Recommendation of Independent Hearing Commissioner

PLAN CHANGE 42

Mangaroa and Pinehaven Flood Hazard Extents

Report and recommendation of the Independent Commissioner appointed by the Upper Hutt City Council pursuant to Section 34 of the Resource Management Act 1991

19 FEBRUARY 2018

CONTENTS

SCHEDULE OF APPENDICES

Cover image source: *'Silverstream Flood 1976 Photo 5' (December 23 1976). Upper Hutt City Libraries. Heritage Collection (Weddell, Howard). Accessed via* http://uhcl.recollect.co.nz/ *11/12/17*

INDEX OF ABBREVIATIONS

This report utilises several abbreivations for brevity's sake as set out in the glossary below:

Abbreviation	Means…
"1% AEP"	1% annual exceedance probability or 1-in-100-year flood event
"the Act"	Resource Management Act 1991
"CDEMP"	Civil Defence Emergency Management Group Plan 2013
"the Council"	Upper Hutt City Council
"Forest & Bird"	Royal Forest & Bird Protection Society of New Zealand Incorporated (Upper Hutt Branch)
"GWRC"	Greater Wellington Regional Council
"LIM"	Land information memorandum
"MRFHA"	The Mangaroa Flood Hazard Assessment 2015 (GWRC)
"NPSET"	National Policy Statement on Electricity Transmission 2008
"the Plan"	Operative Upper Hutt City Council District Plan 2004
"PC42"	Proposed Change 42 to the Operative Plan
"PFMP"	The Pinehaven Stream Floodplain Management Plan 2016 (UHCC & GWRC)
"the plan change"	Proposed Change 42 to the Operative Plan
"Powerco"	Powerco Limited
"RMA"	Resource Management Act 1991
"RPS"	Regional Policy Statement for the Wellington Region 2013
"s[#]"	Section Number of the RMA, for example s32 means Section 32
"s42A report"	The report prepared by UHCC pursuant to s42A, RMA
"SOH"	Save Our Hills (Upper Hutt) Incorporated
"Transpower"	Transpower New Zealand Limited
"UHCC"	Upper Hutt City Council
"UHTCA"	Upper Hutt Town & Country Association

Upper Hutt City Council

Report of the Independent Hearing Commissioner

Proposal Description:
Proposed Change 42 to the Upper Hutt District Plan:
Mangaroa and Pinehaven flood hazard extents

Hearing Commissioner:
DJ McMahon – Independent RMA Hearings Commissioner

Date of Hearing:
27-29 September 2017

Hearing Officially closed:
17 November 2017

1.0 INTRODUCTION

Report purpose

1.1 This report sets out my recommendation to the Council on Proposed Plan Change 42 to the operative Upper Hutt City District Plan 2004.

1.2 I was appointed by the Council to hear submissions made on the plan change and to consider and make a recommendation to the Council as to whether PC42 should be declined, approved or approved with amendments[1].

1.3 The plan change seeks to introduce new objectives, policies, rules and other methods to address flood hazards within the Mangaroa River and Pinehaven Stream catchments.

1.4 The plan change has an extensive background, which I will canvas in due course. It has been the subject of a section 32 report[2], consultation with stakeholders, and of course the public notification and hearing process, culminating in my report and recommendations.

1.5 Before setting out the details of PC42, the submissions to it and my substantive evaluation, there are some procedural matters that I will address, beginning with my role as an Independent RMA Commissioner.

[1] pursuant to s34A, RMA
[2] Section 32 of the RMA sets out the requirements for preparing and publishing reports that evaluate the appropriateness of a plan change.

Role and report outline

1.6 As noted above, my role is to make a recommendation to the Council about the outcome of the plan change. The final decision-making power rests with the Council; and in the event that the Council adopts my recommendations, then this report will become the Council Decision.

1.7 Having familiarised myself with PC42 and its associated background material, read all submissions, conducted the hearing, and having conducted site/locality visits within the catchments subject to the plan change provisions, I hereby record my recommendations.

1.8 In this respect, my report is generally organised into the following parts:

(a) Factual context for the plan change:

This non-evaluative section (comprising report Section 2) is largely factual and contains an overview of the areas subject to the plan change and an outline of the background to the plan change, including the sequence of events leading to this report. It also outlines the main components of the plan change as notified. This background section provides relevant context for considering the issues raised in submissions to the plan change. Here, I also briefly describe the submissions received to the plan change, and provide a summary account of the hearing process itself and my subsequent deliberations.

(b) Evaluation of key issues:

The second part of my report (comprising Sections 3-5) contains an assessment of the main issues raised in submissions to PC42, and where relevant, amplification of the evidence/statements presented at the hearing (in Section 3). I conclude with a summary of my recommendations (in Section 5), having had regard to the necessary statutory considerations that underpin my considerations (in Section 4). These parts of the report are evaluative, and record the results of my substantive deliberations.

Comments on the parties' assistance to me

1.9 In advance of setting out the Plan Change context, I would like to record my appreciation at the manner in which the hearing was conducted by all the parties taking part. In particular, I would like to acknowledge the following:

a. the indispensable role of Council's Administration Officer, Ms Helen Ellams in dispatching my various Minutes, co-ordinating the scheduling of parties and general administrative assistance;

b. the reporting and planning input from the Council's Planners, Mr Brett Osborne and Mr James Beban;

c. the additional advice and assistance provided by other experts appearing for the Council, including Mr Michael Hall, Mr Kyle Christensen, Ms Angela Bell and Mr Ike Kleynbos;

d. the constructive input of all submitters and their witnesses – both lay and technical; and

e. the support of my Hearing Advisor, Mr Jason Jones of Resource Management Group Ltd.

1.10 The above actions promoted a focused hearing process that greatly assisted me in assessing and determining the issues, and in delivering my recommendation.

1.11 These initial thoughts recorded, I now set out the factual background to the Plan Change.

2.0 PLAN CHANGE CONTEXT

Local environment

2.1 As noted above, there are two catchment areas affected by the plan change provisions, being the Mangaroa River and Pinehaven Stream catchments. These are well described in the s32 report, the s42A reports from Council's reporting officers and in the various background documents the plan change relies upon, including (for example) the MRFHA and the PFMP. I begin by recording a brief summary of the two catchments for context.

Mangaroa River catchment

2.2 As shown in **Figure 1** below, the Mangaroa catchment lies to the east of the Hutt River catchment, with the Southern Hills providing topographic separation between the two. The river flows generally in a north-easterly direction through a rural setting, towards its confluence with the Hutt River north of Mt Marua.

Figure 1: Mangaroa River Catchment. (*image source: Google Earth*[3])

2.3 The s32 Report notes that the river is approximately 20km long, and drains a catchment with an area of 103km^2. It adds:

> *3.4 The Mangaroa River is a typical rural river with natural banks and winds its way through the floodplain in a northerly direction before turning west to converge with the Hutt River. No physical flood protection measures confine the channel, although there are a number of culvert structures, service crossings, and potential obstructions along its length.*

[3] Imagery date 6/4/2016. Retrieved December 2017

2.4 The predominant land uses in the area are rural or lifestyle in nature. Land development is low in intensity and largely confined to the valley floor, which is flanked either side by a series of steep hillsides covered in a mixture of native and exotic vegetation.

Pinehaven Stream catchment

2.5 At 4.5km^2 in area, the Pinehaven Stream catchment (**Figure 2**) is considerably smaller than the Mangaroa. The stream's upper reaches originate in the steep, pine-covered Pinehaven hills. From there, the main channel and its tributaries flow north through the neighbourhoods of the Pinehaven residential area, under Silverstream village, and eventually into Hulls Creek near Silverstream Railway Station.

Figure 2: Pinehaven Stream Catchment. (*image source: Google Earth*[4])

2.6 Much of the lower catchment contains culverts, bridges and other engineered elements, consistent with the more urbanised character of the Pinehaven area relative to its upper reaches or indeed the rural dominated Mangaroa catchment.

2.7 The stream is jointly managed by UHCC and GWRC, with the former responsible for the upper reaches and tributaries and the latter responsible for managing the channel between Pinehaven reserve and Hulls Creek.[5]

[4] Imagery date 6/4/2016. Retrieved December 2017
[5] Statement of Sharyn Westlake (27 September 2017), p.3, para 3.1.1

Operative District Plan

2.8 The areas affected by the plan change, being of variable physical characteristics, are already subject to an array of controls associated with the various planning zones and overlays in the operative Plan.

2.9 In the Mangaroa catchment, the predominant zoning of the land area affected by the plan change is 'Rural Valley Floor', though 'Rural Lifestyle', 'Residential', 'Open Space' and 'Rural Hills' zoned-land is also affected. A small portion of land covered by the plan change area at Mangaroa is also subject to the Southern Hills Overlay Area.

2.10 In the Pinehaven catchment, the plan change area includes land zoned 'Rural Hills,' 'Rural Blue Mountain,' 'Residential Conservation,' 'Residential,' and 'Open Space.' Much of the land there is also subject to the 'Protected Urban Tree Group' overlay.

2.11 In both catchments, land has been designated by the Council for recreation or land drainage utility purposes. The latter will provide for some drainage works. I return to this later in this report

2.12 The objectives and policies for hazards in the operative Plan are set out in multiple chapters as follows:

a. ***Rural Zone (Chapter 5)*** – Policy 5.4.3 is one of 12 policies that implement the 3 overarching objectives for the Rural Zone. The policy seeks to provide for rural lifestyle subdivision which avoids, remedies or mitigates the effects of natural hazards.

b. ***Subdivision and Earthworks (Chapter 9)*** – Objective 9.3.1 establishes one of Council's anticipated environmental outcomes[6] as being the promotion of subdivision and development that is appropriate to the natural characteristics of the City and that is consistent with the sustainable use of land. The objective is implemented by three policies, the most relevant of which[7] includes the aim of ensuring earthworks are designed and engineered in a manner compatible with the mitigation of natural hazards.

c. ***Open Space Zone (Chapter 7)*** – Objective 7.3.1 seeks the promotion of a range of open spaces that are maintained and enhanced to meet the natural hazard management needs of the City[8]. Currently there are no specific zone-based natural hazard policies to implement the objective.

d. ***Natural Hazards (Chapter 14)*** – The sole objective[9] in this chapter is the avoidance, remedying or mitigation of the adverse effects of natural hazards on the environment. It is implemented by two policies, the first of which is to identify and mitigate potential adverse effects of natural hazards that are of a potentially significant threat[10]. The second policy reads "*In areas of known susceptibility to natural hazards, activities and buildings are to be designed and located to avoid, remedy, or mitigate, where practicable, adverse effects of natural hazards on people, property and the environment*." [11]

[6] Among other related matters
[7] Policy 9.4.1
[8] Among other related matters
[9] Objective 14.3.1
[10] Policy 14.4.1
[11] Policy 14.4.2

e. ***Utilities (Chapter 16)*** – Objective 16.3.3 is one of four objectives in the Utility chapter. Its aim is to recognise and provide for the sustainable, secure and efficient use, operation, maintenance and upgrading and development of network utilities within the City. The objectives are implemented by 17 policies, including, of most relevance here, Policy 16.4.12 to ensure that network utilities are designed, developed, constructed, located, upgraded, operated and maintained to avoid, remedy or mitigate any actual or potential adverse effects on the environment.

f. ***Hazardous Substances and Waste Management (Chapter 17)*** – Objective 17.3.1 and Policy 17.4.1 relate to the storage, use, disposal and transportation of hazardous substances and the need to manage those activities to minimise effects on human health and the environment.

2.13 The above listed provisions are given effect to by various rules and methods in the operative Plan, including:

a. buildings in the 1% AEP flood extent of the Hutt River are discretionary activities under Rule 33.1;

b. requirements for new hazardous facilities to provide risk assessments with consent applications, including consideration of the susceptibility of the site to natural hazards[12]; and

c. an assessment matter for relevant earthworks consent applications to consider whether the earthworks proposed increase or decrease flood hazards.[13]

2.14 The evidence presented in the section 32 and 42A reports from the reporting planners in relation to the current Plan provisions was:

a. the operative Plan currently already has multiple provisions (objectives, polices rules and methods) dealing with natural hazards;

b. the provisions in the operative Plan contain a strong directive at the objective and policy levels to avoid, remedy and mitigate the effects of natural hazards;

c. there are, however, some policy gaps to implement the above objectives and in particular in relation to:

   i. flood hazard policies generally; and

   ii. zone-based flood hazard polices;

d. at the rule level, and apart from building in the1% AEP flood extent of the Hutt River, there are no specific controls on building in other flood hazard areas;

e. currently, the only rules affecting buildings and activities in the Pinehaven Stream and Mangaroa River catchments are limited to:

   i. an assessment matter for <u>earthworks</u> consent applications to consider whether the earthworks proposed increase or decrease flood hazards; and

[12] Section 34.5 – matters for consideration
[13] Section 23.16 – matters for consideration

ii. a requirement for new hazardous facilities to provide risk assessments with consent applications, including consideration of the susceptibility of the site to natural hazards.

2.15 The planning evidence suggested that, under section 32 of the RMA, there is a clear and identifiable policy and rule gap to implement the existing objective framework relating to natural hazards, and particularly the flooding hazard, and that this is most apparent in the known flood extents of Pinehaven and Mangaroa.

2.16 It was stated that Plan Change 42 represents a response to the current policy and rule gaps in the operative Plan to address the known aspects of the flood hazard in the Mangaroa River and Pinehaven Stream catchments.

Development of the Plan Change

2.17 The plan change was developed following several years of research, consultation, collaboration and statutory planning processes. A brief summary of this history leading to the eventual notification of the plan change is provided below for the respective catchments.

2.18 I have intentionally taken time here to outline, in a reasonably high level of detail, the relevant background. This approach has a certain utility in that recording that material early in this report:

a. not only establishes useful context about the process leading to the notification of the plan change; but

b. it also introduces concepts and technical information that the notified plan change directly relies upon.

2.19 I draw on the information that follows without having to repeat it verbatim in my evaluation in Section 4 of this report

Mangaroa River Flood Hazard Assessment

The MRFHA was commissioned and adopted by the GWRC.

2.20 It was initially completed by Sinclair Knight Merz (SKM) for the GWRC in 2006/2007.[14] A key focus of the MRFHA was to provide an analysis of the existing hazards associated with the Mangaroa River to assist in the preparation of planning and policy controls for the Mangaroa Valley.[15]

2.21 The results of the assessment were presented in separate 2007 SKM reports relating to hydraulic modelling and to erosion hazard (respectively). A brief summary of each follows.

2.22 The first SKM report was based on the hydraulic modelling results derived from the creation of a combined 1D and 2D model, which relied on various survey and data inputs including (in summary):

[14] Section 23.16 – matters for consideration
[15] s32 Report, p.5, para 3.5

a. topographic data comprising LiDAR survey information and a detailed cross section survey of the river channel with around 170 cross-sections assessed in the main river channel and its tributaries;

b. hydrologic data for the Mangaroa Catchment supplied by GWRC;

c. time series data of observed water level data for the Mangaroa River, recorded by GWRC since 1977 at the Hutt River confluence; and

d. simulation analysis of the potential impact of Hutt River flows on the accuracy of the Mangaroa River gauging station.[16]

2.23 The resulting SKM report described the model calibration results as conservative, and it was observed that the model overestimated peak water levels and discharges. Overall, however, SKM found that the model was suitably accurate for its intended purpose. [17]

2.24 The modelled scenarios included the 5, 10, 20, 50 and 100-year events as well as an 'extreme' scenario that applied sensitivity factors to the 100-year event. The results of the modelling exercise were that much of the river overtopped its banks, including under the more frequent return period scenarios.

2.25 Two sets of maps were appended to the SKM report to present results of the modelling, being:

a. a series showing a summary of the 1% AEP raw modelled results without any allowance for freeboard; and

b. the second set of plans for the 50 and 100-year events including an allowance for freeboard.

2.26 The SKM report identified the purpose of providing the second maps was to assist with the establishment of recommended building levels in the Mangaroa Valley.[18] It added that when establishing recommended building levels, it is 'normal' to add freeboard margin to levels derived from the model.[19] The application of freeboard, according to the SKM report, is to cover such matters as:

a. data limitations and approximations, including (for example) assumptions about the roughness of the ground and channel and the impact that has on the flow of water;

b. physical considerations, like the effects on channel capacity from silting or the potential slips that may occur during storm events;

c. the effects of other obstructions on flows;

d. house construction limitations; and

e. the economic and social cost of water ingress on property improvements.[20]

2.27 The concept of freeboard is something I return to in my evaluation subsequently.

---

[16] *Mangaroa River Flood Hazard Assessment - Hydraulic Modelling Report: Volume 1 GW/FP-T-06/63 (20/3/07)*. Sinclair Knight Merz for GWRC, Section 4, pp.5-9

[17] *Mangaroa River Flood Hazard Assessment - Hydraulic Modelling Report: Volume 1 GW/FP-T-06/63 (20/3/07)*. Sinclair Knight Merz for GWRC, Section 5.2, pp.18-22 and Section 7, p. 52

[18] *Mangaroa River Flood Hazard Assessment - Hydraulic Modelling Report: Volume 1 GW/FP-T-06/63 (20/3/07)*. Sinclair Knight Merz for GWRC, Section 6.1, p. 51

[19] *Mangaroa River Flood Hazard Assessment - Hydraulic Modelling Report: Volume 1 GW/FP-T-06/63 (20/3/07)*. Sinclair Knight Merz for GWRC, Section 5.4.3, p. 46

[20] *Mangaroa River Flood Hazard Assessment - Hydraulic Modelling Report: Volume 1 GW/FP-T-06/63 (20/3/07)*. Sinclair Knight Merz for GWRC, Section 5.4.3, p. 46-47

2.28 As noted above, the second SKM report underpinning the MRFHA related to erosion hazard assessment. The starting point for that assessment was the generation of composite geological maps from a variety of methods/sources to identify constraints on river morphology and to locate areas of erosion risk.[21]

2.29 Once that information was compiled, an assessment was carried out by attributing a risk value to the assessed locations of erosion risk based on a matrix of likelihood of failure versus consequence of failure.[22]

2.30 Those risk values were combined with maps to inform the establishment of development-management controls in the Mangaroa Valley from erosion risk.

2.31 The results of both reports - the hydraulic modelling and erosion risk assessments - were subsequently used to inform relevant decision-making on building consent and resource consent applications. In addition, relevant information was disclosed in LIM reports prepared by the Council for affected properties.[23]

Proposed Plan Change 15

2.32 The Council used the results of GWRC's MRFHA to inform its consideration of potential amendments to the District Plan to manage flood risk in the Mangaroa catchment. After public meetings, stakeholder consultation and further research, the Council prepared and publicly notified Plan Change 15 in October 2012. The proposal sought to 'plug the gap' in the operative Plan in respect to flood hazard polices and rules in the Mangaroa catchment (as referenced earlier in this section of my report) by introducing planning provisions for the Mangaroa Flood Hazard Extent and to update the existing provisions relating to the Hutt River.[24]

2.33 Plan Change 15 was heard in May 2013, and the Independent Commissioner subsequently provided his recommendation to the Council that the proposal be approved. At its meeting in September 2013, the Council resolved to defer its decision on Plan Change 15, pending an independent review of the modelling underpinning the proposal.[25]

Independent review of Mangaroa assessments

2.34 The ensuing independent review of the Mangaroa flood and erosion hazard report was carried out by Mr Kyle Christensen, an experienced engineer specialising in river and stormwater engineering. I observe here that, since producing that report, Mr Christensen has been the Council's consulting engineer on flood matters in the Mangaroa Valley, including providing technical input into the s42A report, which I discuss in detail subsequently.

2.35 Mr Christensen's peer review[26] was provided to the Council in April of 2014. The commentary was organised into three sections to address:

---

[21] *Mangaroa River Flood Hazard Assessment – Erosion Hazard Report: GW/FP-G-06/64 (29/5/06)*. Sinclair Knight Merz for GWRC, p.iii

[22] *Mangaroa River Flood Hazard Assessment – Erosion Hazard Report: GW/FP-G-06/64 (29/5/06)*. Sinclair Knight Merz for GWRC, p.iii

[23] Statement of Sharyn Westlake (27 September 2017), p.3, para 3.1.1

[24] Opening Statement of Brett Osborne (undated), p.1, para 2.2

[25] Opening Statement of Brett Osborne (undated), p.1, paras 2.3-2.4

[26] See Annex 1 to Mr Christensen's statement of evidence, dated 25 August 2017 which contained a copy of his peer review letter report

a. hydrology,

b. hydraulic modelling and

c. erosion hazards respectively.

2.36 A summary of each of matter follows.

2.37 The hydrology information Mr Christensen reviewed was from a report produced by GWRC in March 2005.[27] Mr Christensen's findings on the GWRC report:

a. found the rainfall run-off modelling to be undertaken 'very thoroughly' and providing acceptable results with an average error of less than 10% in the modelled peak flow and a 1.5-hour range in the error associated with the timing of the peak; and

b. recorded his agreement with the flood frequency analysis and estimated peak flows for the design return periods detailed in the GWRC report.[28]

2.38 The second aspect of the review related to the SKM hydraulic model, which was assessed by Mr Christensen as follows:

a. three of the four calibration events in the model were significantly higher than the acceptable range[29] for variation between modelled and measured results, and on that basis the hydraulic model was not appropriately calibrated in Mr Christensen's view;

b. freeboard was applied using an industry-standard approach for the time the report was prepared, which became somewhat out-of-date by the time Mr Christensen's assessment was undertaken;

c. the upshot of this observation was that the SKM report's application of freeboard was deemed appropriate for the more confined sections of the river, but excessively high for the remainder of the river;

d. the original SKM report made no mention of the effects of climate change, which Mr Christensen attributed to the evolution of accepted good practice between 2006 and 2014;

e. the manner in which the model accounted for the impact of culverts and bridges was deemed to be appropriate;

f. the delineation and linking of the 1D and 2D models were deemed to be appropriate; and

g. the model's stability was considered to be acceptable.[30]

2.39 In relation to the third aspect of the review - erosion hazard assessment - Mr Christensen found that the SKM methodology and subsequent assessment was appropriate as a high-level screening tool to identify potential areas at risk of erosion.[31]

---

27 Watts, L (2005). *Flood Hydrology of the Mangaroa River*. GWRC technical report.

28 Evidence of Kyle Christensen (25 August 2017), Annexure 1, p.2

29 The peer review describes the acceptable difference in the measured to modelled peak flow as typically in the 10-15% range, whereas the reported differences for the four model runs were 8%, 38%, 38%, and 28% respectively.

30 Evidence of Kyle Christensen (25 August 2017), Annexure 1, pp.3-4

31 Evidence of Kyle Christensen (25 August 2017), Annexure 1, p.4

2.40 Finally, the peer review by Mr Christensen included an account of discussions that he held with the authors (SKM) of the MFHRA reports. Among other points, the report authors suggested that the discrepancy between modelled and measured results could be attributed to the model's original lack of factoring in climate change effects. It was agreed that the model would be recalibrated and that climate change would be assessed using the industry-accepted predicted rainfall and temperature increases through 2115.

Withdrawal of Plan Change 15

2.41 Following the independent review by Mr Christensen, the updated modelling confirmed the Flood Hazard Extent for the Mangaroa River and inundation depths for a 1% AEP flood event. The modelling included allowances for the effects of climate change, blockage of structures across the river corridor and freeboard allocation.[32]

2.42 Due to the time taken to complete the independent review and subsequent modelling updates, the two-year statutory time limit for plan changes under the RMA lapsed and it was necessary to withdraw Plan Change 15. It was formally withdrawn in March of 2016.[33]

2.43 Around that time, the Council was advancing a plan change for the Pinehaven Stream catchment. Given the synergy between that work and the updated assessments for the Mangaroa Valley, the opportunity was taken to align the two projects in terms of the RMA statutory response.

2.44 Before I outline the details of the resulting plan change, however, I outline a brief history of the background work on the Pinehaven catchment, starting with PFMP.

Development of the Pinehaven Flood Management Plan

2.45 As noted in the s42A report, a series of flood events in the Pinehaven Stream catchment in 2004, 2005 and 2009 led to the Council and GWRC forming a partnership to address future flood risk there.[34] It is worth noting that while these three floods were considered 'major' events, they were not as substantial as the flood in December of 1976 – which is thought to be in excess of a 1% AEP event.[35]

2.46 Upon forming the partnership, both Councils commissioned the creation of a draft flood model for the Pinehaven Catchment. Similar to the Mangaroa catchment model, the Pinehaven example was a combined 1D and 2D hydraulic model. It was calibrated with historical flood records, stream gauge data and community consultation, and subsequently peer reviewed externally.[36]

2.47 Throughout the development of the PFMP, several opportunities were taken by both the Councils to consult with the community and key stakeholders, including:

a. a letter drop invited residents in the catchment to share their experiences of flood events with the project team – this led to formal feedback sessions involving a

[32] s32 Report, p.6, para 3.8
[33] Opening Statement of Brett Osborne (undated), p.2, para 2.5
[34] s32 Report, p.6, para 3.10
[35] Pinehaven Stream Flood Management Plan: Volume 1 (6 September 2016), Section 3.3, p.5
[36] Statement of Sharyn Westlake (27 September 2017), p.3, para 3.1.4

number of residents, which proved invaluable in the verification of the modelling results and in the overall understanding of the catchment;

b. a community 'drop-in' session was held in Pinehaven in September 2009, and over 150 residents came and provided comment on the draft 10 and 100-year storm modelling results;

c. an open day/evening was held in July of 2012 to discuss and develop management options, which was attended by 60 residents;

d. on-going individual meetings were held with residents from 2012 onward addressing a range of matters relevant to the various parties engaged with;

2.48 Based on the above, the draft PFMP was notified in October 2014, inviting submissions from the community. A total of 32 submissions were received on the draft PFMP, predominantly from local residents, with the most common feedback expressing concern about the accuracy of the modelling and requesting an independent audit of the model. The actions that followed were:

a. in response to the submissions, the Council commissioned an independent audit, the results of which are discussed below;

b. following the independent audit, the draft PFMP was updated and released for public comment in September 2015;

c. two public open days were held during this consultation period, with 40 attendees recorded as present during those sessions;

d. submissions on the updated PFMP were received and considered, and the PFMP was amended again to provide additional clarity in the report section dedicated to stormwater neutrality; and

e. consultation with iwi during the process confirmed that the stream/catchment has significance to iwi as a waterway, but was not known to be an area of cultural significance to Māori.[37]

2.49 The updated PFMP was considered by the Hutt Valley Flood Management Subcommittee at a hearing in April 2016, which included opportunity for submitters to the PFMP to present.[38] The Subcommittee comprised elected members of GWRC, UHCC and Hutt City Council, as well as iwi representatives.

2.50 Following the Hutt Valley Flood Management Subcommittee hearing, the Subcommittee endorsed the PFMP, on the condition that additional information be provided to explain how the flood risk was represented on the flood maps. A series of maps showing the flood modelling process was subsequently created in discussion with a focus group that was selected to represent the Pinehaven and Silverstream communities. These maps became Volume 2 of the PFMP.[39]

2.51 The final version of the PFMP was adopted by GWRC on 29 June 2016.[40]

[37] Pinehaven Stream Flood Management Plan: Volume 1 (6 September 2016), Section 3.4, pp.11
[38] Pinehaven Stream Flood Management Plan: Volume 1 (6 September 2016), Section 3.3, p.5
[39] Pinehaven Stream Flood Management Plan: Volume 1 (6 September 2016), Section 3.3, p.5
[40] Statement of Sharyn Westlake (27 September 2017), p.4, para 3.1.7

Pinehaven Flood Management Plan – Results and Methods

2.52 In their introductory presentation at the hearing, Mr Osborne and Mr Beban provided the following useful summary of the PFMP results:

> *3.4 Hydraulic modelling was undertaken to establish the Flood Hazard Extent, inundation depths and features such as overflow paths associated with a 1 in 100-year flood event. The modelling also incorporated the effects of climate change (as forecast to 2090), blockage of structures across the stream and freeboard allocation. The identified flood extent of a 1 in 100-year event encompasses 546 residential zoned properties and 25 commercial business zone properties within Pinehaven.*
>
> *3.5 The hydraulic modelling results confirmed that much of the Pinehaven Stream channel has less than a 1 in 5-year flood flow capacity. The numerous bridges and culverts further constrain the stream and are significant contributors to flooding. Furthermore, there is a high potential for blockages in the narrow vegetated stream channel and the intakes of culverts or bridges. The modelling showed that, in places, blockages significantly increased the extent of flooding. In addition, the modelling identified that changes in the upper sub-catchment area (predominantly undeveloped rural zoned land) would increase the flood risk to the downstream community.*
>
> *3.6 The [P]FMP identified that some of the existing flood risk in Pinehaven could be managed through structural upgrades, maintenance and emergency response measures. However, physical works are only able to manage part of the flood risk in the catchment. The planned channel upgrades are to a 1 in 25-year flood event. This is well below GWRC's desired level of protection where residential floor levels would be above the 1 in 100-year flood event.* [41] *(emphasis added)*

2.53 Overall, the PFMP adopted a suite of measures to manage this identified risk. These are:

a. physical works to increase the capacity of the Stream;

b. regulatory planning controls for development in the catchment;

c. community awareness and preparedness, and emergency procedures; and

d. day-to-day maintenance and management of the Stream to avoid blockages, maintain capacity and minimise erosion. [42]

2.54 These methods are discussed in considerable detail in the PFMP. Of direct relevance to this plan change proposal is the planning controls proposed by the PFMP which focus on existing and future land use and subdivision activities, with specific controls requiring:

a. stormwater neutrality,

b. protection of infrastructure, and

c. management of earthworks and forestry, particularly in the upper catchment.[43]

2.55 Further detail on the development controls are provided in the PFMP; many of which feature in the regulatory package in PC42 as I discuss subsequently. Before doing so, however, it is useful for me to canvass and record for the benefit of all parties the process associated with the Independent Modelling Audit of the PFMP.

---

[41] Opening Statement (27 September 2017) pp.3-4
[42] Pinehaven Stream Flood Management Plan: Volume 1 (6 September 2016), Section 6, p.32
[43] Pinehaven Stream Flood Management Plan: Volume 1 (6 September 2016), Section 6.3, p.34

Pinehaven Flood Management Plan – Independent Modelling Audit

2.56 The final matter of context on the PFMP that I outline here is in relation to the independent audit of the flood model undertaken during the development of the PFMP. As will be evident later in my report, this topic is directly relevant to the evidence of Council's consultant engineer, Mr Michael Law, and is particularly pertinent to the stated concerns of those submitters who have sought an independent audit of aspects of PC42 and its supporting information. I draw on the following information when evaluating those concerns in Section 4 of this report

2.57 Similar to Mr Christensen's role in relation to the Mangaroa River flood model, Mr Law was engaged by GWRC to audit the Pinehaven Stream model following public consultation on the draft PFMP in 2014/2015. Like Mr Christensen, Mr Law also has since been engaged by the Council to advise on flood and stormwater engineering for the Pinehaven Catchment, including input into the s42A report.

2.58 Mr Law's original audit was the second independent review[44] of the hydraulic modelling underpinning the draft PFMP. The general scope of Mr Law's review included an audit of:

a. the type of software and modelling package used for the hydrology and hydraulic model;

b. the modelling method used and its appropriateness for both hydrology and the hydraulic model;

c. the use of freeboard and the method by which it was applied;

d. representation of the flood hazard through the way in which maps are displayed and information provided.

2.59 As part of his audit, Mr Law reviewed the available modelling information and associated reports provided by GWRC. He also conducted interviews with GWRC staff, representatives of the consultancies who produced both the hydrology report and the original hydraulic model, and with members of the Pinehaven community.[45]

2.60 Mr Law's audit report included specific assessment matters presented in table form, using a numeric rating and associated 'traffic light' classification to evaluate various components of the models and maps. All of the audited elements were classified as having *"no issues"* or *"minor issues"* except for three elements which fell into the 'major issue' category. None of the elements fell into the 'fatal flaw' category.

2.61 For completeness, the three elements that Mr Law considered as major issues included the following:

a. Mr Law found the model inadequately accounted for increased flood volumes under a *hypothetical* development scenario whereby the upper Pinehaven catchment is developed in excess of 1600 new houses[46];

b. Mr Law identified two issues with the presentation of the PFMP flood maps:

[44] Mr Law's report records that the hydraulic modelling was reviewed by DHI (suppliers of the MIKE FLOOD software used), and found to have been built within DHI's model build guidelines

[45] Beca (13 July 2015), *Pinehaven Stream - Flood Mapping Audit*, p.iii

[46] Beca (13 July 2015), *Pinehaven Stream - Flood Mapping Audit*, Section 8, p.26-27. In this same assessment, Mr Law did not find fault with the model's anticipated 18% increase in peak flow during a 1% AEP event.

i. due to the stream cross-section spacing, modelling of small crossings, and the size of the grid for the 2D model bathymetry, the flood extents shown on the maps may not be detailed enough to define flood levels at, or across, individual properties, especially in the steeper upper reaches of the modelled area - in these areas, Mr Law suggested a degree of caution will be required when using the maps; and

ii. that the use of the term *"hazard"* on the flood maps may be inappropriate given that the flood extent includes allowances for climate change, blockages and freeboard.[47]

2.62 Mr Law's report also addressed specific concerns from the community, including:

a. case studies provided by SoH;

b. the representation of culvert and channel blockage by debris in the modelling; and

c. the effects of future development.

These additional concerns did not alter Mr Law's findings, but they did reinforce his view that there were some issues with the model and maps (as summarised above).[48] In response to Mr Law's findings and associated recommendations, the draft PFMP was amended by GWRC to include additional maps for informative purposes.[49] Provisions were also included in the PFMP to encourage the adoption of hydraulic neutrality requirements for future subdivision and development in future plan change processes.

2.63 In essence, Mr Law's initial concerns regarding the PFMP were addressed by the above amendment to the extent that he found that Overall, the main conclusion of Mr Law's audit report was '*the hydrological and hydraulic modelling underlying GWRC's flood extent and hazard maps is fit for purpose, but the way that flood information is presented in map form could be modified, which may increase the understanding and acceptance of the maps by the community.*'[50] *(emphasis added)*

Plan Change Preparation

2.64 Equipped with the updated modelling information for the Mangaroa River and the PFMP, the Council advanced its preparations on a combined change to the operative District Plan for management of flood risk in the two catchments.

2.65 In addition to the amendments to the operative Plan proposed in PC42, the Council's preparations included:

a. the required consultation with statutory stakeholders;

b. Councillor workshops; and

c. the completion of its evaluation under s32 of the RMA.

2.66 At its meeting of 8 February 2017, the Council's Policy Committee considered and approved PC42 for public notification.

---

47 Beca (13 July 2015), *Pinehaven Stream - Flood Mapping Audit*, Section 4.3, p.79.
48 Beca (13 July 2015), *Pinehaven Stream - Flood Mapping Audit*, Section 5, pp.14-19
49 Pinehaven Stream Flood Management Plan: Volume 1 (6 September 2016), Section 3.3.3, p.5
50 Beca (13 July 2015), *Pinehaven Stream - Flood Mapping Audit*, Sections 2-3, pp.3-4

Plan Change Purpose and Provisions

2.67 Below, I have outlined, the purpose and provisions of the Plan Change in some detail. I have chosen to do so as, although these are readily referenced in the plan change documentation itself, it is useful to have it recorded in a self-contained manner in this report. The relevance of this information is:

a. The purpose of the plan change is directly relevant to my later assessment under s32 as to the appropriateness of the stated new objective(s) in achieving the purpose and principles of the RMA and following that, the appropriateness of the policies and rules of the plan change in implementing the objectives of the plan change; and

b. It is important to record how the provisions were first notified so that there is an explicit understanding of the nature and magnitude of any alterations that occur as a result of my recommendations in Section 5 of this report (in the event that the Council adopts the recommendations)

2.68 The s32 Report records the purpose of the Plan Change as follows:

> *3.19 The purpose of the Plan Change is to implement the planning measures required to address the flooding risk associated with the Pinehaven Stream and the Mangaroa River. These planning measures seek to:*
>
> - *provide for the functioning of the Pinehaven Stream and Mangaroa River Floodplains;*
> - *avoid development in high hazard areas and incorporate mitigation measures into developments and subdivision in lower hazard areas to ensure that the impact of flood events on people and property within the identified Flood Hazard Extents are either mitigated or avoided; and*
> - *ensure development and activities within the Flood Hazard Extents do not exacerbate the impact of flood events on people and property.* [51]

2.69 The public notice for the plan change includes the following summary of the amendments to the Plan contained in PC42:

> *Proposed Plan Change 42 identifies a range of flood and erosion hazard risks and proposes new objectives, policies and rules addressing relevant land use and subdivision activities. The proposed changes seek to avoid certain development and activities within identified high-hazard areas and require mitigation or avoidance within the identified lower-hazard areas. Proposed Plan Change 42 amends Chapters 2, 9, 14, 16, 17, 18, 19, 20, 23, 30, 33, and 34, as well as the relevant Urban and Rural Hazard Maps of the District Plan.*

2.70 More explicitly, the notified proposal added:

a. two new entries to the information requirements for subdivision and development consent applications in the Pinehaven and Mangaroa catchments (respectively);

b. new definitions for 9 terms used in the proposed objectives, policies and methods;

[51] s32 Report, p.8, para 3.19

c. additions and amendments to the resource management issues identified in Chapter 9 (subdivision and development), Chapter 14 (Natural Hazards), and Chapter 16 (Utilities);

d. three new objectives and 8 new policies in Chapter 9, setting out a variety of outcomes and directions relating to the control of subdivision and earthworks, and the avoidance or mitigation of the effects and risks from flood hazards;

e. a new objective and 7 new policies in Chapter 14, establishing a new outcome and associated directions for natural hazards, including:

   i. identification of flood hazard extents and erosion hazard areas to avoid or mitigate hazard risk to people and property and to provide for the function of the floodplain; and

   ii. a direction to *avoid* development within high hazard areas in the flood hazard extent and to *control* development in lower hazard areas;

   iii. new enabling direction for planned flood mitigation works;

   iv. Pinehaven-specific direction to reduce the potential for blockage through use of development controls and to ensure post-development peak flow for the 10 and 100-year flood events shall not exceed pre-development flows; and

   v. Mangaroa-specific direction to enable non-habitable accessory buildings and access in lower risk areas and avoid the latter in higher risk areas;

f. a new objective and 2 new policies to enable the continued operation of utilities in flood extents while maintaining the function of the floodplain to convey floodwaters;

g. an amendment to the explanation to Policy 17.4.1 clarifying that hazardous facilities will be discouraged from locating in areas subject to flood hazards;

h. new restricted discretionary activity rules for *residential* and *business zone* subdivision in the Pinehaven and Mangaroa catchment overlay/flood extents, and associated non-complying activity rules where such subdivision does not meet specified standards;

i. similar rules for *rural zone* subdivision in the two catchments, except that subdivision applications that are do not meet the restricted discretionary activities in the Mangaroa catchment and are within the 'ponding area' or 'erosion hazard area' are discretionary activities;

j. permitted activity rules for earthworks in both catchments subject to area limits and/or where associated with flood mitigation works, with associated restricted discretionary, discretionary and non-complying activity rules where the earthworks are not permitted – the activity status is typically more stringent where the hazard risk is greater;

k. new standards for permitted activity rules relating to utility structures requiring them to be located underground or above the 1% AEP event flood level, and an associated exception to the matters of discretion for such structures that do not meet the permitted standard;

l. new hazard rules for buildings, structures and specified activities in both catchments, including:

   i. permitted activity rules for small accessory buildings or alterations/additions to existing buildings in lower hazard areas;

ii. permitted activity rule in the Mangaroa catchment and controlled activity rule in the Pinehaven catchment for driveways/accessways;

iii. restricted discretionary activity rules in the Pinehaven catchment for Visitor accommodation or residential accommodation activities within the Commercial Business Zone and for any fence in the overflow path;

iv. requirement for any building in the Pinehaven Catchment to achieve hydraulic neutrality for stormwater runoff, assessed as a restricted discretionary activity and subject to validation by a suitably qualified expert

v. other restricted discretionary, discretionary and non-complying activity rules for buildings, structures and activities which are not permitted – the activity status is typically more stringent where the hazard risk is greater;

m. additional assessment requirements to gauge the risk of flood hazards for activities that require resource consent under the hazardous substances rules;

n. new flood hazard map notations for the:

i. flood hazard extent (both catchments);

ii. erosion hazard area (Mangaroa only);

iii. ponding areas, overflow paths and river/stream corridors (both catchments); and

iv. Pinehaven Catchment Overlay.

2.71 Synthesising the above, notified PC42 sought to address the gaps in the operative Plan (as summarised earlier in this report) by increasing the regulatory stringency of the operative Plan in both the Pinehaven and Mangaroa catchments. It adopts a two-pronged approach as follows:

a. It constrains the level of development expressly anticipated by the Plan in these areas to flood protection works, limited small scale activities and utility structures; and

b. For activities that are not expressly permitted, the plan change adopts a more management-based approach through use of case-by-case resource consent processes, with the highest-risk activities being strongly deterred by the proposed policies and rules.

2.72 I return to these themes in Section 3 of my report.

Notification and submissions

2.73 The plan change was publicly notified on 8 March 2017. The closing date for submissions was 8 May 2017, amounting to doubling of the minimum time frame required by Schedule 1 of the Act.

2.74 A total of 25 submissions were received, with 19 in opposition or partial opposition and 6 in support. A summary of those submissions was prepared and subsequently notified for further submissions on 24 May 2017 with the closing date for receiving further submissions being 8 June 2017. Two further submissions were received.

2.75 The summary of submissions identified that three submissions were received after the closing date. I deal with the procedural matters associated with these late submissions subsequently.

2.76 I have provided a full summary of the submissions and further submissions received in **Appendix 1** to this report, including my recommendations on the relief sought by each submitter.

2.77 Adapting the key themes identified in the s42A Report here, the matters raised by submissions generally fall into one of more of the following categories of issue.

a. general support for the proposal;
b. concerns over the accuracy of the maps;
c. proposed amendments to the s32 Report;
d. proposed amendments to the identified resource management issues, definitions, objectives, polices, rules, and anticipated environmental results;
e. concern about the consultation process followed;
f. interest in the proposed provisions relating to hydraulic neutrality;
g. concern that the plan change has not taken sufficient account of potential development in the upper reaches of the Pinehaven catchment;
h. requests for baseline flood information to be included in the district plan to form the basis for future flood impact assessments; and
i. concern that the proposal only relates to two catchments, whereas other catchments experience flooding and are relevant to the plan change content.

2.78 I discuss these issue categories (and the submissions underpinning them) in greater detail under my evaluation of six core grouped issues in Section 3 of this report below.

Pre-hearing directions and procedures

2.79 Prior to the commencement of the hearing, I issued a minute[52] to the parties to address various administrative matters. This and the subsequent minutes I issued throughout the hearing and post-hearing process are contained on the Council web page and files.

2.80 In summary, however, I note here that purpose of Minute 1 was to:

a. confirm the hearing date and my appointment to all parties;
b. encourage pre-hearing meetings and expert conferencing to narrow any issues in contention where possible;
c. invite parties to indicate any particular sites or localities they believed I should visit;
d. direct the parties to provide a list of representations/witnesses that would be appearing at the hearing;

[52] Minute 1, dated 14 August 2017

e. set out a timetable for the circulation of the s42A report, submitter expert evidence and the hearing commencement; and

f. provide a description of the hearing process for submitters, and request that submitters provide an indication of the time they required for presentations for scheduling purposes.

2.81 I also note that, prior to my appointment, the Council conducted pre-hearing meetings with several submitters, including with Transpower, PowerCo and GWRC in the period 3-10 July 2017. Consequently, Transpower and PowerCo tabled written statements rather than making formal presentations at the hearing.

2.82 The Council also organised a facilitated pre-hearing meeting with six submitters on 18 September. The meeting was facilitated by Mr Mark St Clair, a planning consultant and Director of Hill Young-Cooper in Wellington. A copy of the resulting pre-hearing meeting report can be reviewed on the Council website or file. No formal resolutions or agreements were reached amongst the parties to the meeting, but a number of relevant issues were canvassed over the allotted time.

2.83 The s42A report was distributed to the parties on 1 September, three days before the deadline stipulated in Minute 1.

2.84 The only expert evidence pre-circulated other than that of the Council was that of Mr Robert Hall, SoH's engineering advisor. Mr Hall's evidence was submitted to the Council on the eve of the hearing and a copy was made available during the hearing.

The Hearing

2.85 The hearing commenced at 9:00am on Wednesday 27 September 2017 in the Council Chambers at the Civic Offices in Upper Hutt.

2.86 At the outset of proceedings, I asked the attendees if there were any procedural matters to be raised. At that stage, Mr Stephen Pattinson, submitter and representative of SoH sought leave to make a digital audio recording of the hearing.

2.87 I asked if any party objected to Mr Pattinson's request, and no party voiced any concerns. I therefore granted leave for Mr Pattinson to record the proceedings.

2.88 Following this initial matter, I outlined the manner in which I expected the hearing to be conducted, and called for appearances and introductions from the attendees.

2.89 I also outlined my role and the relevant statutory matters framing my consideration of the proposal.

2.90 The hearing ran through to late afternoon on Friday 29 September, and over the course of the proceedings, I heard from the following people:

Council Advisors

- Mr Brett Osborne, Consultant Planner
- Mr James Beban, Consultant Planner
- Mr Kyle Christensen, Consultant Engineer

- Mr Michael Law, Consultant Engineer
- Ms Angela Bell, Council Planning Policy Manager
- Mr Ike Kleynbos, Council Policy Planner

Submitters

- Mr Alan Jefferies, Maymorn resident
- Mr Graham Bellamy, for Forest & Bird
- Mr Charles Baines, Pinehaven resident on behalf of himself and his wife, Lynese
- Ms Nicola Robinson, Pinehaven resident
- Mr Darryl Longstaffe, Pinehaven resident
- Mr Stephen Pattinson, Pinehaven resident and representative of SoH
- Ms Susan Pattinson, Pinehaven resident
- Mr Bob McLellan, for UHTCA
- Mr Kim Williams, Mangaroa resident
- Ms Sharyn Westlake, Team Leader Flood Protection, GWRC
- Ms Lucy Harper, Team Leader Environmental Policy, GWRC
- Ms Jenene and Mr John Moynihan, Mangaroa residents

2.91 During its presentation on 28 September, SoH called several local residents to appear as eyewitnesses of the 1976 and subsequent flood events, including:

- Mr Colin Buckett of 7 Jocelyn Crescent;
- Mr Paul Cocker of 16 Jocelyn Crescent;
- Mr Keith Thomas of 44 Whitemans Road; and
- Mr John Campbell of 2 Harewood Grove

2.92 Unbeknown to me at the time, SoH's engineering advisor, Mr Bob Hall, attended on the afternoon of day 2 of the hearing, but was not called by SoH to present his evidence or answer any questions from me. He did not attend on Day 3 and I was therefore not afforded any opportunity to seek any clarifications regarding his evidence.

2.93 In addition to the tabled statements from Transpower and PowerCo noted above, Jeff and Noeline Berkett – Mangaroa residents – also tabled a statement given their inability to attend the hearing.

2.94 Several other parties signed the attendance register but did not participate in the hearing per se. This included various staff members of the Council, acquaintances of submitters, local professionals and other interested parties.

Hearing adjournment

2.95 At the end of proceedings on the 29th September, I advised that the hearing would be adjourned but would remain open pending the exchange of further information. This was formally recorded in **Minute 2** (dated 2 October), which provided:

a. an inventory of the questions of clarification and further information requests I made of Council Officers over the course of the hearing:

b. a timetable for Council to provide its final reply in writing; and

c. an indication that I would be conducting site visits in the interim and may require assistance if I felt the need to access private property.

2.96 The Council duly provided its written reply on 20 October, and the material was made available on the Council website.

2.97 In conducting a completeness check of the material provided in the reply, I identified, in **Minute 3** dated 25 October, two further questions of clarification arising. Given the confined nature of those questions, I was satisfied that the Council could address the matters in writing without the need to formally reconvene the hearing.

2.98 On 31 October 2017, the Council provided its response to **Minute 3**. Subsequently, I reviewed that material, conducted my site/locality visits and deliberations. My deliberations also included consideration of the late submissions received, which I deal with briefly here.

Late Submissions

2.99 The summary of submissions identifies that submissions 22, 24 and 25 were classified as late submissions[53]. I gather that the submissions were received either after the 5pm cut-off on 8 May, or on the following Monday 11th.

2.100 Section 37 of the RMA sets out that the Council may either extend a time period specified in the Act (in this case the time period for receiving submissions on a proposed plan) or to grant a waiver for failure to comply with such timeframes. Section 37A then sets out the requirements for waivers and extensions if they are to be granted – in this instance, under s37A(1) and (2), which state:

> *[1] A consent authority or local authority must not extend a time limit or waive compliance with a time limit, a method of service, or the service of a document in accordance with section 37 unless it has taken into account—*
> *(a) the interests of any person who, in its opinion, may be directly affected by the extension or waiver; and*
> *(b) the interests of the community in achieving adequate assessment of the effects of a proposal, policy statement, or plan; and*
> *(c) its duty under section 21 to avoid unreasonable delay.*
>
> *[2] A time period may be extended under section 37 for—*
> *(a) a time not exceeding twice the maximum time period specified in this Act; or*
> *(b) a time exceeding twice the maximum time period specified in this Act if the applicant or requiring authority requests or agrees.*

2.101 I am satisfied that no party will be directly (adversely) affected by waiving the time limit to receive the submissions, the interests of the community in achieving an adequate assessment of effects has been considered, and unreasonable delay is avoided by allowing the submissions to be received. Moreover, the submissions were received considerably less than 20 working days after the closing date of submissions, and so Clause [2] is met.

2.102 Accordingly, my recommendations in Section 5 below include a formal recommendation to Council that a waiver be granted for receiving the late submissions.

Hearing Closure and Final Minute

2.103 On 17 November 2017, I formally signalled the closure of the hearing in **Minute 4**.

[53] The submissions were made by Mr and Mrs Berkett, Transpower and Mr Duigald Myers

3.0 EVALUATION OF ISSUES

Overview

3.1 For the purposes of this evaluation, I have grouped my discussion of the submissions and the reasons for accepting, rejecting, or accepting them in part by the *matters*[54] to which they relate – rather than assessing each issue on a submitter by submitter basis.

3.2 This approach is not to downplay the importance of the input from submitters; to the contrary, their input has been invaluable in shaping the grouping of issues and for my consideration of those matters. However, I consider it will be to everyone's benefit for my recommendation to be as tightly focused on the key issues as possible.

3.3 For those parties who are only interested in a particular matter as it pertains to their submission(s), reference can be made to the submitter-by-submitter summary of decisions requested in **Appendix 1**, which includes my recommendation on each specific relief point sought. Those specific decisions have been derived from the issues assessment below.

3.4 I have organised my discussion of issues as follows:

- **ISSUE 1:** General support, opposition and plan change drivers
- **ISSUE 2:** Flood hazard maps
- **ISSUE 3:** Hydraulic neutrality and future development in the Southern Hills
- **ISSUE 4:** Proposed utility provisions
- **ISSUE 5:** Other objectives, policies and methods
- **ISSUE 6:** Other general matters

Evaluation Preamble – Statutory Framework

3.5 Before formally recording my consideration of the above issues, I summarise here the relevant statutory matters that frame my evaluation. These matters have been derived from the Environment Court's *Colonial Vineyards* decision[55], and include the following considerations:

General Requirements

a. the District Plan should be designed in accordance with[56], and assist the Council to carry out, its functions[57] so as to achieve the purpose of the Act;[58]

b. when preparing/changing the District Plan, the Council must:

[54] Clause 10(2)(a) of Schedule 1, RMA sets out that a plan change decision may address submissions by grouping them according to either the provisions of the plan change to which they relate, *or* to the matters to which they relate.
[55] ENV-2012-CHC-108, [2014] NZEnvC 55
[56] s74(1), RMA
[57] s31, RMA.
[58] ss 72, 74(1), RMA.

i. give effect to any NPS[59], the NZCPS[60] or any RPS[61];[62]

ii. have regard to any *proposed* RPS;[63]

iii. have regard to any management plans and strategies under any other Acts and to any relevant entry on the NZ Heritage List and to various fisheries regulations (to the extent relevant), and to consistency with plans and proposed plans of adjacent authorities; [64]

iv. take into account any relevant planning document recognised by an iwi authority;[65]

v. not have regard to trade competition;[66]

vi. be in accordance with any regulation;[67]

c. in relation to regional plans:

i. the District Plan must not be inconsistent with an operative regional plan for any matter specified in s30(1) or any water conservation order;[68] and

ii. shall have regard to any proposed regional plan on any matter of regional significance;[69]

d. the District Plan must also state its objectives, policies and the rules (if any) and may state other matters;[70]

e. the Council has obligations to prepare an evaluation report in accordance with section 32 and have particular regard to that report;[71]

f. the Council also has obligations to prepare a further evaluation report under s32AA where changes are made to the proposal since the s32 report was completed;

Objectives

g. the objectives of the Plan Change are to be evaluated to the extent which they are the most appropriate way to achieve the Act's purpose;[72]

Provisions

h. the policies are to implement the objectives, and the rules (if any) are to implement the policies;[73]

i. each provision is to be examined as to whether it is the most appropriate method for achieving the objectives of the TRMP, by:

[59] National Policy Statement
[60] New Zealand Coastal Policy Statement
[61] Regional Policy Statement for the Tasman Region
[62] s75(3)(a)-(c), RMA.
[63] s74(2), RMA.
[64] s74(2)(b)-(c), RMA.
[65] s74(2A), RMA.
[66] s74(3), RMA.
[67] s75(1)-(c), RMA.
[68] s75(4), RMA.
[69] s74(1)(f), RMA.
[70] s75(1)-(2), RMA.
[71] Schedule 1, Part 2, Clause 22, RMA.
[72] s32(1)(a), RMA.
[73] s75(1), RMA.

i. identifying other reasonably practicable options for achieving the objectives;[74]

ii. assessing the efficiency and effectiveness of the provisions in achieving the objectives[75], including:

a) identifying and assessing the benefits and costs anticipated, including opportunities for economic growth and employment opportunities that may be provided or reduced;[76]

b) quantifying those benefits and costs where practicable;[77]

c) assessing the risk of acting or not acting if there is uncertainty or insufficient information about the subject matter of the provisions;[78]

Rules

j. in making a rule, the Council shall have regard to the actual or potential effect on the environment of activities, including (in particular) any adverse effect;[79] and

Other Statutes

k. the Council may be required to comply with other statutes

3.6 Importantly, I observe here that the further evaluation under s32AA is required only in respect of any changes arising since the Plan Change was first notified. I note that this s32AA evaluation must contain a level of detail that corresponds to the scale and significance of the effects that are anticipated from the implementation of the provisions as amended.

3.7 In considering all of the matters above, I record that my recommendation is based upon my consideration of the following documents:

a. the notified Plan Change and s32 evaluation,

b. the submissions and further submissions received,

c. the Council s42A report, and

d. the statements/presentations from all parties appearing before me.

3.8 As I emphasised at the hearing, it is important that all parties understand that it is not for me to introduce my own evidence on these six issues listed above, and I have not done so – rather, my role has been to:

a. establish that all relevant evidence is before me (or where it isn't, consider whether I should commission additional reports or information[80]); and

[74] s32(1)(b)(i), RMA.
[75] s32(1)(b)(ii), RMA.
[76] s32(2)(a), RMA.
[77] s32(2)(b), RMA.
[78] s32(2)(c), RMA.
[79] S76(3), RMA.
[80] Under s 41C(4) of the Act.

b. test the evidence of others, and to determine the most appropriate outcome based on the views I consider best achieve sustainable management.

3.9 As a closing comment to this preamble, I observe that s32AA(1)(d)(ii) enables my further evaluation reporting to be incorporated into this report as part of the decision-making record. To this end, my evaluation of issues has been structured to satisfy the evaluation report requirements of s32AA as outlined above. Essentially this means that in those instances where I have recommended an alteration to the notified Plan Change, I have explicitly assessed the appropriateness of that alteration in terms of s32AA – within this report, in **Appendix 2**, or in both places.

Issue 1: General support, opposition and plan change drivers

Issue identification

3.10 The majority of submissions focussed on one or more specific issues as justification for their support or opposition to the proposal. However, nine parties made submissions of a more general nature, including:

a. general support for the entire plan change;

b. general support for the proposal, conditional on the resolution of some isolated matters; and

c. general opposition to the entire plan change.

3.11 To summarise these general submissions:

a. Ms Allison Tindale and GWRC gave their support for the entire proposal and considered that the plan change is consistent with good planning practice and the relevant provisions in the RMA and RPS;

b. similarly, Dr Ian Stewart supported the plan change, seeking that the provisions are adopted as notified;

c. conditional support for the provisions came from Mr Vaughn Allan, Transpower and PowerCo; and

d. SoH, Forest and Bird, and UHTCA outlined their general opposition to the plan change, along with opposition to specific aspects of the proposal.

3.12 Ms Tindale, Dr Stewart and Mr Allan did not present at the hearing. As noted in Section 2 above, Transpower and PowerCo tabled statements rather than appear at proceedings. The substance of their submissions and subsequent statements is discussed under Issue 4 below.

3.13 Forest and Bird were represented at the hearing by Mr Graham Bellamy. His presentation focussed mainly on the group's concerns about potential future development in the Southern Hills and the potential impacts on flooding in the Pinehaven catchment. I address that matter under Issue 3 subsequently.

3.14 At a more general level, Mr Bellamy conveyed the group's concerns that flooding is becoming more frequent as a result of climate change.

3.15 Mr Pattinson (and later Ms Pattinson) provided an extensive presentation on behalf of SoH (and S & S Pattinson). I discuss the detail of Mr Pattinson's presentation in subsequent sections of the report, but record here the clear position of general opposition indicated by SoH in its written and oral material.

3.16 Mr Bob McLellan represented UHTCA at the hearing. Similar to Mr Pattinson, Mr McLellan's presentation was focussed on various specific matters, more so than on UHTCA's general opposition to the proposed plan change. Again, as to avoid duplication, I address those specific matters subsequently.

3.17 GWRC's support for the proposal was amplified by Ms Harper and Ms Westlake in their written statements. Of most relevance for this general section, Ms Harper's statement focussed primarily on the strategic policy direction that the plan change derives from the RPS. GWRC's original submission expressed the view that the plan change gives effect to the RPS as required by s75 of the RMA.

3.18 Ms Harper's statement drew my attention to Policies 15, 29, 41 and 51 as the most relevant to the plan change. Policies 15 and 29 are two in a suite of policies that the RPS expresses for subsequent implementation in the various Regional and District Plans in the Wellington Region. The policies read:

> ***Policy 15: Minimising the effects of earthworks and vegetation disturbance – district and regional plans***
>
> *Regional and district plans shall include policies, rules and/or methods that control earthworks and vegetation disturbance to minimise:*
> *(a) erosion; and*
> *(b) silt and sediment runoff into water, or onto land that may enter water, so that aquatic ecosystem health is safeguarded.*
>
> ***Policy 29: Avoiding inappropriate subdivision and development in areas at high risk from natural hazards – district and regional plans***
>
> *Regional and district plans shall:*
> *(a) identify areas at high risk from natural hazards; and*
> *(b) include polices and rules to avoid inappropriate subdivision and development in those areas.*
> *(emphasis added)*

3.19 Additional useful context is provided in the explanation to Policy 29. Of most relevance here, this includes:

> *The process of identifying 'areas at high risk' from natural hazards must consider the potential natural hazard events that may affect an area and the vulnerability of existing and/or foreseeable subdivision or development. An area should be considered high risk if there is the potential for moderate to high levels of damage to the subdivision or development, including the buildings, infrastructure, or land on which it is situated. The assessment of areas at high risk should factor in the potential for climate change and sea level rise and any consequential effect that this may have on the frequency or magnitude of related hazard events.*
>
> *Examples of the types of natural hazards or hazard events that may cause an area or subdivision or development to be considered high risk include…areas that are subject to serious flooding.*
> *…*
>
> *Most forms of residential, industrial or commercial development would not be considered appropriate and should be avoided in areas at high risk from natural*

hazards, unless it is shown that the effects, including residual risk, will be managed appropriately.
…

Examples of how this may be applied to identified high hazard areas include…design standards for floodplains…

This policy promotes a precautionary, risk-based approach, taking into consideration the characteristics of the natural hazard, its magnitude and frequency, potential impacts and the vulnerability of development.

3.20 Ms Harper emphasised that, based on the above, there is a clear policy imperative from the higher order directive documents for the District Plan to identify areas of high hazard risk (including from flooding) and to include policies and methods for the *avoidance* of inappropriate development and subdivision in those areas.

3.21 Ms Harper also advised that the suite of RPS policies containing Policy 41 and 51 are *consideration policies* to be considered when determining resource consents, notices of requirement or district plan changes. The relevant direction in Policy 41 is that earthworks and vegetation are to be controlled to minimise erosion and silt/sediment runoff. Policy 51 is a criteria-based provision, and reads:

Policy 51: Minimising the risks and consequences of natural hazards - consideration

When considering an application for a resource consent, notice of requirement, or a change, variation or review to a district or regional plan, the risk and consequences of natural hazards on people, communities, their property and infrastructure shall be minimised, and/or in determining whether an activity is inappropriate particular regard shall be given to:

(a) the frequency and magnitude of the range of natural hazards that may adversely affect the proposal or development, including residual risk;
(b) the potential for climate change and sea level rise to increase the frequency or magnitude of a hazard event;
(c) whether the location of the development will foreseeably require hazard mitigation works in the future;
(d) the potential for injury or loss of life, social disruption and emergency management and civil defence implications – such as access routes to and from the site;
(e) any risks and consequences beyond the development site;
(f) the impact of the proposed development on any natural features that act as a buffer, and where development should not interfere with their ability to reduce the risks of natural hazards;
(g) avoiding inappropriate subdivision and development in areas at high risk from natural hazards;
(h) the potential need for hazard adaptation and mitigation measures in moderate risk areas; and
(i) the need to locate habitable floor areas and access routes above the 1:100 year flood level, in identified flood hazard areas.

3.22 Similar to Policy 29, the explanation to Policy 51 contains helpful interpretive information to be read in conjunction with the policy, including:

Policy 51(i) requires that particular regard to be given, in identified flood hazard areas, to the need to locate floor levels above the expected level of a 1 in 100 year flood or 1% annual exceedance probability (AEP), to minimise damages. It also recognises that access routes should be located above this level, to allow evacuation or emergency services access to and from a site. The clause uses the 1% annual exceedance probability

> *as a minimum standard, allowing for the possibility that it may need to be higher in certain areas, depending on the level of risk*.

3.23 Importantly, this policy establishes the 1% AEP event as the touchstone for managing flood risk by way of plan provisions, resource consent conditions or notices of requirement. It also directs that decision-making must have regard to the impact of climate change, and reinforces the *"avoid"* direction from Policy 29 for inappropriate development and subdivision.

3.24 The Council's notified s32 Report identified that the proposed policies and methods are a direct response to the RPS direction requiring building floor levels to be above the identified 1%AEP event level.[81] It further noted that the proposed flood maps have informed the development of the proposed objective, policy and the rule framework to ensure risk from inappropriate subdivision or development in high risk locations is avoided.[82]

3.25 Mr Osborne and Mr Beban's s42A report recorded their view that the plan change has been prepared in response to the RPS requirements for natural hazards. They added "[in] *particular, the proposed Plan Change maps the flood hazard for a 1 in 100-year flood, taking a risk-based approach to the management of natural hazards, and accounting for climate change. The proposed plan change is considered to be consistent with the RPS*." [83]

3.26 No party presented evidence at the hearing to refute the shared conclusion from the Council and GWRC expert planning witnesses that the plan change gives effect to the RPS.

3.27 Also relevant in the s32 Report to Issue 1, is the summary of resource management issues at Section 5 of that report. Among other points, the report records the following drivers for the proposed plan change:

> *5.2 Currently, the District Plan is silent on the Flood Hazard Extent associated with the Pinehaven Stream and the Mangaroa River[2].*
>
> *5.3 Under the current District Plan provisions, the primary method available to take into consideration the identified Flood Hazard Extents is at the time of subdivision consent. This approach is indirect and lacks certainty or consistency by being applied individually to each application in the absence of a guiding policy framework. Further it is a risk as the Flood Hazard Extents are not identified or recognised within the District Plan, yet the Council must consider it as part of its statutory duties under Section 106 of the RMA. This approach provides the community with less certainty when undertaking developments, and does not represent best planning practice to address the Resource Management issues identified above.*
>
> *5.4 The current approach also has considerable risks, as a proposal to build within the identified River or Stream Corridors, Overflow Paths, Ponding Areas, or Erosion Hazard Area is currently a Permitted Activity in the District Plan. As such, the Council is unable to use the resource management process to avoid or require mitigation for development within the Flood Hazard Extent. As such, it would be possible for buildings to be constructed which are at considerable risk from flooding, which is inconsistent with the outcomes sought under this Plan Change and does not address the identified Resource Management issues.*

[81] S32 Report, p.24, para 6.43
[82] S32 Report, p.24, para 6.41
[83] S42A Report, p.13, para 46

> *5.5 It is acknowledged that the current District Plan objectives and policies pertaining to natural hazards provide some limited support to the current approach undertaken by Council. However, given the broad applicability of these objectives and policies, the lack of supporting rules for either the Pinehaven Stream or the Mangaroa Flood Hazard Extents, and the lack of recognition of the variability of risk in the Flood Hazard Extents, it is considered that these existing provisions are not sufficient to ensure that Council meets its legislative requirements.*

3.28 No party – let alone any expert witness - presented the view that the status quo provisions give effect to the RPS.

Discussion and findings

3.29 My starting point for this issue is to acknowledge the clear statutory direction under the Act for the District Plan to give effect to the RPS. To that same end, I note there is general acceptance in this case that:

a. the operative Plan *does not* give effect to the RPS as it relates to flood hazards in the Mangaroa and Pinehaven catchments; and

b. the plan change remedies that shortcoming by way of the proposed objectives, policies, rules and other methods.

3.30 I have no reason not to adopt these as my own findings, recognising also that there are any number of alternative ways that the Plan could give effect to the RPS in this respect and that there are other statutory requirements that the plan change must fulfil.

3.31 Indeed, the PFMP clarifies that the methods proposed by the plan change are only part of the solution for the management of flood risk for the Pinehaven catchment. Additional enhancement is envisaged by way of structural works to increase the capacity of the stream, reduce blockages and manage flows. Ongoing river management over time is also proposed, including day-to-day management.[84]

3.32 At several points during the hearing, Mr Beban and Mr Osborne discussed the prospect of structural works to the Pinehaven Stream, noting also that works were not considered necessary in the Mangaroa River given its characteristics. In their written reply, for example, Mr Beban and Mr Osborne noted that:

> *71. The Notice of Requirement process for the structural upgrades to Pinehaven Stream is still at its early stage and is being prepared by an external consultant. However, our understanding of the project to date is as follows:*
>
> *(a) The Notice of Requirement will cover the structure works associated with the Pinehaven Stream flood management, including channel widening, increasing bridge heights, and increasing culvert sizes;*
> *(b) The Notice of Requirement is proposed to be lodged in February 2018;*
> *(c) The Upper Hutt City Council will be the Requiring Authority;*
> *(d) It is our understanding that the majority of the works would be within the Stream Corridor as identified on the Flood Hazard Maps;*
> *(e) The majority of the works would be undertaken in the lower catchment of the Pinehaven Stream (the stretch below the Pinehaven Domain); and*

[84] Pinehaven Stream Flood Management Plan: Volume 1 (6 September 2016), Section 6, p.32

(f) The Notice of Requirement process will be publicly notified and all parties will have an opportunity to lodge a submission.[85]

3.33 Mr Beban and Mr Osborne added that the Council and GWRC have agreed to joint funding of the structural works, each contributing to 50% of the cost. Those witnesses also advised that $5.8M has been earmarked in the Council's LTP to the year 2025.[86] They explained that:

a. the improvements anticipated by the structural works will only provide protection from a 1-in-25-year event, noting also that much of the stream currently only has sufficient capacity for a 1-in-5-year event.[87]

b. Those structural works alone, therefore, will not be adequate to achieve the level of risk management anticipated by the RPS for the 1% AEP event.

3.34 In contrast, the PC42 provisions have been designed to specifically address effects from the 1% AEP event for both catchments – albeit through non-structural methods to control development, subdivision and land use within the identified flood hazard extent.

3.35 Notwithstanding the more detailed evaluation of the specific issues below, I record here my adoption of the uncontested evidence that:

a. the plan change gives effect to the RPS and

b. is superior to the status quo in that respect.

3.36 To the extent that submissions support that finding, I consider they should be accepted as captured in **Appendix 1**. Where submissions outright oppose the plan change and have not proposed suitable measures to implement the RPS for the two catchments addressed by the plan change, they should not be accepted.

3.37 Overall, I find that the need for the plan change is compelling and based on the submissions and evidence presented, the proposal is generally appropriate as it:

a. identifies areas at risk from a 1% AEP flood event; and

b. includes objectives, policies and rules to avoid inappropriate subdivision and development in those areas.

3.38 I acknowledge here that the accuracy of the areas identified as subject to the high flood risk and the appropriateness of the related objectives, policies and rules are the more substantive matters raised in submissions. Those issues are the focus of the remainder of my evaluation.

[85] Council Right of Reply (20 October 2017), p.19, para 71
[86] Council Right of Reply (20 October 2017), p.19, paras 72-73
[87] Opening Statement, p.3, paras 3.4-3.6

Issue 2: Flood hazard maps

Issue identification

3.39 Ostensibly the issue of most contention at the hearing related to the accuracy of the proposed flood hazard maps. Submissions raised a broad range of sub-topics on the matter, including (in summary):

a. Forest & Bird, who sought that the flood maps should be withdrawn and that more time is given to consider the proposed maps and their implications;

b. Mr Longstaffe, who:

   i. considered the maps are misleading in that they do not express anticipated flood depth;

   ii. queried the meaning of the term *"ponding area"* and the accuracy of areas mapped with that notation;

   iii. sought clarification as to the genesis of the flood maps, including whether (or not) they are directly related to the PFMP maps;

   iv. explained that the proposed maps do not conform to actual topographical information surveyed at his and other properties; and

   v. that the plan change be withdrawn until an independent audit of the maps is carried out and a further opportunity is afforded to the community to comment on the results.

c. Ms Melanie Brown, who similarly sought withdrawal of the plan change, unless shortcomings about the flood maps' accuracy are overcome;

d. Mr Williams, who stated that the maps lack sufficient quality and accuracy, and are not reflective of the actual flood risk in the areas;

e. Mr & Mrs Baines, who submitted that the maps are based on unsubstantiated data;

f. Ms Robinson, Mr Geoff Workman, Ms Pattinson and Mr Kyle McLennan who all expressed a desire for an independent audit of the maps, having formed the view that the maps are flawed and/or inaccurate;

g. SoH, who submitted that the maps:

   i. are wrong, and display information in a misleading and inaccurate way;

   ii. are based on incorrect and/or tampered-with data, lack quality and credibility and are not fit-for-purpose;

   iii. should be subject to an independent audit, and should not be incorporated in the plan until community concerns have been properly addressed;

   iv. are not representative of 'standard' industry practice, and should be replaced with maps used by other authorities (Hamilton City, for example);

   v. include large areas in the flood hazard extent that are insignificant due to low depth and/or velocity;

   vi. do not include the maps produced by GWRC; and

vii. show a greater flood extent than observed by residents during the 1976 Pinehaven flood, notwithstanding that several physical improvements were made to the stream during the 1980s;

h. Mr Alexander Ross, who sought for freeboard to be shown separately to the flood extent, or (alternatively) that the maps be deleted and subject to a further review;

i. Mrs Moynihan, who expressed the view that the maps are incorrect, inadequate, confusing, and unfairly disadvantage those affected;

j. Mr Moynihan, who submitted that the maps are incorrect as they relate to his property in that they fail to consider the height of land above the river bank, existing flood protection works and drainage paths;

k. UHTCA, who submitted that the maps:

i. are unclear, and their accuracy and origin are unknown;

ii. fail to demonstrate water depth or velocity;

iii. fail to accurately show the actual hazard effect, particularly for the Pinehaven catchment;

iv. should be based on a recognised standard (for example, the NSW method);

v. contain large areas identified as hazard area despite being shallow and/or slow-moving water – which is not an actual hazard;

vi. are ambiguous in that erosion hazard areas are considered both high and low hazard risk; and

vii. should be subject to an independent audit;

l. Jeff and Nolene Berkett, who submitted that the erosion hazard maps contain several errors, and are not representative of their own observations;

m. Mr Jefferies, who considered the maps are impossible to read, unnecessary and inferior to the maps included in Plan Change 15;

n. Mr Duigald Myers, who submitted that the maps are inaccurate, fail to take account of local contour information, and project an unjustifiably large flood extent at his property.

3.40 I have grouped these submission points by common theme below. Each theme includes a summary of the evidence and submissions presented. My findings on the issue as a whole are then presented at the end of this section. In summary, the themes include:

a. the general purpose, accuracy and clarity of the maps;

b. catchment-wide versus site-specific scale;

c. the role of freeboard and climate change;

d. discrepancies between modelled and observed flood extent;

e. the need for further independent review

General purpose, accuracy and clarity of the maps

Pinehaven maps

3.41 Several parties at the hearing voiced their frustration that the PFMP and plan change processes have involved multiple iterations of hazard maps. As Mr McLellan described it, there is concern "*at the confusion over which maps are for what, and for the way in which the flood extents are presented*."[88]

3.42 Ms Robinson expressed a similar sentiment and observed that in her opinion there are discrepancies and inconsistences in the flood map information in relation to:

a. the PFMP publicised by GWRC; and

b. PC42 notified by the Council.

3.43 She tabled a flood map of the Pinehaven catchment generated in 2005 based on the same model as the PC42 maps which shows a different flood extent than the plan change, and questioned how two different maps could be generated from the same model.

3.44 While beyond the scope of matters that I am able to consider as part of this process, Ms Robinson also gave the view that the PFMP maps themselves (as opposed to the PC42 maps) should be limited to the actual modelled extent of inundation without allowance for freeboard.[89]

3.45 Mr Longstaffe and Mr Pattinson shared Ms Robinson's opposition to the substance of the PFMP maps, and to the manner in which those maps had been relied upon and interpreted for the purposes of PC42. Relatedly, the key point made in Mr Longstaffe's hearing presentation was that the volume of water expected in the PFMP hydrology summary for the 1%AEP event is far less than what is shown spatially on the PFMP hazard maps – that is, in Mr Longstaffe's view, the PFMP contradicts itself. [90]

3.46 Mr Longstaffe also explained that, by his calculations, the volume of water expressed in peak hydrographs for the 1% AEP event indicate that the majority of flood water is contained within the stream channel at his property. By extension, he considered the PC42 maps are misleading and incorrect in that they suggest a greater extent of his property would be affected by floodwater than anticipated in the calculations.[91]

3.47 To assist my understanding of what that would look like on the ground, Mr Longstaffe tabled some useful diagrams with plan and long section views (see Figure 3).

[88] Written Notes, UHTCA (28 September 2017), third page
[89] Written Notes, Nicola Robinson (27 September 2017), second page
[90] Written Notes, Darryl Longstaffe (27 September 2017), first page, paragraph labelled "1."
[91] Written Notes, Darryl Longstaffe (27 September 2017), second page, paragraph labelled "4."

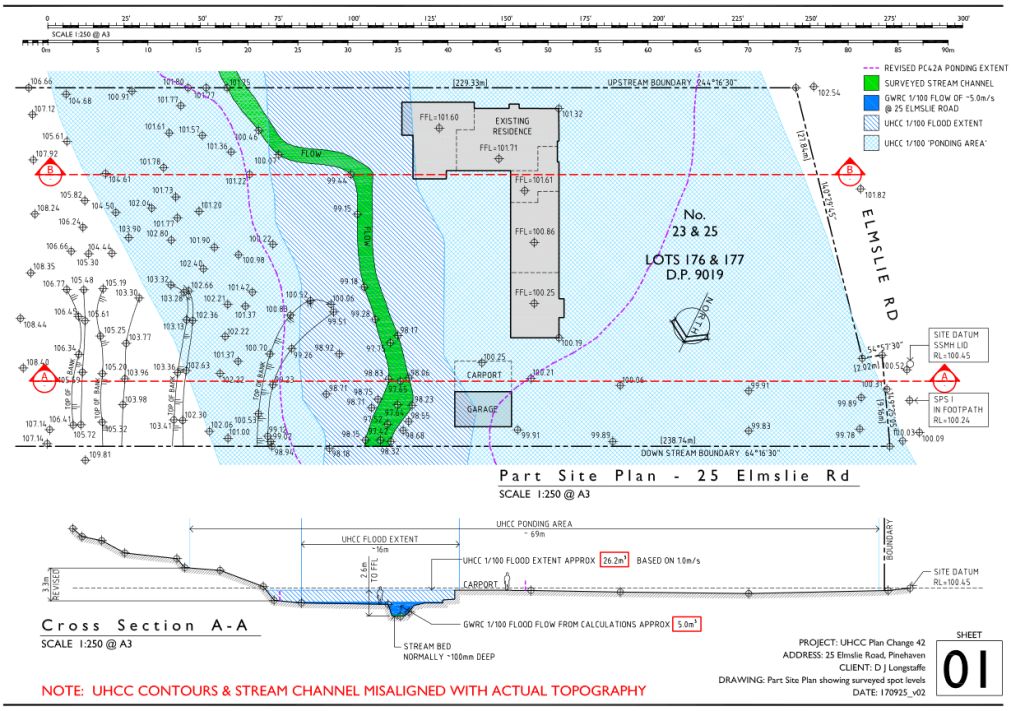


Figure 3: Site Plan and cross section for 25 Elmslie Road.

3.48 The above figure was generated by Mr Longstaffe, using detailed survey data obtained by a qualified surveyor. As part of his discussion of this material, Mr Longstaffe observed that there appears to be large discrepancies in the topographic contour for his property relied upon to generate the Pinehaven flood model when compared with the detailed survey he obtained. I discuss this further below about the catchment-wide versus site-specific approach.

3.49 In the meantime, I note that Mr Longstaffe also expressed concern about the lack of any definition of 'ponding' in the plan change provisions. He considered this shortcoming added to the ambiguity of the PC42 maps, particularly in relation to his property which is too steep to experience ponding to any extent that it might be considered a hazard.[92]

3.50 Mr Pattinson expressed similar sentiments to Mr Longstaffe, and also like Mr Longstaffe, Mr Pattinson obtained a detailed survey of his property. Part of Mr Pattinson's presentation was dedicated to a case study of his property as an indicator of the inaccuracy of both the PFMP and PC42 maps. That particular presentation included more than two dozen slides to illustrate Mr Pattinson's assessment that the GWRC flood model overestimates flood hazard effects on his property due to multiple factors – including incorrect contour information, over-conservative and inaccurate allowance for freeboard and blockages. [93]

3.51 Mr Pattinson presented three more case studies in the Pinehaven catchment in which he generated cross sections of identified locations including flow rates derived from GWRC hydrographs. Based on that information, Mr Pattinson found that the PC42 flood extent amounts to substantially greater flow volumes than the hydrographs indicate.[94]

92 Written Notes, Darryl Longstaffe (27 September 2017), second page, paragraph labelled "6."
93 SoH presentation "*Flood Maps Must be Accurate*"
94 SoH presentation "*4 Case Studies (Dec 2014)*"

3.52 Mr Pattinson also spent time in his presentation to explain that the flood hazard maps do not account for the improvement works made to the Pinehaven Stream in the 1980s. In his view, it is not plausible for the flood extent to be larger than the 1976 extent, given that those improvements have been carried out.[95]

3.53 Mr Hall's tabled evidence addressed the case study at Mr Pattinson's property. On that topic, Mr Hall concluded:

> *(d) My assessment of the situation on the Pattinsons property and the deficiencies evident in both the UHCC and GWRC flood hazard maps are likely to be present everywhere in the catchment and not limited simply to the Pattinson property and accordingly this indicates to me that a critical review of what is presenty* [sic] *being made available with respect to the nature and extent of the flood hazards in the Pinehaven and Mangaroa catchments needs to be undertaken to ensure that what is eventually produced serves the purpose of presenting flood hazard information across the catchment in an informative and accurate way that can readily be understood by the community.*[96]

3.54 Mr Hall's conclusions were based on his own hydraulic analysis, and included reference to the detailed survey information obtained by Mr Pattinson for 27 Elmslie Road.

3.55 Mr Hall also gave the view that the term "*ponding*" used on the PC42 maps is a "*poor choice of terminology*", and should be replaced with more accurate terms.[97] He added that "*ponding per se is not an accurate description of what is likely to be occurring on that land and accordingly creates a misleading impression*."[98] Relatedly, Mr Hall described it as "*imperative*" that the form of the maps convey a clear and accurate message as to what is represented.[99]

3.56 In Mr Hall's view, the maps should be limited to areas where actual flooding and flood related effects are likely and should not include provision for freeboard.[100]

3.57 Mr Law gave an alternative view to Mr Hall on several matters, including on:

a. the application of freeboard; and

b. on the case study evaluation of 27 Elmslie Road –

3.58 Both of these matters are discussed further below.

3.59 Mr Law also responded to the query raised by Ms Robinson about the discrepancy between the 2005 Pinehaven map and PC42 maps. He explained that the difference is not unexpected and likely arises from:

a. better definition of floodplains in the PC42 maps due to the upgrade to include 2D elements in the model (the 2005 maps were based on 1D model results only);

b. extension of the model to include the upper catchments of the Pinehaven Stream;

c. potential differences (including improvement's in modelling since 2005) between the models in the number and spacing of cross-sections, number and dimensions of culverts and bridges included in the model, how informal private

95 SoH presentation "*1980s Significant Drainage Upgrade*"
96 Evidence of Robert Hall (26 September 2017), p.13, para 33(d)
97 Evidence of Robert Hall (26 September 2017), p.13, para 33(c)
98 Evidence of Robert Hall (26 September 2017), p.11, para 30
99 Evidence of Robert Hall (26 September 2017), p.5, para 12
100 Evidence of Robert Hall (26 September 2017), p.13, para 33(c)

structures have been accounted for, other model inputs such as channel/floodplain roughness; and

d. inclusion (or otherwise) of climate change, full or partial blockage of structures, and freeboard.[101]

3.60 Mr Law also clarified in response to Mr Pattinson's presentation that the flood maps *do* account for the improvements made to the Pinehaven Stream in the 1980s.[102] Another observation by Mr Law (and a point also endorsed by Mr Christensen in respect to the Mangaroa Flood Extent documentation) in his consideration of the above submissions – and one that is particularly relevant to the criticisms from submitters that the Plan Change maps are not fit-for-purpose – is that the respective purposes of the PFMP maps and the PC42 maps are quite different.[103] Mr Law amplified this point in his supplementary evidence as follows:

> *56. To confirm; all the Pinehaven flood maps produced for GWRC and UHCC are derived from the same flood model, but different information can be displayed on maps generated from that model. The flood extents can be displayed:*
>
> *(a) With freeboard (PC42 flood hazard maps) or without (1976 modelled outline shown in Figure 2); and with*
> *(b) Outlines to delineate zones for implementation of policy (such as the PC42 maps), or provide detailed information on flood depths, or high-medium-low flood hazard.*
>
> *57. I expanded on this in my 2015 audit report with respect to GWRC's flood mapping) and the information presented in paragraphs 45-48 of my evidence-in-chief. However, I reiterate that the level of detail provided on the PC42 flood hazard maps is appropriate for delivering the provisions of PC42.* [104] (emphasis added)

3.61 In that same context, Mr Osborne and Mr Beban explained that the PC42 maps:

a. are essentially 'zone' maps which define a spatial area within which certain objectives, policies and rules apply;

b. define sub-areas with corresponding labels – such as "overflow path" or "ponding" – which relate to various activity controls on subdivision, land use and development depending on the sub-area affected; and

c. are not intended to show hydraulic or hydrologic detail (such as flood depth or velocity) – which is the domain of the PFMP.[105]

3.62 This misunderstanding of the content and the function/purpose of the PC42 flood hazard maps compared to, say the maps in the PFMP, was unfortunate in my view and seemingly contributed to many of the fundamental concerns raised in respect to PC42. While it seemed to have been less of an issue in the Mangaroa submissions – it nevertheless was also a factor there. Accordingly, I return to this in my discussion and evaluation of Issue 2 below.

---

[101] Supplementary evidence of Michael Law (19 October 2017), para 53
[102] Supplementary evidence of Michael Law (19 October 2017), para 45
[103] Evidence of Michael Law (30 August 2017), p.11, para 42
[104] Supplementary evidence of Michael Law (19 October 2017), paras 56-57
[105] Council Right of Reply (20 October 2017), p.9, para 29

Mangaroa maps

3.63 Mr Jefferies was the first submitter to present in relation to the Mangaroa catchment maps. He outlined three main submission points in turn, the first two of which are relevant to this discussion here.

3.64 Firstly, Mr Jefferies spoke to a plan he attached to his tabled statement. The plan illustrated three locations each situated along the eastern edge of the Mangaroa flood extent near his property. Mr Jefferies expressed the view that the flood extent must be inaccurate in this area given the topographical variation between the three points – being between 20 and 30m in elevation change by his calculations.[106] He gave a similar opinion about the accuracy of the erosion hazard lines.[107]

3.65 In Mr Jefferies evaluation, the PC42 maps have "*smoothed*" the information projected on the PC15 maps. Rather than correcting the PC15 maps, Mr Jefferies considered this change amounted to reduced accuracy.[108]

3.66 Mr Jefferies also gave the view that flood risk to properties downstream from his property were underestimated by the proposed flood maps owing to the high concentration of fallen, falling, dead and dying vegetation in the river channel.[109]

3.67 Mr McLellan spoke to his own observations about the accuracy of the Mangaroa Flood Maps. He compared two cross sections for parts of the river where a similar velocity and volume of water is anticipated but the section distance is substantially different. In his view, this is an anomaly that points to inaccuracies in the maps that should be addressed by independent audit. [110]

3.68 Mr Williams also gave the view that the accuracy of the maps cannot be relied upon. He described the maps as crude, and found the scale to be misleading in terms of overall impact. Mr Williams also expressed concern about the impact of flood information being placed on Council LIM reports and the flow-on effect that will have for insurance purposes. I observe here that the Council's decisions to include certain information on LIM reports is not within my jurisdiction on PC42, so I have not evaluated that matter any further in this report.

3.69 Mr and Mrs Moynihan also were uncertain about the accuracy of the maps. Mr Moynihan gave the view that climate change should not be factored into decision making on flood hazards as it is a "*fear mechanism*" rather than a real effect. The Moynihans also observed that the maps are full of assumptions and demonstrable errors, and based on spatial information lacking sufficient detail. Like Mr Williams, Mr and Mrs Moynihan were concerned about the impact of the maps on their land value and on insurance premiums.

3.70 Mr and Mrs Berkett were unable to attend the hearing, but tabled a statement for my consideration. In that statement, they reiterated their view that the flood hazard maps are misleading and contain errors.

3.71 The Berketts listed results of their own rain records gauged at their property in Whitemans Valley since 1976. They noted that the largest event they recorded in that time was in 2004, which amounts to a 20-year event with a peak flow of 276m^3/sec.

[106] Statement of Alan Jefferies, paragraph 1
[107] Statement of Alan Jefferies, paragraphs 4-7
[108] Statement of Alan Jefferies, paragraph 1
[109] Statement of Alan Jefferies, paragraph 3
[110] Written Notes, UHTCA (28 September 2017), third page

3.72 The Berketts also questioned why the 1%AEP was the model event and how the PC42 maps could be different to the PFMP maps.

3.73 Notwithstanding the above submitters' presentations, Mr Christensen confirmed his view that the flood modelling for the Mangaroa catchment was generated in accordance with best practice and is fit for the purpose intended by the Plan Change.[111]

3.74 In particular, Mr Christensen did not share Mr Jefferies' appraisal that the PC15 maps have been 'smoothed' to generate the PC42 maps. He reiterated the differences between the two has arisen as a result of his peer review of the original model results derived by SKM/Jacobs.[112]

3.75 That review process has been well captured in the final Mangaroa River Flood modelling report, in Mr Christensen's evidence in chief and supplementary evidence, and summarised above in section 2 of this report. Further rationale given by Mr Christensen to demonstrate the maps' appropriateness is set out further below.

Alternative options for mapping descriptions

3.76 At the hearing, Ms Robinson and Mr Pattinson expressed their preference that a different format be adopted for projecting flooding information on the maps. For example, the maps used in the Hamilton City Council District Plan were identified as a preferred alternative to the PC42 maps.

3.77 The Hamilton maps use terminology such as *"high", "medium"* and *"low"* flood hazard area, in contrast to PC42's use of the terms "*stream corridor", "overflow path"* and *"ponding area"*.

3.78 Mr Pattinson's presentation included the following description of the high, medium, and low flood hazard areas in the Hamilton context (***emphasis*** added):

> *This modelling creates a picture of what flooding may look like from an extreme rainfall event (i.e. a 1 in 100 year event). Two sets of modelling are used, one for the Waikato* ***River corridor*** *dealing with river flooding and another for sub-catchments in the city dealing with* ***overland flowpaths*** *and* ***ponding*** *flooding. The land affected has been divided and mapped into high, medium and low categories according to the different flood water depths and velocities that the models show could occur in an extreme rainfall event.*[113]

3.79 Mr Christensen's evidence in chief noted that the Hamilton City, New South Wales Government (2005) and FEMA (2014) methods all use industry practice, whereby depth and velocity of floodwater are used to determine the degree of flood hazard in a particular location. He confirmed that PC42 adopts the same approach, albeit that it retains the descriptors of flood type as opposed to the high, medium or low risk labels. He usefully clarified that, for PC42:

a. the *"high hazard"* areas include River Corridor (where depth > 0.8 m, velocity > 2m/s or Depth x Velocity > 0.5m/s, and also considers past location of main river channel);

[111] Supplementary evidence of Kyle Christensen (19 October 2017), para 18
[112] Supplementary evidence of Kyle Christensen (19 October 2017), para 5
[113] SoH presentation "*Flood Maps Must be Accurate*", slide 3.25

b. the *"medium hazard"* areas include overflow path (where depth > 0.25 m and velocity > 0.5 m/s, or depth x velocity > 0.25m^2/s); and

c. the *"low hazard"* areas include ponding areas (where depth = 0.1 to 0.25 m, velocity < 0.5 m/s or Depth x Velocity < 0.25 m^2/s).[114]

3.80 Mr Law's evidence also discussed the alternative mapping labels preferred by submitters. He said that providing more detail (such as flood depths or velocities) would give plan users more information. However, he added that it is not the planning maps' purpose to provide that level of detail – they are an identification tool, rather than a quantification tool.[115]

3.81 Mr Osborne and Mr Beban also gave the view that the terms used in the PC42 maps have the same intent and meaning as the Hamilton maps. They added that their preference is to retain the notified terminology as it aligns with the nomenclature used in other plans and policies in the Greater Wellington Region.[116]

Proposed s42A Report map amendment: removal of extent less than 100mm depth

3.82 As conveyed by Ms Robinson, Mr Longstaffe and Mr Pattinson at the hearing, some submitters' frustrations with the sheer number and different versions of the flood maps was exacerbated by the recommendation in the s42A report that, in response to certain submissions, the notified PC42 maps for both Pinehaven and Mangaroa be amended to reduce the impact on Flood Extent areas in respect to take account of reduced allowance for freeboard.

3.83 The full outline of the reasons and justification in the report for the proposed amendments to the maps was as follows:

> *83. The flood hazard extent maps notified under this plan change were the same flood hazard maps as denoted in the PFMP and the Mangaroa Hydraulic Modelling Report (GWRC, 2015). However, a number of submissions[6] received on this plan change challenged the accuracy of the flood maps. The Save our Hills submission (#12) specifically opposes the inclusion of areas in the hazard extents where the modelling predicts flood waters of 100mm or less on the grounds that the risk is insignificant and does not represent a hazard to people or property. Submission #12 requests this initial depth is removed from the flood hazard extent.*
>
> *84. The flood hazard maps representing the extent of the flood hazard include all flood water above ground level. Therefore, the proposed planning provisions would apply equally to all areas within the flood extent regardless of the depth. Expert evidence from Mr Kyle Christensen and Mr Michael Law support the removal of the areas comprising less than 100mm as they are likely to represent a very low or insignificant risk to people and property because of the limited flood water depth. Accordingly, such low risk is not considered to require regulatory intervention as part of this plan change.*[117]

3.84 Both Mr Christensen and Ms Westlake explained that the amendments to both the Pinehaven and Mangaroa documents in the s42A report was made via a mapping exercise by removing the area of the flood extent less than 100mm depth including freeboard and did not require or involve any re-running of the relevant hydraulic models. This process

[114] Evidence of Kyle Christensen (25 August 2017), paras 32-32
[115] Evidence of Michael Law (25 August 2017), p.11 para 46
[116] Council Right of Reply (20 October 2017), p.10, para 33-34
[117] s42A Report, p.19, para 83-84

did not result in any change to the design flood levels themselves, but does reduce the extent of land in both catchments to which the plan change provisions apply.[118]

3.85 The upshot of this is that while the revised PC42 flood hazard maps for both Pinehaven and Mangaroa now illustrate the 1%AEP event extent that is greater than 0.1m in depth, the PFMP continues to show the full modelled extent of the 1% AEP event. Ms Westlake added that the GWRC PFMP maps will continue to be used for their intended GWRC purposes, being to:

a. provide flood hazard advice about extent and depth of flooding;
b. recommend building levels for new houses;
c. set fill levels for subdivisions; and
d. act as an information resource on the GWRC webmap. [119]

3.86 As noted in the Council's reply, the retention of the full extent in the PFMP is reflective of its purpose as distinct from the plan change maps.[120] Furthermore, the content of the PFMP – including any amendments to it – is beyond the scope of my jurisdiction and therefore outside any recommendations I am able to make on PC42.

Catchment-wide versus site-specific scale

3.87 This sub-issue builds on the discussion above relating to the case study presentations from Mr Longstaffe and Mr Pattinson for their respective properties.

3.88 An important point that both submitters established with their presentation was that the contour information generated from the detailed surveys of their properties indicate some notable differences to the information relied upon for the flood model. This discrepancy was a major cause for concern for the submitters, and contributed to their collective view that the maps are lacking in accuracy and not fit-for-purpose.

3.89 Upon questioning from me at the hearing, neither Mr Christensen nor Mr Law refuted the accuracy of the survey data obtained by the submitters nor the finding that the survey data is more accurate than the contour information relied upon in the flood model. However, both experts expressed the view that the submitters' presentations did not change their view that the plan change maps remain fit-for-purpose.

3.90 In that respect, Mr Christensen gave the view that it is quite possible for a different flood depth to be obtained where site specific topography is relied upon than the catchment-wide hydraulic analysis used to derive the plan change maps. He stressed that the latter site-specific surveys at the catchment scale are not practicable or cost effective.[121]

3.91 Alternatively, Mr Christensen gave the view that the combined 1-D / 2-D hydraulic model approach used to inform the plan change maps is very accepted practice. For the Mangaroa catchment, this included 130 cross sections to generate the 1-D component and a 1m^2 LIDAR grid for the 2-D component.[122]

[118] See Supplementary evidence of Kyle Christensen (19 October 2017), paras 30-31 and Statement of Sharyn Westlake (27 September 2017), p.5, para 3.5
[119] Statement of Sharyn Westlake (27 September 2017), p.6, para 3.7
[120] Council Right of Reply (20 October 2017), p.10, para 32
[121] Supplementary evidence of Kyle Christensen (19 October 2017), paras 14-16
[122] Supplementary evidence of Kyle Christensen (19 October 2017), paras 15-18

3.92 In response to the flood extent generated by Mr Hall for 27 Elmslie Road, and to Mr Hall's finding that the overland flow predicted in the GWRC flood model is unlikely to result from a 1% AEP event, Mr Law said:

> *80. I have not had the opportunity to discuss with Mr Hall his modelling (as summarised in paragraphs 19 and 27 of his evidence) of 27 Elmslie Road. It appears that while the ground model was based on a detailed survey undertaken by Mr Pattinson, the hydrological and hydraulic modelling was simple:*
>
> *(a) Reference is made in Paragraph 27 to use of the simplistic Rational Method for calculating overland flows. This only provides a single peak flow. While it is appropriate for assessing the differences between pre and post-development peak flows for small development areas, it does not provide the changes of flow over time that GWRC's model requires to assess the catchment-wide interaction of flows from the different subcatchments.*
>
> *(b) No information is provided as to what software or approach was used for the hydraulic modelling to derive flood depths and extents from the calculated flows.*
>
> *(c) Very limited information is provided regarding the modelling parameters and inputs used.*
>
> *(d) My understanding is that no account was taken of upstream and downstream factors (such as constrictions and blockage) that could affect flows and water levels at 27 Elmslie Road.*
>
> *81. I am not aware that Mr Hall has had his modelling reviewed.*

3.93 In the absence of any opportunity to question Mr Hall and test his evidence in the hearing forum, neither Mr Law or indeed myself were able to obtain any clarification to the above matters. On this basis, and as I explained in the introductory section of this report, my role is not to introduce my own evidence but rather to evaluate the evidence before me. In this respect, I have no reason not to accept Mr Law's explanation as to why he is not convinced of Mr Hall's finding that the overland flow predicted in the GWRC flood model is unlikely to result from a 1% AEP event.

3.94 In any event, the key planning issue for my consideration of this sub-issue concerns the role and function of the flood hazard maps in PC42 – which I was advised by the UHCC planning witnesses will operate at two distinct levels:

a. at the <u>macro level</u> – where the catchment-wide maps convey the modelled flood extent (with allowance for freeboard and reductions of 100mm depth) within which specific policies and rules manage subdivision and land use activities; and

b. at the <u>micro level</u> – where there is scope through the resource consent process for affected landowners to commission detailed site-specific assessments, which might in turn demonstrate a more accurate representation of the 1%AEP flood extent on that site, and enable consent to be granted for various activities.

3.95 As I noted in my evaluation below, I accept that this is an appropriate role and function of the flood hazard maps and the rules that underpin them. I also hope that this "due process" has also become clearer to many of the submitters to the plan change.

The role of freeboard and climate change

3.96 As noted above, several submitters gave the view that the flood hazard maps in PC42 should not account for climate change and/or freeboard.

3.97 Mr Hall's evidence also dedicated some time to the application of freeboard in the PC42 hazard maps. He explained that freeboard is generally applied to allow for uncertainties in modelling. Mr Hall signalled that the application of freeboard used in the flatter portion of the Pinehaven catchment – being 300mm – appeared generally appropriate for the stream channel; however, he did not agree with that level of freeboard applying to shallow overland flow or *"ponding"* areas. In his view, a freeboard of 50mm for those shallow areas would be "*more than sufficient*." [123]

3.98 Expanding on that finding, Mr Hall's statement recorded his view that the manner in which freeboard has been applied for flood management in the Pinehaven catchment creates a very confusing and misleading impression of the nature of flooding present (if at all) and fails to clarify the scale of the hazard in a meaningful way. It was also Mr Hall's view in his statements that this has the effect of concealing the actual flood conditions that may be present at a site.[124]

3.99 Mr Hall concluded in his statement that the PC42 maps should be based on the 1%AEP plus climate change water profiles without the inclusion of freeboard.[125]

3.100 Mr Christensen's evidence helpfully assisted me by expanding on Mr Hall's description of freeboard. In that respect, Mr Christensen added that freeboard allows for uncertainty in the hydraulic model accounting for such things as:

a. blockage of bridges and culverts (sediment of other debris);
a. higher than expected channel or floodplain roughness (larger, denser vegetation or other obstructions e.g. fences);
b. uncertainty in the design hydrology;
c. coincidence with high flows in the receiving channel (Hutt River) creating a backwater affect;
d. build-up of sediment in the channel (aggradation);
e. inaccuracies in the topographical survey;
f. waves from vehicles or due to localised hydraulic effects (e.g. upstream of buildings); and
g. higher water levels around the outside of bends (superelevation).[126]

3.101 Mr Christensen's view was that freeboard is not "*an optional extra*" to be added to the output of models. It is, in his description, an estimate of the upper range of inundation for a given return period flood event. By way of example, Mr Christensen explained if "*the <u>modelled</u> flood depth is 100 mm and 300 mm freeboard is considered appropriate then the <u>design</u> flood depth is 400 mm <u>not</u> 100 mm*."[127]

123 Evidence of Robert Hall (26 September 2017), p.11, paras 28-29
124 Evidence of Robert Hall (26 September 2017), pp.11-12, para 32
125 Evidence of Robert Hall (26 September 2017), p.5, para 11
126 Evidence of Kyle Christensen (25 August 2017), para 26
127 Supplementary evidence of Kyle Christensen (19 October 2017), para 20

3.102 Mr Christensen explained the application of freeboard in the PC42 maps as follows:

> *22. The method for application of freeboard for both Mangaroa and Pinehaven catchments is based on the "dynamic" method which is depicted in Annex 1. The "dynamic" method involves adding the designated freeboard to the peak water level in the model and then re-starting the model and allowing the added freeboard to spill out to determine the flood extent. The other method commonly used is referred to as the "static" method which adds the designated freeboard to the peak water level in the model and then extends that out to where that level intersects the land surface. The "dynamic" method is generally preferred as this lessens the potential for exaggerated extents due to the additional volume required to actually fill the floodplain up to the "statically" determined extents.* [128]

3.103 Mr Christensen noted that there are not currently any accepted national standards or guidelines for the application of freeboard.[129] He did, however, provide a comparison of PC42 against recent best practice examples (District Plan reviews) in Christchurch and Auckland. To that end, Mr Christensen found:

a. the Auckland example to be comparable to PC42 in that it:
   i. uses the 1%AEP as the model level event;
   ii. applies freeboard using the dynamic method, albeit that the Auckland freeboard allowance is greater than PC42 (0.5m freeboard applied versus 0.3m); and
   iii. requires floor levels to be raised above 0.5m above the 1%AEP event within the areas affected by the freeboard allowance; and
b. the Christchurch example to be more conservative than the PC42, owing to its use of a 1-in-200-year event and application of freeboard using the 'static' method.[130]

3.104 Mr Christensen also gave the view that the inclusion of freeboard in PC42's case is consistent with what has been applied across the Wellington Region for the respective district plan maps covering the Otaki, Waikanae & Hutt floodplains as well as the mapping currently being developed for a number of floodplains in the Wairarapa.[131]

3.105 In Mr Christensen's view, failure to provide for freeboard is unacceptable, as it could result in future development in areas affected by flooding without being subject to appropriate controls such as minimum floor levels.[132] Relatedly, Mr Christensen concluded that freeboard must be added to the modelled flood levels in order to determine the extent to which planning controls should be applied. Overall, his view was that the PC42 maps do so with freeboard determined in a manner consistent with regionally and nationally adopted practice.[133]

3.106 Mr Law signalled his alignment with Mr Christensen's explanations of freeboard and its application to PC42.[134] In his evidence in chief, he added:

[128] Supplementary evidence of Kyle Christensen (19 October 2017), para 22
[129] Evidence of Kyle Christensen (25 August 2017), para 29
[130] Supplementary evidence of Kyle Christensen (19 October 2017), paras 24-26
[131] Supplementary evidence of Kyle Christensen (19 October 2017), para 23
[132] Supplementary evidence of Kyle Christensen (19 October 2017), para 21
[133] Supplementary evidence of Kyle Christensen (19 October 2017), para 28
[134] Supplementary evidence of Michael Law (19 October 2017), para 72

> 52. *Application of freeboard extends the potential floodplain beyond the modelled flood extent, and is used to assist in the setting of levels for floors and vulnerable services.*
>
> 53. *For the Pinehaven catchment, freeboard has been applied by increasing flood levels by 300mm in the flatter parts of the catchment and by 500mm in the steeper and narrower upper valleys. These increases in flood level are reflected in an increase in flood extent. The difference in freeboard depths between the flatter and steeper parts of the catchment reflects the relative sensitivity of areas to the variables incorporated in freeboard. While methods of applying freeboard vary around the country, the approach adopted for the Pinehaven catchment is used elsewhere and is appropriate for the provisions of the District Plan.* [135]

3.107 For completeness, I note there was consensus amongst the experts – Mr Hall, Mr Law and Mr Christensen – that the effects of climate change should be factored into the modelling underpinning the plan change.

Discrepancies between modelled and observed flood extents

3.108 Submitters from both catchments expressed doubt about the accuracy of the flood hazard maps given observations of actual flood events.

3.109 For example, Mr Williams' presentation focussed on the accuracy of the Mangaroa extent, and included photos he had taken of a flood in 2016, which he described as a large event. Mr Williams cross referenced the extent of floodwaters in the photos against the flood hazard maps as evidence that the latter grossly overestimates flooding effects in the Mangaroa catchment.

3.110 Mr Pattinson's presentation included a summary of 10 eyewitness accounts of the 1976 flood. This included detailed maps and photographs illustrating differences between the observed accounts of the witnesses and the PC42 flood hazard maps.

3.111 Four of the eyewitnesses appeared at the hearing on Mr Pattinson's behalf, including Mr Colin Buckett. From Mr Buckett's account, the 1976 floodwaters never came near his property at 7 Jocelyn Crescent. He explained that the site is some 6m above the Pinehaven Stream, and that flow rates of around 5,000L of water per second would be required for floods to enter the property.

3.112 Mr Buckett also told me that he accompanied an engineer conducting site/area inspections during the 1976 flood, so he had a reasonable grasp of its extent. He recalled that the main problem identified by Hutt County Council at the time was a blocked culvert at Silverstream, which has since been subject to improvement works.

3.113 In response to a question from me, Mr Buckett confirmed that he did not make a submission on the plan change, but that he wrote a letter to the Council expressing his disapproval.

3.114 Mr Paul Cocker – a local resident for 61 years – also gave an account of his experience with the 1976 flood. He told me that he did not observe any water entering houses in the Jocelyn Crescent area, though some water came onto the sites themselves. Mr Cocker also observed ponding at Birch Grove, due to culvert blockages.

[135] Evidence of Michael Law (30 August 2017), p.12, paras 52-53

3.115 Mr Keith Thomas has lived at 44 Whitemans Road since 1975. He said that the PC42 maps do not align with his recollection of the 1976 flood extent, noting in particular his neighbour on Dunns Street whose property (in the proposed PC42 ponding area) did not encounter any surface flooding in 1976. Mr Thomas expressed the view that the maps are inaccurate and send a false impression to the public and to insurers. That the PC42 maps do not align with the 1976 flood is evidence, in his view, that a new model should be generated.

3.116 Mr John Campbell was the last eyewitness called by Mr Pattinson. His experience of the 1976 flood was that the flow levels near his property at 2 Harewood Grove remained within the road, and did not spill over into private property. This is in contrast to the PC42 maps which indicate a ponding area over much of 2 Harewood Grove.

3.117 Mr Pattinson followed the above recorded eyewitness presentations with further accounts of other local residents he spoke with about the 1976 event. He also provided a photomontage of 138 Pinehaven Road, indicating the difference between the observed 1976 flood extent and the proposed PC42 flood extent.[136]

3.118 Mr Pattinson also presented his views on what he described as "*garbage assumptions*" the Council relied upon in justifying the difference between observed and modelled flood extents, including:

a. the assumptions about culvert blockage are overstated and improbable, particularly in light of the improvements made to the stream channel in the 1980s;

b. the assumptions about climate change amount to scaremongering, seeing as they add no more than 100mm to anticipated levels; and

c. the assumptions about freeboard exaggerate the flood hazard, and are unnecessary.[137]

3.119 Mr Hall's evidence did not address the 1976 flood or any discrepancies between its extent relative to the proposed PC42 extent.

3.120 Mr Christensen's supplementary evidence commented on this issue, both generally and with specific regard to the Mangaroa catchment. In a general sense, he noted that a 100-year return period flood event is – by its definition – a rare event. He said:

> *If observations have been made over a long period, such as 50 years there is still only a 40% chance that a 100-year flood event has occurred during this period. This reduces to 18% when considering a 20 year period and 10% when considering a 10 year period. It is therefore more likely (i.e. greater than 50% chance) that an individual hasn't in fact observed a 100-year flood event.* [138]

3.121 Mr Christensen added that with the effects of climate change, future floods are expected to be larger than those events experienced to date.[139]

3.122 In relation to the Mangaroa catchment, and Mr Williams' presentation in particular, Mr Christensen explained:

---

136 SoH presentation "*Community Consultation & 1976 Flood*", slides 1.18-1.19
137 SoH presentation "*Community Consultation & 1976 Flood*", slides 1.21-1.24
138 Supplementary evidence of Kyle Christensen (19 October 2017), para 10
139 Supplementary evidence of Kyle Christensen (19 October 2017), para 10

a. the anticipated 1%AEP event in the Mangaroa River is estimated at 365m^3/s, increasing to 475m^3/s with an allowance for climate change effects;

b. the November 2016 event referred to by Mr Williams was measured at 160m^3/s or approximately a 3-year return period event;

c. further discrepancies in observed flood extents can arise from variable rainfall concentrations in different parts of a given catchment – for example, the 1976 event resulted in 300mm of estimated rainfall in the upper Pinehaven catchment and a 100-year return event, while in the Mangaroa, similar rainfall was recorded in some, but not all parts, of the catchment and the event was deemed a 20-year return there; and

d. this is relevant to his own findings that the 1976 flood event is not useful for model calibration purposes in the Mangaroa catchment. [140]

3.123 Mr Law's supplementary evidence also considered the differences in observed and modelled information in detail. In response to questions I raised during the hearing, he outlined the following points:

a. running observed flood events in a flood model can be useful for calibration purposes, and there are explicable circumstances for observed and model results not marrying fully;

b. in this latter respect, Mr Law noted that the engineers responsible for the original Pinehaven flood model attributed differences to the quality of information being less reliable in 1976 and to the model not allowing for debris blockages;

c. along similar lines, Mr Law noted that while modelling historic events to calibrate is good practice, it presents difficulties including:

   i. the model geometry must reflect the situation as it existed during the historical event;

   ii. ideally, more accurate rainfall data would be available than was obtained during the 1976 event;

   iii. eyewitness accounts are useful, but can be selective and/or not representative; and

   iv. every flood is different and could result in unique rainfall patterns, blockages and/or downstream conditions affecting upstream effects.[141]

3.124 Furthermore, Mr Law gave the view that, based on the available information for the 1976 event, it is reasonable to consider it a 1%AEP event that has not been adjusted to account for climate change. He noted also his view that the hand drawn maps indicating the 1976 flood extent is not of suitable accuracy for model calibration, nor is the methodology for its creation known. Given those characteristics, Mr Law said it was completely understandable that the map did not align with the eyewitness accounts.[142]

3.125 Mr Law also referred to historical photos available in relation to the 1976 flood that illustrate local effects from unpredictable blockages and debris. In his view, such factors are evidence for the need to apply appropriate freeboard and further explain why the flood hazard maps for PC42 do not marry with the observed extents in 1976. [143]

[140] Supplementary evidence of Kyle Christensen (19 October 2017), paras 11-13
[141] Supplementary evidence of Michael Law (19 October 2017), paras 17-21
[142] Supplementary evidence of Michael Law (19 October 2017), para 67
[143] Supplementary evidence of Michael Law (19 October 2017), paras 69-71

The need for further independent review

3.126 The final sub-topic I consider here under Issue 2 relates to requests from submitters that the plan change be put on hold until such time as an independent expert review is conducted into various aspects of the supporting information used to generate the flood hazard maps.

3.127 Mr McLellan, for example, conveyed UHTCA's desire to see the Council pause the current process and re-engage with the community to produce a collaborative model, maps, policies and rules that all parties can agree to. [144]

3.128 In her presentation, Ms Pattinson confirmed that she has repeatedly sought further independent audits of various aspects of the Pinehaven modelling and plan change processes, including that:

a. a neutral auditor be appointed who had not previously worked for the Council or GWRC and that property owners/submitters be involved in her/his appointment;

b. the audit include investigation into the Council and GWRC procedures, the consultant and experts that have been engaged by the Councils, and their relationships with the Councils, to determine whether or not they have acted impartially; and

c. the terms of reference for the audit include consideration of potential future development in the Southern Hills. [145]

3.129 Ms Pattinson also expressed her desire for the Council to fund independent experts and legal advisors to represent interested parties in the community.[146]

3.130 At several junctures during the hearing, Mr Pattinson also expressed his desire for independent audit to be carried out. As this was a matter not only of some import to Mr Pattinson, but also to the outcome of the plan change, I took care to clearly distil the key points he believed should be subject to such an audit. In response to a question I asked to obtain that clarity, Mr Pattinson listed several matters for the review and also requested the ability to come back in writing subsequently.

3.131 I granted Mr Pattinson's request, and his corresponding written inventory of matters to audit included:

a. topography (where GWRC modelling differs markedly at individual site level from facts on the ground);

b. assumptions about climate change;

c. assumptions about blockages

d. assumptions about ground roughness coefficients;

e. the [mis]use of freeboard; and

f. how 'depth <0.1m' is removed from the flood maps. [147]

[144] Written Notes, UHTCA (28 September 2017), second page
[145] Written Notes, Susan Pattinson (28 September 2017), pp.1-2
[146] Written Notes, Susan Pattinson (28 September 2017), pp.2-4
[147] Correspondence from S. Pattinson to PC42 Commissioner entitled "*What to audit and rectify: UHCC PC42 – Mangaroa and Pinehaven Flood Extents*", undated, pp.1-2

3.132 Mr Pattinson also reiterated his desire for the audit to result in the provision of "*true flood hazard maps*" that follow the Hamilton and New South Wales Government method (low/med/high) based on flow depth x velocity without allowance for freeboard, and without mapping areas where flood depth is lower than 100mm.

3.133 For completeness' sake, I note that Mr Pattinson helpfully clarified on several occasions during hearing that neither he nor SoH question the hydrology underpinning the flood maps in either PC42 or the PFMP

3.134 Mr Law addressed this matter in his evidence in chief, noting:

> *38. I concluded in my 2015 audit that the hydraulic modelling behind the GWRC flood maps was fit for purpose for producing the flood extent and hazard maps for the current development situation for the Floodplain Management Plan.*
>
> *39. The modelling represented industry standard practice and a further audit would not change this or alter the flood extent and depths for the design flood events and scenarios modelled, and so the flood modelling is fit for defining the flood hazard extents proposed in Plan Change 42.*
>
> *40. During the audit, I noted an error in the way that future development had been modelled. This was subsequently corrected. I will expand on the potential effects and mitigation of future development later in my evidence.*

3.135 Mr Law also clarified that his original appointment to audit the Pinehaven modelling completed by SKM was indeed independent, and his first appointment by GWRC. [148] In other words, his appointment is in of itself an independent audit of the model.

3.136 Similarly, Mr Christensen's involvement in this proposal has come about due to his initial engagement to independently – and critically – review the previous flood modelling basis for PC15.

Overall findings on the proposed flood hazard maps in PC42

3.137 I share the Council Officers' collective view that the purpose of the maps is an important starting point to gauging their appropriateness. In this instance, the purpose of the plan change maps is *not* to project a spatial representation of the likely flood extent during a 1% AEP event based on a detailed site-by-site evaluation of each relevant property. Rather, they establish a spatial area:

a. derived from a catchment-wide 1-D/2-D model for the 1% AEP event, using industry-accepted practice and including amendments proposed in response to well-founded submissions; and

b. within which specific policies and rules apply to subdivision, land use and development in order to avoid, remedy or mitigate the actual and potential effects of future flooding events.

3.138 The latter of these two was surprisingly not acknowledged by any of the parties who I heard from. I received no information from submitters at the hearing about their thoughts on the appropriateness of the proposed rules for subdivision and land use, or any indication of concern about the important relationship between those provisions and the maps. Instead, the focus was squarely on the maps themselves, their accuracy and the specific information they project.

[148] Supplementary evidence of Michael Law (19 October 2017), para 67

3.139 On that matter of accuracy, I acknowledge the demonstrable effort put into the presentations by Mr Longstaffe and Mr Pattinson in particular, including:

a. the detailed survey information for their respective properties and

b. the associated plans, sections and case studies they presented.

3.140 For the reasons given by Mr Christensen[149] and Mr Law,[150] however, I am not of the view that either of those submitters' presentations demonstrate a fatal flaw with the PC42 maps.

3.141 Moreover, the plan change provisions enable a site-specific assessment pathway where – similar to what Mr Pattinson and Mr Longstaffe provided at the hearing – resource consent applicants can present detailed information in support of a specific subdivision or land use proposal. Where that supporting information is to a higher accuracy than the PC42 maps, the expectation of the plan change is that the detailed information will be favoured, and the application will be processed on that basis. As I alluded to earlier, I consider this use of the consent process is appropriate for achieving the proposed objectives, having considered the full suite of evidence presented at the hearing.

3.142 Where submitters have expressed frustration at the multiple iterations of maps used for the various processes leading to this point, I certainly have sympathy for their position. That the PFMP and plan change processes are related yet distinct, for example, is an inherently confusing concept. However, that is not to say that the plan change is unclear about the purpose of the maps.

3.143 Relatedly, that there are discrepancies or variation between the PFMP maps and the PC42 maps is not (in of itself) an unanticipated or flawed outcome given the reasons for those differences. To the contrary, the most substantial difference between the two has come about as a direct result of Officers agreeing with submissions – particularly submissions from SoH, the Pattinsons and Mr Longstaffe – requesting in their notices of submission that flood depth less than 100mm need not be managed through the proposed regulatory approach in the Plan Change.

3.144 Furthermore, that the maps do not use the format or nomenclature that some have expressed a desire to see is not an indication that the maps are not fit for the purpose intended by the plan change.

3.145 Relatedly, the suggestions from submitters that the Hamilton City Council mapping approach is preferable included no analysis as to the relationship between those maps and any associated planning policies or rules. I was presented with no evidence, for example, to clarify whether the Hamilton City Council maps implement policies with the same direction as in PC42, and/or relate to rules with a comparable breadth or regulatory stringency.

3.146 Similarly, it was not made clear to me whether the strategic direction for flood management in the Waikato Regional Policy Statement – which the Hamilton City provisions must give effect to – is comparable to the corresponding direction in the Wellington RPS.

3.147 Given these observations, some caution must be adopted in considering suggestions that the plan change should adopt the Hamilton approach.

[149] For example, at paragraphs 14-18 of Mr Christensen's supplementary evidence
[150] For example, at paragraphs 33-40 of Mr Law's supplementary evidence

3.148 That said, as submitters *specifically* identified the Hamilton Plan as an alternative to PC42, I have accordingly had regard to those provisions as an example of planning practice adopted in other recent second-generation RMA plans. In reviewing the Hamilton provisions, supporting technical information[151] and related summary information on the Hamilton City Council website[152], my own observations are aligned with Mr Beban, Mr Osborne and Mr Christensen that the intent of the Hamilton provisions is broadly aligned with PC42. For example, I note:

a. the flood maps for Hamilton and PC42 adopt the 1%AEP event with allowance for climate change impacts to 2090;

b. similarly, both Hamilton and PC42 maps are based on a combined 1D-2D catchment-wide model, relying on LIDAR, and with allowances for local conditions;

c. the Hamilton flood maps and associated rules work in much the same ways as the PC42 maps, albeit using different terminology (low, medium, high versus ponding, overflow path and stream/river corridor) and with some differences to rule format, definitions, activity statuses and other methods;

d. freeboard is applied in Hamilton to the implementation of District Plan provisions relating to the 'Flood Hazard Area' (low, medium and high) via permitted activity building rules that require the following minimum freeboard to be applied for building floor levels within that area:

   i. residential buildings = 1%AEP event + 500mm

   ii. commercial buildings = 1%AEP event + 300mm

   iii. non-habitable residential buildings = 1%AEP event + 200mm.[153]

3.149 It is clear from the above that the concept of freeboard is applied to both the PC42 and Hamilton provisions, with two immediately discernible distinctions evident.

a. Firstly, the Hamilton flood map layers do not appear to have applied freeboard to their defined extent. Based on Mr Christensen's evidence about the PC42 modelling exercise, I gather that the flood extent is therefore more confined (overall) than it would be if freeboard were applied within the mapped extents.

b. The second difference is that different freeboards are applied to buildings associated with different activities in the Hamilton context as a risk mitigation measure. This is in contrast to PC42 which has a more uniform application of freeboard.

3.150 In considering these differences between Upper Hutt and Hamilton provisions, and reiterating the lack of evidence presented to me about the detailed statutory drivers, flood modelling, District Plan objectives and policies and other 's32 matters' relevant to the Hamilton context, it is difficult for me to apply any meaningful weight to the notion that the Hamilton provisions are a more appropriate alternative to PC42.

3.151 What is clear from the evidence presented to these proceedings however, is that the application of freeboard is an industry accepted tool for compensating for inherent

[151] AECOM Report "*Flood Hazard Report*" (29 October 2012), retrieved January 2018 from http://www.hamilton.govt.nz/our-council/council-publications/districtplans/flood/Documents/Flood%20Hazard%20Report%20-%2029%20Oct%202012%20-%20Final.pdf

[152] Hamilton City Council webpage "*Flood Hazard Information Questions and Answers*" accessed January 2018 from http://www.hamilton.govt.nz/our-council/council-publications/districtplans/flood/Pages/Flood-FAQ.aspx#23

[153] Hamilton District Plan 2017, Rule 22.5.6

imperfections and unknowns in flood models. To that end, I am not convinced by Mr Hall's evidence that freeboard should not be applied to the GWRC model or the PC42 maps. I share Mr Christensen's conclusion that such an amendment would increase the risk of effects arising from a 1%AEP event which could otherwise be avoided by the plan change provisions. Such an outcome is not consistent with the relevant direction from the RPS or with the objectives and policies proposed in PC42.

3.152 Again, for the reasons they have expressed in evidence (and summarised above), I adopt Mr Christensen and Mr Law's view that freeboard has been appropriately applied for the purposes of the plan change.

3.153 All other things being equal, I am also inclined to align with the preference expressed by Mr Beban and Mr Osborne to retain the nomenclature as notified in PC42 (i.e. ponding, overflow path and stream/river corridor versus low, medium and high) in order to achieve consistency with terminology preferred by GWRC in its policies and plans. I acknowledge also that approach is supported from a technical perspective by Mr Christensen and Mr Law. Also, and most importantly, the effect of the use of one term over the other is of no real consequence given that:

a. the stream element and equivalent level of risk descriptor are largely interchangeable; and

b. the risk associated with a flood element (e.g. river corridor) is clearly defined in PC42 as to whether it is high or low (in this example – high).

3.154 On the matter of the differences between observed and modelled flood extents, I adopt Mr Law and Mr Christensen's collective view that this does not undermine the efficacy of the PC42 maps for the reasons they expressed in evidence (and as summarised above).

3.155 Again, for those submitters requesting use of the Hamilton City approach, I note that it too entails discrepancies between modelled extents and the previous 100-year event experienced in 1958. The Hamilton City Council's website explains the discrepancies stem from reasons similar to those identified by Mr Law in the Pinehaven context, including:

a. incomplete or imperfect historical records/data;

b. changes to the environment that have transpired since the flood event, including to topography, stormwater management infrastructure, land use intensity, and the effects of climate change.[154]

3.156 I acknowledge also Mr Hall's suggestions[155] as to how the maps could be made clearer at informing plan users about their function, by referencing the policies and rules that apply, and/or by citing where more detailed reference material may be found. While such amendments might make the maps themselves more of a 'one-stop-shop' and could be helpful for some plan users, the volume of information (objectives, policies, rules and other methods) relevant is substantial. Listing that amount of material on the maps would arguably render them more complex and less legible and therefore would not achieve the s32 test of being efficient and effective.

[154] Hamilton City Council webpage "*Flood Hazard Information Questions and Answers*" accessed January 2018 from http://www.hamilton.govt.nz/our-council/council-publications/districtplans/flood/Pages/Flood-FAQ.aspx#23

[155] At paragraph 12 of Mr Hall's evidence (26 September 2017)

3.157 Moreover, that suggested amendment by Mr Hall would not diminish the need for plan users to cross-reference multiple parts of the Plan or other relevant information sources. By extension the recommendation of Mr Hall does not enhance the efficient use and implementation of the Plan, relative to the plan change approach.

3.158 Mr Hall's suggestion also omits that other elements of the plan change provide information he's referred to. For example, proposed Clause 2.6.9E sets out specific information to be provided with resource consent applications for subdivision and development in the Pinehaven Catchment Overlay. Among other information, that clause refers plan users to relevant baseline information held by GWRC.

3.159 I am sympathetic to the submitters who have sought further independent auditing of the modelling to be carried out, and/or for the Council to provide technical or legal aide to submitters. However, I must record that the latter is beyond the ambit of my delegated authority. Furthermore, I am compelled to comment on the requests for further independent audit.

3.160 In short, I do not consider such an exercise is necessary, nor do I feel the need – based on all of the material presented by all parties at the hearing – to recommend that the Council suspend the plan change until an audit is completed.

3.161 The involvement of Mr Law and Mr Christensen on this project has come about as a result of their being commissioned to conduct independent reviews of previous modelling undertaken by other professionals. Mr Law and Mr Christensen identified faults with that previous work and recommended actions to remedy those shortcomings, which have been adopted in subsequent revisions.

3.162 Both of the Council's engineering witnesses are experienced and respected practitioners who have given evidence to this hearing in accordance with the Environment Court's code of conduct for expert witnesses. I have no reason to question their independence, and there is no compelling evidence before me from any other party for me to doubt their competence or find fundamental fault with their conclusions. To the contrary, I have found their input to be invaluable and of professional standard befitting these proceedings.

3.163 Overall, for the reasons given in their evidence and summarised above, I adopt the Council Officer's position that the maps are fit for their intended purpose. That said, I have proposed two recommendations for the purposes of improving the clarity of the provisions and enhancing the usability of the plan.

3.164 They are:

a. Firstly, I share the recommendation by officers that the portion of the flood hazard extent with a depth below 100mm should be removed from the hazard maps. In my evaluation, however, this requires a consequential amendment to the definition of *"flood hazard extent"* to acknowledge that the area is no longer the full representation of the 1%AEP event (as notified). The definition should also explain that freeboard has also been allowed for. I have made amendments to this extent in **Appendix 2**,

b. Secondly, I recommend that the Council prepare a guide to the plan change provisions that can be accessed on the Council website and other appropriate locations. The guide should set out information that will assist future resource consent applicants, and provides clarification about the provisions for

perspective purchasers and insurers of property in the areas subject to the plan change. In these respects, I suggest that the Hamilton City Council website hyperlinked above would be a useful reference point.

3.165 For completeness, I note that Mr Osborne and Mr Beban supported the above non-regulatory method in their reply.[156]

Issue 3: Hydraulic neutrality and future development in the Southern Hills

Issue identification

3.166 After the detail of the flood maps, this was the issue that received the greatest attention at the hearing. For the purposes of this report section, I adopt Mr Christensen's description of hydraulic neutrality, which he explained as follows:

> *The basis of hydraulic neutrality is that peak stormwater flows following the development of land are managed to a level that is the same or less than the pre-development situation. This generally requires the construction of storage elements within the development such as wetlands, swales, detention/retention dams, tanks, soakage trenches.* [157]

3.167 I also observe that this description generally corresponds with the definition of *"hydraulic neutrality"* as proposed in PC42.

3.168 Submissions on this issue included those from:

a. Forest & Bird, who sought that hydraulic neutrality provisions are applied in both the Mangaroa and Pinehaven catchments, especially in relation to any future development to the Guilford Timber Land/ Southern Growth area;

b. Mr Vaughan Allan, who sought for the Silverstream Spur to be included in the Pinehaven Catchment overlay;

c. SoH, who submitted that:

   i. the plan change does not adequately address the risk to people and property from future development in the Southern Hills;

   ii. by incorporating the insignificant floodwater depth and ponding within the identified flood hazard extent for Pinehaven allows additional run-off from future development above the stream that would be undetected by the proposed hydraulic neutrality provisions; and

   iii. the benchmark data for assessing pre/post development flows be published in the District Plan; and

d. UHTCA, who similarly sought for benchmark flow data to be included in the District Plan.

[156] Council Right of Reply (20 October 2017), pp.18-19, paras 68-70
[157] Evidence of Kyle Christensen (25 August 2017), para 36

3.169 As noted above, Mr Allan did not attend the hearing, and while Mr McLellan did attend, his presentations did not delve into this issue more than the relief set out in the UHTCA notice of submission.

3.170 Mr Bellamy opened his presentation by expressing Forest & Bird's concerns that flooding is becoming more frequent with the effects of climate change now being felt. He added that substantial flooding has resulted in the last 12 months, with a major cause being from the removal of vegetation in upper parts of catchments. In response to this growing concern, Mr Bellamy said:

> *To lessen the impact of future storm flooding we would like to see vegetation retained on the hills and future development being hydraulically neutral by the limitation of earthworks and the use of peak flow catchment techniques using holding ponds, swales rain gardens etc to initially delay the discharge and lessen the initial runoff.*[158]

3.171 Mr Bellamy added the view that climate change will make effects worse in the future, and that development in the Southern Hills will also exacerbate flooding effects if appropriate controls are not in place. That said, his view was that the plan change is at least partially effective at dealing with this risk through the measures proposed in Section 1.8.11 for consent requirements in the Pinehaven Catchment overlay.[159]

3.172 At the hearing, Mr Pattinson described this as SoH's "key *issue of concern*". He expanded upon this description, giving the view that (in summary):

a. the issue stems from the flood maps treating freeboard as flood water;

b. while it may be appropriate to treat freeboard in this manner in some catchments, it is not the case for Pinehaven because of the known anticipated future development in the Southern Hills;

c. treating freeboard as floodwater makes the two indistinguishable and artificially inflates the flood hazard extent shown on the maps;

d. this has the effect of potentially alleviating future development in the upper catchment / Southern Hills from providing full and proper stormwater management facilities;

e. this also removes existing residents' ability for any recourse for relief from future increases in flooding caused by unmitigated run-off from future development in the Southern Hills because – that being contained largely within the modelled and mapped freeboard extents – it will be claimed by the developer's consultants and by Council that the extra run-off is not making the current flooding situation any worse.[160]

3.173 Mr Pattinson also expanded on the need to publish baseline data in the District Plan. On this point, he gave the view that the exercise should be overseen by an independent expert, and include the publication of:

a. the hydrological model, including sub-catchments, hydrographs and various peak discharge scenarios for the original 2008/9 Pinehaven study; and

[158] Written Notes, Graham Bellamy (September 2017), first page
[159] Written Notes, Graham Bellamy (September 2017), second page
[160] Correspondence from S. Pattinson to PC42 Commissioner entitled "*What to audit and rectify: UHCC PC42 – Mangaroa and Pinehaven Flood Extents*", undated, pp.2-3

b. the hydraulic modelling inputs and outputs, and a complete record of assumptions (including blockages, roughness and climate change). [161]

3.174 Mr Pattinson explained that the reasons why this bespoke response is necessary for the Pinehaven Catchment. In his view, those reasons include:

a. the known anticipated development in the southern hills including the upper reaches of the Pinehaven and Mangaroa catchments, including vegetation clearance, subdivision, earthworks and built development;

b. large areas of problematic mature pines in proximity to and above urban areas;

c. shortcomings in modelling of large scale development scenarios in the southern hills to date; and

d. the aesthetic values of the area which are valued and which should be preserved or enhanced. [162]

3.175 Mr Hall's evidence for SoH also addressed the issue of hydraulic neutrality and possible future growth as follows:

a. He firstly observed that the plan change maps indicate a large proportion of the Pinehaven Catchment have a measure of flood hazard. On that basis, Mr Hall said that there is little, if any, scope to allow that hazard to become greater from a failure to manage runoff from future development in the Southern Hills. [163]

b. Mr Hall also acknowledged that the plan change <u>does</u> address this risk, in particular by Policy 9.4.10 and through the information requirements for resource consents at Section 1.8.11.[164] He added (my <u>*emphasis*</u>):

> *On the basis of the foregoing, I conclude that provided the UHCC ensures that their Policy 9.4.10 and methodology of Sec 1.8.11 of Appendix 8 of PC42 is adhered to in full in the assessment and consenting of any future subdivision development upstream of the Pattinsons* [sic] *property at 27 Elmslie Road, Pinehaven then <u>it is reasonable to conclude that their concerns associated with the need to preserve hydraulic neutrality to the 2008 baseline in the Pinehaven catchment may provide a basis for the Pattinsons to consider if their concerns have been adequately addressed</u>. Nevertheless it would with respect be essential that the UHCC include as an appendix to PC42 a map of the Pinehaven catchment which specified what SEP 1/100 discharges (including climate change) have been considered by GWRC at specific locations in these catchments and confirm that these were the basis on which GWRC used in their hydraulic models and which forms the basis of both the UHCC and GWRC flood hazard maps. This information will then provide a 2008 baseline reference for Council in the administration of it's* [sic] *functions with respect to hydraulic neutrality. In addition this same information would act as a guide to future developers to form their runoff management strategies and a basis from which the public generally can be satisfied that hydraulic neutrality is being maintained in the catchment commensurate with any development that is being proposed.*

3.176 For completeness, I am compelled to record here that there is some ambiguity in my mind as to the precise point Mr Hall was trying to make in this statement – and in particular the

[161] Correspondence from S. Pattinson to PC42 Commissioner entitled "*What to audit and rectify: UHCC PC42 – Mangaroa and Pinehaven Flood Extents*", undated, pp.13-14

[162] Correspondence from S. Pattinson to PC42 Commissioner entitled "*What to audit and rectify: UHCC PC42 – Mangaroa and Pinehaven Flood Extents*", undated, p.14

[163] Evidence of Robert Hall (26 September 2017), p.3, para 9

[164] Evidence of Robert Hall (26 September 2017), p.3, para 10

passage I have underlined. More specifically, it is not obvious to me whether Mr Hall is expressing the view that:

a. it is reasonable for the Pattinsons to feel their concerns about this issue will be sufficiently managed by the proposed plan change provisions; or

b. the provisions are appropriate in his professional opinion (irrespective of the Pattinsons' opinion); or

c. some combination of the two, or some other alternative altogether; and

d. whether his view about the appropriateness of the provisions – either in his view overall, or his view about what the Pattinsons should feel – is contingent upon the Plan stipulating the 2008 baseline data.

3.177 In any case, Mr Hall's evidence did not further justify why the publishing of baseline data is necessary, nor did he contemplate - in a section 32 sense - why such an approach is more appropriate for achieving the objectives of the plan change or the associated higher order direction from the RPS. Mr Hall's evidence did not indicate whether this is standard practice in other RMA plans in the Wellington Region, or in wider New Zealand.

3.178 In contrast to Mr Hall's evidence, Mr Osborne and Mr Beban's report found that the proposed plan change provisions are sufficient to address submitters' concerns about hydraulic neutrality in the Pinehaven Catchment. In summary, they explained their rationale for this finding as follows:

a. any buildings or subdivision proposed within the Pinehaven Catchment Overlay require resource consent under the proposed provisions;

b. associated standards require a report to be provided that meets minimum information requirements identified in Chapter 1.8 and must demonstrate how hydraulic neutrality from any potential development would be achieved;

c. publishing baseline data in the District Plan is unnecessary given that the data can be obtained from GWRC as indicated in the information requirements at Chapter 1.8, consistent with standard practice; and

d. the requirement to use that baseline information as a reference point for which future development must achieve neutrality against ensures no gap is created in the plan framework by omitting the inclusion of the baseline information in the plan.[165]

3.179 Mr Osborne and Mr Beban added to their evaluation of this issue in their Reply, both in response to questions from me and to various points raised by submitters as follows:

a. Firstly, they outlined several provisions in the operative District Plan relevant to the potential development in the Southern Hills of concern to submitters. Those provisions included the following:

i. one dwelling is permitted per site, with any number exceeding that limit being considered as a non-complying activity;

ii. the minimum lot size for subdivision is 20 hectares;

[165] s42A Report, p.56, paras 343-345

iii. limits on vegetation clearance apply such that any larger scale clearance would require resource consent; and

iv. permitted earthworks are limited to a volume of 150m^2 provided they are undertaken on slope less than 28 degrees – any proposal on a steeper slope and/or of greater volume requires resource consent as a restricted discretionary activity.[166]

b. Secondly, the Officers outlined these requirements to illustrate that development in the upper reaches of the Pinehaven catchment is extremely constrained, and that a plan change process would be required in order to urbanise the area. Among other things, such a future proposal would need to meet the relevant requirements of the RMA, including the requirements of s32. [167]

3.180 The Officers also proposed the inclusion of a new objective for the Pinehaven Catchment Overlay such that any future proposal in the area would also need to "*control subdivision within the upper areas of the Pinehaven Catchment Overlay to ensure that peak stormwater runoff during both a 1 in 10-year and 1 in 100-year event does not exceed the existing run off and therefore minimise the flood risk to people and property within the Flood Hazard Extent".* [168]

3.181 In response to my questions on this matter, the Officers observed that any proposal to deviate from or amend the above aims or associated objectives and policies would be subject to full, robust assessments in terms of the appropriateness of doing so. Along those lines, Mr Beban and Mr Osborne noted that proposals in the upper catchment which:

a. fail to provide the necessary assessment of hydraulic neutrality effects as part of a resource consent application would be returned to the applicant as incomplete;

b. are assessed as not meeting the hydraulic neutrality standards would be assessed as a non-complying activity; and

c. have significant effects on downstream properties could be declined.[169]

3.182 Mr Osborne and Mr Beban also relied upon the evidence of Mr Law in reaching their overall view on the appropriateness of the plan change approach to hydraulic neutrality. Among other matters, Mr Law's evidence included the following useful summary on the concept of 'peak flow' at its relevance to the plan change:

> *64. Peak flow is one measure of the changes in hydraulic response due to development. Increases in peak flow are caused by a combination of a reduction in permeable area and quicker runoff from smoother post-development channels and overland flow paths. The decrease in permeable area is also likely to result in an increase in flood volume.*
>
> *65. For a relatively steep catchment such as Pinehaven, limiting peak flows is the critical factor for controlling downstream flood extents and depths, and so is an appropriate form of control. Peak flows can be reduced by providing storage within the development to attenuate the flow hydrograph.*[170]

[166] Council Right of Reply (20 October 2017), pp.13-14, paras 48-51
[167] Council Right of Reply (20 October 2017), p.15, para 55
[168] Council Right of Reply (20 October 2017), p.15, para 56
[169] Council Right of Reply (20 October 2017), p.17, para 63-64
[170] Evidence of Michael Law (25 August 2017), p.14 paras 64-65

3.183 Mr Law added that attenuation has the effect of releasing storm runoff later than would have occurred without storage to manage peak flows on lower reaches of an affected catchment. It was his view that the plan change provisions in Section 1.8.11 will manage the hydrological effects of proposed development in the Pinehaven catchment to achieve hydraulic neutrality. [171]

3.184 Following the presentations by submitters, I asked several questions of clarification from Mr Law, which he addressed in his supplementary written evidence. Of particular relevance here, Mr Law's supplementary statement noted:

> *24. It is important to clarify that the effect of runoff from development in the Southern Hills Growth Area (SHGA) is addressed and managed through the site specific hydraulic neutrality provisions proposed in the plan change. The PC42 flood hazard maps are based on modelling of current levels of development plus an allowance for the potential effects of climate change on stream flows. Therefore, if the level of growth is more intense than predicted, there will be no change to the flood extent identified on the PC42 flood hazard maps.*
>
> *25. As such, the potential urban development in the 'Southern Hills Growth Area' is not part of the flood modelling scenario that underpins PC42 flood hazard maps, rather the current development modelling results are the baseline against which the effects of future development will be assessed and managed.*
>
> *26. From my experience of flood and stormwater modelling for developers and regulators, the effect on downstream properties is a standard test for the acceptability of the effects of development, and the proposal to limit runoff to 80% of peak pre-development flows is the primary means in PC42 to protect downstream properties.*

3.185 In response to the submission from Forest & Bird, Mr Beban and Mr Osborne explained that hydraulic neutrality provisions are unnecessary in the Mangaroa catchment as:

a. the Mangaroa is significantly less sensitive to changes in flows from impervious surfaces given the scale of the river channel; and

b. the wider catchment is rural and therefore unlikely to have the level of development and impervious surfaces to generate sufficient run-off (as is the case with Pinehaven). [172]

3.186 The Officers drew on Mr Christensen's evidence in reaching this finding. [173] Though his evidence was primarily focussed on the Mangaroa catchment, Mr Christensen usefully gave his view about the application of hydraulic neutrality in the Pinehaven Catchment. Specifically, he said it "*is vitally important in small urban catchments which have constrained downstream pipe networks or discharge to small urban streams such as the Pinehaven Catchment.*" [174]

3.187 Also relevant to my recommendation, the Officers recommended some changes to the Pinehaven Catchment Overlay area on the flood hazard maps. As described in the s42A report, the amendments were made to rationalise the boundaries of the Overlay, particularly where the overlay only passes through a small portion of the site. Mr Christensen oversaw the amendments to ensure that the amended overlay remained appropriate from a hydraulic engineering perspective.

---

171 Evidence of Michael Law (25 August 2017), p.15 paras 66-67
172 s42A Report, p.54, para 336
173 In particular at paragraphs 36-39 of Mr Christensen's evidence in chief.
174 Evidence of Kyle Christensen (25 August 2017), para 37

3.188 The reason for the amendment, according to the Officers, was to prevent unintended outcomes in the notified provisions for locations where only a small portion of a given site is situated within the Pinehaven Catchment Overlay. Namely, under the notified provisions an applicant in such circumstances would have to demonstrate hydraulic neutrality for the whole subdivision, including any areas outside the Pinehaven Catchment Overlay. The Officers explained this is beyond the scope of the plan change to maintain hydraulic neutrality only in the catchment overlay. [175]

Discussion and findings

3.189 Considering the latter of the issues outlined above first, I note my agreement with the rationalisation exercise undertaken by the Officers regarding the extent of the Pinehaven Catchment Overlay. For the reasons they have expressed in the s42A report, and as expanded on in **Appendix 2**, I recommend that the notified maps be amended as set out in the s42A report.

3.190 I also adopt the view of Mr Christensen, Mr Beban and Mr Osborne that it is not necessary to apply the hydraulic neutrality provisions in PC42 to the Mangaroa Catchment for the reasons they have stated.

3.191 I have carefully considered the proposal by Mr Beban and Mr Osborne in their reply that a new Objective be included in Chapter 14 relating to hydraulic neutrality in the Pinehaven Catchment. This includes consideration of both the merit of the proposed objective, and the scope to make such an amendment based on the submissions received.

3.192 I specifically questioned the Officers on both matters in my penultimate minute[176], and in response they noted that the amendment:

a. was made in response to the submission and presentation from SoH and others, and scope is afforded through their respective decisions requested;

b. is consistent with and further clarifies the policies and rules in the plan change as notified;

c. broadens the aim of proposed Objective 9.4.3 (as notified), which is limited to subdivision effects, to also achieve hydraulic neutrality through the proposed land use rules where applicable;

d. achieves the purpose of the RMA as it relates to the sustainable management of resources in the Pinehaven catchment, and assists with the implementation of the relevant strategic direction from the RPS;

e. amounts to a relatively low scale of significance. [177]

3.193 Overall, I share the view of the Officers that sufficient scope exists to add new Objective 14.3.3 and that the amendment is appropriate for the reasons summarised above, and expanded upon in **Appendix 2**.

3.194 On the matter of publishing the baseline information in the District Plan, I share Mr Beban and Mr Osborne's view that such an approach is neither necessary nor appropriate. Also consistent with their conclusions, I find that the proposed policies, rules and methods as amended in **Appendix 2** best meet the tests of s32 in providing for a more efficient and

[175] s42A Report, p.20, paras 88-89
[176] Minute 3 (25/10/17), paras 4-8
[177] Addendum to Right of Reply (31/10/17), sixth and seventh pages.

effective means to ensure that the aim of hydraulic neutrality is implemented in the Pinehaven catchment.

3.195 Notwithstanding that this does not align with the specific relief sought by some submitters, my view is that the plan change provisions are consistent with the ultimate outcome sought by those submitters in requesting the data to be published. Namely, *any* future urban subdivision and development in the upper catchment must achieve hydraulic neutrality. Neither that requirement, nor the substance of the assessments required to demonstrate compliance with that requirement (under Section 1.8.11) will be affected by the publishing of the baseline data in the District Plan.

3.196 It is appropriate in my view for the assessment of hydraulic neutrality to be considered through the consent and/or plan change processes as envisaged in the PC42 policies and methods. Moreover, both regulatory pathways offer full public scrutiny of assessments and application documents, albeit that notification may not necessarily follow in all cases (for example, where dictated by s95 of the RMA).

3.197 The user's guide that I previously recommended be prepared by the UHCC would also afford the opportunity for relevant baseline data, hyperlinks to reports, contact information for relevant parties and summaries about process to be utilised for the benefit of applicants and affected parties. Using a non-statutory vehicle to present all of this information affords a centralised resource for information to be accessed, and has the added benefit of not requiring a Schedule 1 process to be updated and improved over time. Again, for the benefit of those submitters who drew my attention to the Hamilton City Council provisions, I note this same non-regulatory method has been adopted there in relation to that Council's District Plan flood management regime.

3.198 Finally, I turn to the contention by submitters that the use of freeboard in the flood hazard maps is a method to 'cloak' increased runoff from future development in the Southern Hills. My evaluation of this point relates back to the previous discussion about the purposes of the various maps and associated information used; and as submitters expressed concern about the PC42 and GWRC information in this respect, I consider both matters in turn.

3.199 In terms of the purpose of the various maps, there is not a direct linkage between the flood hazard maps in PC42 and the information requirements for demonstrating hydraulic neutrality in the Pinehaven Catchment Overlay. As Mr Law put it, "*the impact from future development will be managed through the hydraulic neutrality provisions in PC42, not through the flood extent maps*." [178]

3.200 Rather, the primary information source for the hydraulic neutrality assessment – as expressed in proposed Clause 1.8.11 – is the baseline information held by GWRC. Accordingly, I consider the plan change maps are irrelevant to this evaluation.

3.201 In terms of the accuracy of the PFMP and the associated information underpinning it, Mr Pattinson for SoH expressed concern about this matter at multiple junctures during the hearing. As far as that goes, I share Mr Pattinson's sentiments that the success of the plan change provisions relies upon the accuracy of the information held by GWRC. That is, if the GWRC information proves inaccurate, there is an increasing risk that the effectiveness of the plan change provisions will be undermined.

[178] Supplementary evidence of Michael Law (19 October 2017), para 60

3.202 That said, the PC42 provisions require reference to the hydrological and hydraulic information held by GWRC for the 10% and 1% AEP events including climate change effects, *not* to the PFMP flood maps with freeboard applied. Mr Law captured this clearly in his supplementary evidence, noting:

> *61. That is, any proposal in the upper catchment will have to demonstrate that peak flows from the outlet of the development is no more than 80% of current (predevelopment) peak flows, and no greater than current peak flows further down the catchment. It will be a quantitative assessment of flows, not a comparison of flood extent with freeboard. As such it will not be possible to 'hide' the effects of development on peak flows, but rather used to protect downstream communities from increased flood risk.* [179]

3.203 In summary, I understand that freeboard has been applied to account for inherent limitations in the flood model and to derive appropriate floor levels to protect people and property from the upper extent of possible effects of a 1% AEP flood event. It does not, in my evaluation, have the effect of enabling future unchecked increases in runoff from potential development in the upper catchment areas in Pinehaven and Mangaroa.

3.204 Such development scenarios will be subject to rigorous assessments required by the RMA Schedule 1 plan alteration process, and/or through the resource consent process with specific assessments required against the information requirements expressed in Section 1.8.11, the policy direction and environmental outcomes sought (objectives) in the chapters amended by this plan change proposal. These provisions collectively represent an effective means of ensuring that hydraulic neutrality is achieved by any future development in the Pinehaven Catchment Overlay.

3.205 As a final comment on this matter, I note that I have not considered any specific development scenarios which may occur in the upper catchment as part of my evaluation. At the close of the hearing, no such formal proposals have been made to my knowledge and to speculate about the nature of any development – let alone if or when it may ultimately be proposed – is not within the scope of these proceedings. Irrespective, my evaluation of the proposed provisions is that the plan change provisions are appropriate for ensuring any future development proposals in the Pinehaven Catchment achieve hydraulic neutrality.

[179] Supplementary evidence of Michael Law (19 October 2017), para 61

Issue 4: Proposed utility provisions

Issue identification

3.206 As identified above, submissions were received from Transpower and Powerco in relation to the utility provisions in PC42.

3.207 In its submission, Transpower signalled general support for the plan change. The submission noted that Transpower currently has no existing assets in the areas affected by the plan change provisions, and that its interests are in future assets which may need to be located in those areas.

3.208 More specifically, Transpower made 15 distinct submissions points, comprising (in summary):

a. a general submission that the plan change provisions fully give effect to the NPSET;

b. one submission in opposition to the proposed non-complying activity status for earthworks in the Pinehaven Flood Hazard Extent;

c. four submissions in support of various objectives and policies relating to the enabling and management of utilities and associated activities in identified hazard areas;

d. one neutral submission relating to permitted activity standard in Table 30.8a requiring utility structures to be underground or above the 100-year flood level where crossing a river or stream; and

e. eight submissions in partial support, seeking modifications to objectives, policies and rules relating to the enabling and management of utilities and associated activities in identified hazard areas.

3.209 As summarised in its tabled hearing statement, Powerco's submission generally supported the intent of PC42 but sought amendments to the objectives, policies, rules and other methods to ensure the construction, operation, maintenance, upgrade and replacement of utilities can be undertaken as permitted activities in hazard areas where the activities do not affect the hazards in any material way. Similar to Transpower, Powerco referenced the need for the plan change to implement relevant parts of the RPS pertaining to regionally significant infrastructure.

3.210 As noted above, the pre-hearing meetings between these submitters and the Council led to agreed revisions to various provisions broadly in line with the relief sought by the submitters. Details of the pre-hearing meeting are described throughout the s42A report and in the hearing statements tabled by both submitters.

3.211 In its hearing statement, Transpower signalled that it agreed with all of the changes recommended in the s42A report.

3.212 Powerco also signalled its agreement with the s42A amendments in its tabled statement, with some residual matters it sought to be addressed. The statement included Powerco's view that the recommendations in the s42A report should be adopted except that:

a. where the s42A report[180] has recommended a new advice note at the bottom of Table 33.1 to indicate that the provisions of Chapters 16 and 30 prevail over Chapters 14 and 33 for utility activities and structures in flood hazard areas, Powerco recommends also reference to Chapter 23 so that the utility rules for earthworks also prevail; and

b. that the proposed amendment to Policy 14.4.5 in Powerco's submission be accepted in favour of the officer recommendation to reject the amendment.

3.213 The latter amendment from Powerco was the inclusion of the following underlined text:

> *Policy 14.4.5: Enable planned flood mitigation works with identified Flood Hazard Extents that decrease the flood risk to people and property or maintain the function of the floodplain, whilst managing adverse effects on existing infrastructure.*

3.214 In the hearing statement, Powerco explained the rationale for the amendment being to protect network utility infrastructure from potential damage during flood mitigation works. The statement noted Powerco's experience in other jurisdictions where Councils have uncovered Powerco assets during works without giving Powerco prior knowledge. Powerco suggests this can result in adverse effects on health and safety and security of supply.

3.215 The Powerco statement notes that the proposed amendment aligns with operative Objectives 16.3.1 and 16.3.3 as well as policy 16.4.3. These provisions read:

> *16.3.1 To recognise and protect the benefits of regionally significant network utilities and ensure their functions and operations are not compromised by other activities.*
>
> *16.3.3 To recognise and provide for the sustainable, secure and efficient use, operation, maintenance and upgrading and development of network utilities within the City.*
>
> *16.4.3 Avoid, or as appropriate, remedy or mitigate, the potential for any adverse effects including reverse sensitivity effects on regionally significant network utilities from inappropriate new subdivision, use and development occurring under, over, or adjacent to regionally significant network utilities.*

3.216 The s42A rationale for not recommending the acceptance of the proposed amendment is (in summary):

a. the aim of Policy 14.4.5 seeks to enable flood mitigation works so that benefits provided by the works are realised;

b. when such works are undertaken, the Officers' expectations are that consultation would be undertaken with parties whose assets are affected by the work, including infrastructure providers; and

c. it is not the District Plan's role to ensure that these discussions are undertaken, and that appropriate measures are agreed. [181]

[180] At paragraph 331
[181] S42A Report, p.39, para 248

3.217 Subsequently, Mr Osborne and Mr Beban recommended the deletion of Policy 14.4.5 altogether and the consequential renumbering of the remaining policies in Chapter 14. Their rationale for the change in view was as follows:

> *The objectives and policies of Chapter 14 apply to the proposed rules within Chapter 33 which address development within the identified Flood Hazard Extent. Chapter 33 does not contain any rules pertaining to flood mitigation works. Rather the provisions pertaining to flood mitigation works are contained in Chapter 23, with the associated supporting policy in Chapter 9 (Policy 9.4.9). As such, policy 14.4.5 is a duplicated provision with no supporting rule framework in the corresponding Chapter 33 and thus is recommended to be deleted.*[182]

3.218 Powerco's hearing statement also identified a typographical error in the s42A recommendation[183] to include a new matter of discretion under Rule 30.13(a). The matter in question reads "*The extent to which locating the Network Utility Structure within the Flood Hazard Extent will provide and local, regional or national benefit.*"

3.219 I questioned the officers about this matter at the hearing, wondering whether the word "and" was intended to be "any". Mr Beban and Mr Osborne confirmed in their Reply that the drafting error should be remedied as described.[184]

Discussion and findings

3.220 Having reviewed the Transpower and Powerco submissions and hearing statements, the related sections of the s42A report and revised provisions, I generally adopt the shared view of the three parties that the provisions should be amended as recommended in the s42A report for the respective reasons given.

3.221 In relation to the three outstanding matters identified in Powerco's hearing statement, I firstly note my agreement with the need to correct the drafting error in the matter of discretion under Rule 30.13(a). That is clearly a minor editorial change, and I feel no need to take my s32AA considerations any further.

3.222 For the reasons suggested in the Powerco statement, I also agree that the advice note recommended by Mr Beban and Mr Osborne at the end of Table 33.1 should refer to Chapter 23. At paragraph 320 of the s42A Report it is clear that the Officers intended for Chapter 23 to be referred to as with Chapters 16 and 30. The missing reference to Chapter 23 appears to be a clerical oversight, and I've made a correction to that end in **Appendix 2**.

3.223 The final matter is the proposed amendment from Powerco to Policy 14.4.5. In addition to the reasons cited for its rejection by Mr Osborne and Mr Beban, I note that:

a. the aim of the amendment is already delivered by Policy 16.4.3, which is more holistic in its management of effects on utilities;

b. the implementation of the objectives in Chapter 14 – which are the most relevant for this policy – will not be more effectively implemented by adding Powerco's proposed text; and

[182] Council Right of Reply (20 October 2017), Appendix 6, Amendment 4, under heading "reason for the proposed amendment"
[183] At paragraph 313
[184] Council Right of Reply (20 October 2017), pp.21, para 76

c. while the amendment arguably enhances the implementation of the objectives for utilities, given the general policy direction already provided by 16.4.3 the amendment amounts to unnecessary duplication.

3.224 For these reasons, my recommendation is the Powerco's submission on Policy 14.4.5 is not accepted.

3.225 That said, I do not agree with the suggestion from Officers that the Policy be deleted outright. I have reached this finding primarily for two reasons – one procedural and the other substantive.

3.226 Firstly, I was provided with no indication from Council that there is scope to make such a change based on the submissions received. In my review of the submissions, I consider there is some doubt that such an amendment is indeed within scope.

3.227 Irrespective of that, I do not share the Officers' view that Chapter 33 "*does not contain rules pertaining to flood mitigation works*." To the contrary, the first rule in Table 33.1 identifies "*Flood mitigation works undertaken or approved by a local authority*" as a permitted activity. In my assessment, this represents at least one direct method to which the proposed policy relates.

3.228 Similarly, deleting the policy would – in my view – introduce an unjustified gap in the implementation framework for the objectives in Chapter 14. In particular, I consider the aim of the policy to enable appropriate flood mitigation works is a clear and effective component of the notified plan change provisions for avoiding, remedying or mitigating adverse effects of natural hazards as anticipated in Objective 14.3.1.

3.229 Finally, where the Officers have indicated that Policy 14.4.5 duplicates policy direction in Chapter 9 with rule implementation in Chapter 23, this observation seemingly ignores that Chapter 23 is limited to subdivision and earthworks, whereas Chapter 14 has a wider application. That wider application includes the provisions in Chapter 33 relating to wider flood mitigation works, which may entail construction activities, maintenance or upgrade of structures and vegetation clearance among others. In this respect, I do not share the Officers' claim of duplication and the basis of my recommendation to retain the policy follows the same rationale of the Officers for introducing new Objective 14.3.3.

3.230 For the above reasons, I have recommended retaining the policy as notified and the need for renumbering of subsequent provisions in Chapter 14 as suggested by the Officers is unnecessary.

Issue 5: Other objectives, policies and methods

Issue identification

3.231 Here I focus on the submissions relating to objectives, policies and methods which have not been addressed in the preceding sections of my report.

3.232 In summary, the relevant submissions on this matter include:

a. Mr Allan, who sought several changes to issues, objectives, policies and rules across the plan change (these are discussed in further detail below);

b. Mr Jefferies, whose submission relates to the need or otherwise for the definitions of *"River Corridor," "Ponding Ares," "Overflow Path";*

c. Powerco, who:

i. expressed concern about the definition of *"Stream Corridor"*;

ii. sought amendments to the explanation for Objective 9.3.3;

iii. sought amendment to the explanation for Policy 9.4.6; and

d. Jonathan Mackey, who sought amendments to the rules in Chapters 23 and 33 and relatedly to the Erosion Hazard line as they relate to 43 Mt Marua Drive.

3.233 I discuss these submissions in greater detail by sub-topic below. In a departure from the approach adopted in the previous sections of my report, I set out my discussion and findings for each sub-topic. The sub-topics address the proposed amendments to the District Plan:

a. issues;

b. definitions;

c. objectives;

d. policies; and

e. rules.

Amendments to District Plan Issues

3.234 Mr Allan's submission sought the following amendment to the Identified Resource Management Issues in Chapter 9:

> *Issue 9.2.4 Explanation: … subdivision within a Flood Hazard Extent should ~~avoid~~ restrict high hazard areas and ensure …*
>
> *Issue 9.2.7: …the suitability of the proposed lot for future development needs to be considered to ~~avoid~~ restrict creating new lots in high hazards areas and ensure…*

3.235 Mr Beban and Mr Osborne have recommended that the submission is not accepted, owing to Mr Allan's suggested wording not aligning with the direction in the RPS. They added

that the term *"restrict"* is not as stringent as *"avoid"* and is inconsistent with the intent of the objectives, policies and rules in the plan change.[185]

3.236 Given the strong direction in the RPS – as I have discussed under Issue 1 of my report above – I share the Officers' view that the suggested amendments by Mr Allan are not appropriate.

3.237 I agree also with Mr Beban and Mr Osborne's observations about Mr Allan's proposed amendments not marrying with the objectives, policies and rules in PC42. The interrelationship of those provisions – and particularly where the term 'avoid' is used – is discussed subsequently.

Amendments to Definitions

3.238 Mr Jefferies opposed three of the defined terms in the plan change.

3.239 Firstly, his submission was that the term *"river corridor"* is unlawful and contradicts the term *"river bed"* as used in the RMA. This ultimately relates to a jurisdictional issue raised by Mr Jefferies, which I address in the discussion under Issue 6 below.

3.240 The other two definitions opposed by Mr Jefferies include those for *"ponding area"* and *"overflow path*". Mr Jefferies' submission described the terms as irrelevant and unnecessary, and preferred that the plan use a singular term – *"floodplain"* – to describe~~d~~ the extent of land occupied with relevant waterways are in flood.

3.241 Mr Jefferies presented an organised statement at the hearing, but it did not expand upon his submission as it relates to these definitions.

3.242 Powerco's submission noted that the definition of *"stream corridor"* in the plan change does not distinguish between open and culverted portions of a stream. The submission conveys Powerco's view that this creates ambiguity in the application of the term in policies and rules.

3.243 Mr Beban and Mr Osborne drew on Mr Christensen's evidence as the basis for recommending that Mr Jefferies submission is not accepted. They noted in particular the importance of differentiating between hazard areas based on risk levels associated with differing flood elements, which in turn correspond to the policies and rules proposed. [186]

3.244 I have summarised Mr Christensen's evidence on this point above, and agreed with his view that the terminology used on the flood hazard maps and in the wider PC42 provisions are appropriate and fit-for-purpose. Accordingly, I share Mr Beban and Mr Osborne's view that Mr Jefferies' submission should not be accepted on this matter.

3.245 Mr Beban and Mr Osborne agreed[187] with Powerco's submission that the definition of *"stream corridor"* is ambiguous; however, they recommended that the definition be amended simply by deleting reference to the *"open stream channel"* as follows:

Stream Corridor	*The area defined on the District Plan Part 5 Hazard Maps ~~including the open stream channel~~.*

[185] s42A Report, p.33, paras 200-203
[186] s42A Report, p.34, para 212
[187] s42A Report, p.34, para 215

3.246 In the Officers' view, this amendment removes the ambiguity identified by Powerco and enhances the usability of the provisions. They also recommended a consequential change to the corresponding definition of River Corridor. [188]

3.247 Mr Beban and Mr Osborne also proposed an amendment to the definition for 'flood hazard extent' in their reply. This followed some questions I raised at the outset of the hearing in relation to submissions that sought clarification in the terminology used on the flood hazard maps.

3.248 The notified definition read:

> *Flood hazard extent* *The area identified within the District Plan (Part 5) Hazard Maps. This identifies the area susceptible to the average flood return interval of 100 years (1 in 100-year flood), incorporating climate change to 2090. The Flood Hazard Extent comprises a High and Lower Hazard Area:*
>
> - *High Hazard Area comprises the stream and river corridor, overflow paths and some parts of the Erosion Hazard Area.*
> - *Lower Hazard Area comprises the ponding area and some parts of the Erosion Hazard Area.*

3.249 My main question of clarification was to understand how the *"erosion hazard area"* for Mangaroa catchment could be both a high and low hazard area; and in being both, what implications that had in terms of the plan change's proposed policy direction.

3.250 The officers recognised that the definition created unnecessary ambiguity and in particular, they considered the reference to the high and low hazard areas over-complicated the definition. In response, their recommendation was to delete the final sentence of the definition.

3.251 Overall, I share the Officers' view that the amendments reduce ambiguity. The amendments are essentially an administrative change to enhance clarity, and accordingly, these amendments have been incorporated in **Appendix 2**.

Amendments to Objectives

3.252 Similar to his suggested amendments to the District Plan Issues, Mr Allan sought the term "avoided" in Objective 9.3.2 and its explanation, and in Objective 9.3.3, to be changed to *"restricted."*

3.253 Mr Allan also proposed additional text to the end of the explanation to Objective 9.3.4, to read "*No significant development should be proposed for any specific areas along the Pinehaven and Silverstream Hills as this will likely cause detrimental effect specifically regarding the Flood Hazard Extents and Erosion Hazard Areas*."

3.254 Powerco's submission signalled support for Objective 9.3.3 but sought the explanation to the objective be amended by including the following text:

> *Earthworks can result in unacceptable risk for future development or obstruct or divert flood flow paths. Where earthworks are proposed within the Flood Hazard Extent or*

[188] s42A Report, p.35, para 216-217

> *Erosion Hazard Area, the natural hazard constraints should be considered and areas subject to high hazards are avoided or earthworks managed to protect the integrity of the high hazard area.*

3.255 Mr Beban and Mr Osborne recommended[189] that Mr Allan's submission to replace *"avoid"* with *"restrict"* not be accepted for the same reasons cited in response to his proposed amendment to Issues 9.2.4 and 9.2.7. I share their view.

3.256 Along similar lines, I find Mr Allan's suggested amendment to the explanation of Objective 9.3.4 to be inconsistent with the aim of the objective itself. Namely, the aim is to control, not avoid, development in the upper catchments. I have found above that the hydraulic neutrality and peak flow management approach to the provisions is appropriate, and that extends to the content of Objective 9.3.4. Accordingly, I have recommended that Mr Allan's submission on this point is not accepted.

3.257 The Officers agreed with the sentiment in the Powerco submission that additional clarity would be afforded by adopting the amendment proposed to the explanation to Objective 9.3.3. Specifically, they said:

> *Objective 9.3.3 seeks to control earthworks in the identified flood hazard extents. While earthworks are generally discouraged in high-hazard areas, the proposed rule framework does not prohibit the undertaking of earthworks. It is considered that the suggested amendment provides greater clarity around the parameters that must be met for earthworks to be undertaken in the high-hazard areas.* [190]

3.258 Overall, I agree that the amendment clarifies the intent of the Objective – being to control earthworks. As notified, the explanation could be interpreted as requiring outright avoidance, which does not align with the Objective, or the policies and methods that implement it. Accordingly, I share the Officers' recommendation that the submission be accepted.

Amendments to Policies

3.259 Powerco sought the following amendment to the explanation of Policy 9.4.6:

> *Policy 9.4.6: Limit earthworks in the high hazard areas within identified Flood Hazard Extents and Erosion Hazard Areas to avoid an increase in risk from flood hazards to people and property.*
>
> *Earthworks in high hazard areas are generally inappropriate and can result in the diversion of flood waters, blocking of water flow, or reduce bank stability, which can increase the risk to surrounding properties. To maintain the function of the floodplain it is important that the passage of flood waters is not impeded or blocked*

3.260 Powerco also sought to amend Policy 14.4.8 to read:

> *Policy 14.4.8: Within the Mangaroa River Flood Hazard Extent enable access to dwellings above 1:100 year level where located within the lower hazard areas and avoid access to dwellings when located in high hazard areas.*

[189] s42A Report, p.35, para 222-223
[190] s42A Report, p.36, para 226

3.261 Mr Allan again sought that the term *"avoid"* or *"avoided"* be replaced with "restrict" or "restricted" where used in Policies 9.4.4 and 14.4.3, and in the explanation to Policy 9.4.4.

3.262 Mr Beban and Mr Osborne agreed with the suggested amendments from Powerco to the explanation for Policy 9.4.6 and with the thrust to the amendment to Policy 14.4.8. However, they recommended that the latter be amended with a different wording than proposed by Powerco as the simple addition of the phrase *"to dwellings"* did not, in their view, remove all potential for confusion when applying the policy.[191] Mr Osborne and Mr Beban preferred:

> *Policy 14.4.8: Within the Mangaroa River Flood Hazard Extent enable accesses positioned above 1:100 year level to serve dwellings where located within the lower hazard areas and avoid locating accesses ~~when located~~ within high hazard areas to serve dwellings.*

3.263 Overall, I find that the agreed position between Officers and Powerco that the policy should be clarified is appropriate. The amendments are minor only and are for the sake of clarification.

3.264 For the most part, I prefer the amended version of the policy proposed by Mr Beban and Mr Osborne; however, I have suggested one additional refinement for the sake of consistency in drafting. Namely, I have relocated their suggested *addition of the words "to serve dwellings" from the end of the policy to after the word* "accesses". As set out in **Appendix 2**, I recommend the policy reads as follows:

> *Policy 14.4.8: Within the Mangaroa River Flood Hazard Extent enable accesses positioned above 1:100 year level to serve dwellings where located within the lower hazard areas and avoid locating accesses to serve dwellings ~~when located~~ within high hazard areas.*

Amendments to Rules

3.265 Mr Mackey's submission sought that the rules under Chapters 23.1, 23.21, and 33.1 be amended in order to exempt future development on vacant lots from the Erosion Hazard Area provisions at 43 Mt Marua Drive. Relatedly, submission also seeks that the Erosion Hazard Line in this vicinity should be amended to take account of local topography.

3.266 Mr Allan's submission sought several changes to the plan change rules, including:

a. amendment to the activity status for the non-complying subdivision and earthworks activity rules in the Pinehaven Catchment Overlay (as notified) to restricted discretionary;

b. amendment to the maximum permitted area for earthworks associated with building platforms in the Pinehaven Flood Extent from 20m^2 to 100m^2 and a consequential amendment to apply that same change under the corresponding restricted discretionary activity rule where permitted standards are not met (Chapter 23 rules); and

c. identical amendments to the permitted and restricted discretionary activity rules for buildings in the Pinehaven Flood Extent in Chapter 33.

[191] s42A Report, p.39, paras 251-252

3.267 In response to Mr Mackey's submission, Mr Beban and Mr Osborne firstly noted that 43 Mt Marua Drive was granted subdivision consent in 2012 for six freehold lots and associated earthworks for vehicle access and building platforms, with a subsequent variation to the lot layout being approved in 2015. The latter application was subject to a site-specific erosion hazard assessment, and the Council has since approved a building consent for a new building outside the assessed erosion hazard area on the site. [192]

3.268 The Officers noted that the consented building at 43 Mt Marua Drive could be developed accordingly, but that any future development would require resource consent under the PC42 provisions should they become operative. They added that the determination of the resource consent application would be informed by an erosion hazard assessment, noting that such a report has already been obtained for this site. Accordingly, the Officers did not think the proposed provisions amounted to undue restrictions relative to the status quo.[193]

3.269 Mr Beban and Mr Osborne similarly did not support Mr Allan's proposed amendments to the subdivision, earthworks and building controls in the Pinehaven catchment. In response to Mr Allan's suggested reclassification of non-complying activity rules to restricted discretionary, the Officers said:

> *274. The Non-Complying Activity status allows for Council to consider all effects where either of these thresholds are not met. It also discourages the establishment of these activities through the RMA section 104D tests that apply to Non-Complying Activities. It is considered that the proposed Restricted Discretionary Activity Status, as suggested by the submitter, is not appropriate as this lower activity status implies that development in these areas is more acceptable and would mean that the consent is not subject to the tests under section 104D. This in turn could lead to an increase in risk from inappropriate development occurring in the Pinehaven Flood Hazard extent. The Non-Complying Activity Status is therefore found to be the most appropriate, as it would ensure that the environmental effects resulting from these standards not being met are appropriately considered.* [194]

3.270 I asked several questions of Mr Beban and Mr Osborne on the use of non-complying activity status, particularly in light of the frequent use of 'avoidance' policies in the plan change. They helpfully considered those questions in their reply and subsequent addendum, noting:

a. it is generally accepted that if an activity is occurring in an area where an "avoid objective and policy" is applicable (for example the stream or river corridor) then the development would be contrary to the objectives and policies of the District Plan and fail one of the gateway tests for non-complying activities under s104D RMA;[195]

b. consent could still be granted to any non-complying activity application if it is demonstrated that the effects of the activity on the environment would be minor - though there would need to be exceptional circumstances to why such an activity would be approved to be located in a high hazard area; [196]

[192] s42A Report, p.41, para 266
[193] s42A Report, p.41, paras 267-268
[194] s42A Report, p.42, para 274
[195] Council Right of Reply (20 October 2017), p.8, para 22
[196] Council Right of Reply (20 October 2017), p.8, para 23

c. the use of non-complying activity status is targeted to subdivision and land use activities in high risk areas – such as the stream and river corridor – and the policy direction in both the RPS and the plan change strongly urges avoidance of high risk;[197]

d. given these factors, the provisions do not unduly preclude any activities through the combined use of non-complying status and 'avoid' policy directions; [198] and

e. if future applications under this regime are assessed as having more than minor effects, it would be appropriate for such proposals *not* to pass the gateway tests. [199]

3.271 Along related lines, I questioned the Officers during the hearing about the instances in the plan change where discretionary activity status is also used to implement an 'avoid' policy outcome – for example for buildings in the overflow path of the Mangaroa Flood Extent as a method for implementing Policy 14.3.3. In particular, I was interested to know why non-complying was the most appropriate activity status for some activities and discretionary for others despite the rules both relating to the same avoid policy direction.

3.272 To assist with their consideration of this matter, Mr Beban and Mr Osborne sought legal advice from Ms Kerry Anderson of DLA Piper. In her response, Ms Anderson explained (in summary):

a. recent case law is clear that 'avoid' policies mean 'do not allow' or 'prevent the occurrence of;'

b. on plain reading, discretionary activity status may not implement an avoid policy direction, and it is more practical to utilise non-complying status in those instances;

c. however, there may also be reasons of context, including how the plan as a whole achieves sustainable management, such that discretionary activity status is appropriate for a given activity. [200]

3.273 Having regard to that advice, Mr Osborne and Mr Beban said:

> *45. In terms of this plan change there are some contextual matters that make a Discretionary Activity status more appropriate for the overflow paths, even though they are associated with an "avoid policy". These are as follows:*
>
> *(a) While for the purposes of the plan change the Overflow Paths are categorised as a high hazard area, they have a lower hazard than either the stream of river corridor. On this basis, the Discretionary Activity status recognises this lower hazard risk, when compared to activities in the stream or river corridors, which are non-complying activities.*
>
> *(b) In the Pinehaven Catchment, the overflow paths are largely constrained to the legal road, with only isolated areas on private property. As such, given the limited area of Overflow Path upon which residential development could occur on in the Pinehaven Catchment, a Discretionary Activity classification was considered more appropriate (essentially it is extremely unlikely that further residential development is likely to occur in an overflow path in Pinehaven).*

[197] Addendum to Right of Reply (31/10/17), second and fifth pages
[198] Addendum to Right of Reply (31/10/17), sixth page
[199] Addendum to Right of Reply (31/10/17), sixth page
[200] Addendum to Right of Reply (31/10/17), Appendix 5

> *(c) The Mangaroa River catchment is a rural catchment, with a large floodplain and large properties. As such, it was considered that there is more ability for overflow paths to "breathe" within the context of an individual site (as they are larger). The discretionary activity status assists with this recognition, while still ensuring a full assessment of the relevant effects can be undertaken.*[201]

3.274 In response to Mr Allan's recommended changes to the maximum permitted area for earthworks and buildings in the Pinehaven catchment, the Officers gave the view that the areas set by the notified provisions are more appropriate. Their rationale was that this catchment is highly constrained by existing urban development and the lower area thresholds protect against the potential for inappropriate earthworks to divert floodwaters onto surrounding properties and increase their associated flood risk.[202]

3.275 My consideration of this matter – and indeed of the appropriateness of all of the plan change provisions – was greatly assisted by the table Mr Beban and Mr Osborne attached to their Reply. The table comprehensively illustrates the linkages between the objectives, policies and rules, as well as the 'mechanics' of the proposed provisions. The table also articulates the targeted approach to managing risk inherent in the different policy directions and corresponding activity controls.

3.276 In light of the above, and for the reasons they expressed, I share Mr Beban and Mr Allan's view that Mr Mackey and Mr Allan's submissions to the proposed rules not be accepted.

3.277 I also note my agreement with the Officers' appraisal of the use of both non-complying and discretionary activity status as a 'graduated method' for implementing the proposed policies based on the level of risk associated with respective activities. As there are no additional amendments to the notified provisions associated with that finding, I find no need to take that evaluation any further.

Issue 6: Other general matters

Issue identification

3.278 In this final report section, I address other matters raised in submissions not otherwise discussed above. These matters include submissions relating to:

a. the section 32 Report;
b. consultation;
c. the extent of the plan change;
d. effects on property values; and
e. questions of jurisdiction raised by Mr Jefferies.

3.279 As with my discussion under Issue 5 above, my issue identification, discussion and findings are grouped by sub-topic below.

[201] Council Right of Reply (20 October 2017), pp.12-13, para 45
[202] s42A Report, p.44, paras 281

The Section 32 Report

3.280 Two submissions and one further submission commented on the s32 report. These include the submission from:

a. UHTCA, who made several comments about various parts of the s32 – including concern with changes to the upper catchment, southern growth area, community concerns, difference in high and low hazard risk areas and property prices – but expressed no specific relief in relation to the overall s32 Report;

b. Mr Allan, who similarly made comments about various aspects of the s32 Report and duplicated his suggested amendments to plan change provisions where they appear in the report; and

c. SoH, whose further submission supported several of the comments made by UHTCA on the content of the s32 Report.

3.281 Mr Beban and Mr Osborne observed that the suggested amendments to the s32 report generally related to justification to various amendments proposed by the submitters on this matter, or to other general matters. They added the view that the s32 Report satisfies the requirements under the RMA and that no amendments are required in response to submissions.

3.282 In evaluating this issue, I firstly note that the s32 Report produced by the Council is essentially a snapshot in time of the decision-making process leading to the notification of the plan change. The submission and hearing processes, assisted by the scope of s32AA allow for the assumptions, facts, and rationale identified in the s32 report to be tested such that there is no need to formally amend the s32 report in response to submissions. Irrespective of the end result of the plan change process, the s32 stands alone as a self-contained document.

3.283 That said, the *substance* of the s32 and the related comments made by submitters in relation to the s32 report have been addressed in other parts of this report to the extent relevant.

3.284 As there are no amendments proposed to the notified provisions on this issue, there is no need to take this evaluation further than that.

Consultation

3.285 Several submissions expressed concern about the nature and/or adequacy of public consultation leading to the notified plan change, including the submissions from Mr Allan, Ms Moynihan, UHTCA and SoH.

3.286 Mr and Mrs Berkett also expressed in their tabled statement that there has been a "*lack of consultation from day one*."

3.287 Mr McLellan gave the view at the hearing that if the plan change were a truly collaborative exercise, the Council would have initiated a process that was aimed at resolving differences to the satisfaction of all parties. He requested that the process be put on hold and that a new, more collaborative approach be adopted to resolved the community

concerns about the plan change. [203] Similar to Mr Williams, Mr McLellan also expressed concern about the hazard information being included in LIM reports. He encouraged the Council to take a lead from other local authorities and re-engage with interested communities to resolve that concern. As noted above, Council's obligations to include information on LIM reports is not within my jurisdiction.

3.288 Ms Pattinson expressed frustration with the engagement of both the GWRC and the Council on the PFMP and PC42 projects respectively, outlining several unsatisfactory exchanges she experienced. She gave the view that the outcome of the plan change has been pre-determined, and that there is an imbalance of power in the Council's favour as submitters do not have the same level of resource.[204]

3.289 Mr Pattinson – both in his presentations and by way of asides – explained his view that the consultation underpinning the plan change has been inadequate. He labelled it as a *"box ticking exercise",* noting that important local knowledge has been disregarded by the Council.[205]

3.290 Mr Osborne and Mr Beban reiterated the view that the plan change had met its obligations for consultation in the RMA, and referred to the detailed summary of consultation outlined in part 4 of the Section 32 report.

3.291 I do not intend to repeat that summary here, but suffice it to say I agree with the Officers' view that the consultation has been adequate at the very least (if not substantially more than adequate). The Council has engaged with the community for several years on the key issue at the heart of the proposal, including through the PFMP process, and subsequently through letter drops, public drop-in sessions and private stakeholder meetings leading up to notification of PC42.

3.292 This is not to say that the Council's response to feedback from the community has been satisfactory from the perspective of all parties involved. Clearly there are parties who are opposed to the notion of the plan change, to the science underpinning it, and/or the process followed by the Council in arriving at this point. However, that is not evidence that the Council has conducted a poor consultative process or failed to meet its obligations under either the LGA or RMA. It is more a reflection of the nature of projects such as this, which often are categorised by some level of opposition and disagreement between parties.

3.293 Too frequently the adequacy of consultation is conflated with the extent of 'wins' or outcomes one party has in respect to the consultation topic as opposed to whether or not there has been a genuine attempt to engage between the parties. The criticisms of the consultation process in this instance appear to reaffirm the likelihood that this has indeed occurred in this instance.

Extent of Plan Change

3.294 Several submissions, including from Mr Williams, Mr Moynihan and Forest & Bird, questioned why the plan change is not applicable to all other catchments in the City which may be subject to flooding effects.

[203] Written Notes, Bob McLellan (28 September 2017), first and second page
[204] Written Notes, Susan Pattinson (28 September 2017), first and second page
[205] SoH presentation "*Community Consultation & 1976 Flood*", slide 1.25

3.295 Mr Osborne and Mr Beban noted that the plan change is limited to the Pinehaven and Mangaroa catchments as they are the only areas that have been sufficiently modelled and mapped – though they also clarified at the hearing that there are already settled flood management provisions applying to the Hutt River catchment in the District Plan. They also noted that future additions to the District Plan to address other catchments are not precluded. [206]

3.296 I share the Officers view, and add that it is not necessary for a plan change to comprehensively address all aspects of a particular issue across the entire City. Indeed, it is not uncommon for plan changes to have a narrow or limited focus, either spatially or in terms of provisions proposed. By way of a local example, Plan Change 29 to the Upper Hutt District Plan similarly applied only to a defined area in the Southern Hills, despite the provisions potentially having application elsewhere in the City.

Effects on property values

3.297 Ms Robinson, SoH, Ms Moynihan and UHTCA raised concerns about the impact of the proposal on property values.

3.298 There was no expert evidence presented on this matter at the hearing to confirm whether the proposal would indeed affect property values; however, some information of relevance was tabled.

3.299 Ms Robinson, for example, amplified her submission by explaining that because the flood extent is overstated on the plan change maps, this has the effect of unduly devaluing her property. Mr Pattinson expressed a similar sentiment in his summary and conclusions.

3.300 Mr Pattinson's submission also addressed this issue, including in relation to 'Q&A' information on the Council's website about the economic impact of the proposal. The reference in the submission from SoH cites the Council's appraisal that:

> *The flood hazard exists regardless of whether it is shown on the District Plan maps or not. The risk associated with the hazard may have the effect of reducing property values. However, it is not the hazard maps that cause this effect, it is the risk from the flood hazard itself.*

3.301 In response to this, SOH's submission was that the above is only true if the flood maps are accurate – which they believe is not the case. On that basis, it is the incorrect maps, in their view, not the hazard that is impacting on property values.

3.302 Mr McLellan noted the comment in the s32 report (also mirrored in the s42A report) that effects on property prices cannot be considered as economic effects of the plan change. In contrast, he observed that $180M worth of property was affected by PC15 and advised that affected parties have faced associated issues with insurers. In his view, the Council should remove flood hazard information from LIMs until there is greater confidence about the accuracy of flood information.

3.303 Part 10 of the s32 Report includes detailed information about the likely economic costs associated with the implementation of the plan change provisions. For subdivision, earthworks and building proposals, the report estimates additional costs ranging from less than 1% to 13% depending on the activity in question. Given the benefits to be

[206] s42A Report, p.56, paras 351

realised from the implementation of the proposal, the report finds these additional costs are not unreasonable.

3.304 The s42A report also included advice from Jigsaw Property Consultancy Ltd. [207] The advice did not quantify any economic effects of the proposal, but provided the view that:

a. if a hazard or potential hazard exists, current and future property owners have the right to know about the risk and Councils have an obligation to inform their communities of known risks;

b. the hazard exists whether it is shown on a map or not;

c. the risk may have the effect of lowering property values but not the map itself; and

d. individuals are entitled to the hazard information so they can make their own judgements as to the affect of the hazard on their property value.

3.305 There was no material evidence presented to rebut the quantification of costs relating to the proposed regulatory framework identified in the s32 report. On that basis, I have no reason to find that the proposed rules result in unreasonable economic costs.

3.306 As to the issue of effects on property value, there was a lack of any evidence - expert or lay - to demonstrate a direct *quantitative* effect of the flood hazard maps. Qualitatively, however, the observations by the Council and Mr Pattinson are both reasonable assertions in my view. The critical determinant for this evaluation, on that basis, would be whether or not the maps are accurate.

3.307 As I have already observed above, the compelling evidence to this hearing is that the maps are sufficiently accurate *for their intended purpose*. Accordingly, and in the absence of any quantitative evidence to the contrary, I am not persuaded that the plan change will result in demonstrable effects on property values.

Jurisdictional matter raised by Mr Jefferies

3.308 One of the main points made by Mr Jefferies was in relation to the Council's ability to include provisions in the plan to manage activities in the bed of a river. In his view, the proposed rules relating to the river and stream corridor are outside the Council's jurisdiction and therefore unlawful. Powerco's submission identified a similar position.

3.309 Mr Beban and Mr Osborne's response to this contention was that the provisions are lawful and within the Council's jurisdiction. They explained that terms "*river corridor*" and *"stream corridor"* are used to describe a high hazard area which includes the physical stream and an area of erosion prone land along either side of the water course. As such, this identified corridor comprises an area more than just the physical channel (or bed of the river) of the Mangaroa River and Pinehaven Stream and is not used interchangeably with the RMA definition for the bed of a stream or river. [208]

[207] s42A Report, Appendix 9
[208] s42A Report, p.18, para 77

3.310 They added that:

> *80. In the case of this plan change, the purpose of controlling activities within the bed of a river is to discourage development and inappropriate earthworks within the high hazard risk areas of the Flood Hazard Extent (being the Stream and River Corridors). This is intended to achieve integrated management of the effects of the use, development or protection of land and physical resource as well as control any actual or potential effects of the use, development or protection of land.* [209]

3.311 Mr Beban and Mr Osborne's position was assisted by legal advice from DLA Piper which expressed that there is jurisdiction for the proposed approach in PC42 because a river or stream bed falls within the definition of 'land.' However, the advice added that there is a corresponding need to identify the s31 function relied upon in deriving the rules and to ensure that they are not inconsistent with any regional rules. [210]

3.312 DLA Piper was subsequently asked to reconsider their position following new information presented by Mr Jefferies at the hearing. As noted in Appendix 2 to the Council's reply, DLA Piper reviewed and considered Mr Jefferies' presentation and their position was unchanged.

3.313 Ultimately, I accept the advice from Officers and legal counsel that there is jurisdiction for the proposed rules relating to the river and stream corridor. Substantively, I also share the Officers' view that the provisions are appropriate for implementing the proposed objectives and policies. In particular, the rules will ensure uncontrolled earthworks in high hazard areas do not exacerbate flooding effects elsewhere in the respective catchments.

[209] s42A Report, p.18, para 80
[210] s42A Report, Appendix 3

4.0 STATUTORY CONSIDERATIONS

4.1 Drawing on consideration of the Plan Change material, the submissions and further submissions, and the evidence presented, this part of my report addresses the statutory requirements outlined at the start Section 3 above.

4.2 I have adopted a thematic approach to presenting my findings in this respect, using the *Colonial Vineyards* criteria as a 'road map.' In particular, I rely on (and do not repeat) the detailed reasoning in Section 3 in providing what is essentially a 'high level' response to the criteria and questions prompted by the *Colonial Vineyards* case.

Are the proposed objectives the most appropriate way to achieve the purpose of the Act?

4.3 The plan change includes new objectives for Chapters 9, 14 and 16 that collectively seek the identification of areas within a flood hazard extent and the control of subdivision, earthworks, buildings and other land use activities in those areas so as to avoid or mitigate the effects of flooding on people and property.

4.4 In my view, and for the reasons outlined in Section 3, these objectives are the most appropriate means to achieve the Act's sustainable management purpose in respect of future development of the Mangaroa and Pinehaven catchments.

4.5 In particular, the Plan Change objective facilitates the use, development, and protection of natural and physical resources of the areas in a way that enables enhanced social, economic, and cultural well-being. The Plan Change objectives are also designed to sustain the potential of those resources to meet the needs of future generations, while avoiding or mitigating any adverse environmental effects.

4.6 In reaching these findings, I am also satisfied that the proposal and its aims have had regard to the maintenance and enhancement of amenity values[211] and the quality of the environment[212].

4.7 As an aside, I observe that Part 2 of the RMA was amended in 2017 to add *"the management of significant risks from natural hazards"* to the list of matters of national importance that must be recognised and provided for in achieving the Act's purpose. That amendment post-dates the notification of this plan change, and is therefore not a determinative factor for my decision-making. Should PC42 become operative, however, I note my view that the District Plan will be consistent with that amendment as it relates to the Pinehaven and Mangaroa catchments.

Are the provisions the most appropriate way to implement the "objectives," having regard to their efficiency and effectiveness, actual and potential environmental effects and reasonable alternatives?

4.8 In my evaluation in Section 3, I find that the proposed provisions have been explicitly designed to be effective and efficient at implementing both the proposed and settled objectives of the Plan. Broadly, the policies encompass a two-pronged approach which seeks to:

[211] s7(c), RMA
[212] s7(f), RMA

a. avoid activities in high hazard areas and/or where they would increase the risk from hazards on people and property; and

b. manage lower risk activities.

4.9 Mu evaluation in Section 3 finds that the rules and methods, in turn, effectively and efficiently implement that policy direction through permitted activity standards and resource consent requirements (including the type of activity status) designed to elevate regulatory stringency and scrutiny with increased anticipated risk from flood hazards.

4.10 As described in the issue evaluation above, and in **Appendix 2**, the amendments to the provisions arising since notification have been made for the purposes of improving clarity and/or effective implementation.

4.11 I have also discounted alternative methods to implement the Plan Change objective as proposed by some submitters due to their less effective and/or efficient implementation of the objectives.

4.12 For these reasons, I find that the proposal is more appropriate than the status quo at achieving the plan's settled and proposed objectives on the whole.

Is the Plan Change designed to accord with, and assist the Council to carry out its functions so as to achieve the purpose of the Act?

4.13 PC42 involves the establishment of methods to achieve integrated management of the effects of the use, development, or protection of land and associated natural and physical resources of Upper Hutt City. Further, the Plan Change aims to control the actual or potential effects of the use, development, or protection of land – including for the avoidance or mitigation of natural hazards.

4.14 Accordingly, I find that the Plan Change is designed to accord with and assist the Council to carry out its s31 functions.

Does the Plan Change give effect to any NPS or the NZCPS?

4.15 The NZCPS is not relevant to the Plan Change.

4.16 As noted above, a primary driver for Transpower's submission on the proposal was the need for the provisions to give effect to the NPSET. I have accepted the recommendation of the Officers that several amendments be made to the notified plan change provisions in response to Transpower's submission. Among other reasons for accepting those amendments, I consider they are more appropriate and will better give effect to the NPS than the notified provisions.

4.17 To the extent relevant to this proposal, I find that the proposal will implement the NPSET.

Does the Plan Change give effect to the Regional Policy Statement?

4.18 Again, as noted above, no party contended that the *operative* Plan gives effect to the RPS. In contrast, the clear evidence of Mr Beban and Mr Osborne, and the statement from Ms Harper is that the plan change provisions give effect to the RPS.

4.19 I share their interpretation for the reasons expressed under Issues 2, 3 and 4 above in particular.

Is the Plan Change consistent with any regional plans or proposed regional plans?

4.20 This is particularly relevant to the submission from Mr Jefferies, and his contention that the plan change provisions applying to stream and river corridors should be managed under the relevant GWRC Regional Plans, rather than the District Plan.

4.21 I have accepted the evidence of Mr Beban and Mr Osborne and the legal advice from DLA Piper that the plan change provisions fall within Council's jurisdiction under s31 of the Act. Relatedly, I accept the uncontested evidence of Mr Beban and Mr Osborne that the PC42 provisions are not inconsistent with the Regional Freshwater Plan for the reasons expressed in their Reply.[213]

What (if any) regard should be given to relevant management plans and strategies under other Acts, including any relevant entry in the Historic Places Register?

4.22 Apart from the PFMP – which I have discussed in some detail in preceding sections of the report – the most relevant documents I have had regard to under this category are:

a. *Upper Hutt Urban Growth Strategy 2007*;
b. *Upper Hutt Sustainability Strategy 2012-2022*; and
c. *Land Use Strategy Upper Hutt 2016-2043*.

4.23 These strategies all identify that flooding is a resource management issue for the District, consistent with the plan change provisions.

4.24 The Urban Growth Strategy also specifically:

a. acknowledges the MFHA and the need to identify issues and options for flood management in Pinehaven (which subsequently led to the PFMP)[214]; and
b. states that Council will require new (infill and greenfield) development to provide sufficient management of additional stormwater generated on site, including peak flow management and harvesting.[215]

4.25 In my evaluation, the plan change is consistent with the Council's overarching direction set out in the above strategies. For the reasons specified in Section 3 above, I also find that the plan achieves an appropriate level of consistency with the PFMP.

[213] Council Right of Reply (20 October 2017), pp.6-7, paras 15-18
[214] *Upper Hutt Urban Growth Strategy* (2007), pp.89 & 92
[215] *Upper Hutt Urban Growth Strategy* (2007), p. 66

To what extent does the District Plan need to be consistent with the plans or proposed plans of adjacent territorial authorities?

4.26 This relates to Mr Jefferies' submission, but also to the evidence from the Council that terminology and methods adopted in PC42 are consistent with those used by other Territorial Authorities in the Wellington Region.

4.27 There is no compulsion, in my view, that the terminology need be consistent with other Councils. However, I accept the view of the Officers that it makes good sense to do so.

4.28 In any event, I am satisfied that the proposal has have sufficient regard to the extent to which it needs to be consistent with the NRMP.

5.0 OVERALL RECOMMENDATION

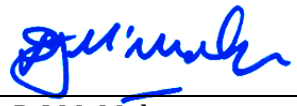
5.1 Based on my consideration of all the material before me, including the section 42A report from the council advisors, submissions, further submissions, evidence presented at the hearing and following consideration of the requirements of Section 32 and other relevant statutory matters, I recommend to the Council that:

(a) a waiver be granted, pursuant to s37 of the RMA, for receiving the further submissions from Jeff & Noeline Berkett, Transpower NZ Ltd and Duigald Myers;

(b) the Plan Change be accepted as notified except where it is to be amended as shown in **Appendix 2** and that all submissions on the Plan Change be accepted or rejected to the extent set out above (and summarised in **Appendix 1**); and

(c) pursuant to Clause 10 of the First Schedule of the Resource Management Act 1991, Council give notice of its decision on submissions to Plan Change 42.

DATED AT WELLINGTON THIS 19th DAY OF FEBRUARY 2018



D J McMahon
Independent Commissioner

APPENDIX 1

Recommendations on relief sought by submission

APPENDIX 2

Annotated provisions with explanation for proposed amendments since notification