**BEFORE THE INDEPENDENT HEARINGS PANEL**

**UNDER** theResource Management Act 1991

**AND**

**IN THE MATTER OF** Resource consent applications by Te Puna Industrial Limited in relation to 297 Te Puna Station Road

**STATEMENT OF EVIDENCE OF ROSS THOMAS KERNOT**

**ON BEHALF OF S2TRUST**

**STORMWATER MANAGEMENT**

**2 JULY 2024**

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**Introduction**

1. My full name is Ross Thomas Kernot. I am a consulting civil engineer and director of the consulting engineering practice, Arete Civil Limited. I am a chartered member of Engineering New Zealand (CMEngNZ) and am a Chartered Professional Engineer (CPEng No. 63027). I have a Bachelor of Engineering (Civil) degree from the University of Auckland (1982).
2. I have been involved in civil engineering for 40 years, specialising in development of residential, local authority and commercial projects for the past 30 years.
3. Of relevance to this application is my experience providing engineering consultancy services for commercial and residential land developments.
4. Some of the projects I have been involved with that include such activities are:

## Teihana Road 14 Lot rural residential subdivision;

## Omokoroa Village Centre, mixed-use development including retail, office commercial, entertainment, and residential apartments at Tralee Street and Hamurana Road, Omokoroa;

## 89 Lot residential Bureta Park development, Otumoetai, Tauranga;

## Northern Quarter Commercial development, Hamilton Street, Harrington Street and Willow Street, Tauranga City Centre;

## 10b Hanlen Avenue Subdivision, Waihi Beach.

**Code of Conduct for Expert Witnesses**

1. I have read the Code of Conduct for Expert Witnesses as contained in the Environmental Court Practice Note 2023, I have complied with the code of conduct in preparing this evidence and I agree to comply with it while giving oral evidence before the hearings commissioners. My qualifications as an expert are set out above. I confirm that the issues addressed in this brief of evidence are within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

# **Scope of evidence**

# My evidence will cover:

##  The effect of the filling and drain diversions that have occurred on the southern side of Te Puna Station Road, hereafter referred to as TPSR, on the ability of the 900mm diameter culvert under TPSR, in the vicinity of my client’s property at 250 TPSR, to convey the design stormwater runoff from the northern catchment.

## Concerns around the TPSR northern roadside drain where the TPIL development road 01 intersects with TPSR.

1. Seeking clarification regarding the difference between the May 2024 reported flood levels and the 2023 reported flood levels.
2. The need for consistency in design rainfall events used in designs and reports.

# In preparation for this evidence, I have reviewed some of the publicly available documents which are available on the BOPRC Notified Applications site. Whilst I have read the various reports, submissions, and evidence I wish to point out that the given the complex nature of the reports and information there has not been enough time to be fully familiar with the various submissions.

# I confirm that I carried out site visits on 10 December 2021, 5 April 2023, and 27 February 2024.

**Executive summary**

1. In my opinion there is an effect on the TPSR northern roadside drain due to the changes to the southern drain, presumably within private property, that have occurred in the past. I consider the applicant’s designs should clearly show the drain and proposed details. I also conclude that the proposed northern widening of TPSR (to enable the proposed TPIL entrance) is not feasible given the lack of room to accommodate the TPSR northern drain. I consider further flood modelling work is required and recommend the modelling process and results should be reviewed by Mr Mark Pennington of T&T.

**Effects of Previous Filling on TPSR Northern Roadside Drain**

1. The subject of this submission is primarily the 900mm diameter RCRRJ culvert under TPSR. I have visited the site during fine weather three times between December 2021 and February 2024, and on each occasion, I have observed that there is standing water 450mm to 500mm over the top of the culvert at the inlet end. There must be a reason for this to occur.
2. It is important to clear up some of the confusion around the status of the 900mm diameter culvert. Mr Daniel Curtis, in page 9 of his evidence, figure 4 and section 4.12, refers to the roadside drain on the southern side of TPSR receiving water from 250 TPSR - Overton site. The property referred to as the Overton site is actually the OLP site, and the flow of water comes from the northern roadside drain. The northern drain receives runoff from the northern half of the TPSR carriageway and road reserve, part of the KiwiRail rail corridor, OLP property, JMC property, as well as rural residential properties. The overall northern roadside drain catchment area is 14.49 ha, the OLP site area is 7.22ha. Whilst the OLP site constitutes half the overall catchment the culvert conveys significantly more runoff than from just from the OLP site.
3. The outlet of the 900mm culvert discharges, along with the TPSR southern drain, into an open drain that is located within TPIL property for a distance of approximately 200m. After that point the drain flows into the Tinex property and then changing direction almost 180 degrees flows for a further 250m before connecting to the TPSR southern drain. The WSP culvert survey (carried out for WBOPDC in 2021) shows that the invert of the open drain passing through the TPIL and Tinex properties has a reasonably constant fall from the 900mm culvert and back to the TPSR southern roadside drain. But there must be some reason to cause water to be held back to the extent that not only is the 900mm culvert full but there is standing water some 400mm to 500mm above the top of the culvert. The obvious conclusion is there must be an obstruction such as a blocked culvert somewhere along the open drain.
4. The backed up water in the drain on the southern side of TPSR has an adverse effect on the northern TPSR roadside drain. On 24 February 2024, Grant Overton (trustee of S2T Trust) requested I visit the site to observe the excavation of a localised section of road pavement failure in the northern side outer wheel track of TPSR. A 1m x 1m approx. hole had been excavated and standing water was observed in the base of the hole at about 0.8m depth, I observed the water level in the nearby roadside drain was at a similar level, and I consider that the TPSR subgrade was being saturated by the high water level. The water level of the TPSR northern drain was being raised much higher than it should be, in my opinion this was due to some compromise in the drainage on the southern side of TPSR.
5. When reviewing the WSP finished contour plan sheet C201, I note this does not show the existing drain that collects and transports runoff from the northern and southern TPSR roadside drains (see attached). This is an important drain and is critical to managing stormwater runoff from the northwest part of TPSR catchment. My concern is the drainage already seems to be compromised and at the very least I consider the design drawings would need to show a plan view of the drain, plus typical cross sections, and a longitudinal section. I would also recommend calculations should be included to show how the section of drain can convey the 10% AEP event with climate change to 2130 flow from the full upstream catchment.

**Impact of Proposed TPSR Widening on the Northern Roadside Drain**

1. I note that the WSP drawing C303 showing the intersection of the new road 01 with TPSR, shows widening to create an additional slip lane on the northern side of the intersection. I do not consider the design as shown in C303 takes into account the actual limitations on site because the proposed widening will cover the area of the existing northern roadside drain (see attached). A topographical survey of the drain along the frontage of the OLP site shows the drain width from top of bank to top of bank takes up most of the width between the edge of the existing TPSR shoulder and the OLP boundary. The road reserve is not able to be widened because the visual screening trees which are a requirement of the structure plan and have been growing for around 20 years, are not able to be moved. Any road widening to enable the intersection will need to be on the TPIL side of TPSR.

**Differences between 2023 and 2024 Flood Modelling**

1. There seems to be a difference in flood levels between the recent 2024 flood modelling results and the flood modelling that was carried out by Dr Joynes for the OLP, Tinex and TPIL properties in 2023. Again, I note that there has not been enough time available to understand where the differences have come from. I do understand the 2024 modelling is based on all the Tinex property’s illegal fill having been removed, but I understand a similar approach was applied to the 2023 modelling. Table 3.1 of the May 2024 modelling report identifies the baseline 1 in 10 year storm peak flood level as RL 2.36m, the 1 in 50 year flood level is 2.87m, and the 1 in 100 year is 2.99m. These levels are in accordance with MVD53. As an aside the same table in section 5.1 (page 10) of Dr Joynes evidence has a different value for the 1 in 50 year baseline flood level. The 2023 modelling showed the baseline 1 in 10, 1 in 50, and 1 in 100 year flood levels of RL 2.21m, RL 2.74m, and RL 2.83m MVD53 respectively. The 1 in 10 year modelling baseline results are 150mm different for some reason. Given Mark Pennington’s involvement in the modelling during 2023 I believe it would be beneficial to the applicant, submitters and authorities, that Mark Pennington be requested to review, with Dr Joynes, the recent modelling and results. I would also like to see flood level difference maps which visually show increases or decreases in flooding for the various scenarios that have been modelled.

**Consistency with Use of Rainfall Data**

1. There needs to be consistency with rainfall data used for flood modelling and hydraulic calculations. I understand BOPRC and WBOPDC require rainfall events allowing for climate change to be based on RCP 8.5 to 2130, the flood modelling seems to be using 2100 rainfall as does the HG May 2024 preliminary pond sizing report.

Name Ross Kernot

Date: 2 July 2024