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 Paul Farrelly (Greenhouse gas)

Dated: 13 June 2024

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SUPPLEMENTARY STATEMENT OF EVIDENCE OF PAUL FARRELLY

INTRODUCTION

1 My full name is Paul Michael Farrelly.

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

Overall response

5 I have read the officer's report, the BECA assessment of greenhouse gases (*GHGs*) and the evidence of Mr Binder.

6 The view of these officers appears to be that the National Policy Statement on Urban Development (*NPS-UD*) Policy 1(e) requires the proponent of a proposal to undertake a calculation of GHGs of that proposal against a baseline scenario and demonstrate that the GHGs of the proposal will be less than the baseline scenario. The council officers and BECA have gone to some lengths to try to calculate this. However, in my view, nowhere does the NPS-UD require this.

7 I believe it is important to consider the broader GHG related context behind the NPS-UD.

8 My understanding is that the GHG reference in Policy 1(e) of the NPS-UD was included in response to the Climate Change Response (Zero Carbon) Amendment Act 2019, to support achievement of New Zealand's greenhouse gas emissions targets through the NPS-UD.

9 NZ has two key GHG emissions targets, as set in legislation by the Climate Change Response (Zero Carbon) Amendment Act 2019:

9.1 reduce net emissions of all GHGs (except biogenic methane) to zero by 2050; and

9.2 reduce emissions of biogenic methane to 24–47 per cent below 2017 levels by 2050, including to 10 per cent below 2017 levels by 2030.

10 NPS-UD Policy 1 requires that planning decisions contribute to well-functioning urban environments, which are urban environments that, as a minimum:

10.1 have or enable a variety of homes that:

(a) meet the needs, in terms of type, price, and location, of different households.

(b) enable Māori to express their cultural traditions and norms; and

10.2 have or enable a variety of sites that are suitable for different business sectors in terms of location and site size; and

10.3 have good accessibility for all people between housing, jobs, community services, natural spaces, and open spaces, including by way of public or active transport; and

10.4 support, and limit as much as possible adverse impacts on, the competitive operation of land and development markets; and

10.5 support reductions in greenhouse gas emissions; and

10.6 are resilient to the likely current and future effects of climate change.

11 In this context, I believe that the NPS-UD envisages that housing can be provided for within urban environments through a variety of housing types and prices by way of intensification of existing urban areas, as well as greenfield development, in a variety of locations. I note Mr Phillips' supplementary evidence describes the importance of defining the extent of the urban environment in order to apply the provisions above at the right scale, and his view that Greater Christchurch is the applicable urban environment for these proceedings.

12 Objective 3 of NPS-UD seeks that district plans enable more people to live in areas of an urban environment where there is high demand for housing, or for business land in the area, relative to other areas within the urban development. I understand the submitters have produced expert evidence which demonstrates there is a high demand for housing in Ōhoka relative to other areas in the district.

13 In my opinion, Policy 1(e) does not require a comparison of GHG emissions between Ōhoka and alternative locations to be made, or the existing land use (as BECA have undertaken in their report). While I did briefly consider alternative locations in my primary statement of evidence, this was primarily to make the point that people seeking a single dwelling

option in a location like Ōhoka are more likely to go further afield within either the Waimakariri or Selwyn districts to find a similar offering (including in locations which are equally far, or further away, than Ōhoka is to Christchurch City).

14 With respect to this point, I would like to correct paragraph 111 of my primary statement of evidence. I understand from the evidence of Mr Jones[1] that buyers preferring Ōhoka who are unable to secure property in this location will either:

14.1 purchase a lifestyle block (which most will underutilise) in order to live in the area; or

14.2 opt for alternatives such as Mandeville, Swannanoa, Fernside, Clarkville, Tai Tapu, West Melton, Marshlands or Oruhia which provide a similar offering to Ōhoka (not Rangiora or Ravenswood/Pegasus as I incorrectly stated in my paragraph 111).

15 Based on Mr Jones' evidence,[2] I understand it is unlikely that if people are unable to purchase a single dwelling in Ōhoka, that they will move into Rangiora, Kaiapoi or Christchurch City. So, a comparison of emissions between Ōhoka and these locations is not appropriate or helpful, given they are not substitutes for potential buyers looking to live in Ōhoka.

16 That said, I do believe that declining this rezoning request could potentially result in a worse outcome from a GHG perspective as buyers may choose to purchase in locations further from activity centres.

17 Regardless, the key wording in NPS-UD from a GHG perspective is that approval of this rezoning (and therefore the development) "contributes" to well-functioning urban environments, which are urban environments that "support" a reduction in GHGs.

18 In this sense, the rezoning should contribute to the ability of Greater Christchurch to support reductions in GHGs.

19 In my view, the direction in the NPS-UD does not require a particular proposal to show reductions in GHGs per se, but to contribute to supporting reductions within the wider urban environment by enabling and encouraging people to take positive action in reducing their own GHG emissions. This can be done through ensuring new development is of a form and design which practically takes steps to support people (i.e. residents of the proposed rezoning/development) to make reductions in their overall GHG footprint such as those being proposed as part of this rezoning request as set out paragraphs 9.1 to 9.7 of my primary statement of evidence.

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1 Evidence of Chris Jones dated 5 March 2024, at paragraphs 11 and 12.

2 At paragraph 11.

20 Additionally, the introduction of the proposed commercial area, and public transport, would benefit the existing residents of Ōhoka as well and could potentially reduce their travel-related emissions, thus supporting a reduction in GHG emissions.

21 In this context, I consider that the submitters have done all that they practically can to contribute to supporting the reduction of greenhouse gases.

22 Furthermore, the removal of dairy cows supports achievement of New Zealand's methane emissions reduction target.

23 To achieve this target, the Climate Change Commission's demonstration path (April 2023)[3] – which is the core scenario for how New Zealand will achieve its GHG targets – assumes that stocking rates of dairy cows nationally would need to reduce 23% by 2050 compared to 2021.

24 The commission acknowledges that there are potential technologies (such as methane inhibiting vaccines, low emissions breeding) that could also potentially reduce the methane emissions, however the demonstration pathway assumes that the main way this target will be achieved is through a reduction in the herd size.

25 Therefore, I am of the view that reducing the amount of land available for dairy farming, as anticipated by this rezoning request, also contributes to supporting a reduction in GHG emissions (specifically biogenic methane, in accordance with the Climate Change Response (Zero Carbon) Amendment Act 2019).

Specific issues with the evidence of Mr Binder and the BECA report

26 Although the NPS-UD does not require a reduction in absolute emissions to be achieved from a change in land use (indeed, if it were, then any sort of housing intensification would not meet the test due to the inherent increase in residents, associated travel emissions, and associated embodied and operational emissions, on the parcel of land), it is still worth discussing the assumptions made by Mr Binder and in the BECA report.

27 Mr Binder states his concerns that the emissions arising from the transport of residents would exceed the existing emissions from the dairy farm.

28 The BECA report then attempts to compare the current dairy farm emissions to anticipated vehicle emissions from residents of the proposed development.

[3] https://www.climatecommission.govt.nz/our-work/advice-to-government-topic/advice-for-preparation-of-emissions-reduction-plans/2023-advice-to-inform-the-strategic-direction-of-the-governments-second-emissions-reduction-plan-april-2023/

29 The first issue I have with BECA's analysis is the emissions figure that they have used in the analysis. BECA have used a car emission factor figure of 0.252kg CO2-e/km:

29.1 I note that I used this figure in my primary statement of evidence at paragraph 43.1 to simply put into context the yearly emissions from the existing dairy farm. My aim was to highlight that the dairy farm's emissions are significant and to offer a comparison to better illustrate their scale.

29.2 However, this is the emissions per km of an average private petrol vehicle in New Zealand, based on the makeup of the 2022 national vehicle fleet. It is not the emissions for an average vehicle in the fleet as it ignores diesel, Electric and hybrid vehicles.

29.3 Secondly, the average emissions factor for passenger vehicle travel is projected by the Climate Change Commission and in Waka Kotahi's Vehicle Emissions Prediction Model (*VEPM*) 6.3 to reduce significantly over time as newer more energy efficient vehicles enter the fleet (such as hybrids), and as there are a greater proportion of electric vehicles in the fleet.

29.4 BECA does acknowledge this, by reference to a 20% reduction in emissions factors between 2018 and 2031, based on the *VEPM* 6.3.

29.5 However, the earliest establishment date for dwellings at the development is estimated to be 2028, and based on discussions with the submitters the full development is not expected to be completed until 2040.

29.6 Therefore, the emissions factor used to calculate the anticipated vehicle emissions should use the anticipated vehicle emissions factor in 2040, not 2022.

29.7 I have reviewed the VEPM, and this forecasts that by 2040 the average emissions per vehicle will reduce to 124g CO_2-e/km, or 0.124kg CO_2-e (compared to the 252g CO_2-e/km, 0.252kg CO_2-e that BECA have used in their analysis).

29.8 The VEPM predicts that by 2050 most (75%) of light vehicle travel will be in electric vehicles (EVs), however I believe that the VEPM significantly underestimates the rate at which EV travel will increase as a proportion of total light vehicle travel.

29.9 The VEPM assumes that electric vehicles will make up 32% of light vehicle VKT[4] in 2040. By comparison, the Climate Change Commission's demonstration path (April 2023)[5] assumes that 75%

[4] Vehicle Kilometres Travelled.

[5] https://www.climatecommission.govt.nz/our-work/advice-to-government-topic/advice-for-preparation-of-emissions-reduction-plans/2023-advice-to-inform-the-strategic-direction-of-the-governments-second-emissions-reduction-plan-april-2023/

of light VKT travel in New Zealand will be in EVs in 2040. This figure comes from the demonstration path excel model (*ERP2-supporting-spreadsheet-Updated-demonstration-path-and-CPR-2022.xls*), available at the link below.

29.10 The demonstration path is the main scenario which underpins the Commission's recommended emissions budgets for New Zealand and therefore I consider it to be the most appropriate predictor of the future makeup of the vehicle fleet.

29.11 Using the VEPM, but updating for the Climate Change Commission's EV predictions, we can then calculate the future average emissions per kilometre in the light vehicle fleet across different time horizons. To do this, we have assumed that the percentage of travel in EVs is as per the Commission's model, and all other light vehicle VKT is in "average" petrol vehicles. This is a conservative approach as it ignores the effect of more efficient hybrid vehicles.

29.12 The results are shown in table 1.

Table 1: Future average emissions of NZ's light vehicle fleet

Year	**VEPM: Average Vehicle emissions (gCO2-e/km)**	**VEPM: % of light fleet VKT in EVs**	**% of light vehicle kms – Climate Change Commission demonstration path**	**Inferred average vehicle emissions (using VEPM) (gCO2-e/km)**
BECA*	252.0			
2024	196.0	1.1%	3.6%	191.8
2028	187.4	2.7%	8%	184.1
2035	158.1	13.7%	50%	100.3
2040	124.0	32.0%	75%	50.3
2045	81.2	57.1%	90%	20.1
2050	50.5	75%	98%	4.0

** Average emissions of a petrol vehicle in 2022, used in BECA analysis.*

30 The next issue lies with the number of vehicle movements per day that BECA have used in their modelling:

30.1 Based on Mr Fuller's evidence,[6] the anticipated average daily trips per household in BECA's analysis (8.2) is too high to be used for evaluating GHG emissions.

30.2 Mr Fuller considers that West Melton trip generation rates are a suitable proxy for Ōhoka.

30.3 Based on recent traffic surveys, the average daily traffic volume in West Melton is indicated to be 5.85 vehicle trips per dwelling per workday, 5.39 trips on Saturdays and 3.90 vehicle trips on Sundays.

30.4 Calculating this across 52 weeks to get the number of trips per annum, we can estimate the indicative number of vehicle trips for an Ōhoka dwelling to be as follows:

*Trips per household = 52*5 weekdays*5.85km + 52 Saturdays*5.39km + 52 Sundays *3.9 = 2,004 trips*

30.5 I have then used these results to calculate a total kilometres per household in Ōhoka, based on the modelled average distance used in BECA's modelling, of 15km per trip.

30.6 According to BECA, this value of 15km is taken from the Christchurch Transportation Model V21a. I have been unable to find any information about this tool online.

30.7 In the absence of other tools however, I accept that this model is a reasonable predictor for travel distances in Canterbury.

30.8 Using the # of trips (2,004) and the trip distance of 15km, I calculate that the average vehicle travel distance per annum will be approximately 30,061km per household (2,004 * 15).

30.9 We can then calculate transportation emissions in the following way:

Emissions = #households annual travel distance *emissions per km*

So, for 2040, when the development is expected to be completed, the calculation for vehicle emissions is:

2040 Emissions = 850 * 30,061 * 50.3g CO_2-e/km= 1,285t CO_2-e

30.10 This is significantly lower than the emissions calculated in BECA's analysis (8,656 t CO_2-e), and also lower than the emissions of the dairy farm.

[6] At paragraphs 24-27.

31 Turning to the dairy farm, since my evidence was produced, the NZ Ministry for the Environment (MFE) have, on 31 May 2024, released updated emissions factors, that result in an increase in emissions factors for dairy cattle. Refer to **Appendix 1** for further details of these factors

32 Using these most up to date figures, the annual emissions from the dairy farm can be calculated to be 1,328t CO2-e (up from 1,231t CO2-e in my evidence).

33 A comparison of this modelling and BECA's modelling is show in Table 2.

Table 2: GHG Comparison to BECA model

Model	**t CO2-e**
BECA modelled transport emissions	8,656
Dairy farm emissions (revised)	1,328
2040 transport emissions	1,285

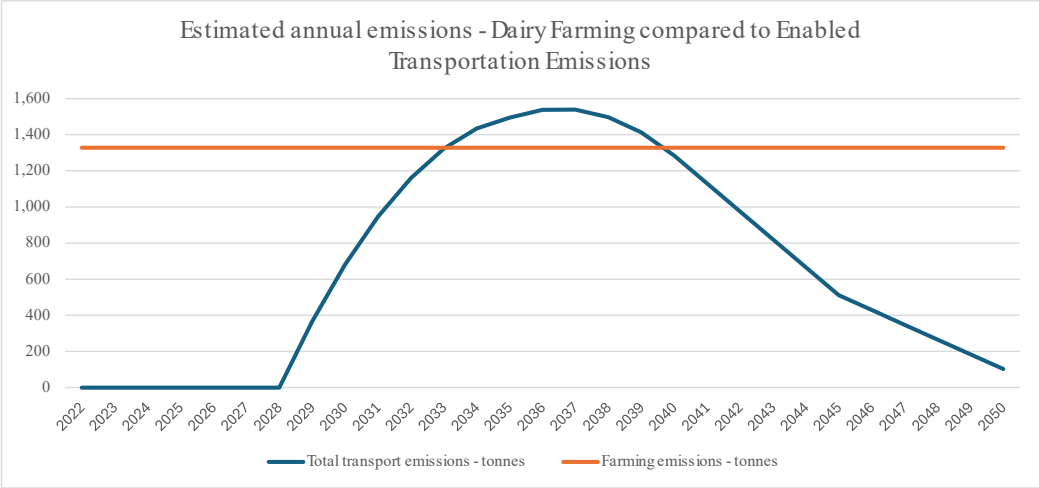
34 Turning to the comparison of transportation emissions and dairy farm emissions over time:

34.1 My modelling assumes that housing development commences in 2028, and concludes in 2040, with 71 houses (850/12) built per annum.

34.2 I assume that the dairy activity ceases once development commences in 2028.

34.3 As the vehicle emissions factor reduces over time, peak transportation emissions are anticipated to occur in 2040, and then decline after that time as the vehicle fleet moves closer to 100% electric.

34.4 The results of my modelling are shown in the figure below:



34.5 My modelling suggests that due to the development timeframe (2028-2040), and the expected improvements in the efficiency of the vehicle fleet during this timeframe, the emissions associated with vehicle transport of residents may temporarily (between 2032-2039) exceed the levels of emissions that would occur if dairying were continued at the current levels of activity, however, in the long-term the travel emissions can be expected to be lower than those of the dairy farm alternative.

34.6 For all other periods, the transportation emissions are modelled to be lower than the anticipated dairy emissions.

35 As set out in paragraphs 13 and 25 above, I do not consider the modelling above to be necessary to demonstrate the proposal contributes to supporting a reduction in GHG emissions, however, I considered it appropriate to respond and comment on where I did not agree with the BECA report. I am of the view that irrespective of this modelling, the proposed rezoning does contribute to supporting a reduction in GHG emissions.

Dated: 13 June 2024

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Paul Farrelly

APPENDIX 1: COMPARISON OF 2023 AND 2024 MFE EMISSIONS FACTORS FOR AGRICULTURE

Factor	MFE 2023	MFE 2024	% Change
Enteric Fermentation – per dairy cow	2,423	2,628	8.4%
Manure Management – per dairy cow	254.5	266	4.5%
Agricultural Soils	377.2	414	9.8%