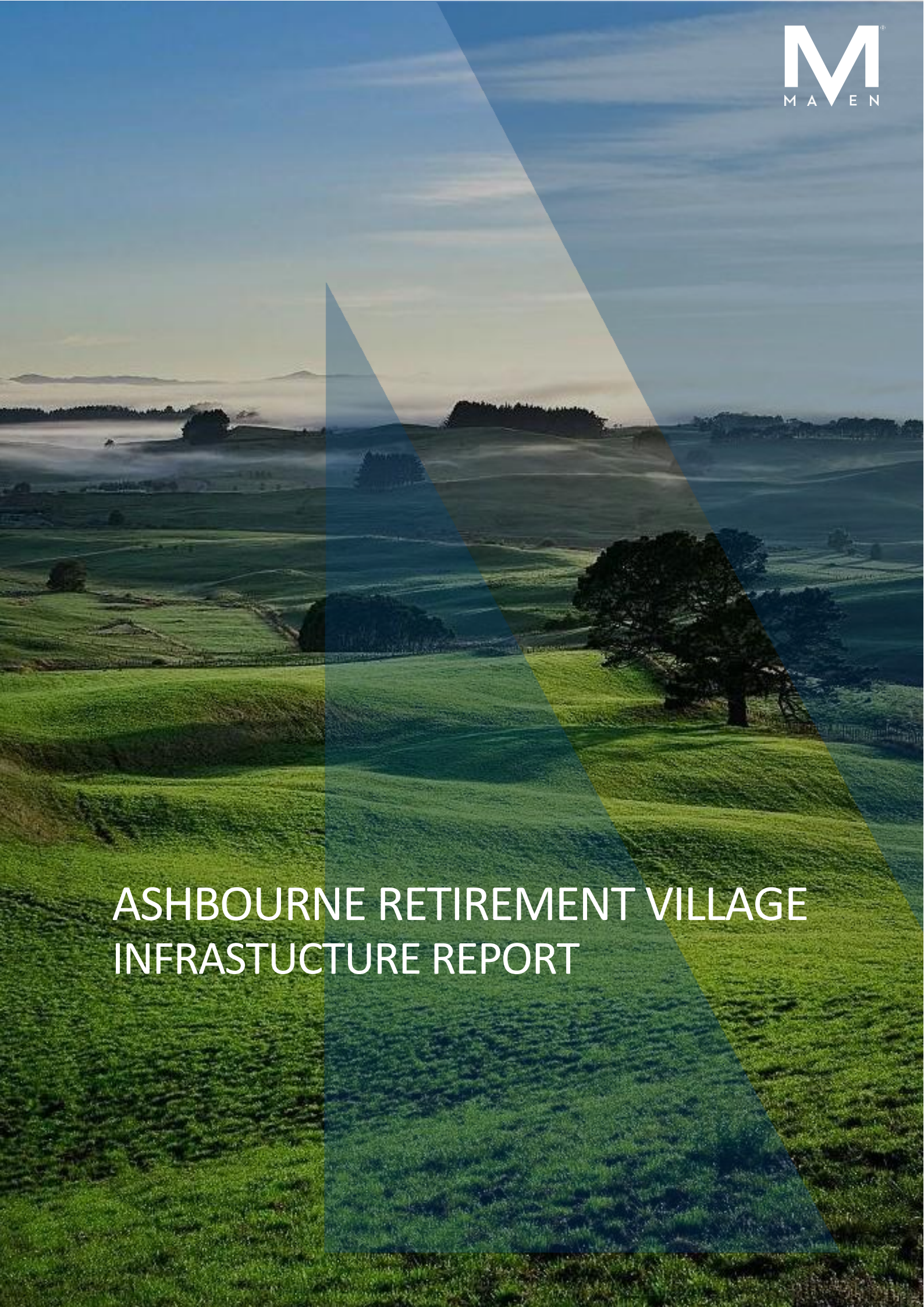

ASHBOURNE RETIREMENT VILLAGE INFRASTUCTURE REPORT

PROJECT INFORMATION

CLIENT	UNITY DEVELOPMENTS LTD
PROJECT	J00606 – STATION ROAD, MATAMATA, MATAMATA-PIAKO

DOCUMENT CONTROL

DATE OF ISSUE	30/01/26
REVISION	C
AUTHOR	David Jin Engineer
REVIEWED BY	Mitchell Smith Associate
APPROVED BY	Dean Morris Regional Director

8 Tainui Street,
Matamata, 3400.
New Zealand
Phone 07 880 9429
www.maven.co.nz

CONTENTS

1. INTRODUCTION

1.1. BACKGROUND

Maven Matamata Ltd have been engaged by Unity Developments Ltd to undertake the infrastructure design in support of Ashbourne Retirement Village development at Station Road, Matamata.

This report is provided to support a 20.0 hectare (ha) retirement village comprising of 218 villas, an aged care hospital and other supporting facilities.

1.2. PURPOSE OF THIS REPORT

The purpose of this report is to outline the design specifications and considerations for the earthworks and supporting infrastructure needed to accommodate the proposed retirement village and ensure it meets the necessary standards as per the Waikato's Regional Infrastructure Technical Specification (RITS) Design Standards, Waikato Regional's Erosion and Sediment Control guide, and Matamata Piako District Council (MPDC) Development Manual.

The information provided herein outlines the methodology associated with the proposed infrastructure onsite.

This report has been updated following further winter groundwater level investigations during October and November 2025. The proposed stormwater solution has been updated to address the challenges posed by near surface peak groundwater levels in the Retirement Village. Updates for revision B of this report are marked in blue for ease of review.

This report is to be read in conjunction with the Engineering Drawings and Calculations and is to accompany the resource consent application.

1.3. SITE DESCRIPTION

The Ashbourne Retirement Village area is circa 20 ha block of land within Matamata Piako District. It is located in a predominantly rural area, on the outskirts of Matamata, approximately 1.8 kilometers south-west of the center of Matamata in the Waikato region

The current site access is opposite 190 Station Road, through a steel and wire gate, and is not an official vehicle crossing.

The site adjoins with the new Highgrove Development to the north-east, an existing dwelling to the west and the remainder of the site is surrounded by pastoral land.

Most of the site is low-lying flat farmland, that is interspersed with artificial farm drains.

There is an existing stormwater swale that follows the northeast boundary and the Waitoa river which runs south to north, approximately 500m to the west of the subject site.

Figure 1: Site Locality Map

1.4.LEGAL DESCRIPTION

The site is legally described as the following:

Address	Lot	Appellation	Area (ha)
247 Station Road	Lot 2	DP 21055	27.38

Table 1: Legal Descriptions with Area

The development site comprises an area of 20ha of the 27.38ha.

2. CONSTRUCTION STAGING

The proposed development will comprise of 218 units, an aged care hospital, and other supporting facilities to accommodate the retirement village.

The development will include private stormwater, wastewater and water supply infrastructure, as well as power, fibre and street lighting.

15 new roads, and 28 common accessways are proposed to provide access to all proposed dwellings and facilities. These roads and accessways will not be vested to council.

A staged approach is proposed, from north to south, to establish a high-quality development. Refer to Proposed Site Overview plan C1100 in Engineering drawings for the development stages.

The 20.0-ha site is currently divided into ten stages. Stage 1 occupies approximately 3.4ha of the site, which will be developed first, and other stages will follow suit.

3. EARTHWORKS

Earthworks will be undertaken in accordance with NZS4431:2022 Engineered fill construction for lightweight structures, to facilitate the development outcome and will include re-contouring, excavations for services, drainage reticulation, formation of building platforms, roading, and accessway construction.

3.1.GEOTECHNICAL INVESTIGATION

A site-specific geotechnical investigation has been undertaken for the development site by CMW Geosciences dated 4th July 2024.

The published geological maps for the area generally align with the geology encountered onsite as comprised of cross-bedded pumice sand, silt and gravel of the Hinuera Formation. Ground water was encountered at 1.6m with the maximum depth of more than 2.6m near the western boundary.

From the ground investigations undertaken by CMW, they have summarized the site geology results in Table 2 below.

Unit	Depth to base (m)		Thickness (m)**	
	Min	Max	Min	Max
Topsoil/Fill	0.1	0.5	0.1	0.5
Stiff to Very Stiff Silt (Hinuera Formation)	1.0	1.1	0.5	1
Dense to Very Dense Sand with interbedded Silt (Hinuera Formation)	5.9	17.3	4.9	16.3
Very Stiff to Hard Silt/Clay (Walton Subgroup)	0.1	18.1	9*	18*
Very Dense Silty Sand (Walton Subgroup)	-	-	**	**
Notes: * Strata not encountered within all test locations. **Thickness only recorded were base of strata has been confirmed.				

Table 2: Summary of Strata Encountered

Upon completion of the proposed earthworks an Earthworks Completion Report will be prepared by the Geotechnical Engineer. This report will certify the adequacy of earthworks and make recommendations on bearing strengths for foundation design purposes.

Per WGA's latest memo, November 2025, results of the further winter groundwater level investigations indicated that groundwater levels are already very close to the ground surface in the northern areas of the planned Retirement Village.

Based on the above, we have adjusted our proposed stormwater design accordingly as detailed in updated section 5 such that it is not reliant on low groundwater levels.

However, it is worth noting that whilst existing peak groundwater levels are near the existing surface, the proposed development includes subsoil drainage beneath each of the roadways as well as a new stormwater pipe network, artificial wetlands, raingardens and a greenway to the south as shown in the engineering plans. The combination of the infrastructure described above will lower the peak groundwater elevation preventing areas of ponding due to groundwater. Refer to WGA's latest technical memo November 2025 which explains this in further detail.

A subgrade CBR of 6 was adopted based on Geotech result Hand Auger Borehole logs within the retirement village area.

3.2. BULK EARTHWORKS

The Engineering Drawings (Refer to Appendix A) detail the extent of the earthworks, refer to engineering plan C2400.

The bulk earthwork for whole site is summarized in table below:

Bulk Earthworks (excluding topsoil strip)	
Total area of ground disturbance	214,800 m² (21.4ha)
Total volume of cut	43500 m^3
Total volume of fill	77300 m^3
Total Volume (net fill)	33800 m^3
Maximum CUT and FILL depth	2.8m FILL / 3.4m CUT
Others	
Topsoil Stripping (200mm)	42,960 m^3

Table 3: Bulk Earthwork Summary

3.3. EROSION AND SEDIMENT CONTROL

Erosion and sediment controls are subject to the Waikato Regional Council 'Sediment and Erosion Control Guideline' and plans outline proposed measures are provided in the engineering plan C2300.

Prior to commencing earthwork operations, it is anticipated that a pre-construction meeting with the WRC monitor team will take place. During this meeting, the erosion and sediment control measures will be discussed and confirmed to ensure that the potential impacts of earthworks and erosion are effectively mitigated.

For a comprehensive understanding of the specific application of sediment and erosion control measures for each area of earthworks, please consult the Construction Management Plan (CMP) which provides detailed guidance on these measures.

4. TRANSPORTATION

4.1. DESIGN STANDARDS

All roads have been designed to accommodate the development and considering RITS, MPDC Development Manual and the Austroads design guidelines with the recommendations of Commute Kiwi transportation consultants.

The design of the road strongly supports a low-speed environment for the retirement village with an emphasis to support vulnerable road users and to encourage walking and cycling. It is conceptual in nature for resource consent purpose only. Finer design details will be confirmed at engineering approval stage.

4.1.1. ENGINEERING EXCEPTION DECISIONS

- No engineering exceptions are proposed for this application.

4.2. DUE DILIGENCE ASSESSMENT – TRAFFIC

Due Diligence Assessment (Traffic) was carried out by Commute Kiwi considering the traffic and transportation effects of the proposed residential development.

For further details, please refer Commute Kiwi Due Diligence Assessment – Traffic.

4.3. PROPOSED ACCESS

There are two entrances to the retirement village. The main entrance will be at the northern end of the development on Station Road frontage where proposed Road 1 (primary main loop) will connect to. This road will provide primary access to the development. Another entrance will be formed at the southern end connecting to the residential site of this development and will be part of Stage 8 of the development.

4.4. ROAD TYPOLOGY AND DESIGN

Road 1 is contained within a 13.5m corridor and include a carriageway width of 7.0m and design of:

- 30mm DG10 asphaltic concrete (on full Grade 5 Primecoat)
- 350mm granular pavement of 100mm AP40 / 250mm GAP 65
- On compacted natural subgrade to a design subgrade of CBR 6

Road 4 and 6 is contained within a 11.0m corridor and include a carriageway width of 7.0m and design of:

- 30mm DG10 asphaltic concrete (on full Grade 5 Primecoat)
- 350mm granular pavement of 100mm AP40 / 250mm GAP 65
- On compacted natural subgrade to a design subgrade of CBR 6

Road 2 to 3, 5, 7 to 13, and 15 are contained within 10.0m corridor and include a carriageway width of 6.0m and design of:

- 30mm DG10 asphaltic concrete (on full Grade 5 Primecoat)
- 350mm granular pavement of 100mm AP40 / 250mm GAP 65
- On compacted natural subgrade to a design subgrade of CBR 6

Road 14 is contained within 9.0m corridor and include a carriageway width of 5.0m and design of:

- 30mm DG10 asphaltic concrete (on full Grade 5 Primecoat)
- 350mm granular pavement of 100mm AP40 / 250mm GAP 65
- On compacted natural subgrade to a design subgrade of CBR 6

There are 28 Accessways varying in width of 4m, 5m, 6m, and 7m wide to accommodate the retirement village access to units.

4.5. PARKING

One parking space is to be provided per dwelling unit. Additional parking is provided throughout the development however none provided within carriageway

4.6. WALKING AND CYCLING

Interconnected footpaths are provided throughout with widths of 1.5m to all the proposed roads. Cyclists would be expected to share the road with motorised vehicles.

5. STORMWATER

5.1. DESIGN STANDARDS

The MPDC Council Development Manual sets out design and construction standards for stormwater and requires all land development projects to be provided with a means of stormwater disposal.

Stormwater systems have been designed in accordance with RITS and other relevant standards including the MPDC Development Manual 2010 and caters for the primary soakage system up to the 10-year event as well as the secondary system and overland flow paths to manage excess runoff that cater for events exceeding the capacity of the primary soakage system for events exceeding the 10-year event.

5.1.1. ENGINEERING EXCEPTION DECISIONS

- No engineering exceptions are proposed for this application.

5.2. EXISTING RETICULATION

There is no existing public network located near the site identified on MPDC GIS data. The existing stormwater infrastructure within the site is limited to farm/roadside swales, culverts and streams. There is an existing stormwater swale located along the eastern and northern boundaries of the site to maximum depth of 2m. There is an existing 375mm diameter culvert crossing Station Road NE of the site. There is also an existing farm drain which runs east to west just south of the site.

The proposed development will have new stormwater systems.

5.3. STORMWATER MANAGEMENT PLAN (SMP)

The proposed Stormwater Management Plan (SMP) has been prepared to support a discharge consent application for the proposed overall Ashbourne Development, which includes:

- Retirement Village (related to this Infrastructure Report);

- Residential Development and;
- Northern and Southern Solar Farms.

Each site has been considered in detail through hydrological and hydraulic modelling, including sensitivity scenarios under future climate conditions.

For further details, please refer to the Stormwater Management Plan (SMP) prepared by Maven Waikato Ltd which outlines the proposed management of stormwater within this development.

5.4. PROPOSED STORMWATER NETWORK

Ashbourne Retirement Village will be serviced by a proposed stormwater network which will collect stormwater runoff from the buildings and road corridors via lot connections and catchpits respectively and discharge up to the 10-year ARI storm event including climate change to 3 raingardens and 2 proposed artificial wetlands. Secondary flows up to the 100-year ARI including climate change will be conveyed via overland flow contained within the road corridors and swales to the proposed wetlands. Raingardens and artificial wetlands will provide water quality treatment and extended detention. The wetlands will also provide attenuation and flood storage to ensure discharge from the proposed development is at 80% pre-development flows for the 10-year and 100-year ARI events.

5.4.1. STORMWATER RETICULATION SUMMARY

With the site being generally flat, the proposed stormwater network utilizes shallow grade pipe networks and swales to convey flows. The network will collect stormwater runoff from the lots and road corridors via lot connections and catchpits and discharge to their respective artificial wetlands or raingardens.

- The north and eastern sub-catchments discharge to artificial wetland 1 located in the NE corner of the site.
- Northwestern sub-catchments are serviced by raingardens 1 and 2 before discharging to the existing drain at the NE corner of the development.
- The southeastern sub-catchment is serviced by raingarden 3 before discharging to the existing drain running north along the eastern edge of the development.
- The southwestern sub-catchment is serviced by artificial wetland 2 located in the SW corner of the site.
- A localized small sub-catchment at the southeast corner of the site will be managed via a roadside raingarden before discharging to the greenway due to levels.

Refer to appendix B for pipe network calculations and sub-catchment areas.

5.4.2. OVERLAND FLOW PATHS (OLFPS)

Additional branches of OLFPs will be created as roading corridors are formed. The following measures will be adopted to mitigate their effects of these overland flowpaths on the proposed development.

- Identify and maintain natural overland flow/watercourse locations to convey concentrated stormwater from the site.
- Utilise existing culverts (where possible) to maintain the same discharge locations, post development.
- Identify and retain any upstream OLFPs and/or watercourses to avoid any upstream flooding.

- Ensure OLFPs are to be designed where possible within the roading network and discharge into watercourses and detention devices.

The preliminary OLFP design is shown in Maven Matamata Ltd drawings C4900 contained within Appendix A. Summary of results provided below and detailed design of the OLFPs will be provided at future detail design stage following the approval of the resource consent.

An assessment of the post development overland flow paths (OLFPs) has been carried out to evaluate the behaviour of surface runoff in the road carriageway under the proposed stormwater management system. The design scenario is based on the 2081-2100 RCP8.5 climate change scenario, incorporating all proposed soakage and treatment devices and the assessment is done through Autodesk Hydroflo software. The OLFPs represents the conveyance of surface runoff because of the proposed system during the 100-year storm event.

Flow depths and velocities were assessed at key locations throughout the development covering all the various road/accessway typologies ensuring and confirming conveyance of the OLFP is viable through proposed carriageway. See below table showing results at the key locations.

	CATCHMENT AREA (HA)	SECTION	FLOW RATE m^3/s	MAX DEPTH m	VELOCITY m/s	DEPTH x VELOCITY
CATCHMENT 02	4.64	A	0.513	0.156	0.71	0.11
		B	0.33	0.141	0.6	0.09
		C	0.33	0.205	0.614	0.13
		D	0.635	0.179	0.679	0.12
		E	0.205	0.125	0.536	0.067
		F	0.505	0.128	0.705	0.09
CATCHMENT 04	4.05	G	0.835	0.191	0.696	0.132
		H	1.240	0.171	1.132	0.193
		I	0.371	0.141	0.635	0.089
CATCHMENT 05	3.16	O	0.360	0.149	0.476	0.070
CATCHMENT 06	5.69	J	0.270	0.133	0.507	0.067
		K	0.330	0.142	0.604	0.085
		L	0.250	0.139	0.501	0.069
		M	0.170	0.097	0.473	0.045
		N	0.320	0.107	0.440	0.047

Table 4: OLFP Results

For OLFP plans, please refer to Appendix A – Engineering Plans.

All OLFP sections comply with standard design thresholds and does not exceed 200mm maximum depth threshold.

Depth x velocity (m^2/s) values remain well below critical safety thresholds defined in Austroads 2012 Part 5, which specify:

- < 0.4m^2/s for pedestrian safety
- < 0.6m^2/s for vehicle safety

The highest recorded value was 0.193m^2/s confirming safe flow conveyance for both pedestrians and vehicles under design conditions. Flow is primarily routed along proposed roads conveyed into roadside treatment and 10-year mitigation devices prior to spilling back (during event above the 10-year) onto the road and get discharged into the proposed ponds or greenway.

It is noted that a separate flood sensitivity analysis has been completed using HEC-RAS 2D modelling assuming all stormwater devices are fully blocked. The assessment detailed in section 7 of SMP, evaluates overland flow behaviour under worst case flooding conditions within and surrounding the site.

5.5. CAPACITY AND QUALITY

Stormwater Strategy for Lot Areas

Roof runoff is managed using inert roofing materials, while driveway runoff is directed through a catch pit with a sump for pre-treatment before disposal into the proposed stormwater network via lot connections. The artificial wetlands and raingardens will provide treatment of runoff from the lot areas. The artificial wetlands are designed to attenuate the 10-year and 100-year ARI storm event including climate change for the lot areas.

Stormwater Strategy for Road Carriageway

The road carriageway runoffs will be collected via catchpits. The artificial wetlands and raingardens will provide treatment of runoff from the road carriageways. The artificial wetlands are designed to attenuate the 10-year and 100-year ARI storm event including climate change for the road carriageway.

Stormwater Strategy for Stormwater Raingardens 1, 2 and 3

Stormwater raingardens 1, 2 and 3 will provide treatment of the water quality volume for their corresponding catchments. Extended detention up to 300mm depth is provided in accordance with RITS. Larger flows up to the 10-year ARI storm event will be discharged via a scruffy dome. Flood storage and attenuation will be provided for by wetland 1.

Stormwater Strategy for Artificial Wetlands 1 and 2

Artificial wetlands 1 and 2 forms a critical part of the overall stormwater mitigation system. Wetlands will be incorporated into the stormwater system to treat the water quality volume, provide extended detention (1.2xWQV) for their corresponding catchments as well as manage peak flows up to a 100-year return period storm event (including climate change) for the proposed retirement village. These wetlands are designed to temporarily store runoff during storm events and release it at a controlled rate, thereby reducing downstream flooding risk and protecting receiving environments. Wetland 1 discharges to an existing culvert which crosses Station Road and heads north via an existing channel eventually reaching Waitoa river. Wetland 2 discharges to the proposed greenway before discharging into the Waitoa River.

Key design considerations include:

- Sizing based on achieving water quality volume within the permanent storage zone, the extended detention and attenuation of the 10 and 100-year storm events releasing at 80% of pre-development.
- Extended detention up to max 350mm depth and release over 24-hours.
- Flow splitter device upstream of each wetland to direct <2-year event through the wetland, >2-year event is directed to a highflow bypass channel to prevent scour of treatment elements and re-mobilisation of accumulated sediments.

- Highflow bypass channel outlet includes an outlet control. Flows back up and engage flood storage within the wetland.
- Permanent storage pool bathymetry per RITS to be detailed during EPA.
- Maintenance access ramp and platform adjacent the forebay will be detailed during EPA.
- Freeboard and spillway design to safely pass extreme events.

Refer to appendix B for wetland and raingarden calculations.

5.6. FLOODING

A flooding assessment has been conducted as part of the Stormwater Management Plan (SMP) to support overall Ashbourne Development, which includes the Retirement Village.

For the proposed development at the Retirement Village, the 100-year ARI secondary flows will be conveyed via overland flow paths contained within the road corridors and swales to the proposed wetlands. The wetlands will provide attenuation and flood storage to ensure discharge from the proposed development is at 80% pre-development flows for the 100-year events.

For further details, please refer to the Stormwater Management Plan (SMP) prepared by Maven Waikato Ltd which outlines the proposed management of stormwater within this development.

5.7. CONNECTION POINTS AND STAGING

- Stage 1 to 4 (Part of 3) - These stages collectively form catchments 2 and 5, which is serviced by the proposed raingardens 1 and 2 and artificial wetland 1. The proposal allows for the construction of raingardens 1 and 2 and artificial wetland 1 during stage 1. This will ensure that required stormwater devices are in place before establishment of future stages within catchment 2 and 5. Stage 2 to 4 will follow, completing the remainder of stages within Catchments 2, and 5.
- Stage 5 to 6 (Part of 3) - These stages form the extent of catchment 6, which is serviced by artificial wetland 2. The proposal allows for the construction of Artificial wetland 2 during stage 3. This will ensure that required stormwater devices are/is in place before establishment of future stages within catchment 6. Stage 5 to 6 will follow, completing the remainder of stages within Catchment 6.
- The earlier stages will enable the construction of these Stormwater mitigation devices, with the later stages to follow.
- Stage 7 - This stage forms part of Catchment 4 and will be serviced by wetland 1.
- Stage 8 - This stage forms part of Catchment 4 and 6 and will be serviced by raingarden 1, wetland 1 and 2.
- Stage 9 to 10 - This stage forms part of Catchment 3 and 4, will be serviced by raingarden 3 and wetland 1.

6. WASTEWATER

6.1. DESIGN STANDARDS

The RITS Wastewater Design Standard sets out design and construction standards for wastewater and requires all land development projects to be provided with a suitable means of wastewater disposal.

The existing public wastewater network near the development is currently at capacity as advised by MPDC therefore the retirement village will have its own wastewater treatment to manage and treat wastewater on site.

6.1.1. ENGINEERING EXCEPTION DECISIONS

- No engineering exceptions are proposed for this application.

6.2. CATCHMENT AREA

The proposed development consists of 218 villas, one Aged Care Hospital, and other facilities across approx. 16 ha. The wastewater design has been based on 45 persons per hectare as per the requirements of RITS.

6.3. DESIGN FLOWS

Calculations for wastewater demand indicate a peak wet weather flow (PWWF) discharge to the proposed wastewater treatment plant of 10.74 l/s. Refer to Wastewater Demand Calculations in Appendix B.

6.4. RETICULATION

6.4.1. EXISTING RETICULATION

There is no existing reticulation at the proposed site.

6.4.2. PROPOSED RETICULATION

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 to be council and will be managed and treated on site.

The wastewater system proposed is based on a gravity sewer inlet and conventional pump station. It will be sized to accommodate associated peak wet weather flows as calculated in wastewater demand calculation in Appendix B.

A range of new 150mmØ and 225mmØ reticulation lines are proposed for this development as shown on C5000-C5003 plans.

These reticulation lines will gravity feed into the proposed pump station (SSMH A1) which pressurise the sewage into the rising main. The rising main will then discharge the wastewater into the proposed wastewater treatment plant (WWTP) located central and slightly east to the proposed development, before discharging to a dispersal field located east of the retirement village. The dispersal field is sized at 24,148m2 and an allowance for a reserve field sized at 50% is shown further to the west. An easement will be provided for both the dispersal field and reserve field as shown on the latest scheme plans.

Refer to updated Inno flow concept design provided in Appendix C for more information on the WWTP, WWPS and dispersal field. This includes a full specification report on design parameters and assumptions.

Further specification and detailing of the new wastewater pump station, WWTP and dispersal field will be provided in detailed design.

6.5. UNIT CONNECTIONS

All units will be serviced with connections as per RITS guidelines and specifications.

6.6. CONNECTION POINTS AND STAGING

- Stage 1 – Gravity reticulation network will be provided. The wastewater would then be conveyed to the new wastewater pump station within Stage 2, servicing up to 52 lots for stages 1 and 2. As part of Stage 1, the WWTP will be constructed.
- Stage 2 to 10 – All stages will contain new gravity reticulation network that would be directed to the new wastewater pumpstation then to the WWTP.

7. WATER SUPPLY

7.1. DESIGN STANDARDS

The RITS Water Supply Design Standard sets out design and construction standards for water reticulation, potable water supply and firefighting supply in accordance with SNZPAS 4509:2008 (NZ Fire Service Fire Fighting Water Supply Code of Practice).

7.2. EXISTING PUBLIC INFRASTRUCTURE

MPDC have confirmed that the existing water supply network in Matamata will not have enough capacity to service the retirement village. This means that all water supply infrastructure within the development will not be vested to be council and will be managed and treated on site.

7.3. DESIGN FLOWS

An estimate of water demand from the proposed building development has been made using the methodology set out in RITS 6.2.3 – Ordinary Supply Requirements.

Calculations for water demand indicate a calculated peak demand of:

- 6.56 l/s for the residential dwellings
- 0.65 l/s for the facilities and;
- 1.31 l/s for hospital – night day facility.

Refer to Water Demand Calculations in Appendix B.

7.4. PROPOSED WATER SUPPLY

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 extracted from the 120m deep borehole will be distributed through a network of 16 water tanks and a treatment facility before being pumped via a 200mm OD HDPE PN 12.5 main from

the pump station to the supporting riser main, ensuring a reliable and potable water supply for development.

Refer to engineering drawing C6000-C6003 plans for Water Supply layout plans.

The drawings C6000-C6003 plans show the proposed water supply systems. It ensures adequate water supply for all dwellings and other facilities, along with fire hydrants and valves to meet minimum requirement detailed in Section 7.5 below.

7.4.1. PROPOSED BOREHOLE AND STORAGE TANKS

A comprehensive assessment of the council's water main has confirmed that boreholes and storage tanks have sufficient pressure to support the development up to Stage 10, including all associated fire flow requirements.

The assessment of the water storage tanks confirmed that the Borehole water supplied by a borehole pump is capable of meeting water supply demand. There are 16 heavy-duty water tanks proposed to meet this demand. Potable water supply for the proposed development will be provided via a storage tank integrated with additional treatment processes(if needed). 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

As per the RITS demand for water age calculations, the water age is to be less than 72 hours. The water model confirms storage duration is below 45 hours.

Refer to Water Storage and EPANET Model calculations in Appendix B.

7.5. FIRE FIGHTING SUPPLY

The minimum firefighting water supply classification required by the RITS is to be in accordance with SNA PAS 4509 NZ Fire Service Fire Fighting Water Supply Code of Practice

Minimum water supply is specified as FW2. Therefore, the proposed residential development must meet the following water supply requirements:

- A primary water flow of 25L/s within a distance of 135m.
- An additional secondary flow of 25L/s within a distance of 270m.
- The required flow must be achieved from a maximum of 3 hydrants operating simultaneously.
- A minimum firefighting residential running pressure shall be 100kPa.
- A minimum working residential water pressure shall be 300kPa.

Based on the fire hydrant flow and pressure test following NZS 3500 Clause 3.2.3 and Table 3.2.3, a FW2 and 125mmOD HDPE is suitable to ensure fire safety. This is shown in the calculations, resulting in a flow rate of 1500 L/min. Eight fire hydrants have been proposed for the entire development to meet compliance with the above fire fighting supply requirements.

Aged care Hospital and Facilities will have sprinklers installed to improve fire safety within these facilities.

Refer to Water Demand Calculations in Appendix B.

8. SERVICES

It is noted that a utility service network is present in the surrounding area and HPA will liaise with utility providers for new underground services such as power, and fibre networks.

C7000 services plan provided in the engineering drawings is indicative and will be confirmed by the HPA group.

All streetlighting will be confirmed by HPA group.

9. CONCLUSIONS

Based on this engineering report we consider that the proposed development can be accommodated at the subject site without generating any adverse effects on the existing infrastructure and stormwater receiving environment.

Stormwater drainage can be provided for the development through overland flowpaths, proposed stormwater network, rain gardens and wetlands. Overland flow paths will be managed through the development, and it will reduce any potential flooding risks to properties. An overarching stormwater strategy has been developed, and this sets out the high-level, best practice approach for stormwater management within the catchment.

Wastewater drainage can be provided for the development though piped networks to intermediary pump stations that will transfer wastewater through the site for discharge into the new Wastewater Treatment Plant.

Potable water for the development will be supplied via an on-site bore, supported by storage tanks and pumps designed to meet demand as required. This approach has been adopted following confirmation from MPDC and WSP that there is no available capacity within the existing council network.

Additional investigation work and detailed reporting for three waters and earthworks will be required to support future structure plans.

10. LIMITATIONS

The calculations and assessments included in this report are a 'desktop' analysis and are preliminary in nature based on information available at time of issue. To the best of our knowledge, it represents a reasonable interpretation of available information.

Depending on the outcome of the high-level structure plan, further community; stakeholder engagement, and feasibility investigations, including engineering design and calculations, will be required to determine the suitability of the areas proposed for the retirement village development.

This report is solely for our clients use for the purpose for which it is intended in accordance with the agreed scope of work. It may not be disclosed to any person other than the client and any use or reliance by any person contrary to the above, to which Maven has not given its prior written consent, is prohibited.

This report must be read in its entirety and no portion of it should be relied on without regard to the limitations and disclaimers set out.

Maven makes no assurances with respect to the accuracy of assumptions and exclusions listed within this report and some may vary significantly due to ongoing stakeholder engagement.

APPENDIX A – ENGINEERING DRAWINGS

APPENDIX B – ENGINEERING CALCULATIONS

APPENDIX C – INTERGRATED TRANSPORTATION ASSESSMENT

APPENDIX D – INNOFLOW WWTP CONCEPT DESIGN