

UNDER

the Resource Management Act 1991

IN THE MATTER

of a request to Kaipara District Council for
Private Plan Change 81: Dargaville
Racecourse by the Dargaville Racing Club Inc

STATEMENT OF EVIDENCE OF HENDRIK (HENK) DE WET ON BEHALF OF THE APPLICANT

CIVIL ENGINEERING – 3 WATERS

10 MARCH 2023

1. INTRODUCTION

1.1 My full name is Hendrik de Wet. I am a Civil Engineer, Technical Director of Lands and Survey Engineering LTD, an engineering consultancy within the Lands and Survey Group, a land development specialist business.

1.2 I hold a National Diploma in Civil Engineering, which I obtained in 2004 from Tshwane University of Technology, a Bachelor of Technology in Civil Engineering, which I obtained in 2011 from Durban University of Technology and have a knowledge assessment outcome from Engineering New Zealand for a Washington Accord Degree.

1.3 I am a Chartered Professional Engineer, Chartered Member of Engineering New Zealand and registered as a Professional Engineer / APEC Engineer on the New Zealand register for international engineers.

1.4 I have worked for 22 years as a civil engineering practitioner, with the last 4 years in New Zealand, specialising in 3-waters engineering work associated with land development and public infrastructure. For the last 2 years, I have been the director of engineering at Lands and Survey, leading the firm's engineering team, providing consultancy services to support resource consent applications, and undertake engineering designs for land development and infrastructure projects in the Northland Region.

1.5 I am also actively involved in assessing civil engineering matters on resource consent applications on behalf of the development engineering teams at various District Councils in the Northland Region.

- 1.6 Prior to the last 4 years, I gained engineering experience working as a civil engineer across southern Africa and middle east, for various consultancies and construction firms since 2001. During this time, I have been responsible for the planning, design and construction of several medium to large scale land development and public infrastructure projects, generally in the 3-waters space.
- 1.7 I have previously provided evidence in Council hearings associated with land development resource consent applications on behalf of Councils. I have provided evidence before adjudicators and dispute arbitration boards on construction contract disputes.
- 1.8 This evidence is in respect of an application by Dargaville Racing Club Inc for Private Plan Change 81: Dargaville Racecourse (“PC81”).
- 1.9 My evidence will:
- (a) Summarise my involvement with the development of PC81;
 - (b) Summarise the key recommendations of my report;
 - (c) Comment on issues raised by submitters relevant to my area of expertise;
 - (d) Comment on the Council Officer’s report.
- 1.10 I have read and agree to abide by the Environment Court’s Code of Conduct for Expert Witnesses as specified in the Environment Court’s practice Note 2023. I am also subject to Engineering New Zealand’s Code of Ethical Conduct, which I am committed to abide by. This evidence is within my area of expertise, except where I state that I rely upon the evidence of another expert witness as presented to this hearing or a report that formed part of PC81. I have not omitted to consider any material facts known to me that might alter or detract from any opinions expressed. I have no conflict of interest to declare.

2. INVOLVEMENT WITH PC81

- 2.1 My involvement in PC81 began after I was requested by the Applicant to provide reporting input to scoping and preparation of the plan change in April 2021. My scope of key reporting areas was agreed to include:
- Natural hazards – Flooding and flood management
 - 3-Waters - Potable water supply, wastewater disposal and stormwater management.

- 2.2 I visited the site several times over the period between April 2021 and December 2021. I have also examined aerial photography, site photographs, and online maps depicting the sites geological setting, susceptibility to natural hazards, designated district plan zoning and public engineering infrastructure and assets in proximity to the site.
- 2.3 I consulted with Council’s development engineering and infrastructure management staff and maintenance contractors to collect information on Councils key infrastructure to inform my reporting.
- 2.4 I prepared a report entitled Civil Engineering Assessment dated 9 February 2022 with project reference 10484, which was submitted as Appendix 4 to PC81 (“my report”).
- 2.5 The PC81 provisions respond to the recommendations in my report.

3. THE SITE

- 3.1 The site is located on the corner of State Highway 14 and Awakino Point North Road, Dargaville. The legal description of the site is Part Lot 37 DP 7811, which has a surveyed area of 46.6729ha, located approximately 3.5km north-east from Dargaville town centre, on the eastern side of State Highway 14.
- 3.2 The site has full road frontage on the south-western boundary to State Highway 14, and Awakino Point North Road along the south-eastern boundary. Awakino Point North Road is a metalled road with trapezoidal table drains along both sides, draining in a north-eastern direction.
- 3.3 The surrounding areas to the east and north-east of the site consist of river flood plain, all at a lower elevation compared to the site, currently being utilised for stock grazing. There are several homesteads scattered in the upper parts of these areas, along the south side of Awakino Point North Road.
- 3.4 The area described in paragraph 3.3 falls within a *Drainage District Targeted Rate Area*¹ for land drainage, which confirms that Council have targeted rates to fund operations to maintain land drainage infrastructure, where a network of drains has been noted in this area to collect and convey runoff and surface water from the catchment, towards the Wairoa River.

¹ *Drainage District Targeted Rate Area* – Kaipara District Annual Plan, 2022-2023

- 3.5 The lower parts of the area described in paragraph 3.3 are mapped on the river flood hazard maps produced by Northland Regional Council as being susceptible to river flooding. The river flood hazard maps also indicate a small section of flood susceptible area within the boundaries of the site, however the depiction of this area is due to a localised depression on the terrain and not truly river flood susceptible as suggested by the model.
- 3.6 Council reticulated potable water supply is available, with a 100mm diameter water main situated along Awakino Point North Road and a 180mm diameter water main located in the State Highway Road Corridor.
- 3.7 No Council reticulated wastewater network is available near the site, with the Dargaville Wastewater Treatment Plant situated approximately 3km from the site.

4. KEY RECOMMENDATIONS OF MY REPORT

- 4.1 The key recommendations of my report were:

i. Potable water supply:

Potable water supply from Council's water reticulation is available in the direct vicinity of the proposed development, and Council's network has adequate hydraulic capacity to meet the demand of the proposed development envisaged for which PC81 is sought. Capacity of water supply to the network from Council's water treatment plant was inconclusive, and Council experiences seasonal raw water shortages to meet the network demand, generally during summer months. I recommended that alternative water supply or supplementary supply by way of rainwater harvesting and ground water supply should be considered.

ii. Wastewater disposal:

A combined (hybrid) gravity / low pressure wastewater system is required to collect and convey wastewater to a single pump station on-site, that discharges effluent to Council's treatment plant situated in Dargaville, via a low-pressure wastewater rising main. At the time of writing my report it was understood that Council was uncertain regarding the capacity of the Dargaville wastewater treatment plant, therefore an alternative low-pressure liquid only system was also recommended for consideration, as an alternative if required, to reduce solids loading on Council's treatment plant.

iii. Stormwater management:

The potential effects on the receiving environment as a result of the proposed development envisaged for which PC81 is sought will be less than minor, provided that mitigation by way of detention, on-site treatment and controlled discharge is provided.

I recommended that the design, construction and maintenance of proposed stormwater management systems comply with relevant engineering standards and be designed to satisfy the provisions relating to *Te Mana o te Wai*² and the objectives and policies for freshwater management in accordance with the National Policy Statement for Freshwater 2020.

5. SUBMISSIONS

5.1 I acknowledge the following submissions and provide a response to the matters raised relevant to my expertise.

Stormwater - Submission by Leanne Phillips / submission 3.3, opposing the application. The submission relates to concerns about the capacity of stormwater drainage and potential flooding of drainage infrastructure downstream of the site. (Supported by further submission by Awakino Point Rate Payers Inc and Northland Transportation Alliance).

Stormwater - Submission by Awakino Point Rate Payers Inc / submission 12.10, opposing the application. The submission relates to a concern regarding the increase in impervious surfaces and the ability to manage increased stormwater flows. The submission states that the proposed stormwater controls are inadequate, and that stormwater management should ensure hydraulic neutrality at the time of development.

Water Supply – Submission by Fire and Emergency New Zealand / submission 8.9, in support of the application, requesting an amendment to the proposed subdivision and land use rules in respect to water supply for firefighting.

Three waters – Submission by George McGowan / submission 9.2, opposing the application. The submission related to concerns regarding the increased demand for water supply and wastewater treatment and disposal.

² *Te Mana o te Wai* – Values to enhance life-supporting capacity of freshwater.

Three waters – Submission by Leo Glamuzina and Kim Harrison / submission 15.3 and 15.4, opposing the application. The submission relates to their concern with “struggling infrastructure”, with specific reference to concerns on the quality and sustainability of potable water supply. The submission includes concerns and commentary on the treatment and disposal of wastewater as well. (Supported by further submission by Awakino Point Rate Payers Inc).

Three waters – Submission by Dargaville Community C/- Roger Rowse / submission 17.2, opposing the application. The submission relates to a concern regarding “additional pressures” on existing and aged infrastructure, with reference to water and wastewater. (Supported by further submissions by Awakino Point Rate Payers Inc, Te Houhanga a Rongo Marae, Te Kuihi and Te Whanau Parore).

5.2 I confirm that the issues and concerns raised in the submissions were all considered at the time of preparing my report included in the application for PC81.

5.3 I summarise the issues raised in submissions as follows:

- i. Capacity of downstream stormwater infrastructure to provide adequate level of service to the proposed development, and increased flood hazard risk in the downstream receiving environment.
- ii. Capacity and level of service of Council’s potable water supply network, and the potential impact the development may have on the water supply system in respect to water quality and continuity of supply.
- iii. Availability, status and capacity of wastewater treatment and disposal. Several submissions questioned the ability for the development to provide on-site treatment and disposal due to the allotment sizes envisaged in PC81.

5.4 Stormwater management and flood hazard

- i. Kaipara District Council Engineering Standards (“KDC ES”) includes minimum requirements for the design and development of stormwater infrastructure, which includes provision for the need for attenuation to ensure discharge from a development / subdivision must be less or equal to that of the pre-developed state. The standards also include provisions and guidance relating to low impact design principles that must be considered when a development proposal is being contemplated.

- ii. My assessment of the site and surrounding receiving environment provided me with an understanding that the provision in the KDC ES in respect to attenuation and low impact design principals applies to this site due to the increased peak runoff from the site expected post development, the potential contaminants the new impermeable surfaces will likely generate, and the existing flood hazards in the downstream receiving environment.
- iii. It was also clear from my assessment that the potential effects the development may have on the downstream receiving environment must be considered when determining the level of treatment and attenuation of stormwater runoff from the site.
- iv. I am of the opinion that the existing drainage and flooding issues being experienced is an existing issue on existing infrastructure. It will not be viable nor feasible to rely on upgrades to the existing infrastructure outside the site to create additional capacity to serve the needs of the proposed development and to provide relief to existing issues being experienced. However ongoing maintenance by Council is expected on the existing infrastructure to ensure the level of service on the existing infrastructure is achieved and maintained, as outlined in Council's annual plan, noting that the downstream infrastructure is within a drainage district targeted rate area. Having said that, the development will create opportunities for improvement of the existing infrastructure.
- v. A stormwater management system can be developed and contained within the boundaries of the site that will provide an acceptable level of service to the proposed development, providing an adequate level of treatment and attenuation to stormwater runoff, prior to release into the downstream receiving environment.
- vi. A conceptual model was included in my report, which provided high level information and an indicative drainage reserve area required to host treatment and attenuation devices sufficient to achieve the objectives set out in the KDC ES and guideline documents it refers to.
- vii. There are well known and widely used standards, technical publications and guideline documents that can be utilised to develop a stormwater management system that will ensure that there are no adverse effects to the downstream receiving environment. The design and detailing of such a management system can be developed at resource consents stage, in collaboration with and for the approval of Council.
- viii. It is my opinion that the effects in respect to stormwater and the potential risk of increased flood hazard can be controlled through an engineered solution within the boundaries of the

site. I am also of the view that the development provides opportunity for some relief to the existing localised flood risk, through careful re-distribution of runoff from the site, and / or additional on-site detention to mitigate the effects of an increase and more frequent intense rainfall events, commonly referred to as the “frequency effect”. Frequency effect rules have been adopted in many engineering standards across New Zealand, which is anticipated to be standardised across the Northland Region.

- ix. The stormwater management concept proposed in my report consists of a network of sealed stormwater pipes that can convey runoff from the development to a series of treatment devices (constructed wetlands, referred to as “ponds” in my report) with a cumulative storage volume of 11,884m³, where runoff can be detained. These structures must have throttled outlets to reduce the peak discharge from the site to that equal or less of the predevelopment state. The baseflow through the treatment devices can provide water quality benefits, which will promote and enhance aquatic life.
- x. The scope of my report was to outline the feasibility of the proposed development in respect to stormwater management. I am of the opinion that a stormwater management solution that will mitigate the environmental effects as a result of the proposed development is feasible. Details of such stormwater management solution can be further investigated, developed, and designed at resource consent stage.

5.5 Potable water supply

- i. Council’s water network is immediately available to the site via recently constructed 180mm diameter watermain. I employed the services of Awa Environmental on the recommendation from Council to undertake a water network capacity assessment. The assessment was undertaken with the aid of hydraulic modelling software. The assessment concluded with confirmation that there is sufficient capacity in the water supply network to serve the development, and that there are no adverse effects on the ability of the network to meet KDC’s Levels of Service. A copy of the Awa network capacity assessment memorandum was included in my report.
- ii. A known issue relates to continuity of supply of raw water to the treatment plant to ensure the demand of consumption on the network is met. At the time of writing my report the treatment plant was operating at a capacity that will meet the consumption demand, however the issue around supply of raw water was inconclusive.

- iii. During subsequent consultation with Council, I have been advised that several proposals, programmes and projects have either been commissioned, or are being contemplated by Council to address the concern regarding the supply of raw water and further work is being planned to improve the raw water supply to the water treatment plant.
- iv. I have also received a capacity assessment report from Council, which was prepared by Apex Environmental, dated June 2021 which further confirmed the capacity of the water treatment plant to meet the demands of consumption on the network, however again highlighted that the *“only limiting factor identified for the plant’s processing capacity is the availability of raw water”*. A copy of the treatment plant capacity assessment report is included in **Appendix A**.
- v. In response to the submission from Fire and Emergency New Zealand, I concur with the requested amendment in the proposed subdivision and land use rules, which is aligned with the recommendations included in section 4.3 of my report.
- vi. Based on my assessment, and considering the information in hand, I am of the opinion that it is feasible to rely on Council’s reticulated water network to supply the development with potable water without any major upgrades to the existing public network to establish a supply. I note that supplementary supply is recommended by way of rainwater harvesting and retention for re-use, which will reduce the load on the public network, but also provide further relief to potential downstream flood hazards. Details of rainwater harvesting and re-use can be further investigated, developed, and designed at resource consent stage.

5.6 Wastewater disposal

- i. It is envisaged that only a small part of the site will be suitable for on-site treatment and disposal as mentioned in section 4.1.2 of my report. The part of the site where this is expected is the proposed “Large Lot Residential Area” intended for rural-residential lifestyle allotments, that will be limited to a minimum allotment size of 4,000m². Wastewater from the balance of the proposed development can be pumped off site to the Dargaville Treatment Plant via a proposed dedicated rising main.
- ii. Capacity and status of the wastewater treatment plant to receive the additional effluent from the proposed development was inconclusive at the time of writing my

report. A capacity and condition assessment of the wastewater treatment plant by Awa Environmental was commissioned by Council after the lodgement of PC81 application. An assessment memorandum prepared by Awa Environmental dated 30 August 2022 concluded that the plant was considered to lack capacity for treating current average dry weather wastewater inflows.

- iii. However, through subsequent consultation and correspondence from Council, it has been confirmed that the treatment plant will have sufficient capacity subject to the completion of remedial works at the plant and further works by Silver Fern Farms on their internal wastewater treatment system which will reduce the current load on the plant substantially. It was communicated that further studies and investigations are underway to confirm the exact loading capacity and further potential solutions Council can undertake to improve the performance of the plant.
- iv. Based on my assessment, and considering the information in hand, I am of the opinion that it is feasible to connect the proposed development to Council's wastewater treatment plant to receive, treat and dispose wastewater from the site. The wastewater can be conveyed via a dedicated low pressure rising main that can be constructed along State Highway 14, in conjunction with the construction of the proposed walking and cycling connections between the site and Dargaville town centre. A copy of the proposed rising main route is included in **Appendix B**. Details of the rising main can be further investigated, developed, and designed at resource consent stage.

6. COUNCIL OFFICER'S REPORT

- 6.1 I respond to relevant aspects of the Council Officer's report below.

Stormwater management and flood hazard

- 6.2 Forth bullet, paragraph 278, comments contained in second memo from the AWA Stormwater Infrastructure Engineer dated 2 March 2023.

"The applicant appears to have misunderstood the purpose of our query. We are not concerned about the effects of the development on flooding from the Wairoa River. We are concerned about potential effects due to displaced ponding on the properties immediately downstream of the site. Any filling of existing depressions which currently store flood water could result in

an increase in peak flows and flood levels and volume due to the loss of attenuation provided by flood waters ponding on the existing site. This may require larger attenuation devices be proposed on the site to mitigate any effects. However, we are comfortable that assessment of this and design solutions are likely to be feasible which can be carried out at the Resource Consent stage.”

- 6.3 I confirm that I understand the query raised regarding the potential displacement of the existing ponding on the site. I used the Wairoa River hydrograph as comparison to demonstrate that it is unlikely that the displacement will affect the downstream river flood levels, where flooding is predominately driven by the flow rates and river flood levels of the Wairoa River. I acknowledge and understand that the receiving environment directly downstream from the site could be impacted by the potential displacement of existing ponding on the site. This was considered during my initial assessments and I believe the potential effects can be controlled by the proposed stormwater management devices recommended in my report. I note the comments from Council’s consultant Stormwater Infrastructure Engineer stating that *“we are comfortable that assessment of this and design solutions are likely to be feasible which can be carried out at the Resource Consent stage.”* I agree with these comments. Solutions where necessary can be developed during the design and resource consent stage.
- 6.4 I understand from correspondence between Waka Kotahi and KDC subsequent to the 42A report that Waka Kotahi agrees with a comment in the AWA report titled *Initial Review of Stormwater Management for Private Plan Change 81, included in the 42A report that “Further information is required regarding the effects of stormwater discharges from the development on the State Highway drain system and the pavement/corridor”.*
- 6.5 I reviewed this during my assessment of overland flow and drainage and confirm that it will be unlikely that there will be any effects on the State Highway drainage system. The section of State Highway along the western boundary of the site drains in a north-western direction, whereas the site drains in a south-eastern direction. Therefore, no discharge from the site is expected to be towards the State Highway.

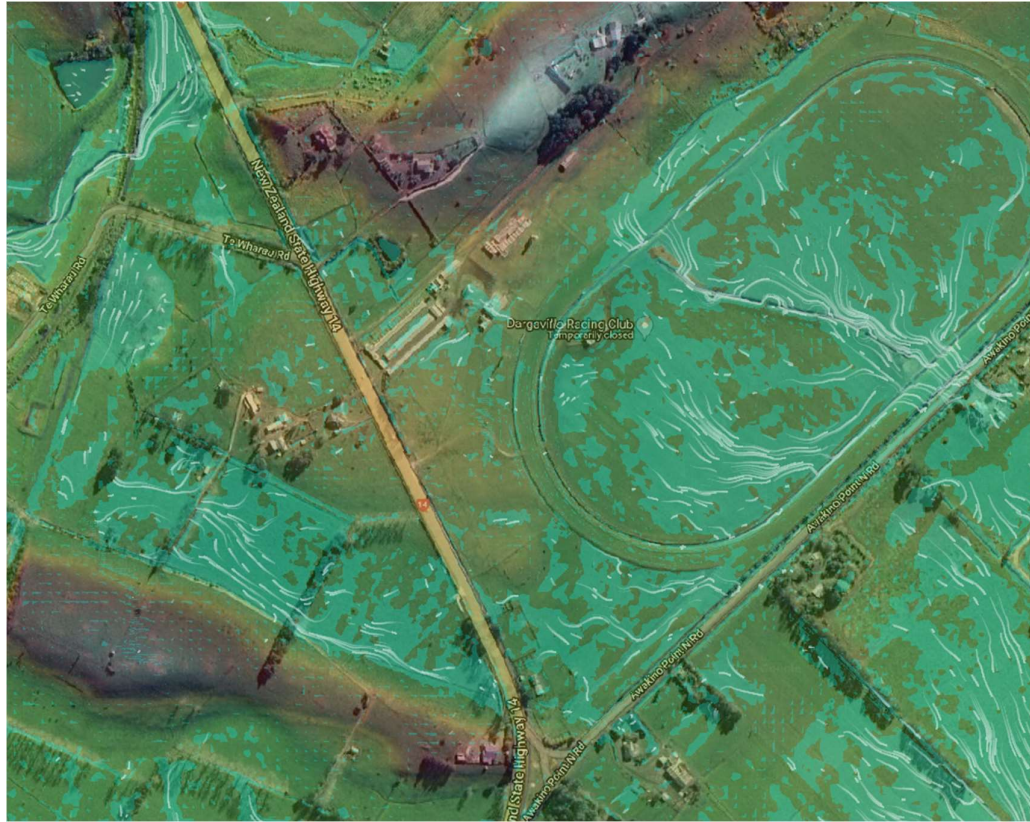


Figure 1 – Lands and Survey Engineering 2D Hydraulic model of overland flow

Wastewater disposal

6.6 Paragraph 305:

“From an engineering perspective, the Dargaville WWTP is in proximity (3km) to the PPC81 area. As raised by the Civil Engineering Assessment lodged in support of PPC81 (at page 16), the proposed bridge crossing on State Highway 14 over the Awakino River would be subject to Waka Kotahi approval. I understand that this approval is yet to be given. I am unaware whether any design work has been undertaken to assess the feasibility of the proposed bridge crossing, and am unable to comment further on the feasibility of this.”

6.7 Paragraph 308:

“...the remaining impediment to providing for wastewater disposal and conveyance is the requirement to cross the Awakino River on State Highway 14. As previously noted, this will require approval of Waka Kotahi and possibly regional council consents from NRC. I have no additional information at this time to confirm that an agreement has been reached with Waka

Kotahi in relation to bridging the Awakino River, nor whether any preliminary feasibility study or consenting assessment has been completed. It would be appropriate for the Applicant to further address these matters in evidence.”

6.8 Paragraph 311:

“...the remaining impediment to providing for wastewater disposal and conveyance is the requirement to cross the Awakino River on State Highway 14. This will require the approval of Waka Kotahi and possibly regional council consents. The likelihood that the necessary approvals will be granted is by no means confirmed and increases the uncertainty as to whether all stakeholders in this process are equally committed to supporting the proposed wastewater upgrades. As such I do not have sufficient information at this time to conclude that PPC81 can be appropriately serviced in relation to wastewater disposal. This is a matter where additional information or evidence from the Applicant and/or Waka Kotahi and NRC would be of assistance.”

6.9 Providing river and stream crossings for utility services is a typical matter that is routinely dealt with at resource consent stage. The proposed route has an existing bridge over the Awakino River for State Highway 14, which has several utility services appended to it. The absence of agreements with the asset owner Waka Kotahi, or consents from Northland Regional Council, does not preclude a feasible river crossing which can be by way of appending the wastewater pipe to the existing structure, or to a supplementary structure alongside the existing bridge.

6.10 I highlight that Council’s Spatial Plan for Dargaville depicts a large part of the site to be within a new Industrial Zone with an approximate area of 184ha, on the northern side of the Awakino River. It is reasonable to conclude the development of a new industrial zone in this location will require access to Council reticulated services, where such services and associated arrangements like the Awakino River crossing is envisaged to be resolved at the development stage, either by an applicant for a resource consent or by Council, depending on the timing of the development and provisions for infrastructure in Council’s Long-Term Plan.

6.11 I understand from correspondence between Waka Kotahi and KDC subsequent to the 42A report, that where the construction of a wastewater pipeline within the State Highway Corridor is proposed, then the Code for New Zealand Utilities Advisory Group (NZUAG) will apply. This code makes provision for attaching utility services to bridge structures.

Potable water supply

6.12 Paragraph 312:

“The technical review of the CEA confirms that there is a seasonal constraint with regard to the supply of sufficient raw water to service PPC81. I do not have sufficient information at this time to determine if measures can be put in place to counteract potential raw water shortages. The Applicant has proposed “conservative approaches to the management of rainwater runoff and harvesting. Effective rainwater harvesting can reduce the system demand substantially. Groundwater by way of community bore is another potable water source that can be explored. Bores and extraction of groundwater would be subject to resource consent from Northland Regional Council (NRC). An enquiry to NRC was submitted to query the current groundwater model. Initial feedback from NRC indicated that there is an unrestricted supply on site however, drainage through the site to be considered. Water levels and quality is unknown at this stage.” Although this information indicates that technical solutions to supplying sufficient potable water to the site are possible (and a design solution could be proposed at the resource consent stage), the provisions of PPC81 do not reflect the potential water supply constraints. As such I cannot fundamentally conclude that there will be sufficient raw water to appropriately supply potable water to development proposed as part of PPC81.”

6.13 It is my understanding that the raw water supply shortages are seasonal constraints, where the water treatment plant has adequate capacity to produce supply to sufficiently meet the consumption demand on the network, including the future demand PC81 will add. Supplementary supply discussed in my report could “fill the gaps” when water supply may be interrupted due to a seasonal shortage of raw water resulting in water use restrictions that may be imposed by Council. Neither Council nor their consultants have provided any indication of insufficient raw water supply to the plant during times outside the dry periods when shortages are experienced, generally limited to summer months. The source, extent and arrangements for supplementary supply can be further investigated at resource consent stage, where the Trifecta Development Area rules and standards for subdivision and land use include relevant matters of control and discretion for resource consents, and water tanks are expressly provided for in the General Residential Area.

6.14 Further to my discussion above in paragraph 6.8, the Council’s Spatial Plan for Dargaville depicts the site to be within a new Industrial Zone where provisions for infrastructure and servicing the zone is expected to be contemplated by Council when developing their Long-

Term Plan, noting the zone is currently serviced with potable water supply via a piped network, with sufficient hydraulic capacity to meet the demand from PC81. As previously discussed in paragraph 5.5(iii), Council has signalled plans and actions towards developing a solution to the seasonal raw water shortage to allow the water treatment plant to maintain consistent and sufficient supply to the network.



Hendrik de Wet

10 March 2023