the alterations to the proposed plan change that they seek in their written, tabled or verbal evidence.
- 18 ECan's attempt to introduce the Port Hills Stormwater QM through evidence alters PC14 in a manner that goes beyond the scope of its original submission.
- 19 Counsel for ECan considers that the Port Hills Stormwater QM was fairly and reasonably raised in ECan's submission and also throughout the PC14 hearing process. The timeline at Appendix A to this memorandum demonstrates why this is not the case – for example the expert conferencing for infrastructure referred to in ECan's legal submissions took place prior to the filing of rebuttal evidence (i.e. before CLDL appreciated the relevance of ECan's proposal to the CLDL site).
- 20 The expert conferencing specifically relating to the Port Hills Stormwater QM took place after evidence and rebuttal evidence, and only involved planning experts. As discussed below, other technical disciplines, particularly engineering, are highly relevant to the assessment of ECan's proposal to introduce a new QM.
- 21 It is critical to the proper administration of processes under the RMA to provide real opportunity for the public to participate where they are potentially affected by a proposal. CLDL was aware that significant changes might result from PC14; it chose to be involved in the process by lodging submissions, reviewing publicly notified submissions and further submissions and provided expert planning evidence.
- 22 But it was never given a real opportunity to participate in relation to the Port Hills Stormwater QM, which is entirely inappropriate given it is directly affected by the proposal. The invitation to participate in expert conferencing was too little, too late. CLDL (and other affected submitters) was given no opportunity to analyse ECan's proposal in any great detail, nor to file technical evidence. CLDL's

involvement in matters directly relevant to its site has therefore been prejudiced.

- 23 We observe Commissioner McMahon’s comments during ECan’s presentation on 24 April 2024 and consider that there is a fairness and natural justice issue that arises if the Panel accepts ECan’s proposal in relation to the Port Hills Stormwater QM. This is particularly problematic for a process that has no appeal rights.

Inadequacy of ECan’s evidence

- 24 Through the course of the PC14 hearings, the Panel have clearly articulated to CCC and submitters that QMs must be justified on the basis of sufficient evidence. ECan’s submission did not propose a QM for stormwater matters in the Port Hills, let alone justify one with evidence in accordance with the relevant sections of the Amendment Act for new qualifying matters under sections 77I, J and L.

- 25 ECan’s evidence sought to ‘back-fill’ its proposal, and still did not include site-specific analysis at the level of detail required to apply a QM to the CLDL site.¹⁰ When compared to the level of analyses undertaken by CCC and other submitters (for example we refer to the comprehensive evidence filed in support of the Airport Noise QM), the justification for imposing the Port Hills Stormwater QM is entirely deficient.

- 26 We refer to the legal submissions filed on behalf of Red Spur Limited (*Red Spur*) dated 8 November 2023 and agree with the concern “*that the timing of introduction of the Port Hills Stormwater QM has not enabled it to be appropriately tested...*”.¹¹ Similarly to Red Spur, CLDL was not in a position to provide evidence in relation to the Port Hills Stormwater QM through the course of evidence and rebuttal evidence exchange.

- 27 Our legal submissions dated 11 April 2024 include a statement from **Mr Michal Glatz**, a civil engineer, in relation to stormwater matters. Mr Glatz’s statement is reproduced at **Appendix B** to this memorandum. This technical expertise is crucial to understand stormwater issues generally and specifically to the CLDL site. It has not been tested by the Panel hearing from and questioning Mr Glatz.

- 28 Legal submissions filed on behalf of Carter Group for the Central City and Commercial Zones hearing¹² outline the correct approach to

¹⁰ Section 77L(c).

¹¹ At paragraph 22.

¹² Legal submissions on behalf of Cater Group Limited in relation to the Central City and Commercial Zones hearing dated 24 October 2023 from paragraph 27.

implementing the MDRS and assessing QMs under the Amendment Act. In summary:

- 28.1 Intensification is the starting point;
 - 28.2 Proper evaluation, based on evidence, of QMs should then follow; and
 - 28.3 The planning response to QMs should be only what is necessary to accommodate them.
- 29 Mr Glatz concludes that intensification on the site will only have a minor impact on stormwater quantity. On this basis, it is submitted that the threshold for establishing the Port Hills Stormwater QM in sections 77I, J and L is not met in relation to the CLDL site - ECan's evidence does not properly evaluate the Port Hills Stormwater QM for the CLDL site and the proposed planning response is not necessary for the CLDL site.

CONCLUSION

- 30 CLDL's position with respect to the Port Hills Stormwater QM is that:
- 30.1 it is not within the scope of matters reasonably and fairly raised through PC14; and
 - 30.2 it is not justified on the evidence.

Dated 7 May 2024



J Appleyard / A Lee
Counsel for Cashmere Land Developments Limited

APPENDIX A

Event	Date	Description
CLDL's submission filed	1 May 2023	<p>CLDL's submission sought to remove the limitation on the number of allotments (380) that could be created within the residentially zoned portions of the site.</p> <p>At the time of making its submission, CLDL was aware of four QMs that were proposed to apply. CLDL does not oppose any of those QMs.</p>
ECan's submission filed	12 May 2023	<p>ECan's submission addresses stormwater infrastructure generally and requests that upper Halswell River catchments are covered by a QM to prevent further intensification due to inadequate infrastructure. CLDL do not consider that the CLDL site is within the Halswell River Catchment based on its review of CCC mapping documents.</p> <p>ECan's submission broadly raised a concern with stormwater management in the Port Hills (relevant extract copied below) but did not seek to apply a QM to the CLDL site directly.</p> <p><i>CRC consider that the Christchurch District Plan should take into account Trangmar's erosion classes and exclude "severe" erosion class land from further subdivision and development...</i></p> <p><i>Excluding further subdivision on "severe" erosion class land would avoid additional sediment entering waterways from the land most likely to erode as a result of rainfall events. CRC consider that medium or high density development on the Port Hills would result in increased stormwater runoff as there is little attenuation capacity in some catchments. This could lead to more sediment loss into Cashmere Stream and the Heathcote/Ōpāwaho River and lead to gross sedimentation of waterways and the coast as well as stormwater networks and down-slope residents. Most of the Port hills are inside the High Soil Erosion Risk Zone under the Canterbury Land and Water Regional Plan. If such development occurs on these hills, there will be a need to require on-site attenuation. CRC understands that sedimentation is captured under Christchurch City Council bylaws, building consents, and in resource consent conditions, but notes that this is an opportunity to more holistically and strategically address the issue rather than relying on these other management mechanisms.</i></p>

Section 42A reports	11 August 2023	<p>Mr Kleynbos and Mr Bayliss refer to a "Residential Hills Precinct".</p> <p>Mr Kleynbos seeks to apply the LPTAA to the CLDL site, although this is not shown at Appendix H to his report. Furthermore, paragraph 7.1.113 of Mr Kleynbos's report seeks to apply the precinct approach for LPTAA to areas zoned Residential Hills in the notified version of PC14. The CLDL site was zoned Future Urban in the notified version and therefore the LPTAA (and associated precinct approach) was not understood to apply.</p>
CLDL tabled evidence of Ms Pia Jackson (planning)	19 September 2023	<p>Ms Jackson noted general agreement with Council's Section 42A reports, subject to further amendments to better reflect the intent of CLDL's submission.</p> <p>Ms Jackson acknowledged she had read the Section 42A reports relating to qualifying matters. Ms Jackson did not understand there to be QMs materially impacting the site. In particular, Ms Jackson did not understand the Residential Hills Suburban Density Precinct (LPTAA precinct approach as explained above) applied to the CLDL site.</p>
ECan evidence of Ms Meg Buddle (planning)	20 September 2023	<p>Ms Buddle seeks to apply the Port Hills Stormwater QM over "<i>all of the residential area located on the Port Hills or within the Halswell Catchment.</i>" Ms Buddle's appendices include high level maps and planning analyses, but none specifically in relation to the CLDL site.</p>
Infrastructure expert conferencing	27 September 2023	<p>CLDL did not take part in this expert conferencing as it was not aware that a Port Hills Stormwater QM was proposed to impact the CLDL site.</p>
Infrastructure JWS	5 October 2023	<p>The experts appear to have agreed that most CCC stormwater facilities are upstream of development on the Port Hills. This is incorrect for the CLDL site, which is upstream of the CCC stormwater basins. Again, CLDL was not aware that it needed to take part in conferencing at this time.</p>
CCC rebuttal evidence of Mr Kleynbos	16 October 2023	<p>Mr Kleynbos's rebuttal evidence clarifies that the LPTAA precinct approach is intended to apply to the CLDL site.</p>

		Mr Kleynbos also acknowledges the potential applicability to the CLDL site of the Port Hills Stormwater QM introduced in Ms Buddle’s evidence. Mr Kleynbos proposed an alternative planning response to that contained in Ms Buddle’s evidence.
Counsel for CLDL email counsel for CCC	27 October 2023	<p>From: Jo Appleyard <Jo.Appleyard@chapmantripp.com> Sent: Friday, October 27, 2023 3:09 PM To: Cedric Carranceja <cedric.carranceja@buddlefindlay.com> Cc: Annabel Hawkins <Annabel.Hawkins@chapmantripp.com> Subject: FW: PC14 - serving of Council's rebuttal evidence [BUD-LIVE.FID1276997]</p> <p>Hi Cedric,</p> <p>As discussed I have been contacted by Cashmere Land Developments Limited who have land on the Port Hills.</p> <p>As much as I can glean the client lodged submissions in support of PC14 which zoned the land for Future Urban with a density control overlay only and no LPTAA.</p> <p>There was then the s42a and I understand there was a discussion with Ike which led to the client understanding that Ike was going to introduce a Hills Density Precinct which wouldn't be subject to LPTAA.</p> <p>They have tabled evidence but didn't ask to be heard as they thought they all agreed.</p> <p>They have now looked at Ike's rebuttal which is different to what was notified and different to the s42a as it says the land should be part of the LPTAA even though it wasn't part of it in the mapping and a new Stormwater QM should be introduced.</p> <p>Ike's rebuttal arriving so late raises some significant natural justice issues and I'm going to have to try and jump in at very late notice and cross examine him and now apply to be heard unless we can work out a sensible solution.</p> <p>Could you talk to Ike and see if the planners could have a conversation next week to see if they are as far apart as they seem and whether Ike has changed his position late in the piece and perhaps we could agree that we could defer my cross examination of Ike on that issue and you would agree to my client seeking leave to be heard a bit later on in the process if needed after they have an initial chat? I don't fancy mucking up next week's schedule by applying late to cross examine Ike and adding extra time into that schedule and then asking for my client to be heard after all as they believe Ike has changed his mind late in the piece.</p> <p>Hopefully this all makes sense to Ike.</p>
Counsel for CCC respond	27 October 2023	<p>From: Cedric Carranceja <cedric.carranceja@buddlefindlay.com> Sent: Friday, October 27, 2023 3:22 PM To: Jo Appleyard <Jo.Appleyard@chapmantripp.com> Cc: Annabel Hawkins <Annabel.Hawkins@chapmantripp.com> Subject: RE: PC14 - serving of Council's rebuttal evidence [BUD-LIVE.FID1276997]</p> <p>Hi Jo,</p> <p>Thank you for your phone call and email. I'll raise this with Ike and see if the planners can have a discussion about this.</p> <p>Kind regards Cedric</p> <hr/>
Mr Michael Patterson (Inovo) contacted Mr Kleynbos by email	2 November 2023	Mr Patterson sought to clarify Mr Kleynbos’s position in rebuttal evidence.

Mr Kleynbos invitation to attend conferencing for Port Hills Stormwater QM	14 November 2023	Mr Kleynbos invited a number of parties to participate in expert conferencing the Port Hills Stormwater QM. Ms Jackson agreed to attend for CLDL.
First planning expert conferencing on new Port Hills Stormwater QM	22 November 2023 (JWS on 11 December 2023)	<p>It was agreed that further investigation should be undertaken regarding a certification approach for earthworks undertaken on the hills to ensure that appropriate Erosion and Sediment Control measures were being implemented.</p> <p>Further investigation should also be undertaken regarding the application of a maximum 50% combined site coverage and impervious surfaces.</p> <p>The appropriate means to respond to the issue regarding loess soils and associated sedimentation/erosion remains outstanding. A certification process was considered to ensure that erosion, sediment control methods etc. are implemented but not to necessarily limit development.</p> <p>Ms Buddle (ECan) and Mr Langman (CCC) considered that limiting development and imposing an impervious site coverage maximum were appropriate to manage stormwater. Ms Jackson did not (and does not) agree.</p>
Planning expert conferencing on Cashmere Worsleys ODP area	23 November 2023 (JWS on 4 December 2023)	<p>The experts agree on removal of the 380 lot limit and ODP. CLDL does not oppose the 650m² minimum lot size proposed for the site.</p> <p>Mr Kleynbos recommends a narrowed scope of the proposed LPTAA QM in some areas, but still supports limiting MDRS outside of accessible areas through the use of QMs. Ms Jackson considers that walking distance alone does not determine accessibility. The LPTAA QM also ignores the benefits of providing increased housing density close to public open space.</p> <p>The experts agree that, should the LPTAA QM apply at all, it only applies to 235 and 245 Worsley's Road and that MDRZ applies on the balance of the residential areas.</p>

		Mr Kleynbos considers that this agreement could still be superseded by the Port Hills Stormwater QM proposed by ECan.
CLDL withdraw from further conferencing on Port Hills Stormwater QM	5 April 2024	CLDL's withdrawal is not because it is not concerned with the Port Hills Stormwater QM. CLDL disagree with ECan and CCC's positions and consider expert input from other disciplines (i.e. not just planning) is required before any progress can be made.
CLDL attend PC14 hearing	18 April 2024	Ms Jackson provided summary statement confirming CLDL's position.
ECan attend PC14 hearing	24 April 2024	Ms Buddle provided summary statement confirming ECan's position, including a timeline and map of where the Port Hills Stormwater QM is proposed to apply.

APPENDIX B

INTRODUCTION

- 1 My full name is Michal Glatz. I am a Senior Civil Engineer at Inovo Projects Limited.
- 2 My qualifications include a Master's Degree in Civil Engineering (MCEng) from the VSB Technical University in Ostrava, Czech Republic (Washington Accord equivalent), and I am a Member of Engineering New Zealand (MEngNZ).
- 3 I have 11 years' experience as a civil engineer working on a range of infrastructure and land development projects.
- 4 This statement relates to the relief sought by Cashmere Land Developments Ltd (*CLD*) on proposed Plan Change 14 to the Christchurch District Plan (*PC14*) and the Port Hills Stormwater Qualifying Matter (*Stormwater QM*) proposed by Canterbury Regional Council (*ECan*).
- 5 I have been asked to comment on the technical basis for provisions relating to stormwater management sought through PC14, specifically in relation to the Cashmere Estate site.

CODE OF CONDUCT

- 6 Although this is not an Environment Court hearing, I note that in preparing my evidence I have reviewed the Code of Conduct for Expert Witnesses contained in Part 9 of the Environment Court Practice Note 2023. I have complied with it in preparing my evidence. I confirm that the issues addressed in this statement of evidence are within my area of expertise, except where relying on the opinion or evidence of other witnesses. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

CASHMERE ESTATE – STORMWATER

- 7 On the matter of stormwater characteristics, Mr Norton stated in para. 23 of his evidence that:

"The below ground assets of sumps, pipes, manholes and pump stations has a limited, fixed capacity that can only cope with the more frequent rainfall events. The below ground network is typically sized to convey a 20% Annual Exceedance Probability (AEP), or "5-year" rainfall event. A 20% AEP event 20% chance of occurring each year.
- 8 It is important to highlight that Cashmere Estate subdivision consent (RMA/2015/3550/F) condition 8.7 specifies that the primary stormwater reticulation network within hillside catchments shall be designed to convey at minimum the critical 5% Annual Exceedance Probability (AEP), or "20-year" rainfall event.
- 9 To provide some context, a primary network designed for a 5-year rainfall event can convey approximately 50% of the flow generated by a 50-year rainfall event and a primary network designed for a 20-year rainfall event can convey approximately 80% of flow generated by a 50-year event. This reduction in overland flows will generally reduce the amount of scour, which will result in a decrease in the mobilisation of fine

grained highly dispersive sediment. This in turn will have a beneficial effect on stormwater infrastructure and receiving waterbodies.

- 10 Ms Newlands also stipulated in para. 31 of her evidence that the primary network/system on the Port Hills is designed to cater for the more frequent rainfall events up to and including the 20% AEP rainfall events. However in line with paragraph 9 above, this is not factually accurate concerning the Cashmere Estate development.

- 11 I agree with the statement of Ms Newlands in para. 22 of her evidence that:

"An increase in the number of houses and building coverage will result in an increase in impervious area, and a reduction in vegetation. This reduces the amount of rain that can infiltrate into the ground and will therefore result in an increase in the quantity of stormwater discharged from the intensified sites.

However, it is also important to clarify that loess material is not very permeable in the first place.

- 12 Laboratory testing was undertaken in December 2019 on a loess sample sourced from Cashmere Estate. The results of this testing confirmed that the hydraulic conductivity of site won loess was 3.0×10^{-9} m/s (or 0.01 mm/hr), which fits into the clay category and confirms very low permeability.

- 13 This testing correlates with Mr Norton's opinion related to stormwater quantity, that the scale of impervious surfaces on hill sites is less of a concern when managed comprehensively across a site and discharged into the built network (also see rebuttal evidence of Mr Kleynbos at para. 40).

- 14 Ms Newlands stated in para. 76 of her evidence:

"Whilst all hill sites are required to provide stormwater storage, the design developed for the Onsite Stormwater Mitigation Guide is based on short intense storms (up to 6 hours duration). The designs are not likely to effectively attenuate discharges for storms with longer durations, and lesser intensities. In addition, there are physical limitations to the positioning of these systems on hills sites. In some situations, it is too difficult to capture all impervious areas, and to direct it to a stormwater storage device (e.g. a rain tank).

In relation to the Port Hills loess areas, I believe that it is important to recognise that, in longer-duration storms (6+ hours), the topsoil layer becomes saturated. Given the low permeability of loess, the peak runoff from the undeveloped land is only marginally lower than runoff from land developed to both residential hills zone (RHZ) level and residential medium density (RMDZ) level.

- 15 To further quantify stormwater quantity implications, in longer duration storms (6h and 12h) between undeveloped land and both residential hillside zone catchment and residential medium-density zone catchment, I conducted a high-level dynamic 12d Model analysis (ILSAX 2 method) where I tested both 5% and 2% AEP storm events over 5ha hillside loess catchments (Undeveloped, RHZ and RMDZ).

- 16 As part of this analysis I concluded that, in the 6 hours and 2% AEP scenario, the peak stormwater runoff increased by 3.5% between the undeveloped scenario and RHZ scenario, and by a further 2% between RHZ scenario and RMDZ scenario.
- 17 As part of this analysis I also concluded that, in the 12 hours and 2% AEP scenario, the peak stormwater runoff increased by 3% between the undeveloped scenario and RHZ scenario and by a further 2% between RHZ scenario and RMDZ scenario.
- 18 Based on the above I believe that intensification will only have a minor impact on stormwater quantity. Results of my high-level analysis for longer duration storms (6h and 12h) can be provided if that would assist.
- 19 I partially agree with the statements of Ms Newlands in paragraphs 74 and 75 of her evidence:

It is not possible for me to quantify the effects on sedimentation that the intensification will result in as; the actual development scale and rate is unknown, and there are many variables associated with the mobilisation and discharge of sediment.

Whilst the impact cannot be accurately quantified, any intensification and associated disturbance of hillside properties will result in an increase in the mobilisation of fine grained highly dispersive sediment, which will in turn have an adverse effect on stormwater infrastructure and receiving waterbodies.

- 20 However, I consider that this statement is only relevant to construction phase discharge from infill developments.
- 21 Stabilisation of loess hillside catchments with impervious surfaces will generally have a beneficial effect on the quality of operational phase discharge stormwater entering the receiving water body (post development). This is achieved by stabilising the surface above the loess material and by reducing overland flows by conveyance of up to 20-year storm events via piped network.
- 22 Additionally secondary flows (conveyance network designed for 50-year storm events however also managing bigger events) are also conveyed into receiving water bodies via road kerbs, channels, swales and through stormwater treatment facilities (e.g., first flush swales, ponds, basins, wetlands) which further manage and enhance water quality.
- 23 It is worth noting that, as part of greenfield developments, designers need to consider the need for scour protection for proposed overland flow channels. Appropriately designed scour protection will also have a beneficial effect on water quality.
- 24 It is also important to reinforce that sites larger than 5,000m² (i.e. Cashmere Estate development) require specific engineering design of their stormwater mitigation systems and typically are required to achieve either hydraulic neutrality or full flood attenuation depending on the receiving environment.
- 25 Construction phase stormwater discharge is being controlled through the CCC stormwater approval process. As part of this process, it is necessary to gain an approved Erosion and Sediment Control Plan which must be implemented on the construction site before commencement of construction activities.

- 26 Cashmere Estates is a new subdivision (greenfield development) for which Regional Consents are also required given the large site area and the fact that the site is located within High Erosion Risk Soils. This means that ECan monitoring is required, and enforcement actions are available.
- 27 The discharge of stormwater during site construction utilises the best practicable erosion and sediment control measures to minimise erosion of land and the discharge of sediment-laden stormwater into the Council stormwater drainage network and the receiving environment.
- 28 Important aspects of erosion and sediment management in greenfield developments (such as Cashmere Estate) are sediment retention basins with automatic or manual (where appropriate) chemical dosing (flocculants).
- 29 As outlined above, I believe that Cashmere Estate development within Port Hills loess areas will have a beneficial effect on operational phase discharge and on the quality of stormwater discharged into the receiving water body.
- 30 Ms Newlands stated in para. 92 of her evidence that:

"... The Residential Hills Zones to be affected by PC14 are in general downstream of Council owned stormwater facilities..."

Given that Cashmere Estate development is directly upstream of the Cashmere Worsleys flood storage basin I believe that this development is well placed for proposed MDRZ.

CONCLUSION

- 31 In my opinion, a Stormwater QM is not warranted for Cashmere Estate as:
- 31.1 Based on the above and with relevant experience related to land development works in Port Hills, I believe that Council legislative tools like resource consents, engineering acceptance, stormwater approvals, stormwater bylaws and the Building Act are appropriate to manage most of the environmental effects.
- 31.2 I do believe that upskilling of building inspectors would be beneficial to ensure that any issues with erosion and sediment control compliance on small sites can be better identified and remediation actions requested.
- 31.3 Cashmere Estate development works trigger the need for ECan consent which is required for works within a High Soil Erosion risk area. This means that ECan monitoring is required, and enforcement actions are available.
- 31.4 Based on the evidence above I don't believe that impervious surfaces are detrimental to loess areas. All hill sites are required to provide stormwater storage by following the Onsite Stormwater Mitigation Guide. Onsite stormwater storage is usually effective for short storms but less effective for longer and lower intensity storms. In the case of hillside loess areas even "permeable" areas become impermeable during longer duration storms after the topsoil layer becomes saturated. As a result of this, the increase in peak runoffs between the RHZ and the RMDZ would be very minor.

31.5 Cashmere Estates is a new subdivision (greenfield development) upstream from the Cashmere Worsleys flood storage basin. This facility was designed and constructed to meet modern stormwater demands. Based on this I believe that Cashmere Estate development is well placed for the proposed intensification.

Dated: 11 April 2024

Michal Glatz