Before the Independent Hearings Panel
at Waimakariri District Council

under: the Resource Management Act 1991

in the matter of: Proposed private plan change RCP31 to the Operative Waimakariri District Plan

and: **Rolleston Industrial Developments Limited**
Applicant

Summary of evidence of Eoghan O'Neill (Stormwater/Wastewater)

Dated: 3 August 2023

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SUMMARY OF EVIDENCE OF EOGHAN O'NEILL

1 My full name is Eoghan Michael O'Neill.

2 I am a Technical Director with Pattle Delamore Partners Ltd and have been employed in that capacity since October 2012. I am a Chartered Professional Engineer with approximately 20 years' experience in the planning and design of wastewater, water supply and stormwater infrastructure.

3 The management of stormwater quantity, including hydraulic continuity between the upstream and downstream catchments, can be managed by means of the following:

3.1 Formalised flow paths to be installed to connect the upstream and downstream catchments.

3.2 Attenuation and flood storage to be provided within the site to manage runoff up to the 2% AEP (50-yr ARI) by the use of basins, compensatory storage, and rain tanks. Stormwater detention basins will be unlined and will be designed to be constructed along the fall of the site with minimal excavation assumed to ensure storage can be provided without intercepting highest groundwater at the site. Low bunding shall be gradually formed along the fall of the contour to retain floodwaters within the formed basin. A conceptual view of a proposed basin is included in **Attachment 1** of this evidence.

3.3 The nature of this stormwater detention basin concept is that the basins themselves, which are not lined, can be constructed with minimal excavation, or no excavation at all if required, to ensure that groundwater is not intercepted during their operation. Therefore, the construction and management of the detention basins at the site will not require consents for the taking of groundwater.

4 Water quality treatment can be provided as follows:

4.1 Residential and retirement village/school runoff to be predominantly treated by means of filtration via high infiltration rate raingardens or swales and bioscapes which will be designed to treat 90% of rainfall runoff from the site. Raingardens and bioscapes, being approximately 1m deep, will likely be constructed into seasonal groundwater. During construction they will be fully lined to avoid any active ongoing drainage of groundwater that may be intercepted at their base. Raingardens are typically constructed within sealed concrete structures while larger bioscapes are typically sealed with a synthetic liner to exclude any intercepted groundwater. Any temporary dewatering

that is required to facilitate this construction can be consented as part of the suite of construction related consents required for the development. As the treatment infrastructure will be fully lined, no active ongoing drainage of groundwater will occur, therefore there will be no consumptive take of groundwater associated with the operation of the stormwater treatment infrastructure.

4.2 Up to 2ha of stormwater wetlands or wet ponds can be constructed at the site as a permitted activity under Rule 5.114 of the Canterbury Land and Water Regional Plan (*LWRP*). This provision allows greater flexibility for the location of potential treatment and storage facilities in wetter parts of the site during detailed design. For the purposes of this Plan Change concept, all stormwater treatment and detention are provided without the use of wetlands or wet ponds.

4.3 Large lot residential stormwater runoff to be treated by means of swales, high-infiltration raingardens and bioscapes.

4.4 Stormwater runoff from business areas to be treated by means of rain gardens or proprietary filtration devices.

4.5 All stormwater treatment infrastructure will be designed to ensure that there is no consumptive take of groundwater which would require a consent.

5 Wastewater for the proposed development can be managed by way of a new wastewater pump station located within the plan change area pumping to Rangiora WWTP via a new rising main.

6 To facilitate the initial build out of lots, and mitigate any odour issues which would occur with a small number of lots connected to the new wastewater main, the new pump station could connect to the existing Mandeville/Ōhoka wastewater pressure main to facilitate the development of an initial 250 lots before the new pressure main was constructed to the WWTP.

CORRECTIONS TO EVIDENCE IN CHIEF

7 There were some errors in the final submitted copy of my Evidence in Chief which I would like to clarify.

7.1 Paragraph 18 refers to 'Attachment 1', but it should refer to Attachment 2.

7.2 Paragraphs 31 & 54 refer to 'Attachment 2', but should refer to Attachment 3 (which was inadvertently omitted from the final evidence version).

7.3 Attachment 3 of the Evidence in Chief has been included at the end of this evidence summary.

RESPONSE TO SUBMITTER EVIDENCE

8 I agree with the evidence of **Mr Wilkins** (Paragraph 26) that, based on the groundwater level monitoring records from Well No. M35/0596, the groundwater at the site is very near surface during times of highest groundwater. The highest recorded level at that bore being 0.12m below ground level in March 2023.

9 I would also note however, as per Paragraph 18 of my evidence, that the test pitting at the site in May 2021 notes that groundwater levels measured within test pits across the site varied from 1.15m to 1.85m depth below ground level. The shallowest depth of 1.15m below ground level was measured in a test pit relatively close to bore M35/0596, and the bore water depth at that time was approximately 0.9m below ground level. I agree with the evidence of **Mr Wilkins** (Paragraph 37) that these groundwater depths are not representative of highest groundwater at the site. I would conclude however, as noted in my evidence, that those measured levels suggest there is the potential for a degree of variability of groundwater depth across the site. An extensive groundwater level investigation across the site is proposed to be undertaken prior to any development which will assist to inform the locations of all stormwater detention basins and the depths at which they could be constructed without intercepting any seasonal groundwater.

10 I disagree generally with Paragraphs 52 to 58 of **Mr Wilkins** evidence. My evidence had noted that detention basins would be constructed to a maximum of 0.2m depth. This assumes that there is likely to be a narrow degree of variability of groundwater depth across the site. The maximum depth of 0.2m was the basis used for the calculation of the likely area associated with the required detention volume. The basins themselves will be located and designed to ensure that that they are located above highest groundwater at the site. This will be informed by the groundwater level investigation discussed above. If this investigation concludes that the basins must be constructed at existing ground level then this is what will be designed. The nature of the detention basin concept is such that they can be designed and constructed along the existing ground contour with no excavation below the existing ground surface. As there will be no consumptive interception of groundwater, the concerns related to consent of consumptive groundwater takes which are detailed in the evidence of **Mr Wilkins** and **Ms Mitten** are not relevant to this proposal.

11 In Paragraph 146 of her evidence, **Ms Mitten** notes concerns of the Regional Council with respect to *"flooding effects based on modelling*

provided by the applicant." Much of this is addressed in the evidence of **Mr Throssell**, however **Ms Mitten** also notes that the modelling does not consider the impact of the development on smaller events such as a mean annual flood event. In response, I would say that the design of the stormwater infrastructure on site will be required to ensure that post-development flows, up to the critical 50-year ARI event, will be managed on site to ensure that post-development flows are no greater than pre-development flows for all situations. The detention volumes presented in my evidence are sufficient to ensure that this is the case. The outflow structures from the detention basins will be carefully designed to ensure that post-development flow being released is no greater than pre-development flows for all events up to and including the critical 50-year event.

12 I agree with the evidence of **Mr Bishop** (Paragraphs 18 and 19) that a wastewater solution for the Plan Change exists and that the details of the final configuration and allocation of costs for provision of infrastructure upgrades would need to be agreed with Council at the time of subdivision consent. I also agree with his statement that any possible temporary connection of the development to the existing Bradley Rd Pressure Main should not compromise the operation of the existing scheme.

13 In Paragraph 20 of his evidence **Mr Bishop** queries the ongoing maintenance requirements for the proposed stormwater treatment devices to be vested with Council. The raingardens and bioscapes will typically require an annual maintenance visit to clean and replace the mulch layer on the surface, no special equipment or skills are required for this maintenance. The engineered media itself would be expected to have an operational life in excess of 25 years. The swales, detention basins and associated bunds would be grassed and would require occasional mowing.

14 In Paragraph 21 of his evidence, **Mr Bishop** notes that the extent and location of the treatment areas are not indicated in the attachments to the evidence. This is true, Attachment 3 of my original evidence, included at the end of this evidence summary, shows only potential detention basin locations as these comprise the largest areas required for stormwater management. The treatment of stormwater is described in Paragraphs 24 to 28 of my evidence. The footprints required for these treatment devices are quite small relative to the size of the catchment served. They will be appropriately sized and located during the detailed design prior to subdivision application. Given that they will be fully sealed, there are few constraining factors which affect their location.

CONCLUSION

15 I am of the view that viable stormwater and wastewater concepts exist for the servicing of the proposed plan change area.

Dated: 3 August 2023

Eoghan O'Neill

Attachment 1 Proposed Detention Basin Designs

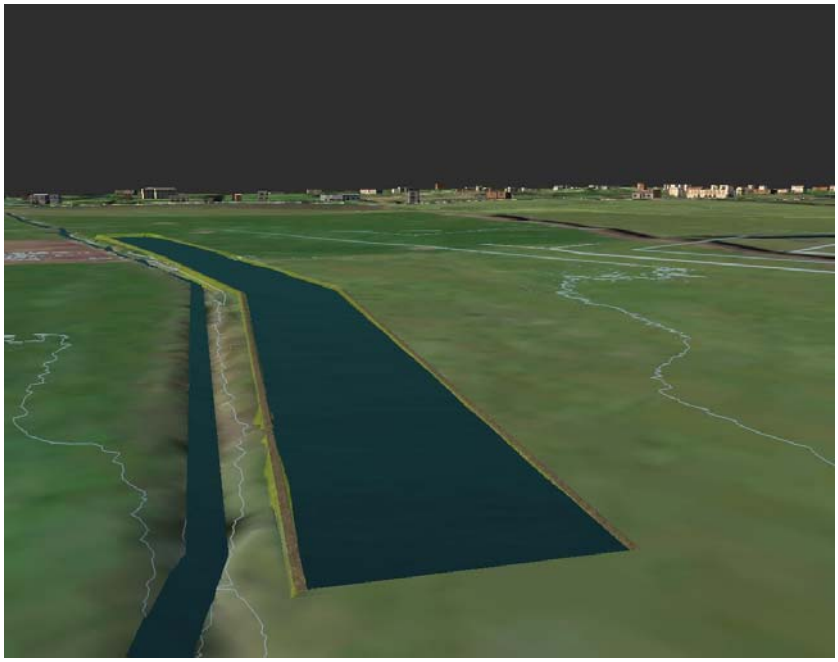


Figure 1 Upgradient View of Detention Basin

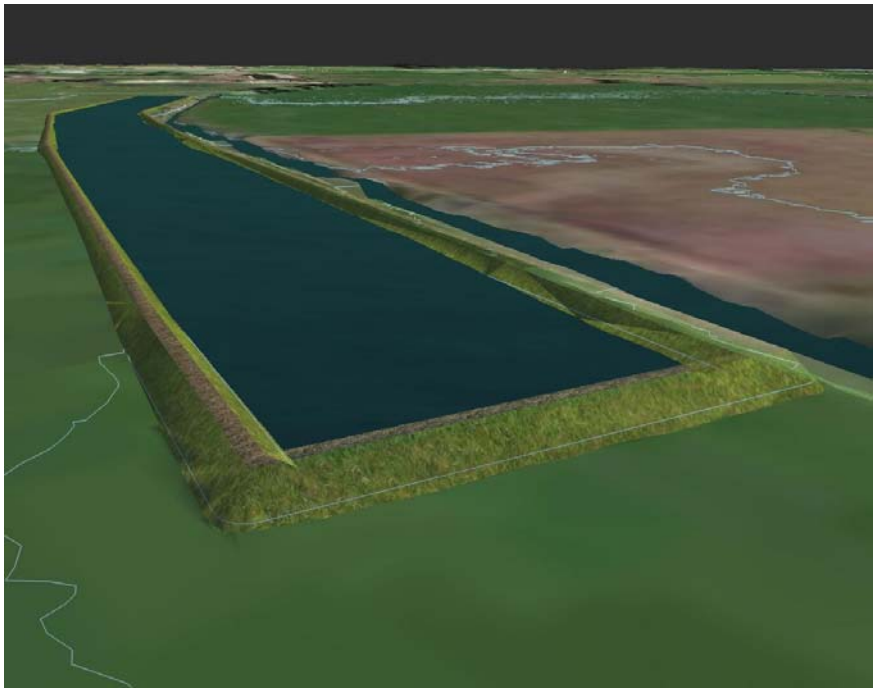
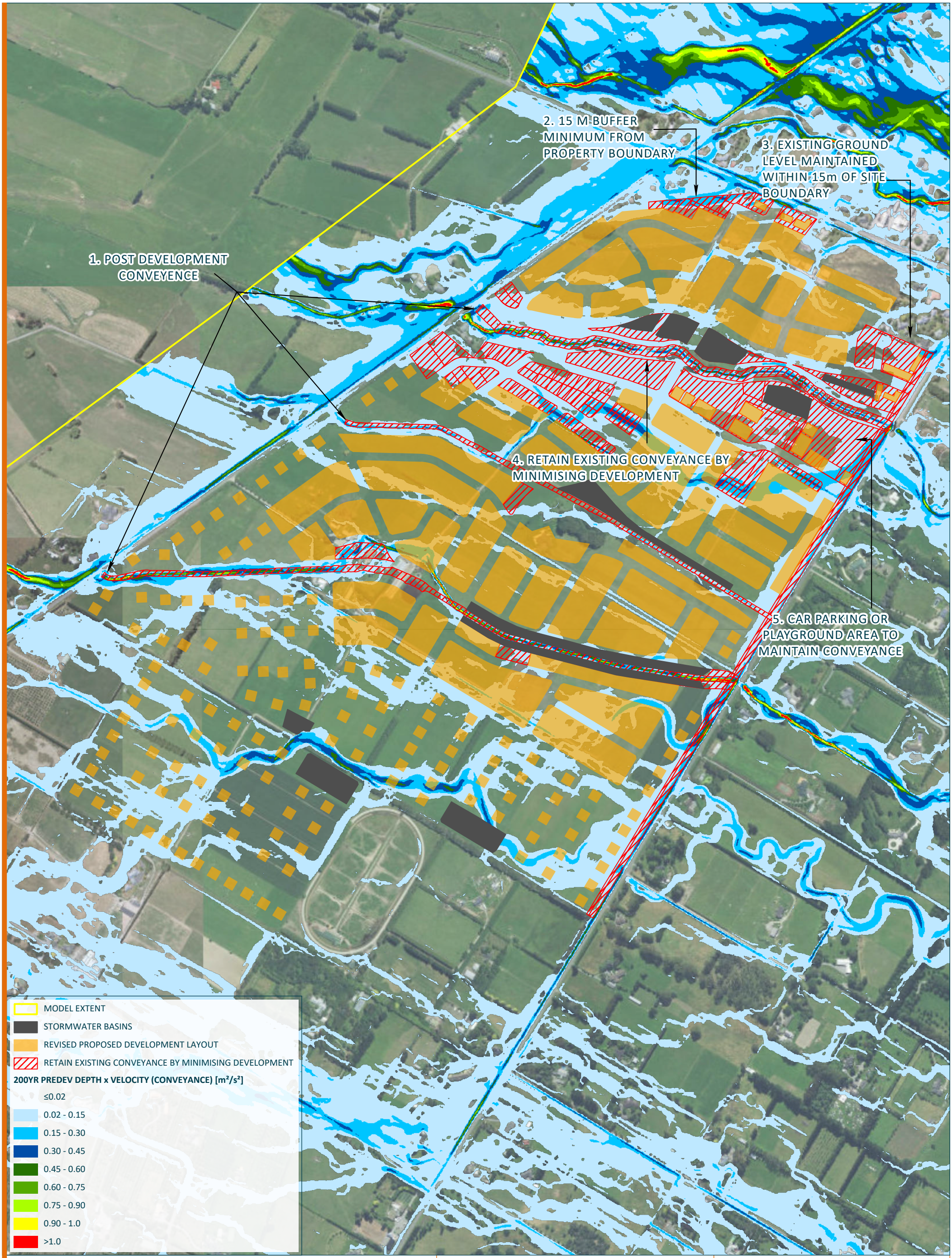


Figure 2 Downgradient View of Detention Basin

Attachment 3 of Evidence in Chief



ATTACHMENT 3: MODELLED SUBDIVISION LAYOUT

OHOKA PLAN CHANGE

SOURCE:
1. AERIAL IMAGERY: EAGLE TECHNOLOGY, LAND INFORMATION NEW ZEALAND, GEBCO, COMMUNITY MAPS CONTRIBUTORS.

0 100 200
Meters
SCALE : 1:7,000 (A3)

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REVISION: 01 | DATE: JUN 23 | BY: JR
CLIENT: ROLLESTON INDUSTRIAL DEVELOPMENTS LIMITED

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