**IN THE MATTER of the Resource Management Act 1991(RMA)**

**AND**

**IN THE MATTER of Private Plan Change 100 – Riverhead to the Auckland Unitary Plan**

**JOINT WITNESS STATEMENT (JWS) IN RELATION TO:**

# Topic: Stormwater and Flooding (1)

**Date 25 June 2025**

Expert Conferencing Held on: 25 June 2025

Venue: Auckland Town Hall and Online

Independent Facilitator: Marlene Oliver

Admin Support: Kasey Zhai

## 1 Attendance:

1.1 The list of participants is included in the schedule at the end of this Statement.

1.2 Declarations – the participants expertise and roles are set out in the schedule. This JWS should be read having regard to those relationships.

## 2 Basis of Attendance and Environment Court Practice Note 2023

2.1 All participants agree to the following:

(a) The Environment Court Practice Note 2023 provides relevant guidance and protocols for the expert conferencing session;
(b) They will comply with the relevant provisions of the Environment Court Practice Note 2023;
(c) They will make themselves available to appear before the Panel;
(d) This statement is to be filed with the Panel and posted on the Council's website.

## 3 Matters considered at Conferencing – Agenda and Outcomes

3.1 **Introductory Discussion – Stormwater & Flooding**

BR provided an outline of the model scenarios completed to date and additional modelling in progress. Refer to **Attachment 1**.

3.1.1 **Overview of scenarios to be modelled for PC100 and discussion on whether any other events need to be included to assess effects at a Plan Change level**

3.1.1.1 All stormwater experts support providing further model runs identified at rows 12, 13, and 14, and that these scenarios are also run without climate change (additional scenarios 15, 16, and 17).

3.1.1.2 All stormwater experts support providing further model runs for row 4 without climate change and with updates to the model as reflected in 12, 13, and 14 (additional scenario 18).

3.1.1.3 KL supports providing further model runs for new scenario 18, with upstream modelled as the total depth of 40 mm for 24 hours (additional scenario 19). Additional scenario 19 is required as the spatial distribution of any given future storm is unknown, the assumption of relatively higher intensity rainfall in the lower catchment is considered equally likely to a storm which occurs simultaneously across the entire catchment. This approach can also be considered to be analogous to assist in the effects of storms with a shorter duration event.

3.1.1.4 BR and ZW consider that additional scenario 19 is highly improbable and is not necessary given the evidence from other runs. PW considers additional scenario 19 is not required for the purpose of a plan change. BR and ZW consider that the details of additional scenario 19 should be discussed in a future expert conferencing session addressing modelling.

3.1.1.5 KL supports providing further model runs as a variation of additional scenario 19 for the downstream is to be modelled as 10-year ARI rainfall instead of 100-year ARI rainfall (additional scenario 20). This was raised in paragraphs 7, 8, 9, and 10 of the section 42A Addendum Report memo from KL and AT.

3.1.1.6 KB considers additional scenario 20 to be beyond the scope of assessment of effected needed to support the Plan Change and has not been identified in evidence to date.

## 3.2 Stormwater Management – Mitigation / Assessment

3.2.1 **HP36 There is uncertainty regarding whether hydrology mitigation / the SMAF control is required for the Riverhead Point Drive catchment. Does this matter need to be included within the precinct provisions or is it appropriate to leave this matter to implementation of the SMP through the resource consent process?**

3.2.1.1 BR, PW, GC, and DS consider that in the absence of the completion of further investigation currently being carried out into the Riverhead Point Drive catchment, it is appropriate to apply the SMAF 1 control to the entirety of the PC100 area and be included in the precinct.

3.2.1.2 BR and PW consider that should further investigation into Riverhead Point Drive confirm that the network manages flows appropriately, hydrological mitigation does not need to apply.

3.2.1.3 DS and GC agree with paragraph 3.2.1.2 and note that if hydrological mitigation does not apply, this can be addressed at subsequent resource consent stages.

3.2.2 **HP37 Is additional work required to understand the potential for stream channel erosion to occur downstream of PC100, especially within the Northern Riverhead Forest Stream and the Southern Stream area?**

3.2.2.1 BR considers that for the plan change, no additional work is required. A detailed assessment of the effects on these receiving environments is more appropriate at resource consent stage when further engineering detail is available.

3.2.2.2 DS raises concerns that assessment has not been provided at this stage to demonstrate that there is a feasible solution to manage changes in hydrology from the proposed diversion of approximately 8 hectares from the western tributary of Riverhead Forest Stream to the Southern Stream to ensure no increase in risk of erosion.

3.2.2.3 PW considers that there are a number of solutions available to mitigate the effects of the 8-hectare diversion and the feasibility of options will be undertaken at the time of resource consent.

3.2.2.4 BR and PW consider that it will be appropriate to identify in the SMP the potential issue raised in paragraph 3.2.2.2 and that no additional work is required to understand the potential stream channel erosion as part of the Plan Change.

3.2.2.5 All experts agree that additional work is required to understand the potential for stream channel erosion for the southern stream only. DS considers that this assessment should be undertaken at the plan change stage. BR, ZW, PW consider that this assessment can be undertaken at the time of resource consent. GC considers there should be explicit reference within the precinct provisions to address this issue at the first resource consent (for earthworks).

3.2.2.6 All experts agree that additional work is required to understand the potential for stream channel erosion for the Northern Riverhead Forest Stream. BR, ZW, PW, and DS consider that this assessment can be undertaken at the time of resource consent. GC and KL consider there should be explicit reference within the precinct provisions to address this issue at the first resource consent (for earthworks).

3.2.2.7 KC, MT, and DW consider that this section 3.2.2 should be reviewed by the planning experts to confirm whether the planning provisions adequately address this matter – refer also to HP38.

## 3.3 Stormwater Management Approach

3.3.1 **HP28 Is the proposed stormwater management approach an appropriate method to manage and/or mitigate the stormwater runoff?**

**HP29 What alternative stormwater management approaches could be considered?**

3.3.1.1 BR considers that the proposed stormwater management approach (outlined in Section 6 of Evidence in Chief), is considered appropriate as a framework to manage and/or mitigate stormwater runoff generated from PC100.

3.3.1.2 BR considers that alternatives have already been considered and tested within the SMP and as outlined in Section 8 and the outcome is that the Best Practicable Option (BPO) has been presented within the SMP for PC100.

3.3.1.3 All experts (engineering and planning) consider that the proposed stormwater management approach is appropriate in principle subject to more detailed matters identified in this JWS and potentially in a future JWS. This applies to questions HP28 and HP29.

3.3.2 **HP33 Is the implementation of the stormwater management proposal impacted by the staging of the development? i.e. if one landowner goes ahead of another?**

**HP34 Does the SMP need to address the staging of the development? If so, does there need to be staging provisions within the precinct provisions, for stormwater management as well?**

3.3.2.1 BR considers that the PC100 SMP includes options that enable management of staged development. This might include interim measures within part of the development to manage stormwater until communal devices are completed. This is common practice, of which there are many examples in Auckland and elsewhere in the country.

3.3.2.2 BR considers that the SMP prepared for PC100 does address the matter of staging of the development, as outlined in response to HP33 and therefore, provisions relating to staging do not need to be included within the precinct provisions.

3.3.2.3 All experts consider that it is not a matter of the staging of development but clarifying the catchments with dependencies in the SMP. The catchments with identified dependencies need to be clarified in the updated SMP.

3.3.2.4 KC, MT, and DW consider that this section 3.3.2 should be reviewed by the planning experts to confirm whether the planning provisions adequately address this matter.

3.3.3 **HP35 Does the upgrade of the Riverhead Road culvert need to occur in advance of any development on site, or just development of certain sub-catchments on the site?**

3.3.3.1 BR, DS, MI, and SF consider that the upgrade of the Riverhead Road culvert is required ahead of the development of certain sub-catchments and this is appropriately captured by Standard IX.6.16 'Riverhead Road Culvert Upgrade'.

3.3.3.2 AT considers assessment criteria IX.8.2(20) should include reference to cumulative effects. All planning experts note that the RMA definition of 'effect' includes cumulative effects. DW suggests that IX.8.2(20)(b) could be amended to read 'flood hazard effects'. All experts agree that this detail will be referred to the planning expert conference.

## 3.4 Network Discharge Consent / Stormwater Management Plan Process

3.4.1 **HP40 part 1 Does the SMP need to be revised / updated, prior to a decision being issued on PC100?**

3.4.1.1 All experts consider that the SMP (Rev 4) will be updated to capture all the relevant amendments presented in the evidence of BR and the JWS' to enable the Hearing Panel to make a decision on PC100.

3.4.2 **HP40 part 2 Does the SMP need to be accepted by Healthy Waters prior to a decision being issued on PC100?**

3.4.2.1 All experts consider that Healthy Waters NDC Team's adoption of the SMP occurs following the approval of the plan change in accordance with NDC Condition 13.

## 4 PARTICIPANTS TO JOINT WITNESS STATEMENT

4.1 The participants to this Joint Witness Statement, as listed below, confirm that:

(a) They agree that the basis of their participation and the outcome(s) of the expert conferencing are as recorded in this Joint Witness Statement; and
(b) They agree to the introduction of the attached information – Refer to paragraph 3.1 above; and
(c) They have read the Environment Court's Practice Note 2023 and agree to comply with it; and
(d) The matters addressed in this statement are within their area of expertise; and
(e) As this session was held both in-person and online, in the interests of efficiency, it was agreed that each expert would verbally confirm their position in relation to this para 4.1 to the Independent Facilitator and the other experts and this is recorded in the schedule below.

**Confirmed: 25 June 2025**

| EXPERT'S NAME & EXPERTISE | PARTY | EXPERT'S CONFIRMATION REFER PARA 4.1 |
|---|---|---|
| Bronwyn Rhynd (BR), Environmental Engineer | RLG (Applicant)<br>Consultant | Yes |
| Zeb Worth (ZW), Environmental Engineer | RLG (Applicant)<br>Consultant | Yes |
| Pranil Wadan (PW), Stormwater Engineer | RLG (Applicant)<br>Consultant | Yes |
| Karl Cook (KC), Planning | RLG (Applicant)<br>Consultant | Yes |
| Kelsey Bergin (KB), Planning | Fletcher Residential Limited (with the applicant)<br>Employee – Development Manager | Yes |
| Anthony Smith (AS), Surveying | Fletcher Residential Limited (with the applicant)<br>Employee – Head of Development | Yes |
| Dali Suljic (DS), Engineer | Auckland Council (submitter)<br>Consultant | Yes |
| David Wren (DW), Planning | Auckland Council (s42A team) | Yes |

| | | |
|---|---|---|
| | Consultant | Online |
| Kedan Li (KL), Stormwater Engineer | Auckland Council (s42A team)<br>Employee – Auckland Council, Healthy Waters | Yes |
| Danny Curtis (DC), Stormwater Management / Engineer | Auckland Council (s42A team)<br>Consultant | Yes |
| Amber Tsang (AT), Planning | Auckland Council (s42A team)<br>Consultant | Yes |
| Mark Iszard (MI), Stormwater Engineer | Auckland Council (Network Discharge Consent holder)<br>Employee - Auckland Council, Healthy Waters | Yes |
| Gemma Chuah (GC), Stormwater Policy | Auckland Council (Network Discharge Consent holder)<br>Employee - Auckland Council, Healthy Waters | Yes |
| Jahangir Islam (JI), Stormwater Engineer | Auckland Council (Network Discharge Consent holder)<br>Consultant | Yes<br>Attended from 9.30am to 12.20pm |
| Sean Finnigan (SF), Stormwater Engineer | Aberdeen Adventures Ltd<br>Consultant | Yes |
| Ryan Pitkethley (RP), Engineer | Good Planet Landholder Submitter Group<br>Consultant | Yes<br>Online<br>Joined at 11.25am (start of HP37 at paragraph 3.2.2) |
| Mark Tollemache (MT), Planning | Good Planet Landholder Submitter Group<br>Consultant | Yes |

# Attachment 1

**Riverhead Private Plan Change - Hydrological and hydraulic model runs overview undertaken to support Riverhead PC100 application**

**Hydraulic Modelling Completed To Date and in Public Record**

| Scenario | Rainfall event | Development | Model Files | | Description | Document Reference | Document Date |
|---|---|---|---|---|---|---|---|
| 1 | 50% AEP | Pre-development | Plan/result: | *Pre-SiteEDR01+OutEDR04-2yrNoCC* | 50% AEP flood assessment scenario for pre-development.<br>No climate change. ED imperviousness within the site and outside of the site. | Appendix 10: STORMWATER MANAGEMENT AND FLOOD RISK ASSESSMENT Revision 04 Appendix 3 | 29/09/2023 |
| | | | Geometry: | *Geo-Pre-V7* | | | |
| | | | Flow file: | *SiteEDR01+OutEDR04-ED-2yrNoCC* | | | |
| | | Post-development | Plan/result: | *Post-SitePostR03+OutEDR04-2yrNoCC* | 50% AEP flood assessment scenario for post-development.<br>No climate change. MPD imperviousness within the site and ED imperviousness outside of the site. | | |
| | | | Geometry: | *Geo-Post-V7* | | | |
| | | | Flow file: | *SitePostR03+OutEDR04-ED-2yrNoCC* | | | |
| 2 | 10% AEP | Pre-development | Plan/result: | *Pre-SiteEDR01+OutEDR04-10yrNoCC* | 10% AEP flood assessment scenario for pre-development.<br>No climate change. ED imperviousness within the site and outside of the site. | | |
| | | | Geometry: | *Geo-Pre-V7* | | | |
| | | | Flow file: | *SiteEDR01+OutEDR04-ED-10yrNoCC* | | | |
| | | Post-development | Plan/result: | *Post-SitePostR03+OutEDR04-10yrNoCC* | 10% AEP flood assessment scenario for post-development.<br>No climate change. MPD imperviousness within the site and ED imperviousness outside of the site. | | |
| | | | Geometry: | *Geo-Post-V7* | | | |
| | | | Flow file: | *SitePostR03+OutEDR04-ED-10yrNoCC* | | | |
| 3 | 1% AEP | Pre-development | Plan/result: | *Pre-SiteEDR01+OutEDR04-100yrNoCC-V3* | 1% AEP flood assessment scenario for pre-development.<br>No climate change. ED imperviousness within the site and outside of the site. | | |
| | | | Geometry: | *Geo-Pre-V7* | | | |
| | | | Flow file: | *SiteEDR01+OutEDR04-ED-100yrNoCC* | | | |
| | | Post-development | Plan/result: | *ProstSitePostR03+OutEDR04-100yr* | 1% AEP flood assessment scenario for post-development.<br>No climate change. MPD imperviousness within the site and ED imperviousness outside of the site. | | |
| | | | Geometry: | *Geo-Post-V7* | | | |
| | | | Flow file: | *SitePostR03+OutEDR04-100yrNoCC* | | | |
| 4 | 50% AEP for upstream and 1% for the rest | Pre-development | Plan/result: | *Pre-SiteEDR01+OutEDR04-100yrNoCC+US2yr* | Scenario to test localised impact for pre-development.<br>No climate change. 50% AEP for upstream of 50 Forestry Road (C11,C12_4 and C12_sum) and 1% AEP for the rest of catchment.<br>ED imperviousness within the site and outside of the site. | | |
| | | | Geometry: | *Geo-Pre-V7* | | | |
| | | | Flow file: | *US2yr+SiteEDR01+OutEDR04-ED-100yrNoCC* | | | |
| | | Post-development | Plan/result: | *Post-SitePostR03+OutEDR04-100yr+US2yr* | Scenario to test localised impact for post-development.<br>No climate change. 50% AEP for upstream of 50 Forestry Road (C11,C12_4 and C12_sum) and 1%AEP for the rest of catchment.<br>MPD imperviousness within the site and ED imperviousness outside of the site. | | |
| | | | Geometry: | *Geo-Post-V7* | | | |
| | | | Flow file: | *US2yr+SitePostR03+OutEDR04-100yrNoCC* | | | |
| 5 | 1% AEP -Attenuation | Post-development | Plan/result: | *Attenuation-SitePostR03+OutEDR04-100yr* | Attenuation scenario to test potential attenuation effect<br>No climate change. MPD imperviousness within the site and ED imperviousness outside of the site.<br>Dummy attenuated flow for three large sub-catchments within the site. | | |
| | | | Geometry: | *Geo-Post-V7* | | | |
| | | | Flow file: | *SitePostR03+OutEDR04-100yrNoCC-attenu* | | | |
| 6 | 10% AEP -Attenuation | Post-development | Plan/result: | *Attenuation-SitePostR03+OutEDR04-10yr* | Attenuation scenario to test potential attenuation effect<br>No climate change. MPD imperviousness within the site and ED imperviousness outside of the site.<br>Dummy attenuated flow for three large sub-catchments within the site. | | |
| | | | Geometry: | *Geo-Post-V7* | | | |
| | | | Flow file: | *SitePostR03+OutEDR04-10yrNoCC-attenu* | | | |
| 7 | 1% AEP + Climate Change 2.1°C | Pre-development | Plan/result: | *Pre-SiteEDR01+OutMPD R04-100yrCC* | Scenario for 2.1 °C climate change.<br>Climate change for 2.1°C increase.<br>ED imperviousness within the site and MPD outside the site. | | |
| | | | Geometry: | *Geo-Pre-V7* | | | |
| | | | Flow file: | *SiteEDR01+OutMPDR04-100yrCC* | | | |
| | | Post-development | Plan/result: | *Post-SitePostR01+OutMPD R04-100yr* | Scenario for 2.1 °C climate change (validation scenario)<br>Climate change for 2.1°C increase.<br>MPD imperviousness within the site and MPD outside the site. | | |
| | | | Geometry: | *Geo-Post-V7* | | | |
| | | | Flow file: | *SitePostR03+OutMPDR04-100yrCC* | | | |
| 8 | 1% AEP + Climate Change 3.8°C | Pre-development | Plan/result: | *Pre-SiteEDR01+OutMPD R04-100yrCC3.8* | Climate change for 3.8°C increase. .<br>ED imperviousness within the site and MPD outside the site. | | |
| | | | Geometry: | *Geo-Pre-V7* | | | |
| | | | Flow file: | *SiteEDR01+OutMPDR04-100yr3.8CC* | | | |
| | | Post-development | Plan/result: | *Post-SiteMPDR03+OutMPD R04-100yrCC* | Climate change for 3.8°C increase. .<br>MPD imperviousness within the site and MPD outside the site. | | |
| | | | Geometry: | *Geo-Post-V7* | | | |
| | | | Flow file: | *SitePostR03+OutMPDR04-100yr3.8CC* | | | |
| 9 | 1% AEP + Climate Change 3.8°C | Post-development | Plan/result: | *Post-SiteMPDR04+OutMPDR04-100yr3.8CC* | 3.8°C Climate Change<br>MPD imperviousness within the site and MPD outside the site.<br>Reduced S02_P Catchment<br>Dummy attenuation of increased S01_P<br>Upgrade Riverhead Road Culvert to 4.5mW x 1.5mH box culvert at same invert as existing | STATEMENT OF EVIDENCE OF BRONWYN RHYND STORMWATER MANAGEMENT / FLOODING:<br>Exhibit 1 ADDENDUM TO RIVERHEAD PLAN CHANGE AREA SMP | 31/03/2025 |
| | | | Geometry: | *Geo-Post-V8 – Riverhead Rd Culvert Upgrade* | | | |
| | | | Flow file: | *SiteMPDR04+OutMPDR04- 100yr3.8CC* | | | |
| 10 | 10%AEP + Climate Change 2.1°C | Pre-development | Plan/result: | *Pred-SiteEDR01+OutMPDR04-010yr2.1CC* | 10yr 2.1°C Climate Change<br>ED imperviousness within the site and MPD outside the site. | STATEMENT OF SUPPLEMENTARY REBUTTAL EVIDENCE OF BRONWYN RHYND:<br>FURTHER ASSESSMENT FRA PC100 | 14/05/2025 |
| | | | Geometry: | *Geo-Pre-V7* | | | |
| | | | Flow file: | *SiteEDR01+OutMPDR04-10yr2.1CC* | | | |
| | | Post-development | Plan/result: | *Post-InMPDR05+OutMPDR04-10yr2.1CC_CULv5* | 10yr 2.1°C Climate Change<br>MPD imperviousness within the site and outside the site.<br>Dummy SMAF 1 detention<br>Refined Riverhead Rd culvert upgrade | | |
| | | | Geometry: | *Geo-Post-V9 - Riverhead Rd Culvert Upgrade v5* | | | |
| | | | Flow file: | *SiteMPDR05+OutMPDR04-10yr2.1CC* | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 11 | 1% AEP + Climate Change 3.8°C | Pre-development | Plan/result: *Pre-SiteEDR01+OutMPD R04-100yrCC3.8*<br>Geometry: *Geo-Pre-V7*<br>Flow file: *SiteEDR01+OutMPDR04-100yr3.8CC* | 100yr 3.8°C Climate Change<br>ED imperviousness within the site and MPD outside the site. | | | 14/05/2025 |
| | | Post-development | Plan/result: *Post-InMPDR05+OutMPDR04-100yr3.8CC_CULv5*<br>Geometry: *Geo-Post-V9 - Riverhead Rd CulvertUpgrade v5*<br>Flow file: *SiteMPDR05+OutMPDR04-100yr3.8CC* | 100yr 3.8°C Climate Change<br>MPD imperviousness within the site and outside the site.<br>Dummy SMAF 1 detention<br>Refined Riverhead Rd culvert upgrade | | | |

**Additional Modelling Currently in Progress in response to submitter queries**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 12 | 50%AEP + Climate Change 2.1°C | Pre-development | Plan/result: *TBC*<br>Geometry: *TBC*<br>Flow file: *TBC* | 2yr 2.1°C Climate Change<br>ED imperviousness within the site and outside of the site.<br>Updated pre development hydrology based on submission feedback (CN values, Lag times, Manning's roughness)<br>Updated culvert layout at 22 Duke Street to reflect 2 x 1.5m diameter culverts installed after previous culvert damaged | | | |
| | | Post-development | Plan/result: *TBC*<br>Geometry: *TBC*<br>Flow file: *TBC* | 2yr 2.1°C Climate Change<br>MPD imperviousness within the site and ED outside of the site.<br>Updated Post development hydrology based on submission feedback (CN values, Lag times, Manning's roughness)<br>Updated culvert layout at 22 Duke Street to reflect 2 x 1.5m diameter culverts installed after previous culvert damaged<br>Includes previous model refinements (Riverhead Rd Culvert Upgrade, S01_P attenuation, inclusion of dummy SMAF detention | | | |
| 13 | 10%AEP + Climate Change 2.1°C | Pre-development | Plan/result: *TBC*<br>Geometry: *TBC*<br>Flow file: *TBC* | 10yr 2.1°C Climate Change<br>ED imperviousness within the site and outside of the site.<br>Updated pre development hydrology based on submission feedback (CN values, Lag times, Manning's roughness)<br>Updated culvert layout at 22 Duke Street to reflect 2 x 1.5m diameter culverts installed after previous culvert damaged | | TBC | TBC |
| | | Post-development | Plan/result: *TBC*<br>Geometry: *TBC*<br>Flow file: *TBC* | 10yr 2.1°C Climate Change<br>MPD imperviousness within the site and ED outside of the site.<br>Updated Post development hydrology based on submission feedback (CN values, Lag times, Manning's roughness)<br>Updated culvert layout at 22 Duke Street to reflect 2 x 1.5m diameter culverts installed after previous culvert damaged<br>Includes previous model refinements (Riverhead Rd Culvert Upgrade, S01_P attenuation, inclusion of dummy SMAF detention | | | |
| 14 | 1% AEP + Climate Change 3.8°C | Pre-development | Plan/result: *TBC*<br>Geometry: *TBC*<br>Flow file: *TBC* | 100yr 3.8°C Climate Change<br>ED imperviousness within the site and outside of the site.<br>Updated pre development hydrology based on submission feedback (CN values, Lag times, Manning's roughness)<br>Updated culvert layout at 22 Duke Street to reflect 2 x 1.5m diameter culverts installed after previous culvert damaged | | | |
| | | Post-development | Plan/result: *TBC*<br>Geometry: *TBC*<br>Flow file: *TBC* | 100yr 3.8°C Climate Change<br>MPD imperviousness within the site and ED outside of the site.<br>Updated Post development hydrology based on submission feedback (CN values, Lag times, Manning's roughness)<br>Updated culvert layout at 22 Duke Street to reflect 2 x 1.5m diameter culverts installed after previous culvert damaged<br>Includes previous model refinements (Riverhead Rd Culvert Upgrade, S01_P attenuation, inclusion of dummy SMAF detention | | | |