Before an Independent Hearings Panel
Appointed by Waimakariri District Council

under: the Resource Management Act 1991

in the matter of: Submissions and further submissions on the Proposed Waimakariri District Plan

and: Hearing Stream 12D: Ōhoka rezoning request

and: **Carter Group Property Limited**
(Submitter 237)

and: **Rolleston Industrial Developments Limited**
(Submitter 160)

Supplementary statement of evidence of Tim McLeod (Infrastructure)

Dated: 13 June 2024

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SUPPLEMENTARY STATEMENT OF EVIDENCE OF TIM MCLEOD

INTRODUCTION

1 My full name is Timothy Douglas McLeod.

2 My area of expertise, experience, and qualifications are set out in my statement of evidence dated 5 March 2024 for this hearing stream.

3 The purpose of this supplementary evidence is to respond to matters raised in the Officer's Report dated 31 May 2024 relevant to my evidence.

CODE OF CONDUCT

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

RESPONSE TO OFFICER'S REPORT

5 In my evidence below I have focussed on the following matters raised in the evidence of Mr Roxburgh, namely:

5.1 Level of service provided by pressure sewer systems.

5.2 Stormwater basins and interception of groundwater.

5.3 Suitability of the Outline Development Plan (*ODP*).

Level of service provided by pressure sewer systems

6 In paragraphs 16 and 17 Mr Roxburgh asserts that a pressure sewer system provides a lower level of service to residents. There are both advantages and disadvantages to gravity versus pressure sewer systems, however I disagree that a pressure system provides a lower level of service over traditional gravity systems.

7 Pressure sewer systems are not in common use in the Waimakariri District, but are now commonly utilised in the Christchurch City and Selwyn districts where residents readily accept the level of service provided. Advice to residents in the Christchurch City Council publication 'Your guide to the local pressure sewer system'[1] is that

[1] https://ccc.govt.nz/assets/Documents/Services/Wastewater/20-404174-Local-Pressure-Sewer-System-User-Guide.pdf

'*the pressure wastewater system is very reliable and robust. There is very little you need to do and very little that can go wrong*'.

8 For the homeowner the system operates the same as a gravity system (the connection from the house to individual pump stations is a gravity system). Items that may cause blockages and damage to a pressure wastewater system can also cause blockages in a gravity system and should not be disposed of down any sewer.

9 The on-going costs to residents for owning and operating their own private pump station as part of the pressure system is offset by lower Council rates. Residents using a gravity system are generally charged higher Council rates that go towards the operation and maintenance of the gravity sewer system which requires centralised pump stations and treatment plants that are sized to manage larger in-flows due to infiltration and inundation during flood events. Pressure sewer systems are more resilient to inundation and damage during high rainfall and earthquake events.

10 I agree with Mr Roxburghs' overall conclusion in paragraph 18 that while there are some inherent challenges and compromises that need to be made in the selection of a sewer system to service the development area, the site can be feasibly serviced for wastewater by either system. I agree with his statement in paragraph 20 that the type of sewer system and arrangements for conveying wastewater via the existing rising main on a temporary basis or a new dedicated rising main do not need to be determined at this stage and can be addressed by consent conditions at the subdivision application or engineering approval stage.

Stormwater basins and interception of groundwater

11 In paragraph 26 of Mr Roxburgh's evidence he notes the methodology of using above ground basins is very uncommon. This methodology and other innovations to mitigate groundwater interception are required because there was a desire for the development to avoid interception of groundwater in light of Environment Canterbury's interpretation of certain rules in the Canterbury Land and Water Regional Plan. Other measures proposed to mitigate interception of groundwater include:

11.1 ensuring drainage trenches are kept shallow (typically no more than 1.2m deep);

11.2 backfilling of excavated trenches using low permeability soils or constructing "water-stops" at intervals to prevent short-circuiting of groundwater along trench lines;

11.3 using pressure sewer systems to avoid deep excavations required for gravity sewer lines and pump stations;

11.4 using open swales or partially drowned piped systems to avoid deep trenches for stormwater drainage;

11.5 using directional drilling or mole-ploughing instead of trench excavation for installation of polyethylene pipelines and cables;

11.6 incorporating service crossings into bridge or culvert designs or directional drilling to install services at crossing points over waterways;

11.7 constructing pavements with engineered soils with lower permeability or incorporation of geotextiles instead of granular hardfill to prevent short-circuiting of groundwater through pavement layers.

12 These sorts of design and construction methodologies are becoming common practice in areas of Christchurch that have similar ground conditions with high groundwater and springs. Recent subdivisions where these methodologies have been incorporated into the subdivision design include Halswell Prestige subdivision in Halswell, and Highsted and Tullet Park subdivisions in Casebrook.

Suitability of the Outline Development Plan

13 In paragraphs 41(a), 42 and 43 Mr Roxburgh raised concerns regarding the indicative sizing shown on the ODP for the Stormwater Management Areas.

14 In my experience an ODP (map or figure) is a diagrammatic representation of the proposed development for planning purposes only. Elements such a roads, pedestrian networks, and landscape features are shown indicatively and diagrammatically for presentation purposes and are not drawn to scale. The concept design for sizing of stormwater management areas would normally be carried out at subdivision consent stage and presented to scale on engineering plans. Final design is then reviewed by Council at the engineering approval stage. Appropriate detailed design of stormwater management areas is acknowledged in the text accompanying the ODP.

15 Likewise, in paragraph 41 (c) Mr Roxburgh also raised concerns that there is no provision on the ODP for water supply headworks or water supply bores. This is a level of detail that would not normally be shown on the ODP as the layout of roads and infrastructure has not been determined at this stage, other than indicative Collector Roads and Local Road connections. Furthermore, design of the water supply infrastructure depends on constructing a test bore to confirm the aquifer parameters. In my experience a test bore would not normally be constructed until subdivision consent stage after the subdivision layout was approved and infrastructure requirements for each stage of development are determined. It is agreed (including by Mr Roxburgh) that on-site water supply is available, but details of how this is achieved is determined through detailed design at the subdivision consent or engineering approval stage.

16 In paragraphs 41(b), 44 and 45 Mr Roxburgh raised concerns regarding what appears to be an overland stormwater conveyance flow path through private property to the south end of the site. The stormwater conveyance path that Mr Roxburgh is referring to is a shallow paleo channel that meanders through the south end of the site. The paleo channel has effectively been replaced by a land drain along the south boundary of the site as indicated on the ODP (shown as dashed blue line for 'stormwater conveyance flow path').

17 The paleo channel can be observed on historical aerial images as a shallow watercourse that likely flowed intermittently (i.e., not ephemeral and dries up over summer-autumn). From the 1990's onwards the watercourse was progressively filled-in as paddocks were reconfigured for intensive dairy farming and replaced with a straightened land drain along the south boundary. The land drain is shown as an 'open private drain' on the Ōhoka Rural Drainage Scheme map (which was attached as Appendix 1 to my primary statement of evidence).

18 The former paleo channel shows up as a medium flood hazard on the Council's Flood Hazard Model for the 1:200 year event because overhanging trees and grid resolution in the flood model masks the land drain, and any overland flow in the flood model is channelled along the former paleo channel instead (no flow is shown in the land drain). In practice, the majority of overland flow will be intercepted and conveyed within the land drain along the south boundary, and the flow that overtops the drain and is directed along the paleo channel is not as significant as the flood model predicts.

19 The land drain may require modification to increase capacity so there is no flow path through residential lots. This can be confirmed at subdivision consent stage by increasing the grid resolution and adding the land drain to the flood model. Driveways and roads developed within the Large Lot Residential Zone will also replace the function of the old paleo channel as secondary overland flow paths where the capacity of the land drain may be exceeded in extreme flood events (lot levels can be graded to allow for this if required).

Dated: 13 June 2024

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Tim McLeod