

Legislative Requirements (i.e. District Plan / Standards / Design Guides)

The drainage and water supply infrastructure design requirements are covered by Wellington Water Ltd's Regional Standards for Water Services - May 2019 (RSWS), and the construction requirements are covered by Wellington Water Ltd's Regional Specification for Water Services May 2019.

Assessment:

Stormwater Quantity:

The WCC public stormwater network runs through the Site, see figure 2 below.



Figure 2 Existing Public Stormwater Network

The Proposed Village will increase the total impervious area of the Site from 1.84ha to 2.16ha with an overall impervious area of approximately 70.6% of the Site. The increase in impervious area (pre-development to post-development) is about 17.5% which will result in an increase of runoff from the Site.

During consultation meetings it was discussed and agreed with Wellington Water that any flood effects upstream or downstream of the Site will be managed with a practical on-site stormwater solution, that is capable of achieving neutrality for a 100 year Climate Change storm event (12 hour storm event with allowance for climate change as agreed with Wellington Water Modelling Team).

It was agreed with Woods (Ryman's Engineering Consultants) that the on-site stormwater management solution would:

- Not increase flooding upstream or downstream along the overland flow paths/flood extents of the Site compared to base case in terms of flood levels and/or flood extents.
- Provide for flows to the stormwater network that would not result in increased flooding downstream with manholes spilling more than base case in terms of flood levels and/or flood extents.

Woods was provided with Wellington Water's Karori Stormwater catchment model. Wellington Water's model was updated in consultation with Wellington Water and the updated model used as the base to undertake an effects assessment in terms of flood risk. The post-development model has been developed to include the proposed terrain and landform/ land use changes proposed within the Site.

Flood modelling concluded that:

- There is no flood risk to the Proposed Village within the Site for all the scenarios modelled;
- There is no increased flood risk to properties upstream or downstream of the Site for all the scenarios modelled;
- The flood storage solution works as expected resulting in no increased water levels or flood extents in neighbouring properties with significant benefits along Donald Street and minor improvements along Campbell Street;
- The modelling undertaken confirms that flood storage of approximately 1,275m³ is required for mitigation for the 100-year with climate change 12-hour duration storm event. However, the volume of the configuration proposed is 1,400m³, which exceeds the required flood storage.
- The modelling has shown that the proposed solution will achieve hydraulic neutrality for the 10-year and 100-year events, therefore there will be no offsite adverse quantity effects. This includes all offsite infrastructure such as culverts, bridges and private property, roads and reserves.

Therefore, the applicant has demonstrated that the proposed development can achieve the agreed stormwater management requirements. These requirements will be included as advice notes. The proposed detention system will be privately owned and operated, and advice notes will detail the need for ongoing maintenance requirements.

The proposed layout of stormwater infrastructure (see Figure 3 on the following page) has been designed to avoid buildings where possible, however there are several areas where it is not possible to entirely avoid passing under buildings, including:

- The existing 1200mm pipe that will remain under Buildings B02 and B03 as there is no other feasible route for this pipe;
- The new 1500mm diversion of the line entering the Site from Scapa Terrace that will pass under a carpark and courtyard located between Buildings B04 and B05, the alternative is a crossing under a main building;
- The existing 375mm pipe at the northern end of the Site currently passes under an existing building. The existing building is to be demolished and replaced with Building B01A. It is not feasible to realign this pipe to avoid the proposed building, therefore it will be lowered to provide clearance to foundations.



Figure 3 Proposed stormwater network

Advice notes shall cover the requirement for the detailed design any proposed pipes under buildings requiring Wellington Water acceptance.

Stormwater Quality:

There are a total of 230 car parks proposed within the Site. While 190 of these carparks are under cover the associated accessways are not, therefore the propose carparks are considered to be a high contaminant generating zone. To ensure adverse effects in the receiving environment are no more than minor, stormwater being discharged off the carparks including associated accessways (manoeuvring, entries and exits) requires treatment for contaminants including sediment, copper and zinc. Advice notes shall detail this requirement.

As noted above the proposed development will increase the impervious area (pre-development to post- development) of the Site by approximately 17.5%. This change in imperviousness lead to increases in peak flow, runoff volume and frequency of runoff from the Site. The key to treating this is hydrological mitigation, minimising changes between post development and pre-development frequency, velocity and volume. If not managed both these effects can have detrimental impacts on downstream ecological and cultural values. Advice notes shall detail this requirement.

The applicant has indicated that building materials will be carefully selected, so to ensure that the use of materials that have the potential to harm and/or pollute waterways is avoided (e.g. unpainted zinc or copper cladding or roofing). Advice notes shall detail this requirement.

Wastewater

The WCC public stormwater network runs through the Site, see figure 4 below.

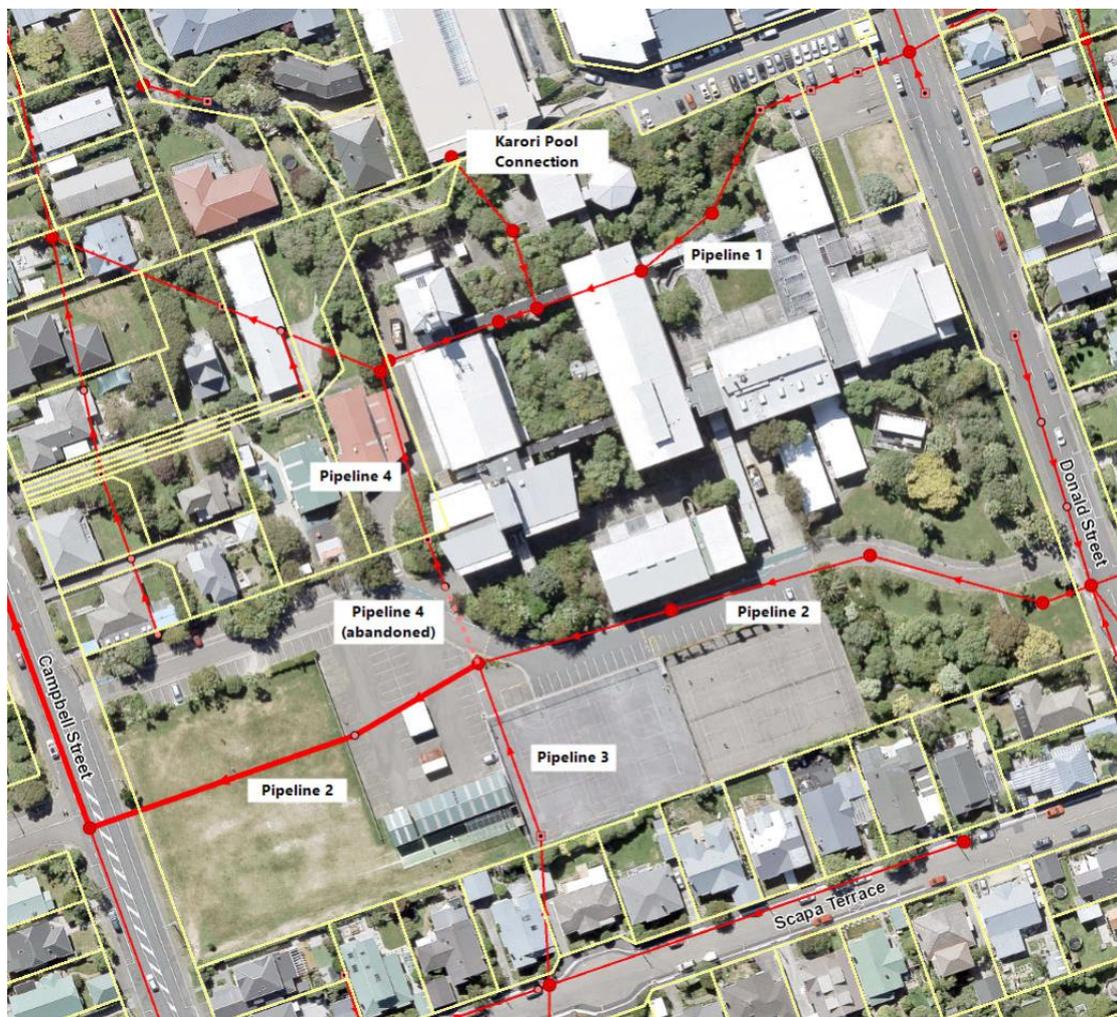


Figure 4 Existing wastewater network on the Site

Ryman has collected historic information on occupancy rates and wastewater loads for this type of village. Domestic sewer loads are on average 160 litres/resident/day,

with a peaking factor of 3, based on information that has been collected by Ryman on sewer loads for its operational comprehensive care retirement villages. This includes allowance for all core functions such as kitchens, common rooms and staff usage.

These figures are less than the domestic flowrates specified in the RSWS and in response to a further information request Ryman supplied the used to support these design figures. This supporting information has been reviewed and accepted by Wellington Water's Chief Advisor for Wastewater.

Wellington Water provided Woods flow data from their Karori WWTP 2017 (current) model for the 1-year Long Time Series (LTS) design event. Based on Ryman's flowrates the peak flowrate from the proposed development is 2.0 l/s which is less than the current peak flowrate from the Site allowed for in the Wellington Water model.

While Wellington Water's Karori WWTP model indicates that the local network has 1 l/s spare capacity it also shows that the trunk network that are already over their design capacity during a 1-year LTS design event with overflows of over 50m³ and 500m³ occurring into the Karori Stream at engineered overflows. Hence the wastewater generated by the development of this Site will require careful consideration at Engineering Approval stage as on site wastewater detention maybe required.

The Site has existing gravity sewer lines that convey wastewater from upstream catchments through the Site. These lines also convey the wastewater from the existing buildings on the Site. The existing lines will need to be realigned through the Site to avoid buildings and underground services where possible, see Figure 5 below.

There is no feasible option to divert pipeline 1 around Building B01A, therefore the line will be lowered to avoid the foundations of this building. This is an improvement over the existing scenario where the line passes under two existing buildings.

Pipeline 3 will be realigned to avoid the new Building B04, this will involve passing below a carpark with a courtyard above. This is the best practical solution to avoid the building.

The realigned gravity pipelines have the capacity to convey PWWF from the upstream catchment as well as the Proposed Village to meet the requirements of Wellington Water.

Advice notes shall cover the requirement for the detailed design any proposed pipes under buildings requiring Wellington Water acceptance.

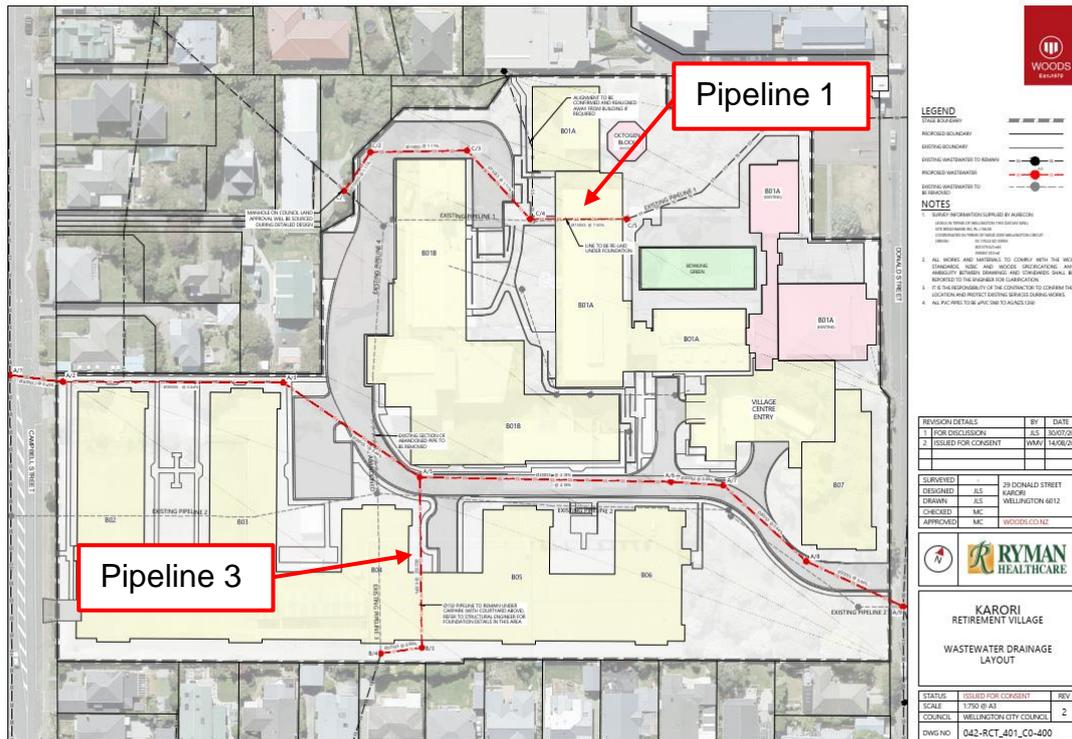


Figure 5 Proposed public wastewater network on Site.

Water Supply

There is no public water supply network running through the Site.

As with the wastewater, Ryman has collected historic information on occupancy rates, water demands for this type of village. Domestic water supply demand loads are on average 200 litres/resident/day, with a peaking factor of 3, based on information that has been collected by Ryman on water supply demands for its operational comprehensive care retirement villages. This includes allowance for all core functions such as kitchens, common rooms and staff usage.

These figures are less than the domestic flowrates specified in the RSWS and in response to a further information request Ryman supplied the used to support these design figures. This supporting information has been reviewed and accepted by Wellington Water’s Chief Advisor for Water Supply.

It is proposed to provide two new connections to the Site from the 150mm main on Donald Street. The first connection will provide the potable supply and fire hydrants within the Site. The second connection will be a dedicated supply for fire protection sprinklers. Both connections will be provided with backflow preventors near the Donald Street boundary and all reticulation within the Site will be privately owned by Ryman.

Based on measured hydrant flow and pressure readings Woods have demonstrated using a hydraulic model that compliance with RSWS, which includes compliance with the New Zealand Fire Service Firefighting Water Supplies Code of Practice.

General

Any infrastructure to be vested with Council will need to be designed and built to the RSWS and the Regional Specification for Water Services. The consent conditions shall detail this requirement and that detailed design documentation be provided.

Conclusion:

Based on the above assessment the proposal **is** supported on public drainage and water supply infrastructure grounds subject to the inclusion of following Advice Notes.

Suggested Advice Notes

Engineering Standards

1. The consent holder will be required to comply with the requirements of the Wellington City Council Code of Practice for Land Development (either its current version or replacement document), unless otherwise modified by condition(s) of the consent or agreed in writing by the Wellington Water Land Development Team. These are the engineering standards for mitigating adverse effects on the environment from earthworks, traffic (roading and vehicle access), wastewater and stormwater drainage, water supply and utility structures.
2. No construction shall start prior to the following engineering plans in relation to water supply, stormwater or wastewater drainage, being accepted in writing by the Wellington Water Land Development Team:
 - a. engineering plans and design certificate,
 - b. specifications
 - c. relevant draft commissioning, operational and maintenance documentation
 - d. The application for engineering plans must be accompanied by a Wastewater Management Report, prepared and certified by a Chartered Professional Engineer, which as a minimum includes :.
 - i. identification of drainage catchment and drainage sub-catchment areas for the pre-development and post-development scenarios including a suitably scaled wastewater master plan showing the aforementioned catchment details including lawful point(s) of discharge, complying with the requirements of the Regional Standard for Water Services.

- ii. details of any proposed on-site detention / retention systems and associated outlet systems required to mitigate the impacts of the proposed development existing upstream and downstream drainage systems
- e. The application for engineering plans must be accompanied by a Stormwater Management Report, prepared and certified by a Chartered Professional Engineer, which as a minimum includes :
- i. identification of drainage catchment and drainage sub-catchment areas for the pre-development and post-development scenarios including a suitably scaled stormwater master plan showing the aforementioned catchment details including lawful point(s) of discharge, complying with the requirements of the Regional Standard for Water Services.
 - ii. an assessment of the peak discharges for all defined rainfall events up to 1%AEP including climate change for the pre-development and post-development scenarios.
 - iii. details of any proposed on-site detention / retention systems and associated outlet systems required to mitigate the impacts of the proposed development on downstream lands and existing upstream and downstream drainage systems;
 - iv. engineering design of all new drainage systems servicing the development, and modifications (if any) to existing drainage systems required to adequately manage stormwater collection and discharge from the proposed development;
 - v. identification of the area of land inundated (if any) as a consequence of the minor and major design storm events in the catchment for both the pre-development and post-development scenarios;
 - vi. All land proposed as major overland flow paths must be identified and provided with easements. The design shall demonstrate that all secondary flow paths proposed in the design can manage flows beyond the capacity of the primary stormwater system;
 - vii. details of all calculations, assumptions and data files (where applicable).

Where drainage works are required, permits in addition to this resource consent will be required namely:

- building consent for private drains, and
- Public drainage permit for all public drains

Scheme and other indicative layout plans that were submitted as part of the application will be used by Council for information purposes only. These plans will not be used for granting approval under the condition above. Approvals will only be given on detailed engineering plans.

3. The consent holder will be required to provide an appropriately sized metered water supply connection to the public main for domestic supply. An engraved plastic tag reading "WATER SUPPLY MANIFOLD FOR (Street No)" is to be secured to the manifold clearly showing which property is served by the manifold. A RPZ-type backflow preventer is required if the connection is greater than 20mm DI.
4. The consent holder will be required to provide for fire-fighting requirements in accordance with the NZ Fire Service Code of Practice for Firefighting Water Supplies NZS PAS 4509:2008. Calculations are to be provided by a suitably qualified engineer to certify that there is sufficient pressure and flow for the development to meet the Code of Practice for Land Development requirements. Calculations are to be based on pressure logging (seven day log) and flow readings taken from the nearest hydrant.
 - a. a separate application for the fire connection will be required to be submitted. Applications for fire service connections will be required to provide a copy of a flow test and pressure log (seven day log) along with supporting calculations conducted by a suitably qualified engineer as well as a detail layout plan showing the proposed connection. The design of the fire service connection and sprinkler system shall allow for any head loss incurred by the required backflow prevention containment device.
 - b. The consent holder will be required to provide all fire connections/sprinkler connections with a double check detector check backflow prevention containment device.
5. To avoid impact on the downstream network, stormwater neutrality is required for all events up to the 1% AEP event (1 in 100 year event). The Site will therefore be required to provide a stormwater management system(s). The stormwater management design will be required to be approved in writing by the Wellington Water Land Development Team and the following aspects must be met.
 - a. The owner of Site will be required at the time of construction, construct an approved stormwater management system or systems in

accordance with plans approved under the Building Consent and agreed with the Wellington Water Land Development Team.

- b. The stormwater management system(s) will be required to be designed so that the total stormwater discharge post-development from the Site for all events up to the 1% AEP event must be less than or equal to the stormwater runoff flows prior to the development.
 - c. Following construction of the stormwater management system(s), an as-built plan and a maintenance schedule will be required to be made available for future property owners. The plan and schedule must be approved by the Wellington Water Land Development Team.
 - d. The owner of the Site will be required to follow the required operation, maintenance and renewal of the system(s), set out in the maintenance schedule, to ensure it is in full working order at all times.
 - e. The owner(s) of the Site cannot increase stormwater discharge, through an increase in non-permeable areas, without Council approval; as an increase in stormwater discharge may result in failure of the stormwater detention systems.
6. All runoff from the proposed carpark areas including associated accessways (manoeuvring, entries and exits) will be required to be treated prior to discharge.
 7. The stormwater treatment systems will be required to be designed in accordance with Wellington Water Limited's Water Sensitive Design for Stormwater: Treatment Device Design Guideline December 2019 Version 1.1.
 8. Prior to Engineering Approval, the consent holder will be required to prepare a draft Operation and Maintenance manual for all stormwater devices, setting out the principles for the general operation and maintenance for the stormwater system, outlet channel and the associated management devices. The draft Operation and Maintenance Manual shall be submitted to the Wellington Water Land Development Team for approval. The Operation and Maintenance manual is to include, but not be limited to:
 - a. a detailed technical data sheet
 - b. all the requirements as defined within the Water Sensitive Design for Stormwater: Treatment Device Design Guideline.
 - c. details of who will hold responsibility for short-term and long-term maintenance of the stormwater devices

- d. a programme for regular maintenance and inspection of the stormwater system
 - e. a programme for the collection and disposal of debris and sediment collected by the stormwater management device or practices
 - f. a programme for post storm maintenance
 - g. a programme for inspection and maintenance of outfall erosion
 - h. general inspection checklists for all aspects of the stormwater system, including visual check of roadside sumps and outfalls
 - i. a programme for inspection and maintenance of vegetation associated with the stormwater devices.
 - j. recommended on-going control methodology to eradicate established pests and invasive weeds from both terrestrial and aquatic areas
9. Bare galvanised, zinc alum or unpainted metal (including copper) may result in contamination of stormwater runoff upon corrosion of surfaces and therefore will be required to not be used for exterior construction, including but not limited to roofing, cladding, gutters and downpipes.
10. The consent holder will be required to install stormwater educational plaques alongside each stormwater sump that is installed within, or in association with, the subdivision which promote public awareness toward maintaining the water quality of the stormwater discharge. The educational plaques and their placement must be approved by the Compliance Monitoring Officer.
11. The Site will be required to have a separate and direct connections to the public stormwater and wastewater networks at locations accepted in writing by the Wellington Water Land Development Team.
12. To avoid impact on the downstream wastewater network, wastewater mitigation maybe required. Any wastewater management design must be accepted in writing by the Wellington Water Land Development Team and the following aspects must be met.
13. The development of this Site will require the public drainage network to be extended/altered to serve the proposed development.
14. The existing public gravity stormwater and wastewater mains within the proposed building site must be re-laid clear of the building or re-laid in new diameter PE100 SDR 17 pipe sleeved within a reinforced concrete pipe, with

