

BEFORE AN EXPERT CONSENTING PANEL

IN THE MATTER of the Fast-track Approvals Act 2024 (the **FTAA**)

AND

IN THE MATTER of Ashbourne (FTAA-2507-1087)

**STATEMENT OF EVIDENCE OF JOHN STERNBERG ON BEHALF OF THE
MATAMATA-PIAKO DISTRICT COUNCIL**

(Retirement village - Water and wastewater)

5th November 2025

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LAWYERS**

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LAWYERS

1. SUMMARY OF EVIDENCE

This evidence addresses the provision of water and wastewater for the proposed retirement village. The technical review of the applicant's substantive application and responses for the Ashbourne development identifies unresolved concerns regarding the viability of disposal of treated wastewater to land and the potential for cross-contamination of bore water. Key points from the review and subsequent applicant responses to queries are summarised below.

1.1 Wastewater

Treatment and Disposal

- (a) MPDC has confirmed that the public wastewater system does not have enough capacity to service the retirement village component of this development. This means all wastewater infrastructure within the retirement village will not be vested in council and wastewater will be required to be managed and treated on site.
- (b) The proposed wastewater management philosophy includes on-site treatment and land disposal. The proposed treatment process (Innoflow) is well known in NZ and acceptable. However disposal of treated wastewater to land is subject to further investigation and more detail regarding location and design of the disposal beds, given the updated findings by WGA (31 October, 2025) of the unacceptably high ground water table (0.5m below ground level (bgl)) in the vicinity of the disposal fields – which may be further exacerbated by ground water mounding.
- (c) Terrane's report (31 October, 2025) has highlighted concerns relating to the groundwater regime, specifically relating to the groundwater table and the potential impact of treated wastewater on bore water quality, supporting the above statement and the need for further investigation and/or design changes for disposal of treated wastewater.
- (d) Pending the outcome of the above and the level of confidence in the viability of land disposal of treated wastewater, locations and areas of both land disposal area and associated reserve area site(s) should be confirmed before approval can be granted.

Reticulation

- (e) Terrane's reports have highlighted concerns relating to high groundwater levels and the impact on wastewater pumpstation risk/design as well as a high risk zone near the entrance (water tank location) and potential risk to services. This needs further investigation which may result in potential design changes.
- (f) It is also noted that, as a result of the high water table, flotation will need consideration when designing the wastewater treatment system (Innoflow) as this will mostly be buried up to 2.7m below ground level.

1.2 Water Supply

- (a) MPDC has confirmed that the existing water supply network in Matamata will not have enough capacity to service the retirement village. This means that no water supply infrastructure within the development will be vested in council and potable water will therefore need to be sourced, managed and treated on site.
- (b) The proposal is to supply water from a new 120m deep bore on site, treat, store and distribute to the retirement village. Water bore modelling (by WGA) has indicated that there is likely to be less than minimum impact on existing bores or surface water bodies as a result of this bore and also less than minimum impact of disposed treated wastewater (50m away) on the bore water quality. However, recent feedback from Terrane (31st October, 2025) indicates concern and further investigation is required in this regard.
- (c) Water quality will need to comply with Drinking Standards requirements, and monitoring and reporting will need to be in accordance with Taumata Arowai (regulator) requirements. Regarding the latter, an approved management organisation and protocol will be required to ensure monitoring, reporting and compliance. The applicant agrees.

2. INTRODUCTION

2.1 My full name is John Derrick Sternberg.

2.2 I am a water and wastewater engineer with 35+ year's experience.

2.3 I am a chartered civil engineer (MSc Eng.) practising mainly in the waters field. My qualifications and relevant experience are set out in **Appendix 1**.

2.4 In preparing this evidence, I have reviewed the following.

- (a) The substantive application:
 - (i) Volume 4 - Assessment of environmental effects – retirement village
 - (ii) Appendix 1M – Geotechnical (CMW)
 - (iii) Appendix 1N – Hydrogeological (WGA)
 - (iv) Appendix 4D - Infrastructure report (Maven)
 - (v) Appendix 4D – Engineering drawings (Maven)
 - (vi) Appendix 4L – Proposed Conditions (B&A)
 - (vii) Appendix 4M - Water management Plan (WGA)
- (b) Terrane Consultants Ltd Geotechnical review 2nd September 2025
- (c) Submission by Highgrove to the substantive application, 15 September 2025.
- (d) Maven Waikato Ltd Memorandum (26 September 2025) response to RFI's raised by MPDC – Consultant Specialist Group
- (e) Updated geotechnical report, October 2025 (CMW)
- (f) B&A response to queries, 20th October 2025
- (g) B&A response to queries (part of minute 2), 28th October 2025
- (h) WGA technical memorandum, 31st October 2025
- (i) Terrane, updated review 31st October 2025

2.5 Attendance at a site visit on 21st August 2025, conducted by the applicant.

3. CODE OF CONDUCT

- 3.1 Although this matter is not before the Environment Court, I confirm that I have read the Code of Conduct for Expert Witnesses outlined in the Environment Court's Practice Note (2023) (**Code**) and have complied with it in preparing this statement of evidence. If a hearing is held, I also agree to follow the Code when presenting evidence to the Panel.
- 3.2 I confirm that the issues addressed in this brief of evidence are within my area of expertise, except where I state that I rely upon the evidence of other expert witnesses. I also confirm that I have not omitted to consider material facts known to me that might alter or detract from my opinions.

4. EVIDENCE

- 4.1 Please refer to my attached report (**Appendix 2**), which provided an initial assessment of water and wastewater for the retirement village. The following is an update on that report, addressing the same matters:

(a) **Wastewater assessment**

Wastewater treatment and disposal

- i. MPDC has confirmed that the public wastewater system does not have enough capacity to service the retirement village. This means all wastewater infrastructure within the retirement village will not be vested in council and wastewater will need to be managed and treated on site.
- ii. The proposal is for wastewater to be reticulated to a pumpstation at the centre of the site and conveyed to the proposed wastewater treatment plant (WWTP) situated in the NW part of the development (stage 2 but built in stage 1).
- iii. The proposed treatment system, Innoflow, is an acceptable, commonly used treatment system in NZ which is modular and can be adapted to provide appropriate levels of treatment.
- iv. Treated wastewater is to be pumped to a land drip line disposal system located at the western boundary of the site. The estimated design flows and hence disposal areas in the design report, associated Innoflow report and WGA reports do not align, and this needs clarity and confirmation.

- v. Terrane Geotechnical report notes *“The water levels visible in open drains and encountered by the hand auger boreholes is (sic) consistent with a shallow groundwater table. It has not been shown whether the high groundwater levels are due to almost fully saturated conditions or one or more perched aquifers”*. Whilst CMW’s Geotech report does not identify any potential soakage/discharge issues for treated WW, feedback from Terrane (14th July, 2nd September and 31st October 2025) and WGA (31 October 2025) implies that disposal of treated wastewater in the proposed area is generally not ideal due to the high water table and potential for ground water mounding.
- vi. Whilst WGA’s (31 October 2025) report confirms that updated modelling shows less than minimal impact of wastewater disposal on the bore water quality, Terrane (31 October 2025) has raised concerns in this regard, relating to close proximity to the bore, as well as the lower ground water level at the bore (compared with the disposal field) which could create a potential path (hydraulic gradient) for contamination. This issue requires clarification as it could have a significant impact on viability, location and design of disposal beds/method. I recommend that more certainty be sought on this issue at this early stage and/or that the applicant proposes an alternative contingency disposal arrangement, should sustainable land disposal in this vicinity be found to be unsuitable (following further investigations).
- vii. Notwithstanding the above, should land disposal of treated wastewater be found to be suitable, it should be confirmed that the disposal field is intended to be above the 20yr ARI flood.
- viii. With reference to Appendix 1M, ground water varies between 1.6m and 2.6m below ground level. As a recent update, WGA memo (31 October) refers to ground water levels monitored 0.5m (bore 25-P4) below ground level (bgl). It is noted that ASNZS1547 (2012) recommends a minimum of 1.2m of vertical separation between the disposal bed and ground water table – relating to the efficacy of the treatment and disposal process. Although the WGA memo (31 October, 2025) notes again that the impact of treated wastewater disposal on the bore water quality is less than minimal, I believe the 0.5m separation is unacceptably low, given the size of the development and associated level of risk, and this could be further impacted by ground water mounding (substantiated by Terrane, 31

October, 2025). There remain unresolved concerns on this issue which needs further clarity and contingency design (or disposal) measures proposed if there is a negative outcome.

- ix. Notwithstanding the above, the proposed application rate of irrigated treated effluent to land in the design report is 5mm/d which, with reference to ASNZS1547 (2012), infers a soil category 2. However, further soakage testing design evidence is required to substantiate assumed soil category and subsequent sizing of the disposal bed (should land disposal be confirmed as viable), considering conflicting information provided. If further information supports the proposed disposal of treated effluent to land, an appropriate reserve area will also be required.
- x. Whilst the treatment process is acceptable, in order to sustain compliance, a well-supported and approved (MPDC, WRC) operating and maintenance regime/agreement will be required. This should be a condition of consent.

Wastewater reticulation

- xi. Terrane's report (31 October, 2025) has highlighted concerns relating to high groundwater level and the potential impact on the wastewater pumpstation design, namely potential for flotation. Whilst this is a risk that can be mitigated at design stage, there is also potential for increased infiltration and inflow to proposed gravity pipes, currently indicated as the preferred reticulation option. This in turn would increase wastewater flows and implicate the sizing of the wastewater treatment system as well as the land disposal area. The alternative of low-pressure sewers should be considered to minimise this impact and also minimise dewatering of deep trenches. Given the high groundwater levels, it is also noted that flotation will need consideration when designing the wastewater treatment system (Innoflow) as this will mostly be buried up to 2.7m below ground level.

(b) Water supply assessment

- i. MPDC has confirmed that the existing water supply network in Matamata will not have enough capacity to service the retirement village. This means that no water supply infrastructure within the retirement village development will be vested in council and potable water will therefore need to be sourced, treated and managed on site.

- ii. The retirement village will be serviced by a 120m deep borehole (72_12812) located near the western boundary, approximately 50m from the indicative wastewater treatment and disposal field. WGA notes that the impact of wastewater disposal on the ground water will be less than minor. However, Terrane's and WGA's updated report (31 October) raise a question relating to the proximity of the disposal field to the bore and potential impact that discharging treated wastewater to land may have on the aquifer and bore water quality, particularly given the low separation (0.5m) between ground water and the disposal bed. Given the uncertainty, I recommend further investigation be undertaken to confirm the extent of risk of bore (and aquifer) water contamination.
- iii. WGA refers to an estimated potable water demand of 183m³/d and note that the proposed bore can support a maximum of 336m³/d. There is some misalignment with Maven's design report and further clarity is required on the expected staged, daily water consumptions (not mentioned in the design report) to support this conclusion.
- iv. On the above basis, WGA concludes that there is sufficient water available for allocation in the source aquifer to support the proposed abstraction and the requested volume is expected to have less than a minor effect on aquifer sustainability. However, in line with Terrane's geotechnical review (2nd September 2025, 31st October) I support their recommendation that further bore yield investigation be undertaken for an extended period of time, to confirm yield and including monitoring wells to monitor drawdown and potential impact on other bores.
- v. The groundwater will be extracted from the borehole and distributed through a proposed network of 16 water tanks and a treatment facility before being pumped to the supporting rising main and distribution system. Further detail will be required regarding fire hazard ratings and provision for firefighting, backflow protection and standby power supply. The applicant has agreed to address these needs at detail design.
- vi. The WGA report provides details of a water analysis, indicating generally good quality with little need for treatment (i.e. low iron and Manganese, suitable alkalinity, hardness and pH). However, in line with Taumata Arowai (regulator) requirements, and in order to comply with Drinking Water Standards, as a service provider, disinfection will be required to

ensure a sustainable supply of safe drinking water. More detail will be required at design stage.

- vii. As a water services provider there will be formal obligations and registration with Taumata Arowai (water regulator) to ensure compliance with the drinking water standards and the regulator's requirements relating to the provision of safe drinking water, regular monitoring and reporting. This should be a consent condition.

(c) **Further matters arising**

i. Maven's response to RFI's;

- Acknowledgement that Regulatory obligations for wastewater management, monitoring and reporting will be addressed through WRC discharge consent conditions & monitoring requirements.
- Regarding groundwater levels and implications raised previously, CMW and WGA have met with Terrane and talked through what is required now and what can be done. Further feedback has been received as covered in the sections above, but there are still unresolved concerns, as also noted above.
- The applicant has acknowledged regulatory obligations relating to the provision of water supply, treatment and distribution and the need for monitoring and reporting. Further details are expected at detail design stage.

ii. Informal submission by Highgrove (adjacent development), 15th September 2025. Key points are noted below;

- *Water ponding after rain events indicates high water table;*
 - Comment – this observation has supported the need for further investigation and conclusion relating to the water table, potential for groundwater mounding and suitability of soil type/category for sustainable discharge of treated wastewater. There are still unresolved concerns and this is yet to be concluded.
- *Impact of proposed water bore on the Highgrove bores*

- Comment – The WGA report notes that the impact of borehole drawdown can be expected to be less than minor. As noted above, further investigation is required to confirm this, namely longer duration pumping and monitoring wells to confirm safe yield and drawdown.
 - *The issue of trucking sewage off site from the retirement village*
 - Comment – As I understand, the intention is not to truck sewage off site but to treat and dispose treated effluent on site. However, sludge generated from the treatment process may need to be further processed on-site and/or disposed of off-site. This is an operational issue which needs to be addressed in the operating and maintenance programme/agreement.
- iii. Further to the above comment, it is also noted that sludge emanating from the water treatment process may (pending water quality and process) also need to be disposed of and this should also be addressed in the operating and maintenance programme/agreement.

5. CONCLUSION

The technical review of the applicant's substantive application and responses for the Ashbourne development identifies unresolved concerns regarding the viability of disposal of treated wastewater to land and the potential for cross-contamination of bore water.

5.1 Wastewater Treatment and Disposal

- (a) MPDC has confirmed that the public wastewater system does not have enough capacity to service this development. This means that all wastewater infrastructure within the development will not be vested in council and wastewater will need to be managed and treated on site.
- (b) The proposed wastewater management philosophy includes on-site treatment and disposal. The proposed treatment process is acceptable. However, the elevated water table at the designated land disposal location has raised concerns around the unacceptably low separation (0.5m) between treated wastewater and the groundwater

table. Given the unresolved concerns, further clarity is required around the proposed land disposal design generally, also taking into consideration potential contingency designs being considered by the applicant to lower ground water (sub-soil drainage).

- (c) Notwithstanding the above, should disposal of treated wastewater to land be found to be suitable, it should be confirmed that the disposal field is intended to be above the 20yr ARI flood.
- (d) Clarity is required regarding estimated wastewater flows, design basis for land disposal of treated wastewater and reserve area.

5.2 Water Supply

- (a) MPDC has confirmed that the existing water supply network in Matamata will not have enough capacity to service the retirement village. This means that no water supply infrastructure within the development will be vested in council and potable water will therefore need to be sourced, managed and treated on site.
- (b) The proposal for water supply to the retirement village comprises a new bore (120m deep), water treatment, storage and reticulation. WGA concludes that there is sufficient water available for allocation in the source aquifer to support the proposed abstraction and the requested volume is expected to have less than a minor effect on the aquifer or adjacent bores. However, noting concerns of Highgrove residents and comments from Terrane, I support Terrane's recommendation to undertake further borehole drawdown tests for longer duration and using monitoring bores, to confirm safe yield and whether the impact on other existing bores will be less than minor.
- (c) Further clarity is required on the staged water demands to confirm required supply, treatment and storage capacities, the proposed treatment process/quality, sludge management, disinfection, storage and distribution including for firewater provision in accordance with SNZ PAS4509 2008 requirements.
- (d) Terrane has noted the potential for cross contamination of bore water from the disposal field, as a result of the ground water being higher at the latter location and also uncertainty relating to the aquitards. This requires clarification by WGA.

- (e) Water quality management, monitoring and reporting will need to comply with Taumata Arowai (regulator) requirements and NZ Drinking Water Standards.

APPENDIX 1

QUALIFICATIONS AND EXPERIENCE

QUALIFICATIONS (John Derrick Sternberg)



BSc Civil Engineering
MSc Water Engineering
MBA
CPEng, IntPEng

EXPERIENCE SUMMARY

CKL: Engineering Manager (2021- current)

Calibre Consulting: Principal Water Engineer (2018-2021)

BioFiltro: General Manager (2015-2017)

Tauranga City Council (TCC): Principal Engineer City Waters (2007-2014)

Prior to 2007: South Africa

Director of HCE (Integrated water IT solutions)

Director of Bambamanzi (prepayment water management).

Senior Associate with Scott Wilson Kirkpatrick (consulting).

PrEng., Fellow member WISA, chair Technical water distribution

PROFESSIONAL PROFILE

John is a chartered engineer with a broad range of skills and 35+ years of experience in the 3-water's industry, covering engineering design, project management and team leadership – in both the private and public sectors. Areas of technical specialty include 3 waters design of water and wastewater reticulation, bulk transfer schemes, pumpstations, water demand management, land development smart water metering. His technical (M Eng) qualifications and experience is complimented with his business management qualifications (MBA) and experience providing valuable input to optioneering, value-for money and whole of life/business case inputs to projects. Johns experience also includes asset renewal/upgrade planning and implementation, early contractor involvement and design and build contracts.

Full CV available on request.

APPENDIX 2

3- WATERS – INITIAL ASSESSMENT

MEMO

To: Susanne Kampshof, MPDC
From: John Sternberg, Bronwyn Rhynd
Reviewed: Bronwyn Rhynd
Re: Ashbourne Substantive Application: SW, WS & WW - Initial Assessment

Date: 2/9/2025
CC: Marius Rademeyer
CKL Ref: B25118

1 Introduction

CKL has been engaged by Matamata Piako District Council (MPDC) to review the substantive application to MBIE, with respect to the Fast Track legislation, for the Ashbourne Development.

Collectively, Ashbourne provides capacity for approximately 520 dwellings, 20 ha retirement village (comprising 218 retirement living units, a 70-bed aged-care hospital), open space, and two solar farms. The Ashbourne project proposal is a Referred Project under the FTAA (Fast Track Approval Act 2024). Maven Matamata Ltd have been engaged by Unity Developments Ltd to undertake the infrastructure design in support of the 20ha Ashbourne Retirement Village development at Station Road, Matamata comprising 218 villas, an aged care hospital and other supporting facilities. The retirement village is a part of a broader development comprising additional residential units and two solar farms.

This initial assessment is based on a broad assessment of the key information pertaining to stormwater, water supply and wastewater for the retirement village and stormwater management for the residential and solar farms to ascertain whether sufficient information is available for a review and/or identification of any obvious fatal flaws. The key information assessed is as follows, together with site visit undertaken on 21/08/2025:

- a. Appendix 1M – Geotechnical (CMW)
- b. Appendix 1N – Hydrogeological (WGA)
- c. Appendix 3F - Engineering drawings Solar farms
- d. Appendix 4D – Engineering drawings, infrastructure report -Retirement Village
- e. Appendix 4G - SW O&M plan -Retirement Village
- f. Appendix 4L – Proposed Conditions
- g. Appendix 4M - Water management Plan (WGA)
- h. Appendix 5F -Infrastructure report
- i. Appendix 5F - Engineering drawings (various)
- j. Appendix 5I - Stormwater Management Plan
- k. Appendix 5J - SW operation and Maintenance plan
- l. Terrane Consultants Ltd Geotechnical review 2nd September 2025

2 Wastewater

The Retirement Village wastewater review references the information within Maven’s infrastructure design report, Appendix 4D and Terrane’s geotechnical review (2 September 2025).

2.1 Summary of key Observations

- a. MPDC have confirmed that the public wastewater system does not have enough capacity to service this development. This means all wastewater infrastructure within the development will not be vested in council and will be required to be managed and treated on site.
- b. The proposal is for wastewater to be reticulated to a pumpstation at the corner of the site and conveyed to the proposed wastewater treatment plant (WWTP) situated in the NW part of the development (stage 2 but built in stage 1).
- c. Treated wastewater is to be pumped to a 2.4ha (approx.) land drip line disposal system located at the western boundary of the site.
- d. Terrane Geotechnical report "The water levels visible in open drains and encountered by the hand auger boreholes is consistent with a shallow groundwater table. It has not been shown whether the high groundwater levels are due to almost fully saturated conditions or one or more perched aquifers"

2.2 Comment

- There are no obvious gaps in information although some information will require clarification.
- Appendix 4L (proposed conditions) notes standards for treatment and monitoring requirements – which look reasonable. However, as WW treatment and disposal will not be vested in council, an additional consideration will be the ongoing operation, maintenance and compliance reporting to the regional and district council, as well as an O&M agreement and responsibility/obligation associated with the overall WW reticulation, treatment and disposal process,
- Whilst CMW's Geotech report does not identify any potential soakage/discharge issues for treated WW, feedback from Terraine (14 July and 2nd September, 2025) implies WW disposal in the proposed area is not ideal and, due to potential perched water tables, the need to punch through these and potential implications (e.g. short circuiting) needs further consideration. This issue requires clarification as it could have a significant impact on location and/or sizing and type of disposal beds/method. It would be recommended to have some certainty around this at this stage and/or have an alternative contingency disposal arrangement, should disposal in this vicinity be found to be unsuitable (following further investigations).
- With reference to Appendix 1M, ground water varies between 1.6 and 2.6 below ground level – this will require consideration for;
 - Minimising deep gravity sewers to minimise I/I and hence total WW flows, pumping capacity and treatment/disposal volumes – e.g. consider the alternative of small-bore low-pressure sewer reticulation, as proposed by Innoflow; Buoyancy compensation for deep pumpstations and potentially treatment plant and/or other chambers
 - Land disposal of treated effluent (further to the above comment re perched water tables)
- Maven have allowed for 2.4ha for land disposal. However, based on a dripline feed of 5mm/d, this may not include reserve area. Generally, numbers differ between Maven, Innoflow and WGA reports - this requires clarification in order to assess land availability and suitability for disposal of treated WW, including planned redundancy/ footprint.
- Innoflow is a commonly used (and acceptable) system in NZ which is modular and can be adapted to provide appropriate levels of treatment.

- The RITS Wastewater Design Standard has been adopted as a design basis so pumpstations and reticulation will be designed accordingly.

3 Water Supply

The Retirement Village water supply review is with reference to Maven's infrastructure design report, Appendix 4D.

3.1 Summary of key Observations

- MPDC have confirmed that the existing water supply network in Matamata will not have enough capacity to service the retirement village. This means that no water supply infrastructure within the development will be vested to be council and will therefore need to be managed and treated on site.
- The proposed bore can (WGA) support a maximum of 336m³/d. The estimated potable demand is 183m³/d.
- The retirement village will be serviced by a proposed 120m deep borehole located near the western boundary, approximately 50m from the indicative wastewater treatment and disposal field. The groundwater will be extracted from the borehole and distributed through a network of 16 water tanks and a treatment facility (noted as *if required*) before being pumped via a 200mm OD HDPE PN 12.5 main from a pump station to the supporting riser main, ensuring a reliable and potable water supply for development.
- Water will be distributed through a pump station and a 200mm OD water reticulation system. The primary water network will comprise of 180mm OD mains, reducing to 125mm OD for subsequent development stages.
- The Maven report confirms that boreholes and storage tanks have sufficient capacity to support the development up to Stage 10, including all associated fire flow requirements.
- Terrane's geotechnical review (2nd September 2025) indicates a need for further bore investigation to confirm yield.

3.2 Comment

- There are no obvious gaps in information although some information will require clarification.
- Bore supply.
 - The bore appears to be far enough from the proposed WW disposal field (approx. 50m). The WGA report notes that the impact of WW disposal on the ground water will be less than minor.
 - The WGA report also notes that the impact of the borehole drawdown will be less than minor.
 - As noted above, Terrane's feedback (2nd September review) indicates that further bore water investigation is required to confirm yield.
- Potable water
 - The WGA report provides details of a water analysis, indicating generally good quality with little need for treatment (i.e. low iron and Manganese, suitable alkalinity, hardness and pH) . However, disinfection (at least) will be required to ensure safe drinking water. More detail can be supplied at design stage.
- Regulatory obligations

- Appendix 4L (proposed conditions) refers to a water management plan – demand management, education etc. which is good. However, no mention is made of regulatory compliance.
- As a water services provider there will be formal obligations and registration with Taumata Arowai (water regulator) to ensure compliance with the drinking water standards and the regulators requirements relating to the provision of safe drinking water, regular monitoring and reporting. Consideration should be given to the establishment of a water (and wastewater) management “organisation” with appropriate contracts in place and obligations/responsibilities clearly outlined. This should be added to the consent conditions.
- Fire
 - There is mention of the care facility being sprinkler protected. What is unclear is how that water will be provided – presumably by dedicated local storage and boosting – to be confirmed nearer building consent stage. If the latter, adequate space needs to be designated as well as provision for backflow protection.
 - Firewater booster pumps will likely need a diesel standby unless the broader site is to be protected by a diesel generator set.

4 Stormwater

These comments combine the initial review of retirement village, residential and solar farms documentation.

4.1 Summary of key Observations

- With respect to the geotechnical investigations, Geotechnical investigation report Rev 1 dated 22 May 2025, the following ground water table observations need to be included in any soakage design parameters:
 - Residential: perched GWT at 1.0m-2.5m BGL and global GWT 3.5m-8.3m BGL
 - Retirement Village: global GWT 1.6m-2.6m BGL
- The overarching stormwater framework is provided in the Stormwater Management Plan, Rev A, dated 30 May 2025 (SMP).
- 2D hydraulic model has been developed to assess the existing and proposed surface flow regime. The model build report has not been provided therefore not reviewed for this review.
- Primary level of service 10yr ARI with disposal via soakage trench, SMP does not seem to apply 50% reduction to soakage rates (Table 5) for residential areas, however further within the SMP reference is for 50% reduction in rates, therefore clarity of the actual soakage rates utilised for design should be requested.
- The Retirement Village has soakage trenches under road carriageways, the longevity of these trenches and the interdependencies of the civil infrastructure should be assessed.
- Mounding assessment has been provided, however not investigated for this review. Geotechnical soakage testing has confirmed that the site is suitable for raingardens and attenuation ponds.
- Raingardens have an assume depth of 1.0m however given that the typical GWT is between 1.0m-2.5m for the residential areas, this information needs to be incorporated into the design to ensure there is sufficient separation between base of raingarden and the groundwater table.

- The absence of 24-hour rainfall intensities in the MPDC manual (page 40, SMP) is noted; however, this design should reference RITS. Accordingly, updates to the design are recommended to incorporate design parameters and rainfall data based on RITS guidance.
- Secondary system is road network to stormwater basin. There are 4 SW basins for residential development and raingardens designed to RITs standard.
- The OLFP management is through road carriageways and the proposed greenway, of which there are modelling outcomes within the reporting, however the model not supplied.
- Reference to the exceedance of standards is stated within the SMP and further flood hazard assessment undertaken.
- Discharge from the Greenway is to 80% of pre- development flows to Waitoa River. There is an acknowledgement of increase in flood depth regarding the Greenway flow, however uncertain as to the location of this increase (refer SMP Section 8.1 pg. 49). Further review of information required.
- The connectivity of the Waitoa River from the Greenway has been shown as a rip rap lined swale of 3m width in the Maven drawing set C4000, however this has not been detailed. However, as observed during the site visit there is an elevation difference that should be addressed. This information would typically be included in a substantive (or resource consent) application.
- Staging of the developments have been considered with connection points presented within the reporting.

4.2 Comment

- The information supplied provides an overview of the approach to stormwater and overland flow path management. The initial overview has identified that there are some areas of clarification required such as soakage rates and 2D modelling.
- Reliance on discharge to soakage requires further investigation into groundwater conditions. This observation is also confirmed by the Geotechnical review by Terrane Consultants Ltd, dated 2nd September 2025.
- The overarching stormwater management provided within the SMP report has not been reviewed against the engineering plans provided in detail. This is to be undertaken post this review.
- Primary network/conveyance:
 - On lot management descriptions within the report needs to be verified against the plans proposed. For example, roof runoff does not have any pretreatment, e.g. sump, prior to on-lot soakage trench.
 - Review of soakage design is to be undertaken to ensure sufficient space is provided within the soakage basins and road carriageway and separation to the groundwater table.
 - Observations of the groundwater table are limited to only part of the year, rather than provide testing for the calendar year. Suggestion is to maintain groundwater monitoring whilst in the design and construction phase. This would be accompanied by adaptive management of the design should this be required to react to higher groundwater conditions.
- Secondary /Overland flow path conveyance
 - Flows within the carriageway modelling have been undertaken in 1D assessment. Verification in 2D model would provide more dynamic result and confirm the 1D assessment at next stage of design.

- Assessment of flows within the Greenway need to be reviewed, to ensure the 80% pre-development/post development threshold is appropriate (or necessary).
 - Greenway discharge flow and interaction with Waitoa River is to be reviewed, as outlined above. This is to occur for this substantive application review, and prior to detailed design.
- Operation and Maintenance Plan has not been reviewed as part of this review, however appreciated that this is included in the package of information.