Maven Waikato Ltd
401001 - Gordonton Retirement Village

Memorandum

To:	Rebecca Shaw (Barker & Associates)
From:	Robert McKenzie (Maven Waikato Ltd)
Reviewed:	Dean Morris (Maven Waikato Ltd)
Subject:	Gordonton Retirement Village (GRV) – Civil Design
Date:	October 2024

Introduction

The proposed project for which a fast-track application under the *Fast-track Approvals Bill Government Bill 31—1* is being applied for is the consenting of:

- The construction of a retirement village; comprising of 659 residential units, cafe, apartment style accommodation and health care provisions.
- Roading, pedestrian, cycling infrastructure associated with the retirement village
- Water, wastewater and stormwater infrastructure associated with the retirement village
- Disturbance of earthworks associated with the retirement village
- Water Take Permit
- Water Discharge Permit

The purpose of this project is to establish a retirement village/estate which has a point of difference to reflect the rural values and attributes of the site and surrounding locality and to provided much needed aged care living for the Waikato District & Region. The project shall include grazing land in and around the site to break up what would be the typical perception of a retirement village. An additional point of difference is also ensuring the site provides connectivity with the village of Gordonton through pedestrian walk ways and/or cycle ways.

The project shall create a unique village/estate style layout with 7 or so 'clusters' of housing. Each cluster is intended to be of approximately 6Ha and having a density of approximately 15 -20 units per hectare (approximately 120 housings/ units per cluster).

It is intended to provide on-site amenities/ facilities including a communal facility with the main centre offering typical village amenities, cafe, apartment style accommodation and further health care provision. Provision of infrastructure will all be managed on site.

The proposed site is of irregular shape and is approximately 66.55Ha comprised in one record of title 676234 legally described as Lot 3-4 Deposited Plan 328606 and Lot 2 Deposited Plan 481700. The site has a relatively flat topography. Remnant forest vegetation occupies fragments of the site comprised within a small grove dominated by kahikatea (Dacrycarpus dacrydioides) with other native species present such as lemonwood (Pittosporum eugenioides), tī kōuka (Cordyline australis) and pōhuehue (Muehlenbeckia australis). The grove of remnant forest vegetation within the site is not marked as a Significant Natural Area (SNA) on current operative plan maps.

The site has approximately 3.8 km of stream habitat. There are seven artificial watercourses with a combined length of approximately 2.6 km and five modified watercourses with a total length of approximately 1.2 km. The site is identified to have a stream/ water body running along the west boundary adjoining with the Gordonton village identified as the Komakorau Stream.

The site is zoned as 'Rural' under the Waikato Operative District Plan (ODP) and General Rural Zone under the Waikato Proposed District Plan – Appeals Version (PDP-AV). The site adjoins Gordonton Primary School to the north also identified as Designation C31 under the ODP and Designation MEDU-29 under the PDP-AV. The site is also applicable to a Site of Significance to Maaori (item 284) which is detailed to be the Otaahua Paa and is described as a Paa site with shallow ditch, depressions and a small terrace.

Maven Waikato Limited have been engaged by a Barker and Associates Limited to explore the feasibility and concept of land development, for a multi-staged rural retirement village. This Infrastructure technical memo will form part of the fast-track application. The purpose of this memo is to provide the developer an initial assessment of the infrastructure servicing for redeveloping the land for new rural retirement village.

Earthworks/Geotech

Earthworks will be required on the site to complete the development. Included within the earthworks are excavation of services and formation of building platforms, paved and landscaped areas. Earthworks will need to be undertaken in accordance with the recommendations made by the geotechnical engineer and other specialists involved.

Measure for erosion and sediment control will need to be designed in accordance with the guidelines of Waikato Regional TR2009/02 document. Resource consent will require that erosion and sediment control measure are implemented and maintained in accordance with the engineering drawings.

A geotechnical desktop review for the proposed GRV area was undertaken by GWE in May 2024 refer to Appendix G for the GWE report for further details.

The report identifies the approximate distribution of prevailing landforms and geologies for the local area, typical geotechnical challenges associated with subdivision development on those landforms and presents strategies to mitigate hazards by further geotechnical investigation and design.

Within GRV the extent of earthworks will vary depending on demand and yield driving design considerations such as developable units, natural watercourses, and protection and mitigation from flooding and overland flow.

Site Ecology

An ecological survey was undertaken for the proposed GRV area by Ecological Solutions in June 2024 refer to Appendix H for the ecology survey for further details.

The survey identified the native and exotic tree species, locations of lizard habitats and possible bat roosting habitats within the native Kahikatea trees, however no bats were sighted during their site visit.

Figure 1 – Existing Vegetation and Lizard Habitat Plan

Natural wetlands within the site are protected and some potential natural wetlands are currently under review. Figure 3 below shows the water features within the site. The artificial watercourses onsite can be modified or infilled, provided they do not contain any native black mudfish.

Figure 2 – Freshwater Features Plan

Site Geology

The subsurface soils encountered within the upper 1-2m of the site can generally be categorized into three main areas as follows:

- Area A – Silt (Loam) over Hinuera formation moderate to high density sand with interbedded silt lenses, these soils are consistent with a high energy depositional environment.
- Area B – Recent Alluvium, as slack water deposits consistent with a low energy deposit, which in turn overlies low to moderate Hinuera formation sands with interbedded silts.
- Area C – Peat, a swamp deposit underlain by recent Alluvium with the denser Hinuera soils at a greater depth.

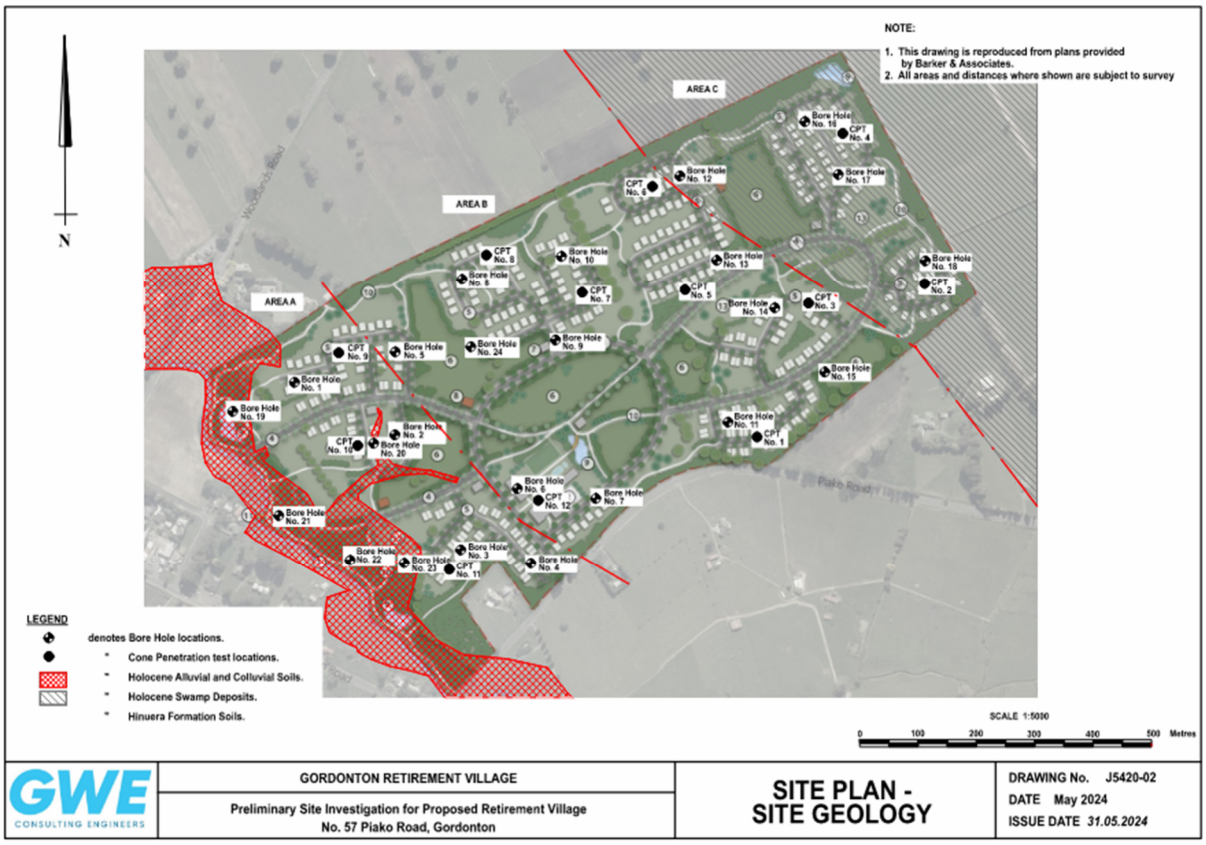

Figure 3 – Site Geology Plan

Low Lying Peatland

Low-lying peat has been encountered in parts of Area C with peat on average 500mm below the surface with peat layer depths ranging 200-500mm. The peat soil belongs to the Tauranga Group and the Piako subgroup. It is a characteristic deposit of the Waikato basin and is described as normally to near normally consolidated and therefore is susceptible to significant settlement, when subjected to loading or drainage. As peat areas are low-lying, they can be susceptible to flooding as well.

Peat Mitigation

Where peat is present, drainage of the peat which could lead to shrinkage shall be carefully considered and mitigated against (see 4.3 Groundwater Recharge).

Peat and any existing over-lying fill material may require undercut and replacement with engineered fill, where peat depths are up to 2m (above the water table) to minimise differential settlement issues.

Preload fill material may be suitable in areas where depths of peat are greater than 2m. Specific, underfill drainage, temporary pre-loading, and settlement monitoring, under the direction of a Geotechnical Engineer, will be required to limit post construction ground settlements.

The peat encountered in Area C based on the borehole results has an average layer depth of 425mm and we anticipate we will need to remove approximately 35,000m^3 of peat through this area.

Building Foundations

The proposed development on peat may require specific foundation solutions due to ground conditions. Piled foundations beyond the peat base or preloading to induce settlements are recommended, with preloading typically around 2 meters and holding periods of 3 to 6 months. Lightweight buildings may use raft foundations designed to handle settlements, while heavier industrial buildings will likely need piled foundations.

The liquefaction analysis identified three key areas:

- Areas with 50 to 100mm of settlement will need specially engineered foundations to address liquefaction effects.
- For settlements exceeding 100mm or liquefaction within 2 meters of foundations, a hybrid approach with a geogrid reinforced gravel raft and engineered raft foundation is advisable.
- Areas facing lateral spreading will require ground improvements and engineered foundations.

Refer to GWE report for more details.

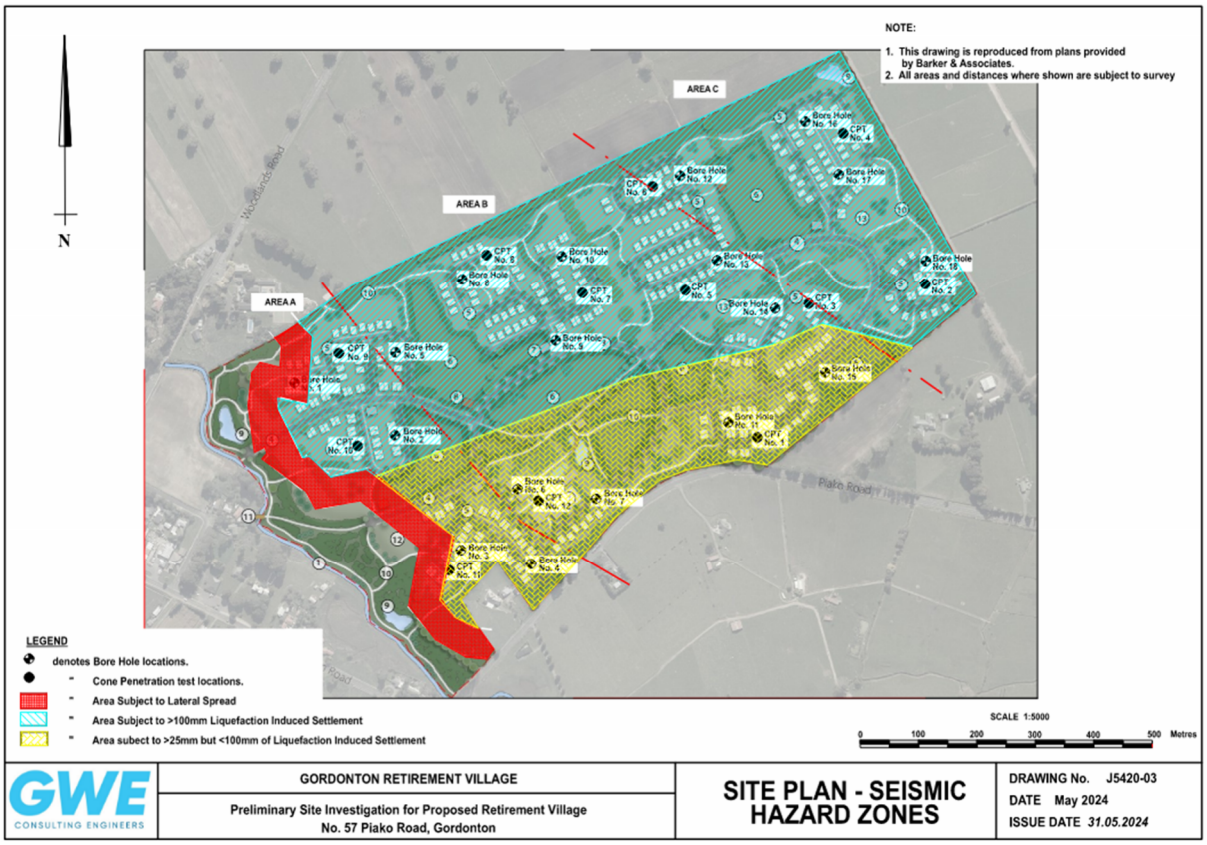

Figure 4 – Seismic Hazard Zones Plan

Roading Construction

For construction of any new roads, where the peat is less than 2m the peat it will likely be undercut and removed, and approved engineered fill placed. For peat soils greater than 2m in depth, the peat will likely be preloaded to induce ground settlement and the settlement monitored. The expected settlement time is 3 to 6 months based on historical results for surrounding areas.

Sediment and Erosion Control

Sediment and erosion control measures are to be established in accordance with Waikato Regional Council's (WRC) erosion and sediment control guidelines for soil disturbing activities. Erosion and sediment controls should be in place before earthworks commence and checked onsite by the engineer. Sediment and erosion control drawings will be provided prior to construction.

Preliminary Earthworks

A preliminary earthworks assessment has been undertaken for the proposed development. The design terrain was developed based on the concept development plan layout for the roading and stormwater.

Earthworks Volumes	
Total Cut =	408,519m³
Total Fill =	402,993m³
Balance (Cut) =	5,526m³

Table 1 – Earthworks Volumes

Volumes indicated are solid measure in place, no bulking or compaction factors have been applied and topsoil stripping has not been included.

Preliminary Earthworks consist of a maximum cut depth of 5.5m and a maximum fill depth of 4.4m. With majority of the cut being on the southwest of the site being disbursed on the northeast. 90% of the earthworks are within the 2m cut to 2m fill range, with the remaining 10% outside this range.

Preliminary earthworks levels result in a balance which is essential for effective project management, influencing cost, environmental impact, site stability, and overall project efficiency. Proper planning and execution of cut-fill operations can lead to significant benefits throughout the project lifecycle.

Stormwater

A preliminary stormwater strategy for GRV is to set out the best practice framework for stormwater management. The stormwater is currently managed by the existing wetlands, farm drains and culverts to convey the surface runoff through the site.

Refer to Appendix A for the stormwater layout drawing C400 and Appendix C for the stormwater calculations.

Lower Waikato Zone Plan

WRC have prepared the Lower Waikato Zone Plan, for the Lower Waikato Catchment Stormwater Management and GRV is located within the stormwater catchment area.

The Zone Plan includes the following interrelated 30-year goals to guide the implementation of the ICM activities within the zone:

1. Provide and maintain sustainable flood protection to rural land and urban areas to the agreed level of service.
2. Contribute to improving water quality within the zone.
3. Contribute to ensuring that soils within the zone remain productive.
4. Manage the instream impacts of urban development and land use intensification in association with territorial authorities and other partners.
5. Promote and enhance indigenous biodiversity in both aquatic and terrestrial environments.
6. Support mana whenua and strengthen community partnerships.

Suggested Outcomes

Proposed objectives of the stormwater strategy are:

- Provide an option-based assessment for water quality treatment in support of the future development of the study area.
- Consideration and requirement for extended detention in support of the future development of the study area to avoid any downstream flooding, erosion and scouring.
- Confirming the need for attenuation of peak flow during storm events up to the 100-yr events.
- On-site retention (volume reduction) to ensure pre-development runoff rates and volumes are maintained within catchments and streams.
- Recommendations to guide the future plan change application(s) to ensure the positive environmental outcomes are achieved.
- Aligning our stormwater strategy with the goals set out in the WRC Lower Waikato Zone Plan.
- Identify existing overland flow paths.
- Identify existing flood hazards.
- Provide 80% of Predevelopment flows discharging from the site to mitigate adverse effects on the receiving environment.

Reticulation

The existing stormwater infrastructure within GRV is limited to farm/roadside drains and streams. The development of GRV will be supported by new private stormwater networks. New groundwater recharge soakage pits will provide, some at source primary treatment within the road corridors and it will help manage the natural groundwater hydrology throughout the site.

The new stormwater network will discharge into the proposed wetlands on the eastern and western side of the development. The stormwater wetlands will provide water quality treatment for the WQV or lower flow events generated from the site and attenuation of the primary and secondary flows.

The stormwater infrastructure will need to comply with the conditions for resource consent, engineering approval and/or building consent. Where possible, the stormwater network will be designed and constructed within the internal road network.

Groundwater Recharge

Soakage and recharge of stormwater will be required to maintain hydrology to prevent dewatering of downstream wetland and streams and to mitigate ground shrinkage. For areas of deep peat, the preference would be to construct wetlands through these areas. Recharge pits should be designed at regular intervals throughout the development to encourage even distribution of groundwater recharge.

Detailed investigations by a suitable qualified Geotechnical Engineer, to determine the suitable recharge treatment measure to be implemented for each area. Recharge treatment measures will need to consider the future infrastructure and buildings in the decision-making process.

Rainwater Harvesting/Reuse

Roof water tanks will be used for portable water supply for each building and each retirement unit will be fitted with a 22,000L roof collection tank. Rainwater is harvested directly off the roof and travels through sealed down pipes to a water tank which sits either above ground or below.

The stormwater overflows from the roof collection tanks will discharge into the stormwater network via the stormwater unit connection or onsite soakage trench. Through utilising the roof water, it offsets stormwater runoff for each site, and it also meets the Water-Sensitive Urban Design (WSUD) criteria.

Rainwater harvesting requires a building consent and would be enforced by a condition of resource consent and consent notice within the overarching consent for the site. The use of rainwater reuse and their effects on water supply demand will need to be investigated and confirmed with council.

Artificial Wetlands

Wetlands will be designed in accordance with Waikato's Regional Infrastructure Technical Specifications (RITS) and other relevant standards including TR20-06 Waikato Stormwater Runoff Modelling Guideline (TR20-06) and TR20-07 Waikato Stormwater Management Guideline (TR20-07). Wetlands will provide secondary treatment (following forebay and raingardens and/or swales) and extended detention prior to discharging to the existing stream or primary network. Wetlands will be located offline to the existing stream, to allow upstream flows to bypass the wetland.

Stormwater Quality and Quantity

An assessment has been undertaken to establish the best practical design options for the stormwater quality and quantity design in support of RITS. These options include:

At source stormwater quality control through the following controls:

- Inert roofing materials for all future buildings.
- Reduction of impervious areas by adopting a cluster development layout and utilising permeable paving (where possible).
- Lot development supported by approved propriety devices such as raingardens, tree pits, stormwater filters, etc.
- Treatment of public roads and or right of ways via approved propriety devices (soakage trenches, raingardens, swales, stormwater filters, etc) as per GD01 design guidelines.
- Sub-catchment wide stormwater quality provision through detention basins and wetlands.
- Planting of riparian areas and protection of any existing bush features within GRV.
- Use of the treatment train devices (soakage trenches, swales and/or amalgamated raingardens and artificial wetlands) to provide storage and attenuation for the required storm events from WQV, ED, 2-year, 10-year, and 100-year ARI.
- Protection from mitigation of natural soils.

A treatment train solution is a proposed solution which would be in the form of an integrated forebay, amalgamated soakage trenches and stormwater wetlands for each catchment. This provides a two-step treatment and reduces the amount of maintenance required by creating one location per catchment to attend to.

Proposed stormwater wetlands have been sized based on RITS refer to Appendix C for the stormwater calculations and the stormwater calculations are summarised in the table below.

Catchment	Catchment Area (Ha)	Minimum Wetland Volume Required (m^3)
A	37.65	19661
B	28.90	15092

Table 2 – Stormwater Wetland Details

The wetlands will discharge into the existing Komakorau stream and north overland flow path. Refer to drawing C400 in Appendix A for the concept stormwater plan, which provides preliminary catchments and stormwater wetland locations.

Flooding

The site is located adjacent to the Komakorau River, an area likely to experience flooding during a 100year storm event. Figure below showing the Waikato Flood Portal excerpt. We have contacted Waikato Regional Council to provide us with more details on the river flooding model as presented in the figure 5 below.

Figure 5 – Waikato Flood Portal relation to GRV

A preliminary flood assessment has been completed for the site, to better understand the potential impact of the adjacent River to the site during flooding event. This preliminary assessment did not account for upstream or downstream river infrastructures in place as part of the river/flood and diversion management. These typically includes culverts, dams, flood gates, pumps etc.

The assessment was conducted using HEC HMS for hydrological modelling and HEC RAS for hydraulics flooding analysis.

Figure 6 – HEC flooding analysis

The Result shown above shows general similarities between the extent shown in the WRC flood hazard portal in terms of the river flood extent into the site. These findings further provide clarity on the existing flow dynamics of stormwater during the 100year event which informs proposed infrastructure for stormwater mitigation.

Pre development, Upstream flows that enters the site along the south eastern boundary can be captured and discharged directly into the existing open drain adjacent to the Eastern Wetland, by use of channels or cut off drains as depicted in our stormwater plan. This would ensure that stormwater Mitigation measures will not incorporate any external upstream catchment.

Wastewater

Maven have undertaken a desktop study to identify the most suitable option for wastewater disposal for the Gordonton area. The site is in a rural location and there is no pre-existing infrastructure within the area to service this proposed development. Onsite wastewater treatment is the only current feasible option for servicing this development. Refer to Appendix A for the concept wastewater layout drawing C500.

Proposed Infrastructure

The site topography is generally flat, GRV would be predominantly serviced by gravity mains. The site will be split into two major catchments in the eastern and western wastewater catchments.

The eastern gravity pipe network will drain to underground wastewater storage tanks located within the eastern reserve area adjacent to the proposed stormwater wetland. The wastewater storage tanks will need to provide minimum 9 hours of emergency storage, in line with the requirements in RITS 5.2.10.7. The wastewater will be pumped via a wastewater rising main, through to an upstream receiving manhole, which will form part of the western gravity pipe network.

The combined wastewater flows for the entire site will be conveyed through the western gravity pipe network to the wastewater treatment plant, which will provide long-term onsite wastewater treatment.

The new wastewater treatment plant would need to be constructed during the first stage of the development.

The wastewater calculations for each stage are summarised in the table below:

GRV Wastewater			
Stage	**Units**	**Population**	**Peak Flow (l/s)**
1	44	88	2.09
2	60	120	2.41
3	138	276	4.83
4	138	276	3.62
5	124	248	3.37
6	111	222	3.06
7	68	136	1.76
8	117	234	2.85

Table 3 – Summarised wastewater calculations

The treated wastewater will be discharged to land via approved discharge techniques. The treated wastewater discharge will meet the required New Zealand/regional standards and will require future discharge consents.

Water

Maven have undertaken a desktop study to identify the most suitable option for potable water for the GRV development. Water supply for Gordonton is fed by a 150mm diameter. uPVC watermain located in Puketaha Road. WDC and Hamilton City Council pay for the portable water supply. There is an existing water pump, along Sainsbury Road that boosts the water pressure for the water supply network to Gordonton.

An existing 150mm uPVC watermain that runs along Gordonton Road. There is an existing 63OD MDPE ridermain that connects to the watermain at the intersection of Piako Road and Gordonton Road, and it continues along Piako Road as a single end feed to just past the 22 Piako Road before the line terminates. The existing ridermain currently only provides water supply to the 22 Piako Road property. A single end feed 100 diameter. MDPE watermain follows Piako Road and it terminates just before the existing ridermain.

Water Supply Option 1

Gordonton town has limited water supply and the existing water supply network could not support the additional water supply demands for circa 800 new retirement village units. Each unit will be self-sufficient with individual 22,000L roof tanks for each unit for portable water supply.

A new 100,000L fire supply tank will be installed in the centre of development. The fire supply tank will have a 25OD PE trickle feed line, that will connect to the existing 100 dia. MDPE line in Piako Road. Watermains will be installed within the road corridors, with strategically placed fire hydrants to provide firefighting supply to all the buildings throughout the development. A water pressure pump will be installed from the tank outlet, to provide firefighting water pressure for the watermains through the development.

Refer to drawing C600 for the proposed water supply plan in Appendix A.

Water Supply Option 2

Utilise existing and create new water bores for raw water supply. We would recommend discussing the feasibility of this option with WDC and WRC, prior to proceeding with site investigations. Bore water supply could provide for a portion of the site or for the entire site. The bore water would require onsite water treatment if the intended water use is for portable water supply for this development.

The water supply calculations for each stage are summarised in the table below:

GRV Water Supply			
Stage	**Units**	**Population**	**Peak Flow (l/s)**
1	44	88	1.32
2	60	120	1.81
3	138	276	4.15
4	138	276	4.15
5	124	248	3.73
6	111	222	3.34
7	68	136	2.05
8	117	234	3.52
TOTAL	800	1600	24.07

Table 4 – Summarised water supply calculations

Recommendations

Option 1 would be our recommended option. Option 1 would not affect the natural groundwater hydrology; it would cost considerably less to establish and to maintain the infrastructure over the long term.

We recommend arranging a meeting with WRC and WDC to confirm the acceptance of the water supply strategy.

Services

We have received service provisions for power (WEL) and fiber (Lightwire) refer to Appendix B. There is no existing gas network within the general area. Both power and fiber have confirmed that their networks will be able to supply GRV. Services will be incorporated into the typical service cross section design and coordinated with each of the service providers.

Conclusions

Based on the information provided in this memorandum we believe the site is viable development. The following conclusions are recommendations based on the information at the time of writing this report and are not limited to these recommendations.

Stormwater drainage can be provided for GRV, through wetlands, ground water recharge and piped stormwater networks. Overland flow paths will be managed through the development, and it will reduce any potential flooding risks. 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 GRV, though piped networks that will drain to the onsite plant for wastewater treatment. Treated greywater will discharge to the stormwater wetland and the treated sludge will be removed and disposed at the nearest landfill periodically.

Potable water supply within GRV retirement village units via roof water tank collection. Firefighting supply will be provided through a pressured firefighting watermain network through the development.

Additional investigation work and detailed reporting for three waters and earthworks will be required for developing the overall strategy.

Appendix A – Concept Engineering Drawings

N

WOODLANDS ROAD

EXISTING DRAIN TO BE INFILLED

COUNCIL MANAGED STORMWATER DRAIN FROM URBAN DESIGNER DRAWING

STORMWATER DEVICE - CATCHMENT B
DETENTION VOLUME REQUIRED: 15,092m³
TREATED STORMWATER TO BE DISCHARGED TO COUNCIL MANAGED STORMWATER DRAIN

PROPOSED SW OUTLET WITHIN THE SITE.
ENERGY DISSIPATERS AT OUTLET TO MINIMISE EROSION AS ATTENUATED FLOW FROM THE WETLAND SHEET FLOWS INTO THE EXISTING STREAM

CATCHMENT B
28.9 HA

CATCHMENT A
37.65 HA

STAGE 1
STAGE 2
STAGE 3
STAGE 4
STAGE 5
STAGE 6
STAGE 7
STAGE 8

GORDONTON SCHOOL

WASTEWATER TREATMENT PLANT
INDICATIVE LOCATION

KOMAKORAU STREAM

CUT OFF DRAIN OR SIMILAR TO BE INSTALLED ALONG THE SOUTH WESTERN BOUNDARY TO COLLECT EXISTING OVERLAND FLOW AND DISCHARGE TO OPEN DRAIN

PIAKO ROAD

STORMWATER DEVICE - CATCHMENT A
DETENTION VOLUME REQUIRED: 19,661m³
TREATED STORMWATER TO BE DISCHARGED TO KOMAKORAU STREAM

PROPOSED SW OUTLET . ENERGY DISSIPATERS AT OUTLET TO MINIMISE EROSION AS ATTENUATED FLOW FROM THE WETLAND SHEET FLOWS INTO THE EXISTING STREAM

PIAKO ROAD

KOMAKORAU STREAM INDICATIVE
100YR RIVER FLOOD EXTENTS
FROM MAVEN FLOOD MODELLING

KOMAKORAU STREAM INDICATIVE
100YR RIVER FLOOD EXTENTS
FROM WAIKATO DISTRICT COUNCIL

GORDONTON ROAD

FOR INFORMATION

INDICATIVE OVERLAND FLOW DIRECTION

100YR INDICATIVE RIVER FLOOD EXTENTS

WASTEWATER PUMP STATION

WASTEWATER TREATMENT PLANT

FIREFIGHTING SUPPLY TANK

ROADS

w EXISTING WATERMAIN

Rev	Description	By	Date
B	FOR INFORMATION	RJM	10/2024
A	FOR INFORMATION	TH	06/2024

	By	Date
Survey	-	-
Design	MKS	06/2024
Drawn	MKS	06/2024
Checked	DM	06/2024

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Project
RETIREMENT VILLAGE
GORDONTON
57 PIAKO ROAD
FOR
BARKER

Title
PROPOSED
SW DRAINAGE
CONCEPT PLAN

Project no.	401001
Scale	1:5000 @ A3
Cad file	SW CONCEPT.DWG
Drawing no.	C400 Rev B

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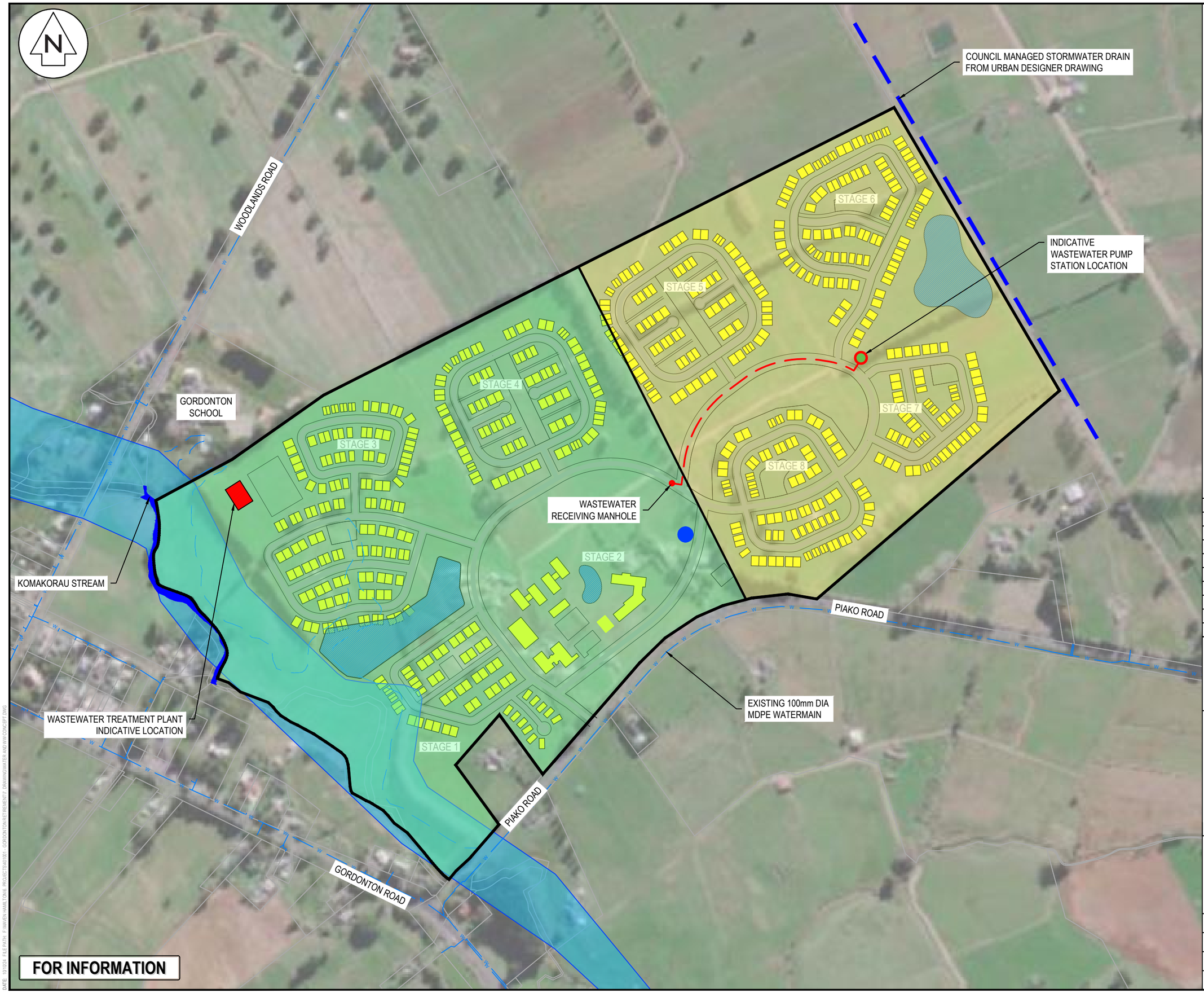

NOTES:

1. WASTEWATER GRAVITY RETICULATION TO DRAIN TO ONSITE WASTEWATER TREATMENT PLANT.

- 100YR INDICATIVE RIVER FLOOD EXTENTS
- WW EASTERN CATCHMENT
- WW WESTERN CATCHMENT
- WASTEWATER PUMP STATION
- ONSITE WASTEWATER TREATMENT PLANT
- FIREFIGHTING SUPPLY TANK
- ROADS
- WW RISINGMAIN
- EXISTING WATERMAIN

Rev	Description	By	Date
B	FOR INFORMATION	RJM	10/2024
A	FOR INFORMATION	GNT	07/2024

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Project
RETIREMENT VILLAGE
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FOR
BARKER

Title
PROPOSED WASTEWATER DRAINAGE CONCEPT PLAN

Project no.	401001
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Cad file	WATER AND WW CONCEPT.DWG
Drawing no.	C500 Rev B

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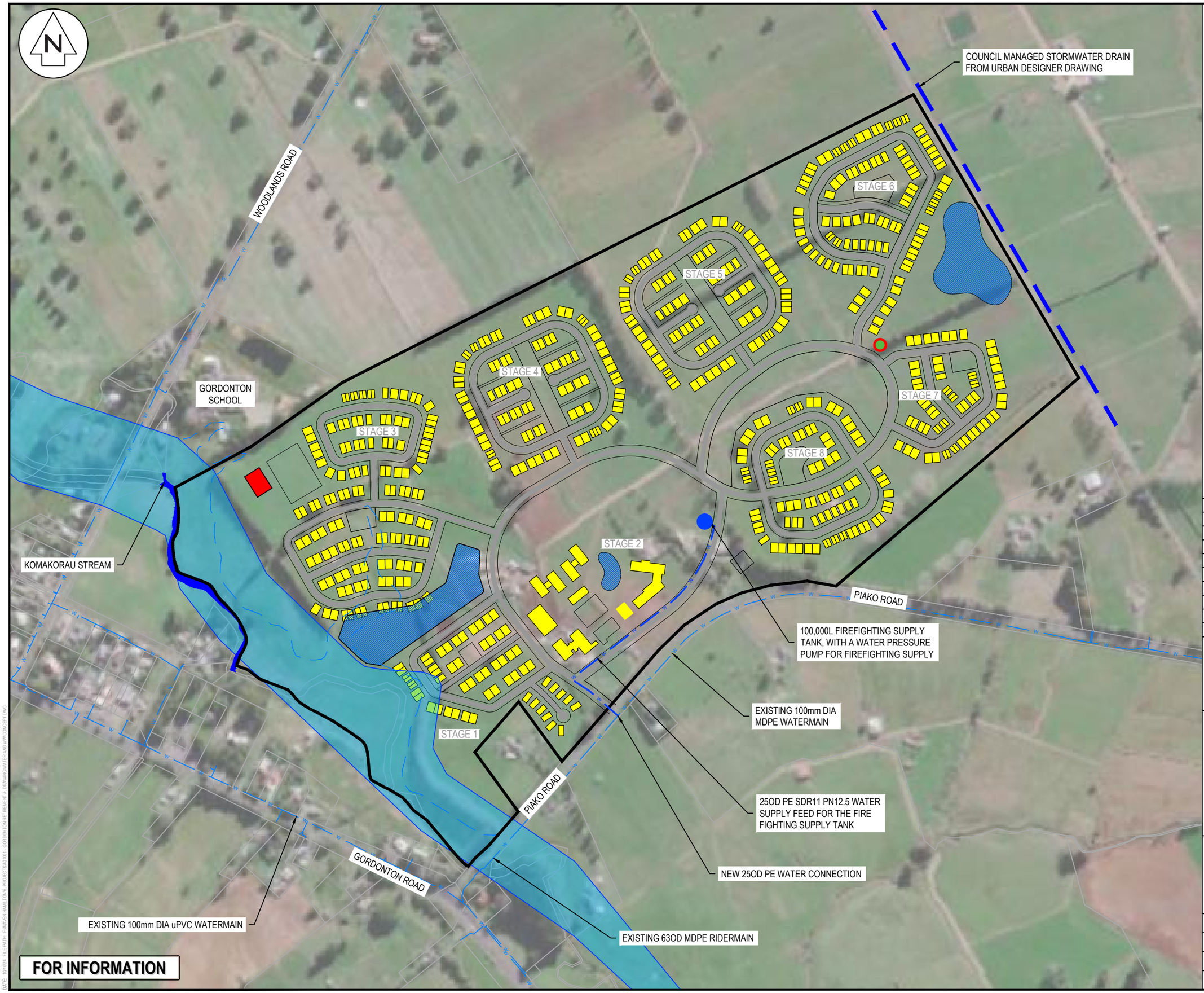

NOTES:

1. FIREFIGHTING RETICULATION WATERMAINS ARE TO BE INSTALLED THROUGHOUT THE DEVELOPMENT, WITH FIRE HYDRANTS POSITIONED WITH A MAXIMUM DISTANCE OF 135m FROM ANY BUILDING.
2. EACH RETIREMENT VILLAGE UNIT WILL HAVE A 22,000L ROOF WATER TANK FOR PORTABLE WATER SUPPLY.

- 100YR INDICATIVE RIVER FLOOD EXTENTS
- FIREFIGHTING SUPPLY TANK
- WASTEWATER PUMP STATION
- ONSITE WASTEWATER TREATMENT PLANT
- ROADS
- PROPOSED WATERMAIN
- EXISTING WATERMAIN

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Project
RETIREMENT VILLAGE GORDONTON 57 PIAKO ROAD FOR BARKER

Title
PROPOSED WATER SUPPLY CONCEPT PLAN

Project no.	401001		
Scale	1:5000 @ A3		
Cad file	WATER AND WW CONCEPT.DWG		
Drawing no.	C600	Rev	B

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Appendix B – Service Provisions

Your Ref: GRV

21 June 2024

Tim Hawke
Maven Waikato Ltd
286 Victoria St
HAMILTON

Dear Tim

RE: PROPOSED SUBDIVISION – GORDONTON RETIREMENT VILLAGE, PIAKO ROAD, GORDONTON

Thank you for your enquiry regarding the power availability for the proposed subdivision of the area known as GRV on Piako Road.

We have investigated the electricity supply requirements for the above proposed subdivision and we are able to supply the electrical reticulation.

In order for us to give clearance to the Waikato District Council it will be necessary for the power to be extended to the boundary of all lots.

If you wish us to proceed with pricing for the installation of the electrical reticulation please contact us at www.wel.co.nz/get-connected/subdivision . Please attach this consent letter with your application.

We thank you for your enquiry. If you have any further queries or require additional information, please do not hesitate to contact me.

Yours faithfully

Miranda McLean
PROJECT MANAGER

Lightwire Limited
103 London Street
Level 1, Urban Homes building
Hamilton

MAVEN WAIKATO LIMITED
07 242 0616 | 027 298 7762
Timh@maven.co.nz
www.maven.co.nz
Level 1, 286 Victoria Street, Hamilton Central

21st June 2024

Dear Tim

Re: Proposed Subdivision – **Gordonton Retirement Village (GRV)**

Lightwire Limited is pleased to inform you that as of 21st June 2024 we can provide fiber telecommunications services to Gordonton Retirement Village (GRV) at 57 Piako Road, Gordonton.

Telecommunications services may be supplied from our Woodlands / Garfield Central office cabinet location. We currently have back haul infrastructure available at this site to subscribe 800+ connections.

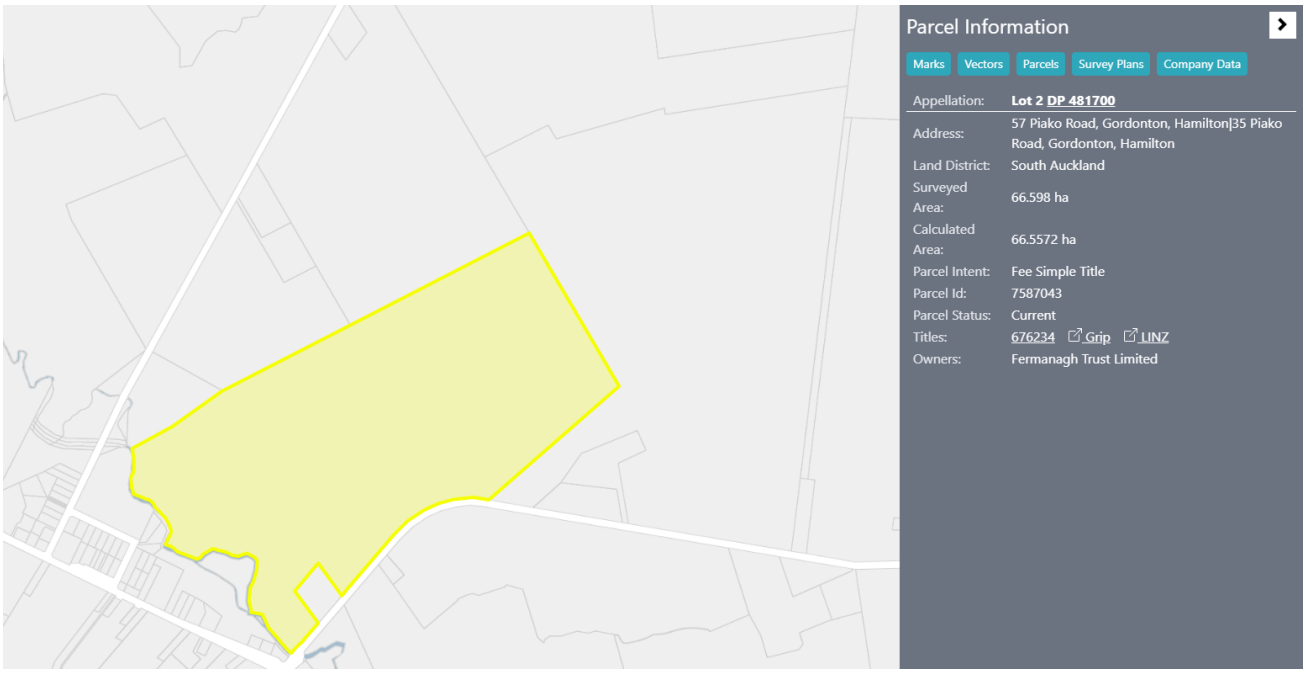
We note that (i) the contribution required from you towards reticulation of the development, and (ii) our ability to connect the subdivision to the Lightwire network, may (in each case) change over time depending on the availability of the Lightwire network in the relevant area.

If you decide that you wish to connect this subdivision to Lightwire's services, you will need to contact Lightwire [including reference to where contact details can be found]. At that time, we will provide you with a full contract, including confirmation of the contribution payable.

Yours sincerely,

Mike Cook
Head of Rural
Lightwire Limited

Lightwire


Parcel Information
Marks
Vectors
Parcels
Survey Plans
Company Data
Appellation: Lot 2 DP 481700
Address: 57 Piako Road, Gordonton, Hamilton|35 Piako Road, Gordonton, Hamilton
Land District: South Auckland
Surveyed Area: 66.598 ha
Calculated Area: 66.5572 ha
Parcel Intent: Fee Simple Title
Parcel Id: 7587043
Parcel Status: Current
Titles: 676234 Grip LINZ
Owners: Fermanagh Trust Limited

Appendix C – Stormwater Calculations

Maven Associates Ltd.	Job Number 401001	Sheet 1	Rev A
Job Title 57 PIAKO ROAD Calc Title Pre-development Catchment A	Author TH	Date 11/07/2024	Checked DJM

1. Runoff Curve Number (CN) and initial Abstraction (Ia)

Soil name and classification	Cover description (cover type, treatment, and hydrologic condition)	Curve Number CN*	Area (ha) 10000m2=1ha	Product of CN x area
C	Open Space (Sandy Loam or Silty Loam)	74	37.65	2786.10
* from Appendix B		Totals =	37.65	2786.10

WQV

CN (weighted) = total product / total area = 2786.10 / 37.650 = 74.0

Ia (weighted) = 5 x pervious area / total area = 5 x 37.650 / 37.650 = 5.0 mm

2. Time of Concentration

Channelisation factor C = 1 (From Table 4.2) natural channels

Catchment length L = 0.9 km (along drainage path)

Catchment Slope Sc= 0.001 m/m (by equal area method)

Runoff factor, CN / (200 - CN) = 74.0 / (200- 74.0) = 0.59

$t_c = 0.14\ C\ L^{0.66}\ (CN/200\text{-}CN)^{-0.55}\ Sc^{-0.30}$

= 0 1 0.93 1.34 7.94 = 1.390 hrs

SCS Lag for HEC-HMS…. $t_p = 2/3\ t_c$ = 0.931 hrs

OK
use
0.93 hrs

Worksheet 1: Runoff Parameters and Time of Concentration

Maven Associates Ltd.		Job Number 401001	Sheet 4	Rev A
Job Title	57 PIAKO ROAD	Author	Date	Checked
Calc Title	Pre-development Catchment A	TH	11/07/2024	DJM

1. Data

Catchment Area	A=	0.37650	km2(100ha =1km2)
Runoff curve number	CN=	74.0	(from worksheet 1)
Initial abstraction	Ia=	5.0	mm (from worksheet 1)
Time of concentration	tc=	0.931	hrs (from worksheet 1)

2. Calculate storage, S =(1000/CN - 10)25.4 = 89 mm

3. Average recurrence interval, ARI	100	(yr)
4. 24 hour rainfall depth, P24	149	(mm)
5. Compute c* = P24 - 2Ia/P24 - 2Ia+2S	0.438	
6. Specific peak flow rate q*	0.059	
7. Peak flow rate, $q_p=q^*A^*P_{24}$	**3.310**	(m3/s)
8. Runoff depth, $Q_{24} = (P_{24}-Ia)^2/(P_{24}-Ia)+S$	88.9	
9. Runoff volume, $V_{24} = 1000xQ_{24}A$	33471.94	(m3)

NO CLIMATE CHANGE

Worksheet 2: Graphical Peak Flow Rate

Maven Associates Ltd.		Job Number 401001	Sheet 5	Rev A
Job Title	57 PIAKO ROAD, GORDONTON	Author	Date	Checked
Calc Title	Post-development Catchment A	TH	11/07/2024	DJM

1. Runoff Curve Number (CN) and initial Abstraction (Ia)

Soil name and classification	Cover description (cover type, treatment, and hydrologic condition)	Curve Number CN*	Area (ha) 10000m2=1ha	Product of CN x area
C	Road	98	11.30	1106.91
C	Open space - Good condition (grass cover >75%)	74	9.22	682.58
C	Residential District (65% IMPERVIOUS)	90	17.13	1541.79
* from Appendix B		Totals =	37.65	3331.28

CN (weighted) = total product / total area = 3331.28 / 37.650 = 88.5

Ia (weighted) = 5 x pervious area / total area = 5 x 9.22 / 37.65 = 1.2 mm

2. Time of Concentration

Channelisation factor C = 0.6 (From Table 4.2) piped

Catchment length L = 0.9 km (along drainage path)

Catchment Slope Sc= 0.001 m/m (by equal area method)

Runoff factor, CN / (200 - CN) = 88.5 / (200- 88.5) = 0.79

$t_c = 0.14\ C\ L^{0.66}\ (CN/200\text{-}CN)^{-0.55}\ Sc^{-0.30}$

= 0.1 0.6 0.93 1.14 7.94 = 0.707 hrs

SCS Lag for HEC-HMS…. $t_p = 2/3\ t_c$ = 0.474 hrs

OK use 0.474 hrs

Worksheet 1: Runoff Parameters and Time of Concentration

Maven Associates Ltd	Job Number 401001	Sheet 8	Rev A
Job Title 57 PIAKO ROAD Calc Title Post-development Catchment A	Author TH	Date 11/07/2024	Checked DJM

1. Data

Catchment Area	A=	0.3765	km2(100ha =1km2)	
Runoff curve number	CN=	88.5	(from worksheet 1)	
Initial abstraction	Ia=	1.2	mm (from worksheet 1)	
Time of concentration	tc=	0.474	hrs (from worksheet 1)	

2. Calculate storage, S =(1000/CN - 10)25.4 = 33 mm

3.	Average recurrence interval, ARI	100	(yr)	
4.	24 hour rainfall depth, P24	170	(mm)	
5.	Compute c* = P24 - 2Ia/P24 - 2Ia+2S	0.717		
6.	Specific peak flow rate q*	0.108		*HEC-HMS Check*
7.	Peak flow rate, $q_p=q^*A^*P_{24}$	**6.913**		**2.648** 80% Pre
8.	Runoff depth, $Q_{24} = (P_{24}-Ia)^2/(P_{24}-Ia)+S$	141.1		
9.	Runoff volume, $V_{24} = 1000xQ_{24}A$	53132.83	(m3)	

Pre development run off volume	**33471.94**	(m3)
Post development run off volume	**53132.83**	(m3)
Pre development flow rate	**3.31**	(m3/s)
Post development flow rate	**6.91**	(m3/s)
Detention Volume Required	**19660.89**	(m3)
Required pond base area (assumed 1.5m depth)	13107.26	(m2)

Worksheet 2: Graphical Peak Flow Rate

Maven Associates Ltd.	Job Number 401001	Sheet 1	Rev A
Job Title 57 PIAKO ROAD Calc Title Pre-development Catchment B	Author TH	Date 11/07/2024	Checked DJM

1. Runoff Curve Number (CN) and initial Abstraction (Ia)

Soil name and classification	Cover description (cover type, treatment, and hydrologic condition)	Curve Number CN*	Area (ha) 10000m2=1ha	Product of CN x area
C	Open Space (Sandy Loam or Silty Loam)	74	28.90	2138.60
* from Appendix B		Totals =	28.90	2138.60

WQV

CN (weighted) = total product / total area = 2138.60 / 28.900 = 74.0

Ia (weighted) = 5 x pervious area / total area = 5 x 28.900 / 28.900 = 5.0 mm

2. Time of Concentration

Channelisation factor C = 1 (From Table 4.2) natural channels

Catchment length L = 0.75 km (along drainage path)

Catchment Slope Sc= 0.001 m/m (by equal area method)

Runoff factor, CN / (200 - CN) = 74.0 / (200- 74.0) = 0.59

$t_c = 0.14\ C\ L^{0.66}\ (CN/200\text{-}CN)^{-0.55}\ Sc^{-0.30}$

= 0 1 0.83 1.34 7.94 = 1.233 hrs

SCS Lag for HEC-HMS…. $t_p = 2/3\ t_c$ = 0.826 hrs

OK
use
0.83 hrs

Worksheet 1: Runoff Parameters and Time of Concentration

Maven Associates Ltd.		Job Number 401001	Sheet 4	Rev A
Job Title	57 PIAKO ROAD	Author	Date	Checked
Calc Title	Pre-development Catchment B	TH	11/07/2024	DJM

1. Data

Catchment Area	A=	0.28900	km2(100ha =1km2)
Runoff curve number	CN=	74.0	(from worksheet 1)
Initial abstraction	Ia=	5.0	mm (from worksheet 1)
Time of concentration	tc=	0.826	hrs (from worksheet 1)

2. Calculate storage, S =(1000/CN - 10)25.4 = 89 mm

3. Average recurrence interval, ARI	100	(yr)
4. 24 hour rainfall depth, P24	149	(mm)
5. Compute c* = P24 - 2Ia/P24 - 2Ia+2S	0.438	
6. Specific peak flow rate q*	0.061	
7. Peak flow rate, $q_p=q^*A^*P_{24}$	**2.627**	(m3/s)
8. Runoff depth, $Q_{24} = (P_{24}-Ia)^2/(P_{24}-Ia)+S$	88.9	
9. Runoff volume, $V_{24} = 1000xQ_{24}A$	25692.94	(m3)

NO CLIMATE CHANGE

Worksheet 2: Graphical Peak Flow Rate

Maven Associates Ltd.		Job Number 401001	Sheet 5	Rev A
Job Title	57 PIAKO ROAD, GORDONTON	Author	Date	Checked
Calc Title	Post-development Catchment B	TH	11/07/2024	DJM

1. Runoff Curve Number (CN) and initial Abstraction (Ia)

Soil name and classification	Cover description (cover type, treatment, and hydrologic condition)	Curve Number CN*	Area (ha) 10000m2=1ha	Product of CN x area
C	Road	98	8.67	849.66
C	Open space - Good condition (grass cover >75%)	74	7.08	523.92
C	Residential District (65% IMPERVIOUS)	90	13.15	1183.50
* from Appendix B		Totals =	28.90	2557.08

CN (weighted) = total product / total area = 2557.08 / 28.900 = 88.5

Ia (weighted) = 5 x pervious area / total area = 5 x 7.08 / 28.90 = 1.2 mm

2. Time of Concentration

Channelisation factor C = 0.6 (From Table 4.2) piped

Catchment length L = 0.75 km (along drainage path)

Catchment Slope Sc= 0.001 m/m (by equal area method)

Runoff factor, CN / (200 - CN) = 88.5 / (200- 88.5) = 0.79

$t_c = 0.14\ C\ L^{0.66}\ (CN/200\text{-}CN)^{-0.55}\ Sc^{-0.30}$

= 0.1 0.6 0.83 1.14 7.94 = 0.627 hrs

SCS Lag for HEC-HMS…. $t_p = 2/3\ t_c$ = 0.420 hrs

OK
use
0.420 hrs

Worksheet 1: Runoff Parameters and Time of Concentration

Maven Associates Ltd	Job Number 401001	Sheet 8	Rev A
Job Title 57 PIAKO ROAD Calc Title Post-development Catchment B	Author TH	Date 11/07/2024	Checked DJM

1. Data

Catchment Area	A=	0.2890	km2(100ha =1km2)	
Runoff curve number	CN=	88.5	(from worksheet 1)	
Initial abstraction	Ia=	1.2	mm (from worksheet 1)	
Time of concentration	tc=	0.420	hrs (from worksheet 1)	

2. Calculate storage, S =(1000/CN - 10)25.4 = 33 mm

3.	Average recurrence interval, ARI	100	(yr)	
4.	24 hour rainfall depth, P24	170	(mm)	
5.	Compute c* = P24 - 2Ia/P24 - 2Ia+2S	0.717		
6.	Specific peak flow rate q*	0.115		*HEC-HMS Check*
7.	Peak flow rate, $q_p=q^*A^*P_{24}$	**5.650**		**2.101** 80% Pre
8.	Runoff depth, $Q_{24} = (P_{24}-Ia)^2/(P_{24}-Ia)+S$	141.1		
9.	Runoff volume, $V_{24} = 1000xQ_{24}A$	40784.69	(m3)	

Pre development run off volume	**25692.94**	(m3)
Post development run off volume	**40784.69**	(m3)
Pre development flow rate	**2.63**	(m3/s)
Post development flow rate	**5.65**	(m3/s)
Detention Volume Required	**15091.75**	(m3)
Required pond base area (assumed 1.5m depth)	10061.17	(m2)

Worksheet 2: Graphical Peak Flow Rate

Appendix D – Wastewater Calculations

Maven Associates	Job Number	Sheet	Rev
	401004	1	A

Job Title	Gordonton Retirement Village	Author	Date	Checked
Calc Title	Stage 1 - WW Demand	TCH	18/06/2024	DJM

As per Waikato Local Authority RITS standards

Domestic Average Daily Flow (Water Consumption)=	200	*l/person/day*
Infiltration Allowance=	2,250	*l/Ha/day*
Surface Water Ingress=	16,500	*l/Ha/day*

No. of retirement units =	**44**	
Catchment area =	**7.3**	*Ha*
Total Population	88	
Wastewater Peaking factor =	2.5	

Using a population value person (max development scenario)

Average Daily Flow (ADF)=	34.03	m^3/day
Peak Daily Flow (PDF)=	0.70	*L/sec*
Peak Wet Weather Flow (PWWF)=	**2.09**	*L/sec*

Pipe Ks (uPVC) = 0.60

PWW Flow *l/s*	Pipe dia *m*	Gradient *%*	Capacity *l/s*	Velocity *m/s*	Check *OK*
2.093	0.15	1.00	**17.96**	1.02	OK

Maven Associates	Job Number	Sheet	Rev
	401004	2	A

		Author	Date	Checked
Job Title	Gordonton Retirement Village			
Calc Title	Stage 2 - WW Demand	TCH	18/06/2024	DJM

As per Waikato Local Authority RITS standards

Domestic Average Daily Flow (Water Consumption)=	200	*l/person/day*
Infiltration Allowance=	2,250	*l/Ha/day*
Surface Water Ingress=	16,500	*l/Ha/day*

No. of retirement units =	**60**	
Catchment area =	**7.9**	*Ha*
Total Population	120	
Wastewater Peaking factor =	2.5	

Using a population value person (max development scenario)

Average Daily Flow (ADF)=	41.78	m^3/day
Peak Daily Flow (PDF)=	0.90	*L/sec*
Peak Wet Weather Flow (PWWF)=	**2.41**	*L/sec*

Pipe Ks (uPVC) = 0.60

PWW Flow *l/s*	Pipe dia *m*	Gradient *%*	Capacity *l/s*	Velocity *m/s*	Check *OK*
2.409	0.15	1.00	**17.96**	1.02	OK

Maven Associates	Job Number	Sheet	Rev
	401004	3	A

		Author	Date	Checked
Job Title	Gordonton Retirement Village			
Calc Title	Stage 3 - WW Demand	TCH	18/06/2024	DJM

As per Waikato Local Authority RITS standards

Domestic Average Daily Flow (Water Consumption)=	200	*l/person/day*
Infiltration Allowance=	2,250	*l/Ha/day*
Surface Water Ingress=	16,500	*l/Ha/day*

No. of retirement units =	**138**	
Catchment area =	**14.9**	*Ha*
Total Population	276	
Wastewater Peaking factor =	2.5	

Using a population value person (max development scenario)

Average Daily Flow (ADF)=	88.73	m^3/day
Peak Daily Flow (PDF)=	1.99	*L/sec*
Peak Wet Weather Flow (PWWF)=	**4.83**	*L/sec*

Pipe Ks (uPVC) = 0.60

PWW Flow *l/s*	Pipe dia *m*	Gradient *%*	Capacity *l/s*	Velocity *m/s*	Check *OK*
4.831	0.15	1.00	**17.96**	1.02	OK

Maven Associates	Job Number	Sheet	Rev
	401004	4	A

		Author	Date	Checked
Job Title	Gordonton Retirement Village			
Calc Title	Stage 4 - WW Demand	TCH	18/06/2024	DJM

As per Waikato Local Authority RITS standards

Domestic Average Daily Flow (Water Consumption)=	200	*l/person/day*
Infiltration Allowance=	2,250	*l/Ha/day*
Surface Water Ingress=	16,500	*l/Ha/day*

No. of retirement units =	**138**	
Catchment area =	**9.3**	*Ha*
Total Population	276	
Wastewater Peaking factor =	2.5	

Using a population value person (max development scenario)

Average Daily Flow (ADF)=	76.13	m^3/day
Peak Daily Flow (PDF)=	1.84	*L/sec*
Peak Wet Weather Flow (PWWF)=	**3.62**	*L/sec*

Pipe Ks (uPVC) = 0.60

PWW Flow *l/s*	Pipe dia *m*	Gradient *%*	Capacity *l/s*	Velocity *m/s*	Check *OK*
3.615	0.15	1.00	**17.96**	1.02	OK

Maven Associates	Job Number	Sheet	Rev
	401004	5	A

		Author	Date	Checked
Job Title	Gordonton Retirement Village			
Calc Title	Stage 5 - WW Demand	TCH	18/06/2024	DJM

As per Waikato Local Authority RITS standards

Domestic Average Daily Flow (Water Consumption)=	200	*l/person/day*
Infiltration Allowance=	2,250	*l/Ha/day*
Surface Water Ingress=	16,500	*l/Ha/day*

No. of retirement units =	**124**	
Catchment area =	**8.9**	*Ha*
Total Population	248	
Wastewater Peaking factor =	2.5	

Using a population value person (max development scenario)

Average Daily Flow (ADF)=	69.63	m^3/day
Peak Daily Flow (PDF)=	1.67	*L/sec*
Peak Wet Weather Flow (PWWF)=	**3.37**	*L/sec*

Pipe Ks (uPVC) = 0.60

PWW Flow *l/s*	Pipe dia *m*	Gradient *%*	Capacity *l/s*	Velocity *m/s*	Check *OK*
3.367	0.15	1.00	**17.96**	1.02	OK

Maven Associates	Job Number	Sheet	Rev
	401004	6	A

		Author	Date	Checked
Job Title	Gordonton Retirement Village			
Calc Title	Stage 6 - WW Demand	TCH	18/06/2024	DJM

As per Waikato Local Authority RITS standards

Domestic Average Daily Flow (Water Consumption)=	200	*l/person/day*
Infiltration Allowance=	2,250	*l/Ha/day*
Surface Water Ingress=	16,500	*l/Ha/day*

No. of retirement units =	**111**	
Catchment area =	**8**	*Ha*
Total Population	222	
Wastewater Peaking factor =	2.5	

Using a population value person (max development scenario)

Average Daily Flow (ADF)=	62.85	m^3/day
Peak Daily Flow (PDF)=	1.50	*L/sec*
Peak Wet Weather Flow (PWWF)=	**3.06**	*L/sec*

Pipe Ks (uPVC) = 0.60

PWW Flow *l/s*	Pipe dia *m*	Gradient *%*	Capacity *l/s*	Velocity *m/s*	Check *OK*
3.064	0.15	1.00	**17.96**	1.02	OK

Maven Associates	Job Number	Sheet	Rev
	401004	7	A

Job Title	Gordonton Retirement Village	Author	Date	Checked
Calc Title	Stage 7 - WW Demand	TCH	18/06/2024	DJM

As per Waikato Local Authority RITS standards

Domestic Average Daily Flow (Water Consumption)=	200	*l/person/day*
Infiltration Allowance=	2,250	*l/Ha/day*
Surface Water Ingress=	16,500	*l/Ha/day*

No. of retirement units =	**68**	
Catchment area =	**4.5**	*Ha*
Total Population	136	
Wastewater Peaking factor =	2.5	

Using a population value person (max development scenario)

Average Daily Flow (ADF)=	37.33	m^3/day
Peak Daily Flow (PDF)=	0.90	*L/sec*
Peak Wet Weather Flow (PWWF)=	**1.76**	*L/sec*

Pipe Ks (uPVC) = 0.60

PWW Flow *l/s*	Pipe dia *m*	Gradient *%*	Capacity *l/s*	Velocity *m/s*	Check *OK*
1.764	0.15	1.00	**17.96**	1.02	OK

Maven Associates	Job Number	Sheet	Rev
	401004	8	A

Job Title	Gordonton Retirement Village	Author	Date	Checked
Calc Title	Stage 8 - WW Demand	TCH	18/06/2024	DJM

As per Waikato Local Authority RITS standards

Domestic Average Daily Flow (Water Consumption)=	200	*l/person/day*
Infiltration Allowance=	2,250	*l/Ha/day*
Surface Water Ingress=	16,500	*l/Ha/day*

No. of retirement units =	**117**	
Catchment area =	**6.9**	*Ha*
Total Population	234	
Wastewater Peaking factor =	2.5	

Using a population value person (max development scenario)

Average Daily Flow (ADF)=	62.33	m^3/day
Peak Daily Flow (PDF)=	1.53	*L/sec*
Peak Wet Weather Flow (PWWF)=	**2.85**	*L/sec*

Pipe Ks (uPVC) = 0.60

PWW Flow *l/s*	Pipe dia *m*	Gradient *%*	Capacity *l/s*	Velocity *m/s*	Check *OK*
2.852	0.15	1.00	**17.96**	1.02	OK

Appendix E – Water Supply Calculations

Maven Associates		Job Number 401001	Sheet 1	Rev A
Job Title	Gordonton Retirement Village	Author	Date	Checked
Calc Title	Stage 1 Water Demand	TCH	18/06/2024	DJM

Water Catchment

As per RITS Standard 6.2.3

	2	People per Unit
Demand	260	l/person/day

Demand Rates

Average Demand =	260	litres/person/day
Peak Demand (5x) =	1300	litres/person/day

Population	Units	People	Occupancy
Retirement Village Units	44	2	88
Total			88

Demand	Persons	Rate l/p/day	Flow l/s
AD Water	88	260	0.26
PD Water	88	1300	1.32

Peak Demand	Persons	Rate l/p/day	Flow l/s
PD Water	88	1300	**1.32**

Maven Associates		Job Number 401001	Sheet 2	Rev A
Job Title	Gordonton Retirement Village	Author	Date	Checked
Calc Title	Stage 2 Water Demand	TCH	18/06/2024	DJM

Water Catchment

As per RITS Standard 6.2.3

	2	People per Unit
Demand	260	l/person/day

Demand Rates

Average Demand =	260	litres/person/day
Peak Demand (5x) =	1300	litres/person/day

Population	Units	People	Occupancy
Retirement Village Apartment Units	60	2	120
Total			120

Demand	Persons	Rate l/p/day	Flow l/s
AD Water	120	260	0.36
PD Water	120	1300	1.81

Peak Demand	Persons	Rate l/p/day	Flow l/s
PD Water	120	1300	**1.81**

Maven Associates		Job Number 401001	Sheet 3	Rev A
Job Title	Gordonton Retirement Village	Author	Date	Checked
Calc Title	Stage 3 Water Demand	TCH	18/06/2024	DJM

Water Catchment

As per RITS Standard 6.2.3

	2	People per Unit
Demand	260	l/person/day

Demand Rates

Average Demand =	260	litres/person/day
Peak Demand (5x) =	1300	litres/person/day

Population	Units	People	Occupancy
Retirement Village Units	138	2	276
Total			276

Demand	Persons	Rate l/p/day	Flow l/s
AD Water	276	260	0.83
PD Water	276	1300	4.15

Peak Demand	Persons	Rate l/p/day	Flow l/s
PD Water	276	1300	**4.15**

Maven Associates		Job Number 401001	Sheet 4	Rev A
Job Title	Gordonton Retirement Village	Author	Date	Checked
Calc Title	Stage 4 Water Demand	TCH	18/06/2024	DJM

Water Catchment

As per RITS Standard 6.2.3

	2	People per Unit
Demand	260	l/person/day

Demand Rates

Average Demand =	260	litres/person/day
Peak Demand (5x) =	1300	litres/person/day

Population	Units	People	Occupancy
Retirement Village Units	138	2	276
Total			276

Demand	Persons	Rate l/p/day	Flow l/s
AD Water	276	260	0.83
PD Water	276	1300	4.15

Peak Demand	Persons	Rate l/p/day	Flow l/s
PD Water	276	1300	**4.15**

Maven Associates		Job Number 401001	Sheet 5	Rev A
Job Title	Gordonton Retirement Village	Author	Date	Checked
Calc Title	Stage 5 Water Demand	TCH	18/06/2024	DJM

Water Catchment

As per RITS Standard 6.2.3

	2	People per Unit
Demand	260	l/person/day

Demand Rates

Average Demand =	260	litres/person/day
Peak Demand (5x) =	1300	litres/person/day

Population	Units	People	Occupancy
Retirement Village Units	124	2	248
Total			248

Demand	Persons	Rate l/p/day	Flow l/s
AD Water	248	260	0.75
PD Water	248	1300	3.73

Peak Demand	Persons	Rate l/p/day	Flow l/s
PD Water	248	1300	**3.73**

Maven Associates		Job Number 401001	Sheet 6	Rev A
Job Title	Gordonton Retirement Village	Author	Date	Checked
Calc Title	Stage 6 Water Demand	TCH	18/06/2024	DJM

Water Catchment

As per RITS Standard 6.2.3

	2	People per Unit
Demand	260	l/person/day

Demand Rates

Average Demand =	260	litres/person/day
Peak Demand (5x) =	1300	litres/person/day

Population	Units	People	Occupancy
Retirement Village Units	111	2	222
Total			222

Demand	Persons	Rate l/p/day	Flow l/s
AD Water	222	260	0.67
PD Water	222	1300	3.34

Peak Demand	Persons	Rate l/p/day	Flow l/s
PD Water	222	1300	**3.34**

Maven Associates		Job Number 401001	Sheet 7	Rev A
Job Title	Gordonton Retirement Village	Author	Date	Checked
Calc Title	Stage 7 Water Demand	TCH	18/06/2024	DJM

Water Catchment

As per RITS Standard 6.2.3

	2	People per Unit
Demand	260	l/person/day

Demand Rates

Average Demand =	260	litres/person/day
Peak Demand (5x) =	1300	litres/person/day

Population	Units	People	Occupancy
Retirement Village Units	68	2	136
Total			136

Demand	Persons	Rate l/p/day	Flow l/s
AD Water	136	260	0.41
PD Water	136	1300	2.05

Peak Demand	Persons	Rate l/p/day	Flow l/s
PD Water	136	1300	**2.05**

Maven Associates		Job Number 401001	Sheet 8	Rev A
Job Title	Gordonton Retirement Village	Author	Date	Checked
Calc Title	Stage 8 Water Demand	TCH	18/06/2024	DJM

Water Catchment

As per RITS Standard 6.2.3

	2	People per Unit
Demand	260	l/person/day

Demand Rates

Average Demand =	260	litres/person/day
Peak Demand (5x) =	1300	litres/person/day

Population	Units	People	Occupancy
Retirement Village Units	117	2	234
Total			234

Demand	Persons	Rate l/p/day	Flow l/s
AD Water	234	260	0.70
PD Water	234	1300	3.52

Peak Demand	Persons	Rate l/p/day	Flow l/s
PD Water	234	1300	**3.52**

Appendix F – GWE Preliminary Geotech Report (Bound Separately)

Appendix G – Ecology Survey (Bound Separately)