Before the Selwyn District Council

under: the Resource Management Act 1991

in the matter of: Proposed Private Plan Change 69 to the Operative District Plan: Lincoln South

and: **Rolleston Industrial Developments Limited**
Applicant

Summary of Evidence of Tim McLeod (Civil Engineer)

Dated: 23 November 2021

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SUMMARY OF EVIDENCE OF TIM MCLEOD

INTRODUCTION

1 My name is Timothy McLeod and I am a Senior Civil Engineer at Inovo Projects Limited. I have over twenty-five years' experience as a Civil Engineer working on a range of infrastructure and land development projects.

2 I have been involved in various stages of the Plan Change 69 (PC69) application and am therefore familiar with the site characteristics.

3 In my evidence I assessed the water and wastewater networks and infrastructure upgrades required to service the proposed plan change site.

INFRASTRUCTURE ASSESSMENT

4 Capacity upgrades to the existing Lincoln water network can be completed to supply water for the PC69 area. Lincoln has accessible groundwater aquifers for drinking water abstraction available, and new water supply bore(s) could be developed on-site to augment supply. In addition, existing water take consents could be transferred to Council to assist with water supply demand.

5 With regards to wastewater, the majority of the plan change area can be serviced by gravity wastewater network discharging to new pump stations located at the western and eastern boundaries of the PC69 site. Lots that cannot be serviced by gravity sewer could utilise low pressure pumped sewer systems to discharge into the gravity network or rising main.

6 Direct connection from new pump stations to the SDC Allendale Pump Station would be required for ultimate development, although the existing wastewater pipe network in Springs Road could be used for the initial stages.

7 The addition of PC69 catchment is expected to increase the overflow to the emergency storage pond beside the Allandale Pump Station during wet weather events. Revised estimates provided by WSP predict 1,230m³ of overflow to volume to storage. However, there is still plenty of capacity for emergency storage as the storage pond capacity is approximately 30,000 m³.

8 In summary, already planned infrastructure upgrades or new infrastructure constructed as part of the development of the site can provide for its infrastructure needs. There are no physical or capacity constraints which would impede development of the site.

STORMWATER

9 Stormwater conveyance and treatment will be managed within two catchments east and west of Springs Rd. The proposed discharge of stormwater to ground proposed for each catchment is ultimately to the Ararira/LII River.

10 Stormwater Management Areas (SMAs) are proposed downstream of each catchment in accordance with Christchurch City Council's Wetlands and Waterways Design Guide. There is potential for development of the eastern portion of the site combining stormwater treatment, reserve space and wetland restoration. Further flood modelling will be required as part of the detailed subdivision design to confirm minimum elevation levels for locating the SMAs above predicted flood levels.

11 The eastern part of the site between the RL 3.5 and 4.0m (NZVD2016) contour levels has been identified for primary stormwater treatment and attenuation above the 1 in 50 year flood level. Areas below the RL 3.5m contour can be used for wetland treatment of stormwater. Assessment of the flood levels will be carried out in more detail at the time of subdivision design to confirm these levels, but it is not expected to impede development of the plan change area.

PREVENTING INTERCEPTION OF GROUNDWATER

12 Service trenches and hardfill areas constructed as part of urban development can be much more permeable than the surrounding soils and can result in interception of groundwater and therefore reduced spring flows. Penetration of the confining layer and/or interception of groundwater, particularly in areas of high groundwater or in close proximity to identified springs, can be avoided during construction by various methods including;

- ensuring service trenches are kept shallow (typically no more than 1.2m deep);
- backfill excavated trenches using low permeability soils or constructing "water-stops" at intervals to prevent short-circuiting of groundwater along trench lines;
- use directional drilling or mole-ploughing instead of trench excavation for installation of PE pipelines and cables;
- using low pressure pumped sewer systems to avoid deep excavations for gravity sewer lines and pump stations;
- using open swales or partially drowned piped systems to avoid deep trenches for stormwater drainage;

- incorporate service crossings into bridge or culvert designs or directional drilling to install services at crossing points over waterways.

13 Pavement depth for roads is expected to be approximately 0.6m depth and shallower than installed services. Where subgrade improvement or replacement is required due to the presence of peat or organic rich materials, then engineered soils with low permeability or use of geotextiles can be used instead of granular hardfill to avoid potential short-circuiting of groundwater through pavement layers. Pavement construction in the neighbouring Te Whariki subdivision used similar techniques.

14 Detailed site investigation including borelogs and installation of piezometers will be completed prior to detailed engineering design to identify the confining layer thickness, any buried peat layers, and seasonal fluctuations in groundwater levels.

15 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 principles have been incorporated into the subdivision design include "Halswell Prestige" in Halswell, and Highsted and Tullet Park subdivisions in Casebrook.

OTHER MATTERS

16 The Lincoln Main Drain is a spring-fed classified drainage channel that crosses the northeast portion of the site from northwest to southeast, and serves as the main drain outlet for the Te Whāriki subdivision. It is proposed to divert the Lincoln Main Drain from its current alignment to discharge directly into Springs Creek. The main outlet from the Te Whāriki subdivision stormwater management area will also be diverted (piped or channelled) along the northern boundary or incorporated into the plan change area drainage system. The proposed diversion presents opportunities to naturalise and enhance this waterway.

17 Feasible options for creating walking and cycling links with Verdeco and Te Whariki subdivisions to the north can be achieved through existing or planned recreation and landscaping reserves along the northern boundary. The road connection to Kaitorete Drive within Te Whariki subdivision shown on the updated Outline Development Plan is feasible by modifying an existing stormwater detention pond.

18 Moirs Lane has a legal road width of 20.12m (or 1 "chain") along its length as shown on deposited survey plans DP17916 and DP445316, which is sufficient width to provide for the proposed collector road and existing Rail Trail shared path. Property boundaries shown on the on-line LINZ database referred to by Council Officers and other

submitters is misleading due to inaccuracies that have arisen during the digitisation of old survey plans.

CONCLUSION

19 Overall, I remain of the view that practical and economic engineering solutions are available to provide the required infrastructure and to mitigate the potential impact of urban development, and that the proposed plan change can be supported from an infrastructure perspective.

20 I am happy to answer any questions concerning my evidence or the proposed conditions.

Dated: 23 November 2021

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Tim McLeod