Memorandum

To:	Jarrod Thompson- Stride	**Date:**	12 November 2021
From:	Richard Atherton and Angela Pratt	**Our Ref:**	
Reviewed by:	Graham Levy		
Copy:	Gerard Thompson, Bianca Tree, Ben Gurton, Matthew Thode		
Project:	Johnsonville Town Centre Redevelopment		
Subject:	Ministerial Referral Application for Fast Track Consenting - Civil Engineering Input		

1 Introduction

Stride Investment Management Limited (Stride) is submitting a Ministerial Referral Application (Referral) for a Stage 1 redevelopment of the Johnsonville Town Centre (JTC) under the COVID-19 Recovery (Fast-track Consenting) Act 2020 (the Act).

This Memorandum (Memo) is prepared by Beca Ltd (Beca) as a part of its commission to Stride. The purpose of this Memo is to provide high-level Civil Engineering commentary to support the Referral by responding specifically to the following points contained within the Act, where possible:

Section 19(d) Whether the project may result in a public benefit by:

(ix) Strengthening environmental, economic and social resilience in regard to managing risk from natural hazards[1] and effects of climate change; and

(v) Improve environmental outcomes for coastal or freshwater quality, air quality or indigenous biodiversity (as it relates to freshwater quality) *Section 20(3)-Information requirements for Application for referral*

(e) a description of the anticipated and known adverse effects of the project on the environment; and

(o) a description of whether and how the project would be affected by climate change and natural hazards:

[1] *Natural hazards such as floods, droughts, cyclones, earthquakes, liquefaction, tsunami landslides, etc, can often result in a natural disaster to communities. A natural disaster is an event caused by forces beyond human control that has a negative effect to people, property, and the environment. Climate change can also worsen natural hazards.*

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2 Site Description and Staging

Stride is currently progressing the opportunity to redevelop Stage 1 – Town Centre Core (Stage 1) of the JTC Redevelopment, with future further stages currently being master planned. The proposed redevelopment is in the suburb of Johnsonville in Wellington.

Figure 1 indicatively outlines the existing Johnsonville Shopping Centre (JSC) site within the red boundary. The site is bounded by Johnsonville, Moorefield and Broderick Roads. The site excludes the following areas within this block.

- Johnsonville Train Station to the west of the site.
- Mobil fuel station, McDonald's restaurant and Bill Cutting Place to the north of the site.

The proposed redevelopment is occurring on a site with an overall area of approximately 41,000m².

The Stage1 – Town Centre Core is indicatively shown in beige in Figure 1 and is approximately 20,000m². In the medium term, the remainder of the JTC Redevelopment site will be occupied by existing buildings and carparks to service the new shopping centre, until the future stages are progressed and constructed.

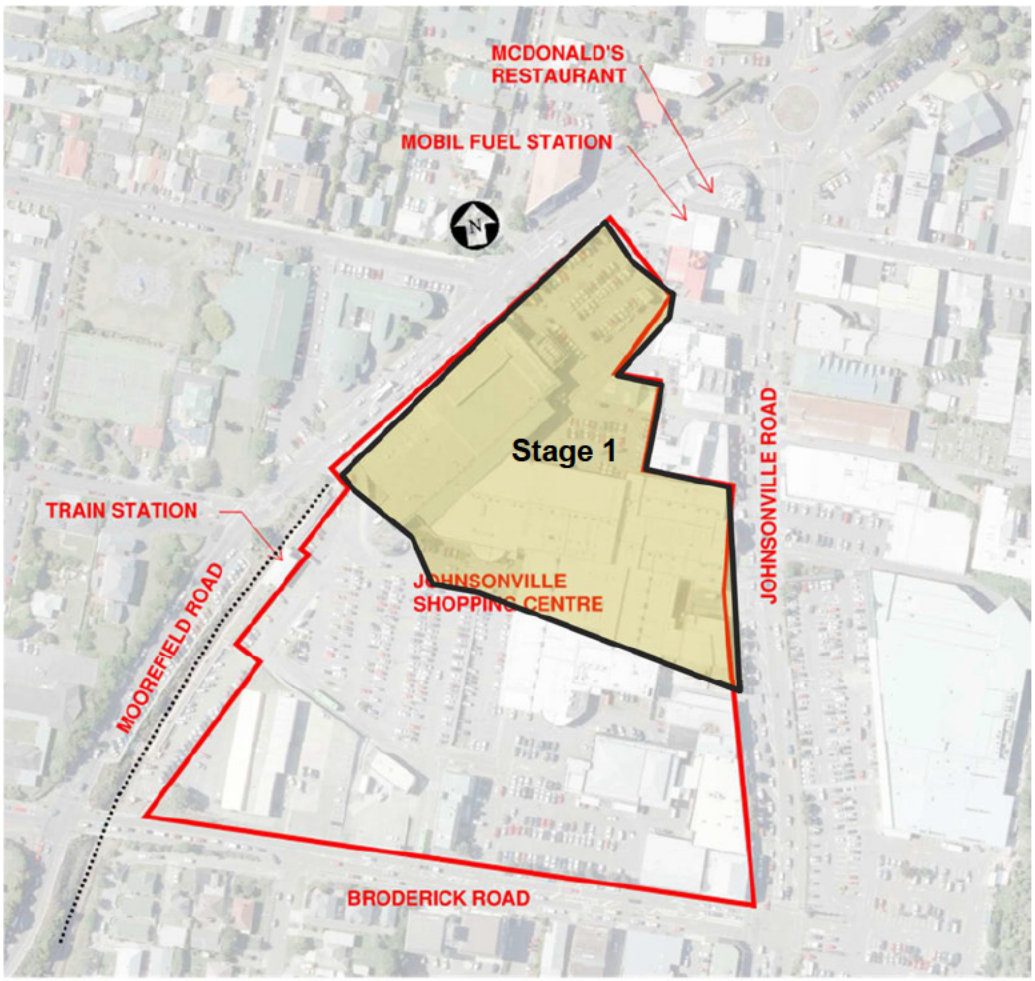

Figure 1 Johnsonville Town Centre Site

3 Civil Engineering Scope

The Civil Engineering scope for the JTC Redevelopment is expected to include the following, but not necessarily limited to:

- The new utility service connections to service the JTC Redevelopment including potable water, drainage, wastewater, power, gas and data/communications.
- Diverting existing utility service connections within and adjacent to the JTC Redevelopment.
- Footpath, road layout and traffic signal alterations on Johnsonville, Broderick, and Moorefield Roads to improve access and traffic flow to the JTC Redevelopment and the wider Johnsonville catchment.
- Permanent retaining walls.
- Preparing an earthworks management plan (including sediment and control plan) to accommodate the new JTC Redevelopment.
- Preparing a stormwater management plan setting out approaches of how the stormwater quantity and quality could be managed to mitigate the effects from the JTC Redevelopment.

4 Utility Services and Three Waters

4.1 Context

The redevelopment of the site in Johnsonville has been in the pipeline for several years with previous resource consents granted in 2009 and 2017 for larger developments on this site. As a part of the masterpalnning for those consents, the utility service providers, Wellington Water and Wellington City Council (the Council) were consulted to:

- Confirm whether the existing utility service infrastructure can service the proposed JTC Redevelopment and maintain a similar level of service to the Johnsonville area.
- Demonstrate that the effects on the utility services as part of the redevelopment have been considered, documented and discussed.

Given this, it can be anticipated the utility services and three water networks will have sufficient capacity to cater for Stage 1 because it is smaller than the previous consented developments. Notwithstanding that, the civil, fire and building services engineers will work closely with the wider Stride Project Team (Project Team), and the key stakeholders with any potential upgrades required to service all the JTC Redevelopment and maintain a similar (or greater) level of service to the Johnsonville area.

4.2 New Utility Services and Three Water Connections

4.2.1 Utility Services

The civil, fire and building services engineers will develop the design of the utility service connections, management systems and any potential upgrades required to service the JTC Redevelopment. As a part of the consultation, the utility service providers will confirm the capacity of their network and advise of any planned renewals or upgrades within the next five to ten years in the Johnsonville area. This will be key when considering the future stages of the JTC Redevelopment.

The building services engineer will manage, coordinate and design the new gas, power, telecommunications and fibre optic cable connections to Stage 1 because they'll be aware of the required performance of these services. This would include any specific engineering assessment requirements and consents from Wellington Electricity. It is anticipated the new JTC Redevelopment is likely to move away from gas and move towards power, to support greener and more sustainable outcomes for the JTC Redevelopment. This will be considered further as the design progresses and the servicing demands are better known.

4.2.2 Three Water Connections

The civil and building services engineers will work with Wellington Water and the Council to develop the design of the new three water connections for Stage 1 and any potential upgrades required to cater for the future stages of the JTC Redevelopment. Beca will seek information from Wellington Water who are responsible for confirming the capacity, including flows and pressure of their existing water supply and wastewater pipelines.

It is anticipated that there is adequate capacity in the wastewater and potable water networks to cater for Stage 1. Again, as the design progresses and the future servicing demands for the wider JTC Redevelopment are better known, the capacity of these existing networks will be considered with Wellington Water and the Council. Stride will also seek agreement from Wellington Water to make new connections to their three water networks.

4.3 Affected Utility Services and Three Waters

Beca will undertake a coordination role with the wider Project Team in identifying the affected services within and around the JSC site and collaborate closely with the utility service providers and Wellington Water to achieve an optimal location/treatment for the affected service that is workable and minimises the disruption to the local area. Based on the previous work undertaken, it is anticipated that there will be a low number of affected utility services associated with the construction of Stage 1, given half of the site is being developed.

As a part of the utility services identification, Beca will also work with the geotechnical engineer (and others) to prepare a scope of works for the site investigations and potholing that would need to be undertaken to locate the existing utility services in and around the JTC Redevelopment.

Stage 1 is likely to affect the following existing stormwater and sewer pipelines that pass through the site. These include:

- The 1500 mm diameter pipeline that cuts across the northeast corner of the site and underneath an existing building which is to be demolished and rebuilt as part of the proposed redevelopment works.
- The existing 150 mm sewer that crosses the centre of the site from Wanaka Street to Hawea Street.

It's unclear whether a Central Stormwater Pipeline that crosses the site from Moorefield Road near the railway station to the Johnsonville / Broderick Road intersection will be affected by the development of Stage 1. Nonetheless, any pipeline diversions will be explored further with Wellington Water and when further design and investigation work is undertaken.

In conclusion, it is anticipated that any affected utility services can be appropriately managed with the key stakeholders for Stage 1 and the future stages of the JTC Redevelopment.

5 Footpath, Road and Traffic Signal Alterations

Footpath, Road and traffic signal alterations on Johnsonville, Broderick, and Moorefield Roads will be needed to improve access and traffic flow to the JTC Redevelopment and the Johnsonville catchment. The extent and scale of these alterations for Stage 1 will be informed by the traffic impact assessment, which is currently being initiated by Stride. A traffic assessment by Stantec is also being submitted to support the Referral.

Beca will work closely with the traffic engineer to confirm the new road layout that has been approved by the Council, as part of Stride's Resource Consent application. Beca will overlay the new road layout over the existing "as constructed" layout to understand the full extent of the works for Stage 1 and the future stages. Beca, the traffic engineer and the appointed contractor will work alongside the Council and key stakeholders to consider the construction staging of these works and develop a Construction Traffic Management Plan to minimise the disruption to the Johnsonville community. Therefore, it is anticipated these works can be appropriately managed.

6 Retaining Walls

Beca will work with the architect, structural and geotechnical engineer to determine the type, height and location of the permanent retaining walls within the JTC Redevelopment. There is an opportunity for the Project Team to move away from "traditional" concrete retaining solutions and explore the use of "greener" vegetated retaining wall options for the shorter height walls, to reduce the carbon footprint and the effects on the environment.

7 Earthworks Management Plan

An Earthworks Management Plan (including sediment and control plan) will be prepared as part of the consent application for Stage 1, outlining how the effects of the earthworks are anticipated to be managed for the JTC Redevelopment. These effects generally include, the management of traffic generated by the removal of the excavated material, dust, noise, and vibrations, and erosion and sediment controls. It is also noted that there have been previous resource consents granted for the site in 2009 and 2017 for larger developments on this site.

The civil engineer and the geotechnical engineer will explore the opportunity to keep the excavated material and re-use it elsewhere to fill any areas of the site where the ground needs to be raised. This would curtail the amount of excavated material being removed from site, which would reduce the construction traffic and minimise the disruption in Johnsonville and beyond. Plus, it will help to reduce the carbon footprint from the construction activities.

Overall, it is anticipated these earthworks can be appropriately managed for Stage 1.

8 Stormwater Management

8.1 What is Stormwater?

Stormwater is water that runs off urban hard surfaces such as roads, driveways, footpaths and rooftops, whether flowing overland or in channels, down sumps or pipes through a catchment[2].

8.2 Stormwater Management Plan

A stormwater management plan (the Plan) will be prepared setting out approaches on how the stormwater quantity and quality could be managed within and around the proposed JTC Redevelopment. The purpose of this document is to:

- Protect and/or enhance the environmental, social and economic values of the JTC Redevelopment, the suburb of Johnsonville and beyond.
- Mitigate the effects from JTC Redevelopment with respect to the flooding risk in Johnsonville.
- Where possible, support the Council and Wellington Water in their management of the wider stormwater challenges and flood risks (i.e. managing natural hazards) in Johnsonville and beyond.

The Plan will generally focus on the following with regards to the JTC Redevelopment:

- Managing stormwater runoff
- Improving stormwater quality
- Managing the Johnsonville flooding risk

8.3 Managing Stormwater Runoff

8.3.1 Stormwater Neutrality

Wellington Water require that the JTC development achieves “Stormwater Neutrality”. At a high level this means not increasing stormwater flows from the development and not exacerbating any existing stormwater issues. WW define its requirement as:

“The stormwater management system(s) must be designed so that the total stormwater discharge post-development from the JTC Redevelopment for a 10-year rainfall event and a 100-year rainfall event must be less than or equal to the stormwater runoff flows prior to the development”

The Project Team will work closely with the Council and Wellington Water to meet Wellington Water’s requirements around achieving stormwater neutrality by reducing the amount of stormwater runoff being discharged from the site into the Council’s stormwater network. The aim is to preserve the status quo or help reduce the risk of flooding on neighbouring, and downstream properties. Flooding can have economic, environmental, and social impacts on the community.

Generally, when developing or building on a site, the permeable grassed areas are replaced with impermeable sealed areas, such as buildings, roofs, footpaths and carparks. This change in surface from permeable to impermeable increases the velocity, volume and flowrate of stormwater running

[2] Water Sensitive Urban Design - A Guide for WSUD Stormwater Management in Wellington

off these areas. In the case of the JTC development, the existing site is already 100% impervious, therefore there will be little/no change in impermeable area.

Often stormwater neutrality is achieved by implementing a system, generally on the redeveloped site, which holds back (detains) the stormwater discharge from the site and slowly releases the stormwater at a rate that is no greater than the site's current discharges. This can be undertaken by storing stormwater in oversized pipes and/or tanks and/or detention ponds, with an appropriately sized outlet to control the discharge rate. The size and scale of the detention system depends on the extra peak stormwater flow from the redeveloped site. Alternatively, Water-Sensitive Urban Design (WSUD) measures can be implemented.

8.3.2 JTC Site Discharges

Most of the rainfall that falls onto the existing JTC site is collected and directed to the Council's stormwater network. The existing JTC site has 100% coverage with buildings or paved car parks and streets. As the existing JTC site has 100% coverage, the stormwater runoff from the site is unlikely to change due to the redevelopment. The expected exceptions to this are as follows:

1	Extra flows generated from dewatering, for example: a) During construction b) Relieving water pressures from a basement	The flows from the JTC site increase because of the dewatering that may be required as part of the proposed redevelopment and may affect stormwater neutrality.
2	Balancing the flows discharging to the Council's network	Depending on the location and discharge points of the building drainage systems, the balance of flows discharging to the Council's network may change. This may impact on the sizing of the pipes.
3	Climate change	Future stormwater asset design must consider the impact of climate change, particularly increases in rainfall intensity.

The potential of these options will be further investigated during the detailed design phase. Best practice approaches to detain the water will be developed in collaboration with Wellington Water and in accordance with the standards and guidelines identified in **Appendix A**.

8.3.3 Opportunities to reduce the JTC site discharges

The stormwater discharged from the JTC Redevelopment can be collected and detained to reduce the discharge from the site. This can be achieved by providing tanks, oversized pipes or ponds (as noted earlier) or integrating Water Sensitive Urban Design (WSUD) measures to create open, sustainable, and multifunctional spaces. This needs to be undertaken in collaboration with the Council and Wellington Water who are likely to have projects on the horizon to improve the wider stormwater system.

Examples[3] of WSUD with respect to stormwater runoff include:

- Green roofs to reduce runoff volume and provide thermal benefits

[3] Water Sensitive Urban Design - A Guide for WSUD Stormwater Management in Wellington

- Vertical gardens (climbers) to shade north-facing facades and also to provide a small reduction in runoff volume/flow, although considered to be a very marginal benefit.
- Rainwater harvest tanks for re-use and/or to smooth peak discharge (slow release)
- Permeable paving in carparking/pedestrian areas to reduce runoff volumes
- Raingardens, ponds and wetlands to provide amenity, detention, stormwater treatment and biodiversity, where space is available.

The Project Team will consider the integration of these WSUD measures to reduce the discharge from the JTC Redevelopment, to protect and/or enhance the environmental, social and economic values of the JTC Redevelopment, the suburb of Johnsonville and beyond.

8.4 Improving Water Quality

8.4.1 Post-Development

To improve the water quality on the downstream marine environment, the stormwater discharges from the parts of the JTC site which are expected to be contaminated will be treated through best practice approaches and/or water sensitive design. Such areas are likely to include uncovered carparks. It is not expected that roof areas will require treatment, on the basis that these are not contaminant generating (i.e. not exposed galvanised steel or copper roofing materials). Building materials are yet to be confirmed at this stage.

Selection of treatment devices will be undertaken at a later date, but these will be selected from those devices best suited for removing the contaminants likely to be generated i.e. metals, sediment and hydrocarbons.

8.4.2 During Construction

During construction, particularly the earthworks phase, it is possible that discharges of sediment from the site could occur. It is therefore proposed that appropriate erosion and sediment controls will be utilised and that these will be designed to manage flows from the contributing catchment area. Controls will be moved as required to suit the phases of construction. An erosion and sediment control plan will be prepared by the constructor in accordance with the guidance proposed by Greater Wellington Regional Council.

8.5 Existing Flood Risk

The JTC site is subject to flooding due to its location at the low point of a valley. While the discharge of stormwater from the area in moderate storms is via a pipe network, overland flows occur in larger storm events. This is evidenced by the flood modelling work already undertaken by Wellington Water in the Johnsonville catchment. This modelling work is understood to have taken account of recent development areas in the catchment, climate change and associated changes in rainfall figures.

The flood-risk at the JTC Redevelopment site takes two forms:

- Flooding due to constraints in the downstream network, resulting in ponding around/on the site.
- Secondary overland flows towards the site that need to be conveyed through/around the site. This flow occurs when the pipe network capacity is exceeded and water surcharges onto the surface.

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Both forms of flooding are also influenced by climate change in that rainfall intensities and hence flows increase. Both flooding forms need to be considered in determining the layout and levels of the redevelopment.

8.5.1 Downstream Network Constraints

Flooding due to constraints in the downstream network, resulting in ponding around/on the site as indicatively shown in Figure 3.

Figure 2: Flood Map including Downstream Network Constraint on SH1 On-ramp

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8.5.2 Secondary Flows

The secondary flows follow the red and yellow arrows shown in Figure 4. The preliminary flood maps (2019) from Wellington Water indicate two key overland flow paths entering the site:

- South-west flowpath (red arrows): This is an overland flow path along the railway line, under Broderick Road, through the KiwiRail carkpark and onto the JTC site. Flows then continue through the JTC carparking and out onto Johnsonville Road via an alleyway.
- North-west flowpath (yellow arrows): This is an overland flow path from overflows of the culvert under Moorefield Road. This flow enters the JTC carparking area and exits through an alleyway and Bill Cutting Drive and also leads to ponding on the site in the low area on the north side of the JTC building.

In developing the site, and protecting the buildings from flooding, it is important that the secondary flow paths are managed such that flooding is not made worse on other neighbouring property and roads. The current JTC plans cut off the south-west flow path and it is therefore important that this secondary flow is managed appropriately in the design of the JTC. The development is not likely to cut off the northern secondary flow path (yellow arrows) however access may be impeded, therefore this will also need to be considered in the design of the JTC.

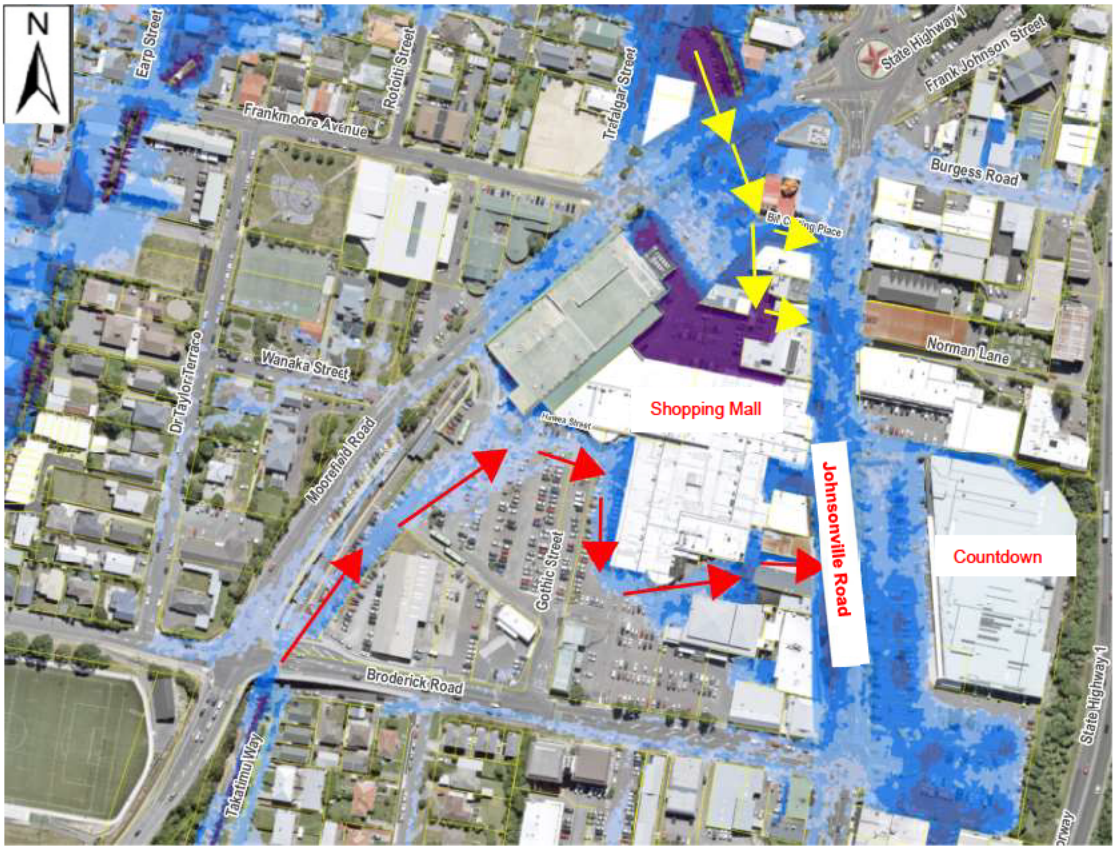

Figure 3: Existing Overland Flow Paths in Yellow and Red

8.6 Managing the Existing Flooding Risk

Mitigating the two types of flooding will likely be managed by:

- The Council and Wellington Water can enhance the resilience of the stormwater network by upgrading the capacity of the downstream network, in and around SH1 Johnsonville on ramp. Such mitigation would likely result in lower flood levels in the JTC area and lower flood risk to the JTC Redevelopment.
- The Project Team setting the floor levels within the site such that flood water does not enter the building, where possible. Access into and out of the building would also need to be considered.
- The Project Team and Wellington Water conveying and discharging overland flows around the proposed Redevelopment.

Other mitigations options which will be considered further are identified below:

- The provision of sealing the building or erecting temporary flood barriers on building accesses could provide an additional/alternative mitigation option. These could be manually or automatically operated in a flood situation. It is noted that it is heavily reliant on a robust early warning system and will need to be further investigated.
- Accepting the risk that less critical parts of the JTC redevelopment may flood for a short period of time (say less than 24 hours).
- The viability of flood storage by way of tanks can also be further explored

It's likely that a range of mitigation measures will need to be combined and implemented by the Project Team, the Council and Wellington Water to reduce the flood risk and to enhance the resilience in Johnsonville to anticipated increases in rainfall as a result of climate change.

Further flood modelling work will be carried out to inform:

- The wider effects of implementing these mitigation measures (i.e. increasing flood depth and extent elsewhere) and what other mitigation measures may be required
- The effectiveness and timing of these mitigation measures, in conjunction with the future stages of the JTC Redevelopment.

Once the flood modelling work is complete, the Project Team, the Council and Wellington Water would work together to seek greater alignment on the sequencing of when the proposed mitigation measures would be implemented for both Stage 1 and future stages. For clarity, it is unlikely all the proposed mitigation measures set out would be required to redevelop Stage 1 and it is anticipated there will be less reliance on the Council and Wellington Water needing to implement their mitigation measures such as upgrading the downstream network.

In conclusion, it is anticipated that the stormwater and the flood risk can be appropriately managed with the key stakeholders for both Stage 1 and the future stages of the JTC Redevelopment.

9 Conclusions

This Memo provides high-level Civil Engineering commentary to support the Referral for Stage 1 of the JTC Redevelopment. In conclusion:

- It is anticipated the utility services and three water networks will have sufficient capacity to cater for Stage 1.
- The Project Team will work closely with the key stakeholders with any potential upgrades required to service all the JTC Redevelopment and maintain a similar (or greater) level of service to the Johnsonville area.
- The affected utility services can be appropriately managed with the key stakeholders for Stage 1 and the future stages of the JTC Redevelopment.
- The Project Team will work alongside the Council and key stakeholders to consider the construction staging of the new road and footpath works and develop a Construction Traffic Management Plan to minimise the disruption to the Johnsonville community.
- There is an opportunity for the Project Team to move away from “traditional” concrete retaining solutions and explore the use of “greener” vegetated retaining wall options for the shorter height walls, to reduce the carbon footprint and the effects on the environment.
- It is anticipated the effects of earthworks can be managed, with an Earthworks Management Plan (including sediment and control plan) will be prepared as part of the consent application for Stage 1.
- The Project Team will explore the opportunity to keep the excavated material and re-use it elsewhere to fill any areas of the site where the ground needs to be raised which will help to reduce construction traffic movements and the carbon footprint of construction activities.
- A stormwater management plan will be prepared setting out approaches of how the stormwater quantity and quality could be managed to mitigate the effects from the JTC Redevelopment. The purpose of this document is to:
    - Protect and/or enhance the environmental, social and economic values of the JTC Redevelopment, the suburb of Johnsonville and beyond.
    - Mitigate the effects from JTC Redevelopment with respect to the flooding risk in Johnsonville.
    - Where possible, support the Council and Wellington Water in their management of the wider stormwater challenges and flood risks (i.e. managing natural hazards) in Johnsonville and beyond.
- It is anticipated that the stormwater and the flood risk can be appropriately managed with the key stakeholders for Stage 1 and the future stages of the JTC Redevelopment. At this stage, mitigation options are still being explored with forward work focusing on the following steps:
    - Develop the JTC Redevelopment Master Plan whilst considering how stormwater can be most appropriately managed.
    - Further develop potential solutions/mitigation measures to manage stormwater for Stage 1.

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- Work collaboratively with Council and Wellington Water to understand the benefits of mitigation in the wider catchment.
- Test these mitigation measures in the Wellington Water Flood model, which Beca has been provided a copy of to demonstrate that the mitigation improves or minimises the downstream flooding.
- Undertake detailed design of the conveyance, attenuation (storage), treatment and flooding mitigation measures required for Stage 1.

Richard Atherton

Senior Associate - Civil Engineering
Beca

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s 9(2)(a)

Angela Pratt

Senior Environmental Engineer
Beca

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Appendix A - References

Reference Document	Website Paths
Managing Stormwater Runoff The use of approved solutions for hydraulic neutrality Version 3	https://www.wellingtonwater.co.nz/assets/Uploads/Managing-Stormwater-Runoff.pdf
Water Sensitive Urban Design A Guide for WSUD Stormwater Management in Wellington	https://wellington.govt.nz/-/media/environment-and-sustainability/environment/files/wsud-guide.pdf
Water Sensitive Design for Stormwater: Treatment Device Design Guideline December 2019 Version 1.1	https://www.wellingtonwater.co.nz/assets/Uploads/WSD-for-Stormwater-Treatment-Device-Design-Guideline-December-2019.pdf
Wellington City Council Code of Practice for Land Development, 2012	https://wellington.govt.nz/-/media/property-rates-and-building/urban-development/files/complete.pdf
Regional Standard for Water Services, May 2019 Version 2.0	https://www.wellingtonwater.co.nz/assets/Uploads/Regional-Standard-for-Water-Services-May-2019.pdf