,Before the Selwyn District Council

under: the Resource Management Act 1991

in the matter of: Proposed Private Plan Changes 81 and 82 to the Operative District Plan: Dunns Crossing Road, Rolleston

and: **Rolleston Industrial Developments Limited** and **Brookside Road Residential Limited**
Applicant

Summary of Evidence of Paul Farrelly (Greenhouse gas emissions)

Dated: 12 September 2022

Reference: JM Appleyard (jo.appleyard@chapmantripp.com)
LMN Forrester (lucy.forrester@chapmantripp.com)

chapmantripp.com
T +64 4 499 5999
F +64 4 472 7111

PO Box 993
Wellington 6140
New Zealand

Auckland
Wellington
Christchurch

chapman tripp

SUMMARY OF EVIDENCE OF PAUL FARRELLY

1 My full name is Paul Michael Farrelly. I am a Principal Consultant for Lumen in their dedicated energy and carbon team, I have worked in this field for the past 10 years.

2 When considering the GHG impacts of a potential land use change, it is important to evaluate both the emissions from the existing land use and the anticipated emissions arising from the new land use.

3 A considerable level of GHG emissions are already occurring on a portion of land subject to the Proposed Plan Changes, as a result of livestock that is grazed on the land.

4 These emissions occur primarily from methane, which is known to have a much greater impact on global warming than carbon dioxide.

5 Whilst new emissions will arise from the construction and operation of dwellings, and from travel undertaken by residents, these emissions would likely occur elsewhere in New Zealand if this development does not proceed, due to the need to build more houses to accommodate a growing population.

6 The location in Rolleston provides some climate resilience as none of the sites are within flood plain areas or near to coastlines.

7 Over a 90-year life cycle, energy usage is currently the most significant source of emissions that occurs in residential developments in New Zealand, followed by the embodied carbon of building materials.

8 Stand alone or detached housing emissions are lower on a per m^2 basis[1] than the emissions of apartments. This is because high embodied carbon materials (concrete and steel) are typically used to build apartments, compared to stand alone houses that are primarily constructed of timber.

9 Lifetime energy usage emissions from stand-alone homes can be minimised through the specification of energy efficient homes, the elimination of natural gas/LPG in developments, and encouraging a high uptake of solar PV panels.

10 The potential for solar PV uptake is much greater on stand-alone homes (compared to apartments or medium density multi-level homes) due to the much greater ratio of usable roof area to floor area.

[1] https://iopscience.iop.org/article/10.1088/1755-1315/588/2/022064/pdf

11 GHG emissions arising from increased travel between Rolleston to Christchurch are cited (by Christchurch City Council) as an issue.

12 I consider that over time the frequency of travel between Rolleston and Christchurch will reduce, due to working from home becoming more prevalent, and Rolleston's growth will result in a greater proportion of trips remaining within the local area.

13 The GHG impact of commuting trips is also expected to reduce as uptake of electric vehicles (*EVs*) increases and the development of public transport infrastructure increases usability.

14 I consider it likely that the uptake of EVs will be much faster in "commuter-belt" areas such as Rolleston, where the daily commute distance is such that there is a strong economic incentive, via fuel cost savings, to choose an EV instead of a traditional internal combustion engine (*ICE*) vehicle, and where the round-trip distance is not so long that range anxiety becomes an issue.

15 Furthermore, the uptake of EVs is likely to be much greater in properties with a garage (as opposed to residences located in a denser urban area, where vehicles may be parked on the street).

16 Accounting for the points above, I consider that, on balance, the Proposed Plan Changes likely support a reduction in GHG emissions, relative to other greenfield development opportunities available in the greater Canterbury region.

Dated: 12 September 2022

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Paul Farrelly