MEMO

To: Winton Land Limited
From: Scott McIntyre
Cc: James Dufty
Date: 24/01/2025
Re: **Sunfield Fast Track Application – 3 Waters Review**

McKenzie and Co at the request of Winton Land Limited (WLL) have undertaken an engineering review of the '3 Waters Strategy' prepared by Maven Associates for a Fast Track Approvals Act Application (FTA) application of 244.5 ha of a master planned community known as **Sunfield**.

The site is located in Ardmore and is generally bounded by Old Wairoa Road to the south, Cosgrove Road to the West and Airfield Road to the north.

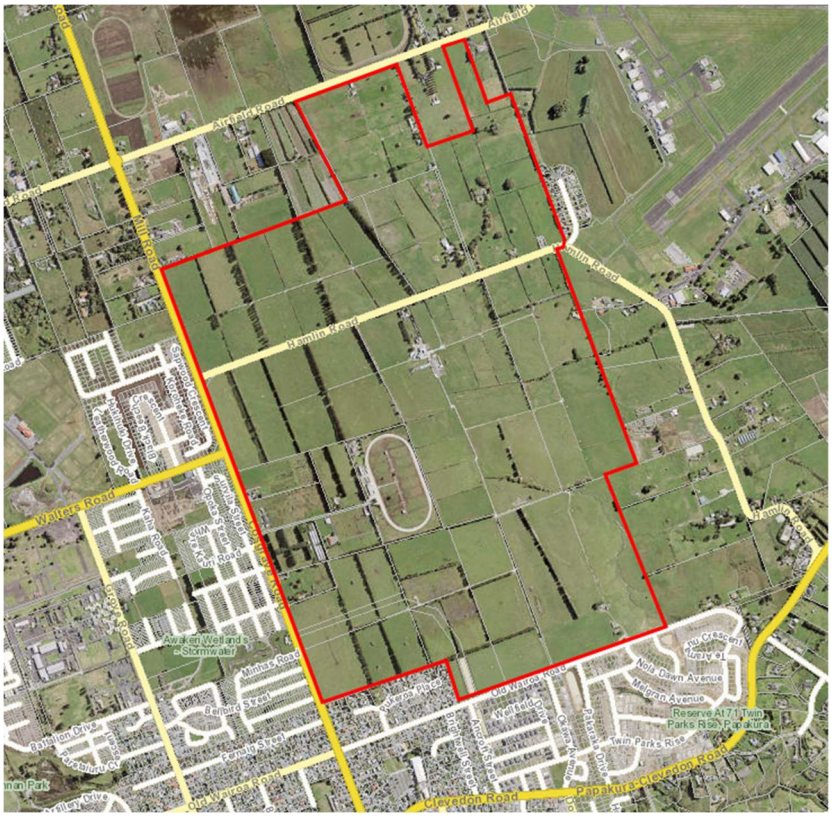

Figure 1: Site – Auckland Council GIS

In undertaking the review McKenzie and Co have had the following information made available to review.

- Preliminary 3 Waters Strategy, Rev F Dated 10/9/2021 – Prepared by Maven Associates
- Preliminary 3 Waters Strategy Report, Rev B, dated 11/12/23 – Prepared by Maven Associates
- Sunfield – FTA Application Three Waters Strategy Report – Prepared by Maven Associates

The information contained in the above reports has been subject to an engineering review by Mckenzie and Co to determine if the strategy for managing the 3 Waters follows good engineering practice, meets the expected levels of service, can be developed to comply with Auckland Council's respective standards and requirements and is a practical engineering solution.

The 3 Waters reviewed are as follows and are addressed individually.

- Stormwater
- Wastewater
- Water Supply

Stormwater

The proposed strategy for stormwater is to treat surface water runoff, manage runoff volume from the proposed development in specifically tailored ways per sub catchment to manage discharges to downstream areas and receiving environments and mitigate the impact of increased impervious areas by re-charging the underlying Peat areas.

The overall approach is to use a Best Practical Option (BPO) strategy including alternatives due to the presence of Peat soils.

The latest information provided now incorporates Auckland Councils transition from Stormwater Code of Practice (SWCoP) version 3 to version 4 which requires climate change factor increase from 2.1 degrees to 3.8 degrees.

All of the development will provide Stormwater Management Area Control 1 (SMAF 1). Due to the proposed wetlands, swales, ponds, and ground recharge methods being employed final details of the amount of detention and or retention provided can be addressed at later stage of the design.

Stormwater Quality Treatment

The strategy states that stormwater quality treatment is proposed to be undertaken by a treatment train approach largely consistent with GD01 requirements.

Proposed buildings will use inert materials and the runoff can be directly discharged to the re-charge pits with overflows to the reticulated network. No treatment is proposed or considered necessary.

Roads will have surface water runoff collected via catchpits which will include some form of primary treatment (Tetra Trap or similar) prior to discharging to re-charge pits. Refer Section 3.4, Para 4 of the strategy report. The same paragraph notes that this approach does not meet the requirements of the Network Discharge Consent (NDC) but is considered BPO.

Auckland Council document GD07 Soakage and Ground Re-Charge Guide, Table 16 notes in the 6th bullet point that additional treatment in accordance with GD01 may be required. This should be clarified in the application to make it clear if additional treatment is proposed.

Secondary treatment of surface water runoff will be provided by way of the swale network and or wetlands that are proposed for the site.

Tertiary treatment to complete the treatment train approach will be provided by the Awakeri Wetlands and the McLennan Wetland for Catchment A only with Catchments B, C and D utilising a number of proposed on site stormwater ponds/wetlands to provide the required stormwater treatment.

Based on the review, the stormwater treatment methods proposed collectively provide an adequate level of stormwater treatment in-line with the best practical option approach and Auckland Council standards and requirements.

Stormwater Conveyance

Conveyance of stormwater around the site is proposed as a combination of reticulated networks and open channels. The reticulated networks will be designed to cater for the 10% AEP event while open channels will be designed for up to the 1% AEP event as they will also function as overland flows paths in many cases. This is BPO for the local area and is compliant with Auckland Council standards and guidelines. The use of open channels in flat terrain is common practice and avoids the need for significant piped infrastructure.

Stormwater Flood Mitigation

The site is low lying and subject to widespread surface flooding as identified in the 3 Waters Strategy Report. It has little or no reticulated drainage currently.

Surface water runoff from the site will discharge from 5 primary catchments post development identified A through D2.

Catchment A, has a pre development catchment of 93.4ha and a post development consists of 173.8 ha of developed formerly, Future Urban (FU) and Mixed Rural Zone (MRZ) land that will discharge through the extension of the Awakeri Wetlands which WLL has reached agreement with Healthy Waters over design of the sections of the Wetlands that traverse the WLL land including the Cosgrove Road culverts.

Hydraulic modelling has been undertaken utilising design parameters provided by Healthy Waters for the contributing catchments at Maximum Probable Development levels incorporating the proposed extension of the Awakeri Wetlands and the network of swales proposed. The hydraulic modelling undertaken using HEC-HMS and HEC- RAS uses appropriate design assumptions and has incorporated the Council's increase in Climate change factor from 2.1 degrees to 3.8 degrees. The increase in climate change factor from 2.1 to 3.8 degrees results in an increase in flows from the upstream catchment that are not attenuated within SDL land and will be passed downstream into the existing section of the Awakeri Wetlands.

Given the large increase in post development contributing catchment and extensive modifications proposed it is recommended that an independent peer review by an experienced flood modeler is undertaken to confirm the preliminary assumptions and flood model outputs.

Catchment B and C has a predevelopment catchment of 472.7ha comprising of predevelopment catchments C1 and C2 and a post development catchments of 443.3ha consisting of 70 ha of MRZ land and 373.3 ha of upstream undeveloped land that will discharge to the Northern Outflow 1 towards the Papakura Stream. Runoff modelling using HEC-RAS with appropriate design assumptions has determined that the pre-development runoff for the 1% AEP event is in the order of 55.2 cu.m/s and the post development flows will be managed to not exceed these predevelopment levels by the use of numerous attenuation devices which restrict the flow to 51.4 cu.m/s. This is achieved via a Dry Pond (Dry Pond 1) and secondary swales which will convey flows to the wetland pond to attenuate and manage flows from development within the WLL land.

The upstream undeveloped Catchment C is intercepted on the eastern boundary and conveyed along the eastern and then northern portions of the site to discharge to Northern Outflow 1. This channel conveys the upstream flows thereby removing significant overland flow from the development allowing the land to be suitable for urban landuse.

The post developed flows calculated using HEC-RAS demonstrate that runoff can be managed to predevelopment levels and as with Catchment A an independent peer review is recommended.

Catchment D1 consists of 17.6ha zoned industrial/employment and discharges to the north (as does Catchment B and C) and the Papakura Stream. This catchment remains the same size in the post development scenario. Runoff modelling reveals pre-development flows for the 1% AEP event in the order of 4.62 cu.m/s and post development of 4.61 cu.m/s. This is achieved through the creation of attenuation volume via Stormwater Pond 2.

This catchment should be included in the recommended peer review of the overall stormwater modelling.

Catchment D2 consists of 2.4ha zoned industrial/employment and discharges to the north (as does Catchment B and C) and the Papakura Stream. This catchment remains the same size in the post development scenario. Runoff modelling reveals pre-development flows for the 1% AEP event in the order of 0.88 cu.m/s and post development of 0.88 cu.m/s. This is achieved through the creation of attenuation volume in proposed Stormwater Pond 3.

This catchment should be included in the recommended peer review of the overall stormwater modelling.

Based on the review of the results outlined in the Maven Associates 3 Waters Strategy report, and subject to detailed design and a detailed flood model review, the stormwater flood mitigation approach proposed provides an adequate level of flood mitigation in-line with the best practical option and Auckland Council standards and requirements.

Wastewater

The wastewater strategy proposes to utilise a low-pressure system (LPS) reticulation network. The strategy does also note that a gravity-based system with pump stations could also be a viable option.

Given the sites very flat profile and the subsurface conditions (large areas of Peat) the use of a reticulation network that is shallow founded, not susceptible to differential settlement, a LPS is considered the preferred design solution. LPS systems are in use throughout the Auckland region and are an acceptable design solution.

Maven have calculated peak design flows using Watercare guidelines and notably used the Average Dry Weather Flow (ADWF) method as opposed to the Peak Wet Weather Flow (PWWF) method. This approach is appropriate when LPS system is being utilised.as the risk of illegal connections and infiltration is largely eliminated.

To support the proposed density the strategy has used the PWWF method to determine the peak flow for a 1550 lot development based on the existing zoning development potential if served by a gravity-based reticulation network. This has derived a peak flow of 64.91 l/s which is considered the 'permitted peak base flow'. The peak flow for the proposed development has also been assessed using the ADWF method and this has determined a potential developed peak flow of 57.63 l/s

The values and approach included in the strategy is consistent with Watercare guidelines for calculation of peak flows for both methods. This approach is appropriate to determine peak flows and confirms that if an LPS system is utilised the proposed development peak flows are less than the potential flows from a gravity-based system based on the current zoning potential of the site.

The entire project is to be reticulated towards a 525mm diameter Takanini Branch sewer line located near the site in Bruce Pulman Park. Maven have stated both Watercare and Veolia have confirmed that there is adequate capacity for the project flows from the Sunfield development. It is noted that confirmation of this should be included with any final application.

Based on the review of the wastewater approach proposed in the Maven Associates 3 Waters report, and subject to Watercare and Veolia confirming adequate wastewater capacity, the wastewater proposed can provide an adequate level of service in-line with the best practical option approach.

Water Supply

The water supply strategy proposes a reticulated supply network that will provide both potable water and firefighting requirements. This is common practice in the Auckland region to service developments and is considered the most practical approach.

The water strategy also notes that Veolia are responsible for the operation, maintenance and connections to the water supply that will serve the Sunfield development.

The new supply network is proposed to connect to an existing Bulk Supply Point (BSP) on the existing 450mm diameter transmission line located within Airfield Road on the northern boundary of the site. New infrastructure will be required from the BSP to the development site.

Maven have calculated the peak water demand values which are contained in Appendix D of the Strategy document. It is noted that the calculated values use different allocations of dwellings, light industrial land and retail to those used in the Wastewater calculation while the value for schools is the same, refer table below. The wastewater allocations appear consistent with the overall summary of land-uses in the Strategy

document. It is recommended that the water demand values are re-assessed on the same land use basis to be consistent.

Table 1 - Water and Wastewater Demand Assumptions

Use	Wastewater	Water Supply
Dwellings	4000 Dwellings	5000 Dwellings
Light Industrial	55.9 ha	40.5 ha
Retail	13.5 ha	8.2 ha
Schools	2000 people	2000 People

The method of calculation for peak water demand is consistent with Watercare guidelines.

Maven have noted in their report that preliminary discussions with Veolia have indicated that the existing BSP points will be able to meet the fire fighting requirements. Confirmation of this should be provided in the final reporting submitted with the fast-track application.

Maven have also noted that the BSP may require upgrading or a second BSP installed to meet demand requirements for potable supply. This approach is considered practical and again this assumption should be confirmed during the consenting process.

The waters strategy notes that the local bulk supply network is connected nearby to the main water supply bulk supply network for much of the Auckland region. The strategy assumes that due to this close proximity, there will be adequate supply available. This assumption, which is reasonable, will need verification from Watercare to confirm supply is available during the consent application.

Based on the review of the water supply approach proposed in the Maven Associates 3 Waters report, and subject to Watercare and Veolia confirming adequate supply, the water supply proposed can provide an adequate level of service in-line with the best practical option approach.

Conclusion

Overall, the 3 Waters strategy proposed by Maven Associates generally follows Auckland Council requirements and guidelines for land development.

The approach for stormwater of managing flows to pre-development levels or in the case of Catchment A to a managed peak flow discharge via a combination of channels, swales, ground recharge and wetlands has been demonstrated in the information provided. The design approach follows the correct design assumptions and practices and subject to final detailed design and an independent flood model peer review, the stormwater strategy ought to perform as predicted with no downstream detrimental impacts.

The use of a low-pressure wastewater reticulation system is supported as the most appropriate engineering solution for the development. The method of peak flow determination is in accordance with the appropriate design standards. Subject to confirmation from Watercare and Veolia on capacity, the design strategy is appropriate.

Water reticulation demand assumptions should be updated to be consistent with the overall project demands, although no significant changes to water demand values are expected. Confirmation from Veolia on supply availability to be suitable for the development should be sought during the consent application.

In conclusion, based on the information that has been provided as part of the engineering strategy review, and subject to an independent flood model peer review, and further detailed design, the engineering approach identified in the Maven Associates Preliminary 3 Waters Strategy Report is considered appropriate and in line with best practical options and Auckland Council standards and requirements.