Infrastructure Report

Drury Centre – Stage 2

Kiwi Property Holdings No. 2 Limited

25/03/2025

For Fast Track Consent Application

Document Control

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Statement of Qualifications and Experience

Colin Dryland

I am a Principal Engineer and the General Manager of Engineering at Wood and Partners Consultants Limited ("Woods"). Woods is a multi-disciplinary consultancy specialising in planning, urban design, engineering, water infrastructure, and surveying. I have been employed at Woods since 2012.

I hold a National Diploma of Architectural Technology (Unitec Institute of Technology, 2002), a New Zealand Diploma of Civil Engineering (Unitec Institute of Technology, 2011), and an Applied Diploma of Civil Engineering (Infratrain 2014). I am a Chartered Professional Engineer (CPEng) and a member of Engineering New Zealand (CMEngNZ), Engineering New Zealand Transportation Group, New Zealand Society of Construction Law and Water New Zealand. In addition, I am also a qualified Independent Hearings Commissioner and am appointed to the Palmerston North City Council Commissioner Pool until November 2026.

I have 23 years of experience in all aspects of land development engineering design, construction and contract management.

I have been the principal designer, report author and lead engineer for a wide range and scale of land development projects, including but not limited to: earthworks and erosion and sediment control; civil infrastructure servicing; stormwater modelling and green infrastructure; on-site stormwater and wastewater disposal; roading, transport, pavement engineering and geometric design; streamworks and culverting; and all aspects of land development Resource Consenting and Engineering Plan Approval design and compliance.

I confirm that, in my capacity as approver of this report, I have read and abide by the Environment Court of New Zealand's Practice Note 2023, in particular section 9 on the Code of Conduct for Expert Witnesses.

Thanujah Haran

I am a Senior Associate Engineer within the Engineering Team at Wood and Partners Consultants Limited ("Woods"). Woods is a multi-disciplinary consultancy specialising in planning, urban design, engineering, water infrastructure, and surveying. I have been employed at Woods since 2014.

I hold a Bachelor of Civil Engineering degree from Monash University, Melbourne. I am a Member and Chartered Professional Engineer with Engineering New Zealand (Membership No. 1014439), as well as a Fellow and Chartered Professional Engineer with Engineers Australia (Membership No. EA3703650).

I have over 24 years of experience in Highways design, earthworks, roading, stormwater, wastewater and water design for land development and infrastructure projects. I have been the principal author and lead engineer for a wide range of Infrastructure and Earthworks Methodology reports to support land development projects.

I confirm that, in my capacity as reviewer of this report, I have read and abide by the Environment Court of New Zealand's Practice Note 2023, in particular section 9 on the Code of Conduct for Expert Witnesses.

Glenn Wright

I am a Senior Associate Engineer within the Engineering Team at Wood and Partners Consultants Limited ("Woods"). Woods is a multi-disciplinary consultancy specialising in planning, urban design, engineering, water infrastructure, and surveying. I have been employed at Woods since 2021.

I hold a Bachelor of Engineering degree from the University of Auckland, which I completed in 2006. I am a Chartered Professional Engineer (CPEng) and a member of Engineering New Zealand (CMEngNZ).

I have over 19 years of experience in earthworks, roading, stormwater, wastewater and water design, for land development and infrastructure projects.

I have been the principal author and lead engineer for a wide range of Infrastructure and Earthworks Methodology reports to support land development projects.

I confirm that, in my capacity as reviewer of this report, I have read and abide by the Environment Court of New Zealand's Practice Note 2023, in particular section 9 on the Code of Conduct for Expert Witnesses.

Sine Foulger

I am an Associate Engineer within the Engineering Team at Wood and Partners Consultants Limited ("Woods"). Woods is a multi-disciplinary consultancy specialising in planning, urban design, engineering, water infrastructure, and surveying. I have been employed at Woods since 2022.

I hold a Bachelor of Engineering (Honours) degree in Civil Engineering (University of Auckland, 2012), a Master of Engineering Studies (Honours) in Transportation (University of Auckland, 2013) and a Bachelor of Science (University of Auckland, 2007). I am a Chartered Professional Engineer (CPEng), an International Professional Engineer (IntPE(NZ)), a member of Engineering New Zealand (CMEngNZ), the Temporary Works Forum NZ and UDINZ.

I have 13 years' experience of working in residential land development in Auckland. My technical experience involves design of all civil engineering aspects related to residential subdivisions, including but not limited to roading geometry, earthworks, stormwater and wastewater design. My experience involves preparation of land development packages for small to large scale residential subdivisions, from preliminary concept to design phase, through to consenting and construction.

I confirm that, in my capacity as author of this report, I have read and abide by the Environment Court of New Zealand's Practice Note 2023, in particular section 9 on the Code of Conduct for Expert Witnesses.

Anuj Chaswal

I am a Civil Engineer within the Engineering Team at Wood and Partners Consultants Limited ("Woods") at Wood and Partners Consultants Limited ("Woods"). Woods is a multi-disciplinary consultancy specialising in planning, urban design, engineering, water infrastructure, and surveying. I have been employed at Woods since January 2024.

I hold a bachelor's degree (BEngTech) from Unitec Institute of Technology, 2018. I am a member of Engineering New Zealand (MEng).

I have 7 years of experience working in residential and commercial land development in Auckland and Waikato regions. My technical expertise is roading geometry, earthworks, stormwater and wastewater design. I have been involved in small to large subdivisional projects from preliminary design to compliance stage.

I confirm that, in my capacity as contributor (wastewater, roading) of this report, I have read and abide by the Environment Court of New Zealand's Practice Note 2023, in particular section 9 on the Code of Conduct for Expert Witnesses.

Marcel Bear

I am a Principal Engineer at Wood and Partners Consultants Limited (Woods). Woods is a multi-disciplinary consultancy specialising in planning, urban design, engineering, water infrastructure, and surveying. I have been employed by Woods since April 2017.

I hold the qualification of Bachelor of Engineering (Honours) in Civil Engineering from the University of Auckland, which I completed in 1990. I am a Chartered Engineer with Engineering New Zealand.

I have 30 years of professional experience in water supply design and planning. My experience includes water supply design, hydraulic modelling and infrastructure master planning, for greenfield and brownfield developments such as; the Unitec site- Auckland, Northcote, Wesley and Waikowhai neighbourhoods and the Sleepyhead Development in Ohinewai.

I confirm that, in my capacity as contributor (water) of this report, I have read and abide by the Environment Court of New Zealand's Practice Note 2023, in particular section 9 on the Code of Conduct for Expert Witnesses.

Cristian Jara

I am Water Engineer within the Water Infrastructure & Planning team at Wood and Partners Consultants Limited ("Woods"). Woods is a multi-disciplinary consultancy specialising in planning, urban design, engineering, water infrastructure, and surveying. I have been employed at Woods since November 2020.

I hold the degree of Professional Civil Engineer from the Pontifical Catholic University of Chile with a Diploma in Hydraulic Engineering, which I obtained in 2013. I am member of Engineering New Zealand (MEngNZ) and Water New Zealand.

I have 10 years of professional experience in wastewater and water supply modelling and pipeline design. I have been the engineer responsible of creating/reviewing water supply models for infrastructure projects in the public and private sector. Recent projects include:

- Supporting the infrastructure development in multiple neighbourhoods for Kāinga Ora (Glen Innes, Point England and Mangere East amongst others)
- Creating and reviewing water supply models and reports to support resource consent applications for multiple Milldale development stages

I confirm that, in my capacity as contributor (water) of this report, I have read and abide by the Environment Court of New Zealand's Practice Note 2023, in particular section 9 on the Code of Conduct for Expert Witnesses.

1. Introduction

This report has been prepared in support of the application by Kiwi Property Holdings No 2 Limited (the "applicant" or "Kiwi Property") for the subdivision and development of Stage 2 of the Drury Centre under the Fast-track Approvals Act 2024. In summary, this application proposes the subdivision and development of land as Stage 2 of the Drury Metropolitan Centre. Stage 2 of the Drury Centre compliments the development and activities approved in Stage 1 by proposing a range of commercial, retail, accommodation and community buildings and activities ("the project"). The project also includes the creation of open spaces, bulk earthworks, installation of infrastructure and roading network.

The scope of this infrastructure assessment provides comprehensive information on:

- Proposed earthworks.
- Integration with existing Stage 1 infrastructure to service Stage 2.
- Analysis of infrastructure capacity and requirements.
- Compliance with standards, Auckland Council policies, and industry best practices.

The infrastructure design adheres to key regulatory frameworks including:

- Watercare Codes of Practice for wastewater and reticulated water.
- Auckland Council Code of Practice for Land Development and Subdivision.
- Auckland Transport Code of Practice (ATCOP).
- Auckland Council Guideline Documents (GD) GD01, GD04, and GD05.
- NZS4404:2010 Land Development and Subdivision Infrastructure.

The report addresses the following key infrastructure components:

- Earthworks and site preparation.
- Erosion and sediment control measures.
- Transportation network.
- Stormwater management and treatment device.
- Wastewater infrastructure.
- Water supply systems.
- Utilities services.

This infrastructure report demonstrates how the proposed Drury Centre Stage 2 development will be adequately serviced while meeting all regulatory requirements and industry best practices. The design approach prioritises sustainability, resilience, and long-term operational efficiency, creating a robust foundation for this development.

2. Project Background and Proposal

2.1. Project Overview and Background

The Drury Centre Precinct represents a significant urban development project encompassing approximately 50 Ha of land strategically located in the Drury Centre Precinct. This project follows the approval of Stage 1 under the COVID-19 Recovery Fast-track Consenting Act 2020 which authorised the subdivision and development of land for commercial (large format retail) and superlots for future residential development and the creation of open space reserves. Stage 1 of Drury Centre has since secured Engineering Plan Approval for construction commencement.

Drury Centre Stage 2 encompasses 20.85 Ha to the north of Stage 1. This second phase will extend critical infrastructure networks from Stage 1 to support the range of accommodation, commercial, retail and community activities proposed in this project.

Adjacent to the project site is the NZTA SH1 Offramp and Overpass, Road 2 North Project to the west, the Stage 1 development to the south, and existing lifestyle residential lots to the east.

2.2. Project Site

As illustrated in Figure 1 the Drury Centre Stage 2 is located in the northern and eastern portion of Drury Centre Precinct. Along the western boundary is the national grid corridor overlay containing 220kV transmission lines. The previous 110kV transmission lines and associated support structures within the national grid corridor overlay were removed by Transpower in mid-2024. The Hingaia Stream flows along the western boundary of the site, with a tributary Stream A located in the northern portion of the development area.

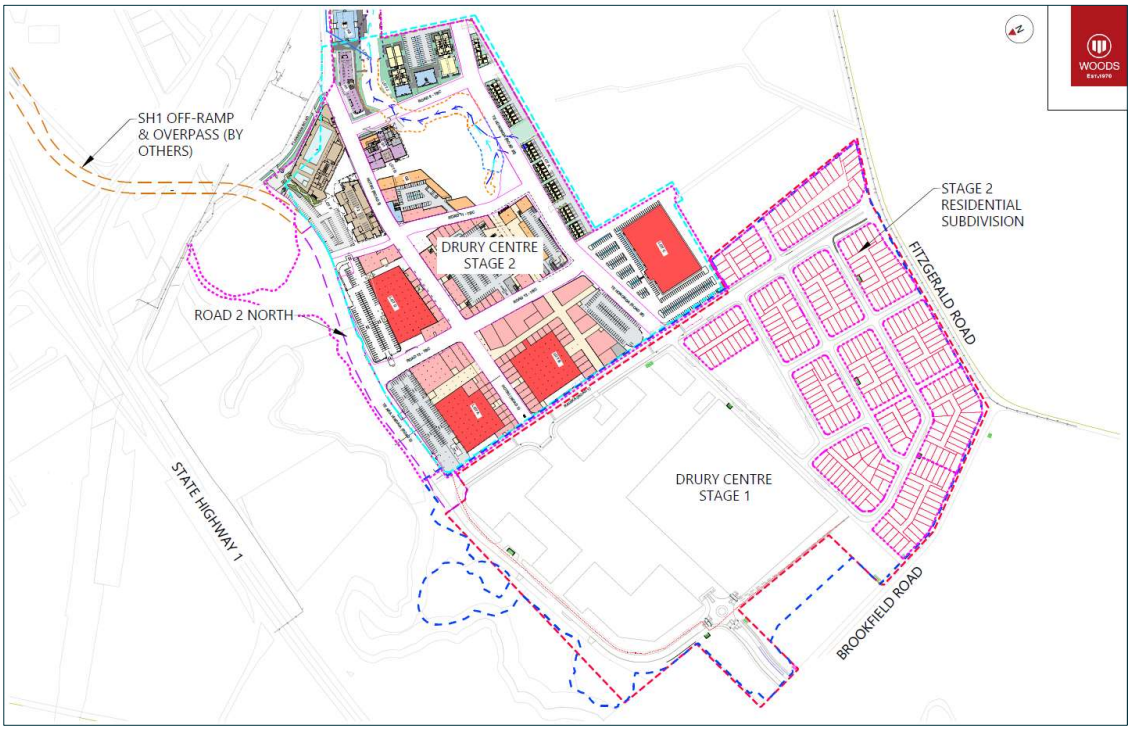

Figure 1. ***Drury Centre Stage 2 Project Location***

2.3. Stage 1 Residential Subdivision

The Drury Town Centre Stage 1 project included 13 residential superlots. As a component of the Stage 2 Fast Track Consent process, the subdivision of these 13 superlots is proposed.

As part of the Drury Town Centre Stage 1 Fast Track Consent (BUN60390224), subdivision of the residential superlots was accounted for in the design. In terms of the infrastructure servicing of these superlots, this was accounted for in the EPA design (ENG6042965). The EPA approved water and wastewater lot connections for each superlot has been designed to accommodate the required capacity for further subdivision of the superlots. Therefore, the approved infrastructure has capacity to service the subdivided superlots.

Each superlot is proposed to be serviced by an 8m wide Jointly Owned Access Lot (JOAL), with integrated footpath. JOALs are proposed to be fully concreted with a maximum 18% impervious area. As per the Stormwater Implementation Management Plan (SIMP)[1] submitted as part of the EPA, up to 18% of the SMAF 1 hydrological mitigation for JOALs and private roads, is accounted for in the two wetlands for Stage 1.

The subdivision of the Stage 1 superlots requires the extension of the stormwater and wastewater networks proposed under BUN60390224 and ENG60429650. These networks have been detailed in evidence of the ability to service each of the proposed Fee Simple lots.

A water network is available in the roadside berm, approved by Veolia on 14/01/25 under ENG60429650. The servicing plans detail how connection to each fee simple lot can be obtained. The Stage 1 development is serviced by power and telecommunication services, sized appropriately to service the anticipated superlot development.

We conclude that there is no barrier to the servicing of the superlot subdivision with this level of development envisaged and designed for in the underlying consenting and design.

2.4. Project Proposal

As shown in Figure 2 this Stage 2 development is part of the broader Drury Metropolitan Centre which incorporates a mix of land uses including retail, residential, accommodation, entertainment, commercial and community activities. This project also includes the subdivision of land to create 10 allotments which will accommodate the aforementioned activities.

[1] Stormwater Implementation Management Plan prepared for Kiwi Property Group Ltd by Woods 13/05/2024 Rev V2

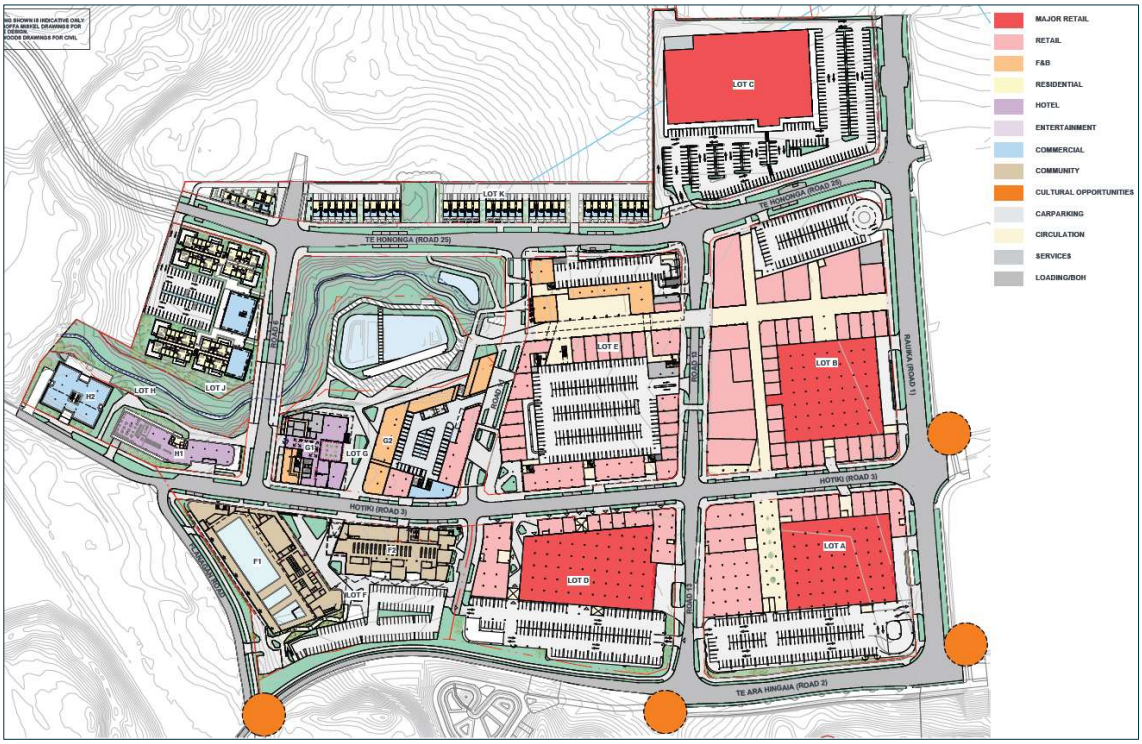

Figure 2. ***Drury Centre Stage 2 Masterplan (Source: Ignite Architects, 14/02/2025)***

The project includes internal roading networks, pedestrian and cyclist connections, and essential servicing infrastructure such as stormwater infrastructure reticulation, stormwater management devices, water supply, wastewater reticulation and utility services.

The Drury Centre Stage 2 development has been designed to integrate with the approved Stage 1 development. The surrounding stream areas will be enhanced through planting, improving the ecological value of both the Hingaia Stream and Stream A.

The development prioritises active transport modes through an extensive network of cycling and pedestrian facilities, ensuring comprehensive connectivity throughout the entire precinct.

The subdivision scheme plan for this project is shown on the application plans, drawing P24-447-02-0001-SC, for which Kiwi Property Holdings No.2 Limited is seeking Land Use and Subdivision Consent.

3. Earthworks

3.1. Plan References

Refer to the 1000 Series Drawing Set submitted as part of this consent application for the detailed earthworks design.

3.2. Existing Consents

The Drury Centre Stage 2 development area contains two previously consented earthworks areas that inform the current development approach. Resource Consent LUC60435472 approved for Interim Earthworks at 120 Flanagan Road across 3.4 hectares, permitting the removal of 130,000m^3 of clay material from site. Additionally, Resource Consent LUC60431681 at 108, 128 and 132 Flanagan Road provided approval for infrastructure Services Connection works, specifically enabling earthworks associated with the construction of the shared user path for the Drury Centre development.

These consented areas are shown in Figure 3, with the Interim Earthworks areas shown in purple, and the earthworks associated with shared user path construction highlighted in blue.

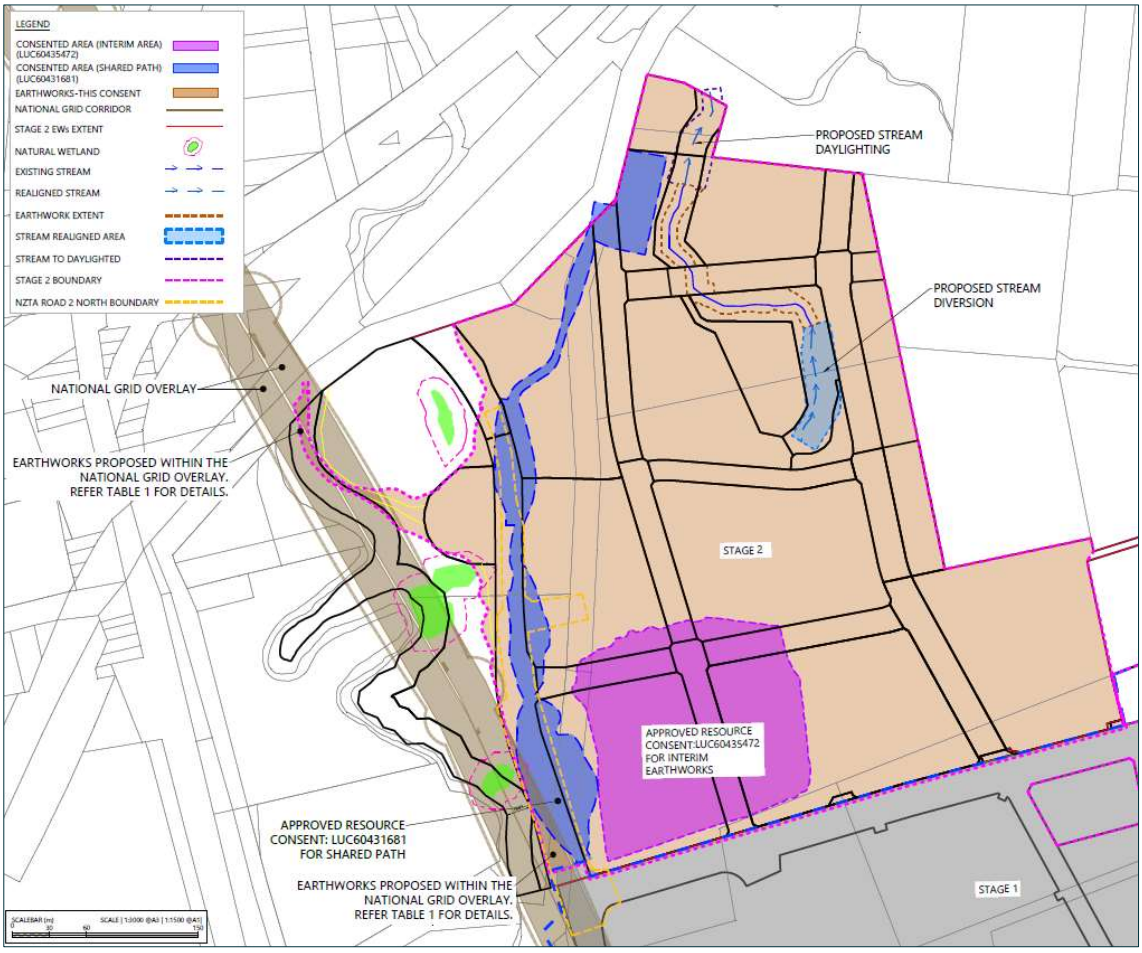

Figure 3. *Consented Earthworks Within Stage 2*

3.3. Overlapping Earthworks

West of the earthworks approved under LUC60431681 are additional earthworks authorised under BUN60423831 that are associated with the NZTA project for construction of the SH1, overpass, and direct connection to the Drury Centre development. Earthworks (and stormwater) associated with the offramp are included in this application, however the roading component is excluded from this application.

3.3.1. National Grid Corridor Overlay Earthworks

There is a portion of Stage 2 earthworks proposed within the national grid corridor overlay and therefore within the specified distances within NZECP 34:2001 (NZ Electrical Code of Practice for Electrical Safe Distances). These are summarised in Table 1 below.

Table 1. Earthworks Within the National Grid Overlay

Consent	m3 cut	m3 fill	Ha area
This application	21	7,200	0.24

All earthworks activities within the national grid overlay will comply with the safe distance guidelines specified in NZECP 34:2001. Appropriate measures, including the implementation of safe working practices and coordination with relevant electrical authorities will be in place to mitigate any risk. These precautions will ensure that the earthworks can proceed safely without compromising the integrity of the national grid infrastructure.

Table 2 summarises how the design will comply with the PA standards in Chapter D26 (National Grid Corridor Overlay) of the Auckland Unitary Plan.

Table 2. Proposed Permitted Activity Standards Compliance with AUP Rules (D26.6.1.1)

Standard	Compliance
D26.6.1.1 Permitted activity standards for Land Disturbance within the National Grid Yard	
(1) Land disturbance must:	
(a) be no deeper than 300mm within 6m of the outer visible edge of the foundations of a national grid tower support structure;	Compliant – there are no earthworks within 6m of the 220kV national grid pylon structures.
(b) be no deeper than 300mm within 2.2m of a national grid pole support structure or stay wire;	Compliant – there are no earthworks within 2.2m of the 220kV national grid pylon structures.
(c) be no deeper than 3m between 6 to 12m from the outer edge of the visible foundation of a national grid tower support structure;	Compliant – there are no earthworks within 12m of the 220kV national grid pylon structures.
(d) be no deeper than 750mm within 2.2 to 5m of a National Grid pole support structure; except that vertical holes not exceeding 500mm in diameter beyond 1.5 from the outer edge of pole support structure or stay wire are exempt;	Compliant – there are no earthworks within 5m of the 220kV national grid pylon structures.
(e) not create an unstable batter that will affect a National Grid support structure; and	Compliant – earthworks are set well apart from the 220kV pylons to ensure that they do not compromise the integrity of any National Grid support structure. The proposed Earthworks designs have been designed and assessed by suitably qualified Geotechnical Engineers where batters will remain stable and not compromise the integrity of any National Grid support structure.
(f) not result in a reduction in the ground to conductor clearance distances below what is required by Table 4 of NZECP34:2001.	From Table 4, for 220kV circuit voltage lines: - **Vertical distance required for conductors to roads = 8.0m**. For the proposed design or land traversable by vehicles (e.g. wetland access track), these have more than 8m vertical clearance. Therefore, this condition is complied with. - **Radial distance in any direction other than vertical on all land = 5.0m.** There are no earthworks within a 5m radial distance of these overhead electric lines. Therefore, this condition is complied with.

3.4. Existing Landform

The Stage 2 project area features varied topography, with elevations ranging from a high point of 31 meters RL (Reduced Level) to a low point of 3 meters RL, representing a significant 28-meter levels change across the site. The land predominantly slopes downward from east to northwest, with the lowest elevations located along the Hingaia Stream. A notable natural feature is a south-north tributary situated in the northern portion of the Stage 2 site (referred to as "Stream A"). This tributary drains into Fitzgerald Stream which ultimately converges with the Hingaia Stream.

3.5. Site Clearance

Significant infrastructure work involving the decommissioning and dismantling of the 110kV Transmission lines and support structure pylons (to the west of the site) has already been completed by Transpower.

Site clearance to prepare the site for the proposed Stage 2 development will include the removal of existing fences, all other buildings and any remaining demolition material.

3.6. Earthworks Overview

The Drury Centre Stage 2 development requires comprehensive bulk earthworks to reshape the existing landform, establish suitable building platforms and to tie in with the design levels from Stage 1 of Drury Centre approved to the south of the project area. LUC60435472 and LUC60431681 enable a portion of the required earthworks, as per the tables below. Additional earthworks are required to complete the Stage 2 development landforms. The approved earthworks consent LUC60435472, enables excess clay material to be removed off site. This area is contained within the Stage 2 area and the volumes have been removed from the Stage 2 information in Table 3. In addition, there is another earthworks consent within the Stage 2 development (LUC60431681), which enables construction of a pedestrian shared path, between Stage 1 and the future train station. These volumes have also been removed from the Stage 2 information in Table 3. The scope and methodology of these works are detailed in the separate earthworks report[2] with expected volumes as per the tables below. Figure 4 illustrates the bulk earthworks within Stage 2.

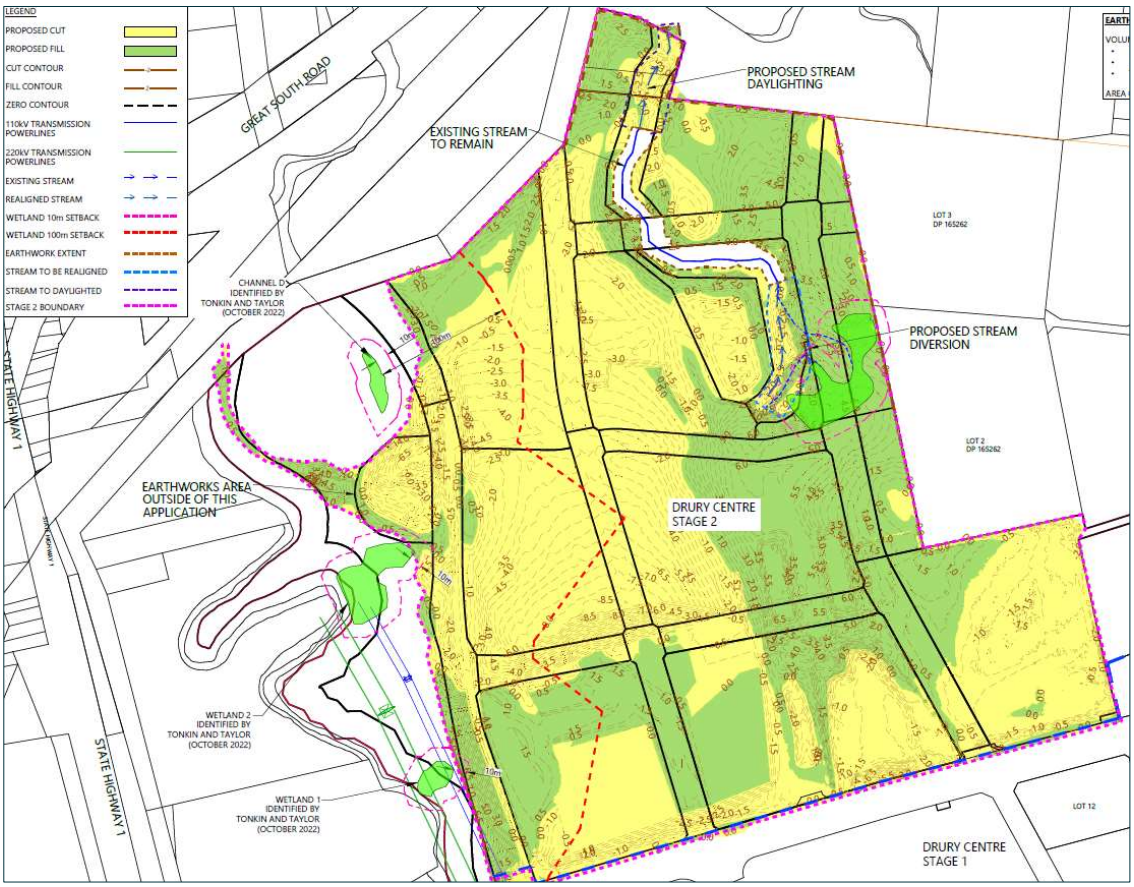

Figure 4. *Stage 2 Cut Fill Plan*

As shown in Figure 4, the proposed Stage 2 earthworks are within 100m of the natural wetlands. To mitigate against any potential impacts, erosion and sediment controls will minimise the discharge of sediment to the receiving environment:

- For works within 50m of existing streams and a super silt fence will be erected between the works and the stream. The super silt fences will provide a backup protection in the unlikely event that the primary erosion and sediment control devices and measures fail. Alternatively, oversized and well compacted bunds will be constructed.

[2] Earthworks Methodology Report prepared for Kiwi Property Holding No. 2 Limited by Woods 28/02/2025 Rev V4

- For works areas that are not within 50m of existing streams and waterways: grass filter strips will be utilised prior to entering existing streams and waterways to contain any uncontrolled discharges. These will be minimum 50m wide.

For Overland Flow Paths (OLFPs), these will be managed using erosion and sediment controls during earthworks, including:

- Dirty water diversion bunds coupled with a super silt fence along the upstream edge of OLFPs.
- Super silt fence along the downstream edge of OLFPs.
- Sediment retention ponds to capture and settle out sediments before water flows off-site or into nearby wetlands or streams. These are sized and designed to handle high runoff volumes and prevent sediment from moving downstream.

Regular monitoring during and after construction will be carried out as part of the earthworks methodology to detect for any signs of erosion, sediment buildup, or changes in flow direction. Any issues will immediately be addressed and actioned.

Riparian restoration is proposed to line the proposed stream diversion. This will provide additional stability to the flow paths and prevent the water from eroding the landscape, as well as filter out contaminants before they reach sensitive areas.

The management of site topsoil will follow best practice procedures, involving systematic stripping and stockpiling for future reuse. This will be redistributed across the project area, primarily within the development lots, landscaped areas, roadside berms, and the Hingaia Stream riparian margins. Any surplus topsoil will be removed from the site, via third party topsoil merchant(s).

A summary of the earthworks is included in Table 3 below. The area and volume of earthworks proposed within the 10m riparian margins in Hingaia Stream and Stream A are quantified in Table 4 and Table 5.

Table 3. Cut and Fill Balances

Consent	m3 cut	m3 fill	Ha area
LUC60435472 at 120 Flanagan Road	133,501	-	3.4
LUC60431681 national grid corridor overlay	6,450	13,730	1.1725
This application	212,225	195,873	20.85

Table 4. Earthworks Within Riparian Margins (Hingaia Stream)

Consent	m3 cut	m3 fill	Ha area
This application	8	251	.046

Table 5. Earthworks Within Riparian Margins (Stream A)

Consent	m3 cut	m3 fill	Ha area
This application	3,200	7,150	1.10

Table 6. Earthworks Within a Sediment Control Protection Area (Stream A) 50m landward of a stream

Consent	m3 cut	m3 fill	Ha area
This application	12,585	39,844	3.38

3.6.1. Proposed Retaining Wall

A timber pole retaining wall 108m long is proposed along the eastern border of the Stage 2 boundary. The proposed location and long-section is shown in Figure 5. The wall is typically 2.9m high with a maximum height of approximately 3.20m. Due to the retained height, a suitable barrier will be required in conformance with NZBC:F4. Further details and design will be provided as part of the eventual building consent abutting Lot 2 DP165262.

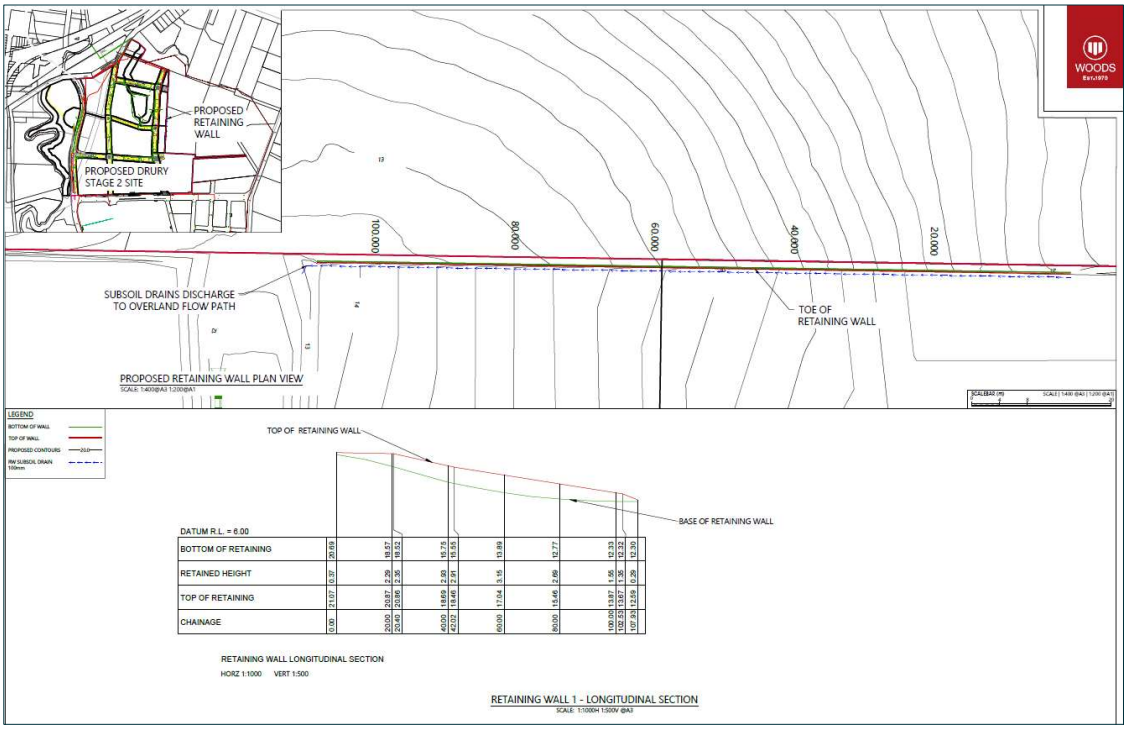

Figure 5. *Proposed Retaining Wall 1*

3.7. Ecology

Stage 2 of the Drury Metropolitan Centre development encompasses works affecting streams, wetlands, and terrestrial environments. A comprehensive Ecological Management Plan[3] has been carried out, documenting the ecological values present and potential effects of the proposed development. This assessment has informed the development of detailed management approaches and restoration strategies for the project. The following key points summarize the ecological aspects and proposed management framework:

- Stream Modifications: The project includes permanent reclamation of 79m of stream, realignment of 97m, and daylighting of approximately 80m of piped stream. Detailed stream assessments have been completed and are documented in the Ecological Impact Assessment.
- Wetland Impacts: Works are proposed within 10m and 100m of natural inland wetlands. The extent and values of these wetlands have been assessed and documented in the supporting ecological reports and in the section below.

[3] Drury Metropolitan Centre: Stage 2 Ecological Management Plan prepared for Kiwi Property Holding No. 2 Limited by Tonkin & Taylor February 2025 V0.3

- Terrestrial Vegetation: Site investigations have confirmed the vegetation types and ecological values present. Vegetation clearance will be required as part of the development works.
- Native Fish: Fish surveys including eDNA sampling have been completed, confirming the presence of native fish species. Management measures are detailed in the Native Fish Relocation Plan.
- Bird Values: Bird surveys have been completed to assess the site's importance for native avifauna. Management requirements are outlined in the Avifauna Management Plan.
- Bat Assessment: Bat habitat assessments have been undertaken considering the site's proximity to known bat populations. Specific protocols are provided in the Bat Management Plan.
- Lizard Values: Site investigations have assessed potential lizard habitat and presence. Management approaches are detailed in the Lizard Management Plan.
- Restoration Planning: Detailed riparian and wetland restoration plans have been developed based on site assessments and Auckland Council guidelines. Implementation will follow completion of works.
- Management Framework: A comprehensive Ecological Management Plan has been prepared incorporating all required management protocols and restoration approaches based on the completed ecological investigations.

For detailed information on ecological values, effects assessments and specific management requirements, refer to the Ecological Management Plan and associated management plans.

3.7.1. Wetland Impact Assessment

The impact of earthworks on the natural wetlands identified by Tonkin and Taylor has been assessed. The location of these are existing wetlands shown in Figure 4. The area and volume of earthworks proposed within 10m and 100m of these existing wetlands are summarised in Table 7 and Table 8, and discussed further in this section.

Table 7. Earthworks Within 10m of Wetlands

Consent	m3 cut	m3 fill	Ha area
Wetland 1	0	700	0.16
Wetland 2	17	150	0.40
Channel D Wetland	0	0	0.18

Table 8. Earthworks Within 100m of Wetlands

Consent	m3 cut	m3 fill	Ha area
Wetland 1	15,373	25,506	4.28
Wetland 2	66,130	5,207	5.59
Channel D Wetland	34,963	5,569	4.73

Where proposed earthworks are within the designated margins of these existing wetlands, we commit to implementing best practice erosion and sediment control measures throughout the duration of the earthworks to minimise any potential environmental impact. Protective measures including erosion control and sediment management, will be implemented to safeguard the wetland environment and maintain its ecological integrity throughout the project.

3.7.1.1. Existing Wetland 1

For existing Wetland 1, there are proposed earthworks within 100m of the wetland. However, the earthworks planned will not modify the wetland catchment, with runoff from the proposed earthworks expected to flow into the existing catchment and to the same discharge points.

3.7.1.1. Existing Wetland 2

Proposed Wetland 2-2 is within 10m of existing Wetland 2. As shown in Figure 6, the stormwater outlet from the proposed wetland will eventually discharge into Wetland 2. High flows will also be diverted toward Wetland 2. Before discharge into the existing wetland, the stormwater outlets will discharge onto riprap rock structures designed to dissipate flow energy, minimising the potential erosion and adverse impacts. Additionally, further proposed measures will be implemented including green outfall planting and strategic river rock placement to naturalise and provide scour protection, as well as preserve the ecological value of the wetland, ensuring that its natural functions and habitat integrity are maintained. These measures support the maintenance of natural wetland base flows.

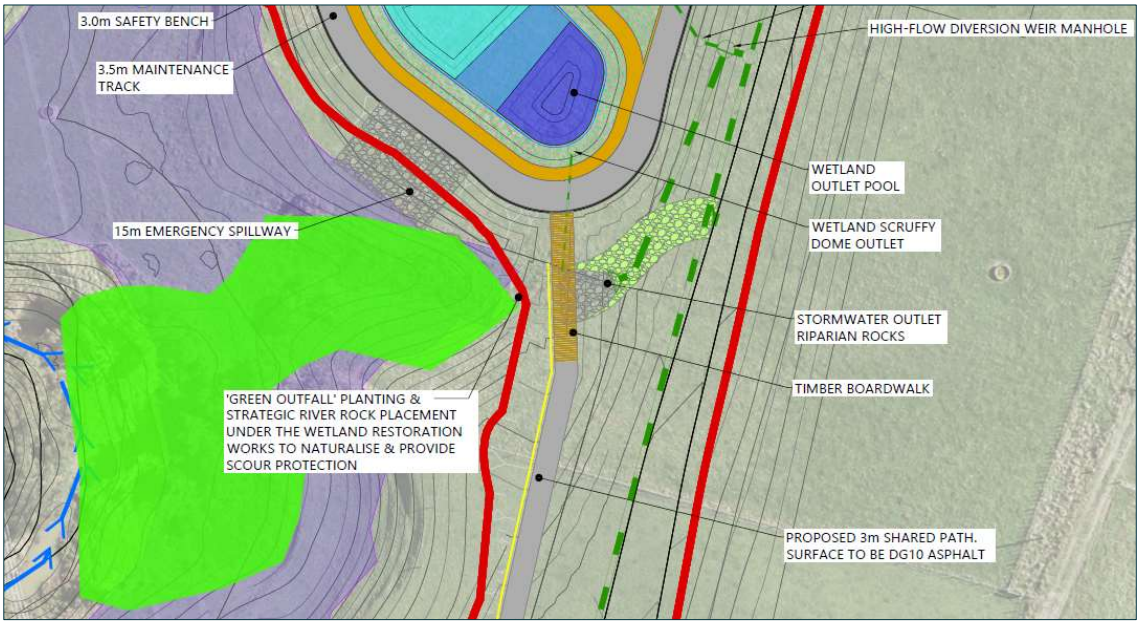

Figure 6. ***Proposed Wetland 2-2 Outlets to Existing Wetland 2***

The emergency spillway for the Proposed Wetland will discharge away from Existing Wetland 2 and be directed towards Hingaia Stream.

3.7.1.1. Existing Channel D Wetland

There are proposed earthworks within 10m and 100m of existing Channel D Wetland. However, the earthworks planned will not modify the wetland catchment, with runoff from the proposed earthworks are expected to flow into the existing catchment and to the same discharge points.

3.8. Proposed Stream A Realignment

The Drury Centre Stage 2 development will require modifications to the existing watercourse, particularly Stream A to facilitate establishment of the roading network and Drury Boulevard in particular which is identified as a key structuring element in the precinct provisions. This realignment has been designed to balance the constraints associated with the precinct provisions, the Drury Boulevard Corridor width and minimising stream works as much as practical.

The realignment is discussed in Tonkin and Taylor's Ecological Management Plan[3]. In summary the removal of existing farm culverts across the 73m of existing permanent stream length being realigned, will significantly enhance ecological values. It will result in improved fish passage, habitat and riparian planting.

Currently 10m of the stream length is culverted. The realigned channel will be 57m long, resulting in a net loss of approximately 16m of the existing stream length. The width of the wetted stream bed in the realigned channel will be 2.9m. Figure 7 shows an indicative cross-section of the design.

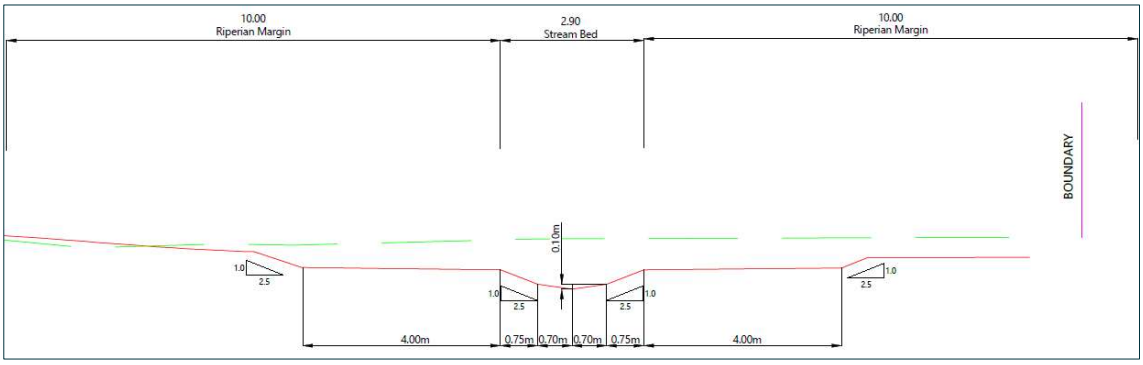

Figure 7. ***Stream A Realignment Cross-Section***

The construction methodology for this will be done in accordance with Auckland Council's "Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region" (GD05, August 2023). It is highlighted in Woods Earthworks Methodology Report, and is summarised as follows:

- The realignment of Stream A can occur before or after the daylighting of the bottom section of the stream.
- Prior to commencing work, a downstream bund will be constructed.
- Coordination is to be confirmed with T&T for fishing and ecology considerations. Temporary fish recovery programme will be undertaken prior to construction commencement and during works.
- Topsoil bunds will be utilised to divert clean water around the construction area and into sediment retention ponds, without placing any bund in the stream near the works area.
- Work will involve topsoil stripping, material removal, cut and fill operations for final levels.
- The works area will be stabilised upon completion of the project.
- Inspection will ensure that no contaminated water is discharged into the works area.
- Following completion, the downstream bund will be removed promptly and the area stabilised.

3.9. Proposed Stream A Daylighting

Daylighting of existing Stream A will involve partially decommissioning the existing culvert, and the new stream will be reinstated along the alignment of its approximate or original location, connecting to the Fitzgerald Stream. The existing culvert is approximately 112m in length. Approximately 80m of stream will be daylighted and approximately 99.7m of Stream A realigned. Enabling works will be undertaken prior to the commencement of the bulk earthworks.

All proposed modifications have been designed in accordance with current technical standards and environmental guidelines, ensuring a balance between development objectives and sustainable ecological outcomes.

Table 9 summarises how the design will comply with the PA standards in Chapter E3 (Lakes, rivers, streams and wetlands) of the Auckland Unitary Plan and Regulation 70(2) of the NES for Freshwater.

Table 9. Proposed Daylighting Compliance with AUP Rules (E3.6.1.10 & E3.6.1.13)

Standard	Compliance
E3.6.1.10 All works on existing structures must comply with all of the following standards	
During the activity bed disturbance upstream or downstream of the structure must not exceed 10m either side, excluding the length of the structure	Compliant, will be managed. Drawing P24-447-01-1160-DR highlight that the works will be well within the 10m riparian margin on either side of the stream.
Best practice erosion and sediment control measures must be used to minimise any discharge of sediment, including sediment impounded behind an existing structure	The Woods Earthworks Methodology Report highlights a comprehensive construction methodology for working in the stream bed. These works will be done in accordance with GD05. This is also discussed in Section 3.8.
Debris or other material must not be re-deposited elsewhere in the bed of the lake, river or stream, or within the one per cent annual exceedance probability (AEP) flood plain	Compliant - refer to comment in Row 2 above.
The activity must not cause more than minor bed erosion, scouring or undercutting immediately upstream or downstream	Compliant - refer to comment in Row 2 above.
The activity must not compromise the structural integrity of the structure	Compliant - refer to comment in Row 2 above.
E3.6.1.13	
The structure must be removed from the bed as far as practicable	Compliant - refer to comment in Row 2 above.
Any remaining sections must not be a hazard to public access, navigation or health and safety	The design of the culvert will ensure that any remaining sections do not pose a hazard to public access, navigation, or health and safety. All potential risks will be assessed, and appropriate safety measures, such as signage, barriers, or modifications, will be implemented to mitigate any hazards. Hazard mitigation will be assessed in the Safety in Deign register. This will be done in full compliance with the AUP to ensure the safety and well-being of the public.
The bed must be restored to a profile that does not inhibit water flow or prevent the passage of fish upstream and downstream in waterbodies that contain fish.	The design will ensure that the reinstated streambed is restored to a profile that facilitates unimpeded water flow and enables the passage of fish both upstream and downstream. Coordination will be made between Woods and Tonkin and Taylor during this process. Appropriate design measures will be incorporated to create a natural flow path that supports fish migration, in full compliance with the AUP requirements for waterbodies containing fish. As mentioned in Tonkin and Taylor's Ecological Impact Assessment, the realignment of Stream A results in improved fish passage.

3.10. Structures

The design of Road 5 incorporates a crossing structure over Stream A which is proposed to be implemented as an arch culvert. This culvert will be approximately 48.9m in length. The final design specifications are to be determined and documented in the Engineering Plan Approval (EPA) plans. This arched culvert requires discretionary activity consent because it will not be parallel to the direction of water flow. However, this culvert will be designed and constructed to the relevant permitted activity standards in Chapter E3 of the AUP for culvert structures. Table 10 summarises how the design will comply with the PA standards in Chapter E3 (Lakes, rivers, streams and wetlands) of the Auckland Unitary Plan and Regulation 70(2) of the NES for Freshwater (Table 11).

Table 10. Proposed Structure Compliance with AUP Rules (E3.6.1.14 and E3.6.1.18)

Standard	Compliance
E3.6.1.14 All works on existing structures must comply with all of the following standards	
Structure length to comply with: (a) the total length of any extended structure must not exceed 30m measured parallel to the direction of water flow. This includes the length of any existing structure and the proposed extension but excludes erosion or scour management works; (b) any required erosion or scour management works must not exceed 5m in length, either side of the extended structure. Such works protruding into the bed do not require a separate consent as they are authorised under this rule; and (c) a new structure must not be erected or placed in individual lengths of 30m or less where this would progressively encase or otherwise modify the bed of a river or stream	(a) The proposed length of the arch culvert is approximately 20m long. (b) Will be compliant with this standard. (c) The arch culvert is proposed to be one length of structure.
During construction bed disturbance upstream or downstream of the structure must not exceed 10m either side, excluding the length of the structure.	Bed disturbance during construction will not exceed this 10m standard on either side.
The structure must not prevent the passage of fish upstream and downstream in waterbodies that contain fish, except that temporary restrictions to fish passage may occur to enable construction work to be carried out.	Coordination is to be confirmed with Tonkin and Taylor regarding fish passage considerations. However, the intention is to maintain fish passage.
The structure must not cause more than minor bed erosion, scouring or undercutting immediately upstream or downstream.	The culvert will incorporate erosion and scour protection measures to reduce erosion around the culvert inlet and outlet. Scouring and erosion will be minimised because of the proposed structure and erosion and scour management works associated with it.
Construction material and ancillary structures must be removed from the bed following completion of the activity.	Upon completion of the culvert construction, all construction materials and ancillary structures will be removed from the bed in accordance with the AUP requirements. Any temporary works or materials used during construction will be carefully cleared to ensure that the bed is restored to its natural state, ensuring minimal environmental impact.
Other than provided for by another rule, the activity must not increase the height or storage capacity of any existing dam	Not applicable – no existing dams involved
The 1per cent annual exceedance probability (AEP) flood shall be accommodated by the structure and/or by an overland flow path without increasing flood levels up stream or downstream of the structure, beyond the land or structures owned or controlled by the person undertaking the activity	The culvert design will accommodate the 1 per cent annual exceedance probability (AEP) flood by ensuring that the structure and/or an overland flow path can safely convey this flow. The structure will be designed, sized and aligned so that overland flow continuity upstream and downstream of the site is maintained. Hydrological modelling will be undertaken to confirm that there are no upstream or downstream effects of the proposed structure.
Calculation of flow rates will be made using the Auckland Council Technical Publication 108: Guideline for stormwater runoff modelling in the Auckland Region, April 1999	Flow rates for the proposed culvert design will be calculated in accordance with this guideline for accurate estimation of stormwater runoff and flow rates for the culvert system
E3.6.1.18	
The 1 per cent annual exceedance probability (AEP) flood shall be accommodated by the structure and/or by an overland flow path without significantly increasing flood levels up stream or downstream of the structure.	The culvert design will accommodate the 1 per cent annual exceedance probability (AEP) flood by ensuring that the structure and/or an overland flow path can safely convey this flow. The structure will be designed, sized and aligned so that overland flow continuity

	upstream and downstream of the site is maintained. Hydrological modelling will be undertaken to confirm that there are no upstream or downstream effects of the proposed structure.
Culverts must be constructed of inert materials with a design life of at least 50 years.	The culvert will be constructed using inert materials that are durable and suitable for long-term performance. The materials selected will have a design life of at least 50 years, to comply with this standard. This ensures the culvert's structural integrity and functionality over the specified design lifespan.

Table 11. Proposed Structure Compliance with the Resource Management (National Environmental Standards for Freshwater) Regulations 2020

Standard	Compliance
(a) The placement, use, alteration, extension, or reconstruction of a culvert, in, on, over, or under the bed of any river or connected area is a permitted activity if it complies with the conditions. *Conditions* (b) The conditions are that –	(a) The design of the culvert will be detailed further in the Engineering Approval stage and designed to be compliant with this requirement.
(a) The culvert must provide for the same passage of fish upstream and downstream as would exist without the culvert, except as required to carry out the works to place, alter, extend, or reconstruct the culvert; and	(a) The culvert has been designed and will be constructed to enable the same fish passage conditions upstream and downstream as would naturally exist without the culvert.
(b) The culvert must be laid parallel to the slope of the bed or river or connected area; and	(b) The culvert has been designed to be parallel to the stream bed.
(c) The mean cross-sectional water velocity in the culvert must be no greater than that in all immediately adjoining river reaches; and	(c) The design of the culvert will be detailed further in the Engineering Approval stage. It will be designed to ensure that the mean cross-sectional water velocity within the culvert will not exceed the velocity in the immediately adjoining stream reaches, maintaining hydraulic continuity and minimizing any adverse effects on the stream's flow and aquatic life.
(d) the culvert's width where it intersects with the bed of the river or connected area (s) and the width of the bed at that location (w), both measured in metres, must compare as follows: i. where $w \leq 3$, $s \geq 1.3 \times w$: ii. where $w > 3$, $s \geq (1.2 \times w) + 0.6$; and	(d) The design of the culvert will be detailed further in the Engineering Approval stage and designed to be compliant with this requirement.
(e) the culvert must be open-bottomed or its invert must be placed so that at least 25% of the culvert's diameter is below the level of the bed; and	(e) Refer to comment (d) above.
(f) the bed substrate must be present over the full length of the culvert and stable at the flow rate at or below which the water flows for 80% of the time; and	(f) Refer to comment (d) above.
(g) the culvert provides for continuity of geomorphic processes (such as the movement of sediment and debris).	(g) Refer to comment (d) above.

3.11. Geotechnical Investigations

A geotechnical investigation report was prepared by Aurecon[4] for the wider Drury Centre Subdivision, and an addendum report to that by CMW Geosciences (CMW) for Drury Centre Stage 2[5]. This section summarises the findings from CMW's report for the Stage 2 project extent.

3.11.1. Liquefaction

Liquefaction was assessed and the general finding was that the soils were non-liquifiable, with maximum SLS settlements of 0mm and ULS of <10mm. As such, it was found that no additional assessment would be required.

3.11.2. Slope Stability

Specific slope stability analysis was carried out by Aurecon. Based on site walkovers and reviews of aerials, and an analysis on a section of the western slope north of Stage 2, Aurecon concluded that there was generally no evidence of active or recent slope instability.

In conclusion, Aurecon recommended conducting a detailed stability analysis upon completion of the earthworks design, with CMW specifically highlighting a detailed analysis for the stream realignment area.

3.11.3. Static Settlement / Compressible Soils

Static settlements were assessed, considering the building platform layouts for Stage 2 are yet to be confirmed. It was stated that post-construction settlement and differential settlements should be less than 50mm to be within code limits.

Lot 35 was found to have greatly exceeded the above allowable total settlement levels and highlighted as an issue. Therefore, it is recommended that additional CPT testing be carried out on this lot to further characterise the settlement risk.

Overall, it was concluded that future development loads would be needed to confirm whether any ground improvements be required as part of the earthworks, and that a preload-surcharge carried out across the lot platforms to mitigate settlements to acceptable levels.

A separate Static Settlement memo is appended to CMW's Geotechnical report providing more in-depth settlement assessments as well as settlement monitoring mitigation measures during and after construction.

3.11.4. Expansive Soils

Lab testing of liquid limits and linear shrinkage were carried out, suggesting that the values were higher than what is permitted by the standards outlined in NZS3604:2011. It was recommended that further specific testing be carried out following earthworks for expansive soils, and that the design of building foundations consider expansive soils.

3.11.5. Groundwater Considerations

It was concluded that bulk earthworks and services trenches were unlikely to encounter groundwater as part of the earthworks, and therefore permanent dewatering is not required.

3.12. Contamination Assessment and Remediation Strategy

The Stage 2 development site comprises predominantly greenfield land, previously utilised as rural/lifestyle blocks. Detailed site investigations have been undertaken to assess potential contamination risks associated

[4] Drury Centre Geotechnical Investigation Report prepared for Kiwi Property Holdings No.2 Ltd by Aurecon 04/10/2022 Rev 5

[5] Drury Centre Stage 2 Addendum Geotechnical Investigation Report prepared for Woods by CMW Geosciences 29/11/2024 Rev A

with historical land uses. The Detailed Site Investigation (DSI) conducted by Aurecon[6] identified three distinct areas requiring contamination management.

Following the DSI findings, a comprehensive Remedial Action Plan (RAP) was prepared by Engeo Ltd[7] for the Stage 2 project extent. Soils around building halos which exceeded remedial criteria have been removed and validated.

Soil testing was carried out at 108 and 120 Flanagan Road where surface soils around the former residences contained lead at concentrations exceeding the AUP Permitted Activity (environmental) criterion and / or the published range of background concentrations. These areas have been successfully remediated.

Additional characterisations for three areas were made and reported on in the RAP. In summary, remediation will be required for 64 Flanagan Road. Contamination for these areas are summarised as follows:

- 64 Flanagan Road – historical fill and fertiliser storage characterisation:
    - Asbestos is present as 'asbestos containing material' above published human health criteria in an area of undocumented fill. This is in relation to fragments of fibre cement tiles that are likely to contain asbestos. Remedial earthworks will be required to remove this fill. Controls for earthworks involving this are included in the report.
- 68 Flanagan Road – historical fill:
    - Asbestos was detected at a concentration equivalent to the human health criterion.
    - Heavy metals / metalloids and Polycyclic Aromatic Hydrocarbons (PAHs) were identified above the AUP Permitted Activity (environmental) criteria, but below relevant remedial criteria.
- 108 Flanagan Road – historical fill:
    - Asbestos was detected at a concentration below the human health criterion. Heavy metals (above the environmental discharge criteria) were detected.
    - The area is not planned to be earthworked, however it is within the site boundary. Groundwater monitoring will be carried out, and whilst the results may render that no remediation will be required, the presence of this contamination must be identified in a long-term monitoring and management plan to ensure its proper management moving forward.

3.12.1. Remedial Strategy

The remedial strategy for 64 Flanagan Road is the removal of soil with contaminants above the adopted human health and environmental criteria. The estimated volume is 210m3 over an area of 350m2. Remedial works shall be completed prior to the bulk topsoil strip to minimise the potential for accidental mixing of impacted soils with non-impacted soils and shall be undertaken in accordance with the controls listed in the RAP.

4. Erosion and Sediment Control

4.1. Plan References

Refer to the 1000 Series Drawing Set submitted as part of this consent application for the detailed Erosion and Sediment Control Plan.

[6] Drury Centre Project Detailed Site Investigation prepared for Kiwi Properties Holdings Ltd by Aurecon02/03/2021 Rev 1

[7] Remedial Action Plan – Stage 2 Drury Development prepared for Woods Limited by ENGEO Ltd 29/01/2025 Rev 06

4.2. Principals & General Approach

Erosion and sediment control measures for Drury Centre Stage 2 have been designed in accordance with Auckland Council's "Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region" (GD05, August 2023). The site's erosion and sediment management will be implemented through a combination of new controls including new sediment retention pond, bunds and silt fences, proposed as part of this application, and controls consented under the previously referenced consents (LUC60435472 and LUC60431681).

Ongoing monitoring of these control measures will continue throughout the duration of the earthworks consent period. The controls will remain active until lot areas are stabilised. Refer to the Drury Centre Stage 2 Bulk Earthworks – Earthworks Methodology Report, prepared by Woods.

This comprehensive erosion and sediment control strategy ensures effective environmental protection during the construction phase while maintaining compliance with all regulatory requirements and industry best practices.

5. Roading

5.1. Plan References

Refer to the 2000 Series Drawing Set and Integrated Traffic Assessment (dated February 2025) submitted as part of this consent application for detailed roading design.

5.2. General Road Design & Philosophy

Figure 8 below illustrates the proposed roading network for Stage 2 of the Drury Centre development which is consistent with the key roading infrastructure elements and road network envisaged in the Drury Centre Precinct provisions. The network includes two public roads to be vested with Auckland Council, one private Key Retail Street, and three private local roads, which provide internal east-west connections.

Road 2 North extends from the proposed State Highway 1 off-ramp and is part of the NZTA Drury State Highway 1 Off-Ramp project.

Kiwi Property Group Holdings No.2 Limited will retain ownership and maintain responsibility for all private roads within the development.

All intersections will be signalised, except for one give-way controlled intersection, optimising traffic flow throughout the development and allowing safe pedestrian movement.

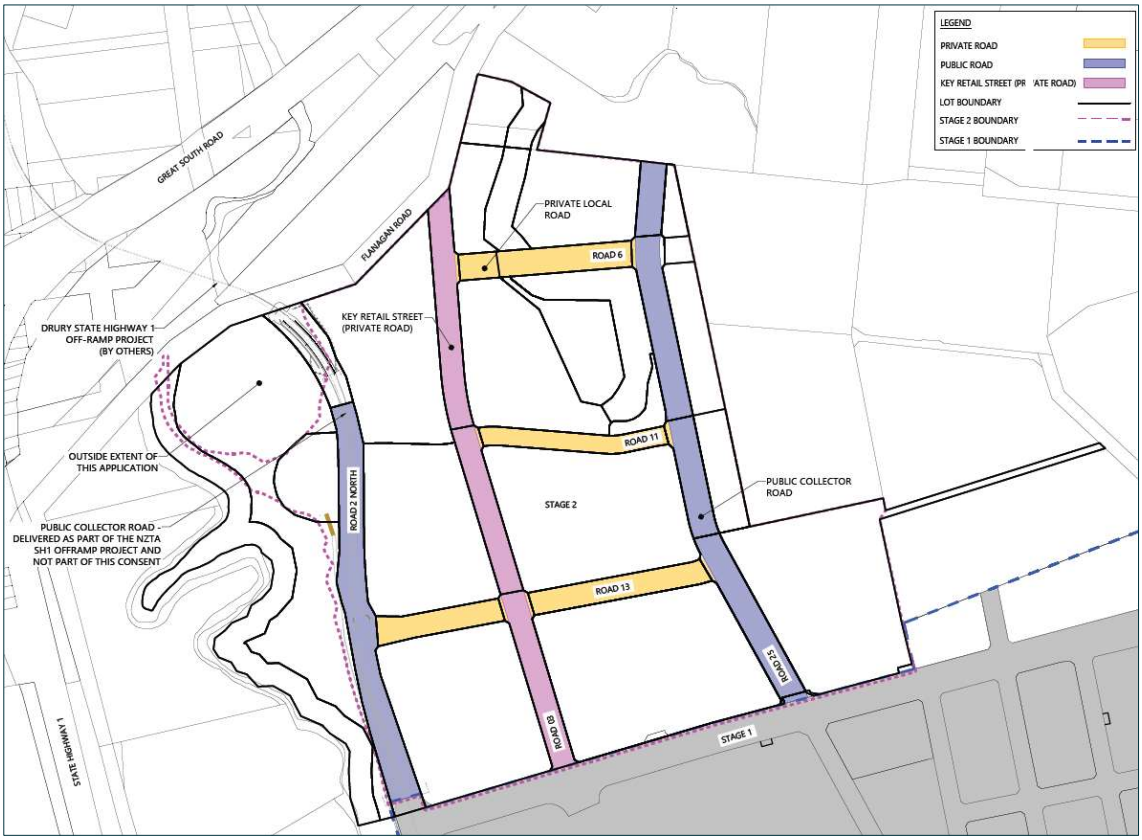

Figure 8. ***Stage 2 Proposed Roading Layout***

5.3. Typical Road Typologies

The road network for Drury Centre Stage 2 incorporates three distinct typologies from the Drury Centre precinct provisions – Collector Roads (Drury Boulevard), Key Retail Street, and Local Roads, as detailed in the 2000 series consent drawings.

The Collector Road features a 23m wide road reserve and the cross-section includes indented parking bays, footpaths, and landscaped or grassed berms between these features.

The private Key Retail Street is the pedestrian-focused environment for commercial activities, designed as a 20.4m wide reserve that encourages pedestrian activity. The cross-section includes two-way traffic lanes, indented parking bays, and footpaths on both sides, enhanced by landscaped berms that provide a buffer and aesthetic appeal.

The local road network comprises three private roads designed to create a low-speed environment. East-west connections feature a 16m road reserve with a 6.4m wide carriageway indented parking bays, footpaths and landscaping.

5.4. Design Speeds & Speed Management

The road network within Drury Centre Stage 2 has been designed with low operating speeds to ensure safe movement throughout the development. The Collector Road is designed for 40 km/hr, while both the Key Retail Street and Local Roads operate at 30 km/hr.

Speed management is achieved through the proposed urban environment and signalised intersection. Raised tables at key pedestrian crossing points provide additional speed control while enhancing pedestrian safety. These measures create a safe environment that supports both vehicular and pedestrian movement while meeting Auckland Transport requirements.

5.5. Intersection Design

The Drury Centre Stage 2 roading network includes seven intersections, all designed to ensure efficient traffic flow and safety for all users. Six of these intersections will be signalised, while one will feature give-way control. The design incorporates key safety and accessibility features to prioritise safe and smooth traffic movement for road network users.

6. Stormwater

The stormwater management approach for Drury Centre Stage 2 focuses on implementing an integrated design philosophy that aligns with Auckland Council requirements while protecting and enhancing the natural environment. The development incorporates both water quality treatment and quantity management through various measures.

6.1. Plan References

Refer to the 3000 Series Drawing Set and the Woods Stormwater Report submitted as part of this consent application for detailed stormwater design.

6.2. Design Philosophy

The stormwater management strategy adopts a comprehensive approach that includes flood management, hydrological mitigation, and water quality treatment. All impervious surfaces within the development will meet SMAF 1 hydrological mitigation requirements. The design prioritizes the use of communal treatment devices where practical, incorporating raingardens and bioretention systems for both public roads and private areas.

6.3. Treatment Devices and Management

6.3.1. Wetland 2-1 & 2-2

Two communal wetlands provide primary stormwater treatment systems for the development. Both are proposed to be privately owned and maintained devices. Wetland 2-2 will be integrated within the Hingaia reserve area, while Wetland 2-1 will be positioned adjacent to Stream A. Wetland 2-2 will be constructed as part of this consent, with capacity to provide mitigation for the Drury Stage 2 project, as well as servicing the access road delivered as part of the SH1 offramp project for NZTA.

These two strategically located devices will provide comprehensive stormwater management, delivering both water quality treatment and hydrological mitigation for runoff from roads, carparks, and future development zones. The wetlands have been carefully positioned to maximise their amenity value to the community while ensuring they remain outside the Hingaia Stream's 100-year flood plain.

Stormwater management for the project will be implemented through privately owned and maintained treatment devices. This integrated system incorporates underground storage tanks for roof runoff management, complemented by bioretention systems designed specifically for parking area drainage. All components have been engineered to provide appropriate retention and detention volumes that fully comply with GD01 requirements, ensuring effective stormwater control across the retail zone.

6.3.2. Raingardens

The rain gardens proposed for Drury Centre Stage 2 have been designed in accordance with Auckland Council's GD01 guidelines and the Auckland Transport Design Manual specifications. Each rain garden incorporates engineered filter media, subsoil drainage, and overflow structures sized to treat the water quality flow (calculated at a 10mm/hour rainfall intensity). These devices provide both retention and detention to meet SMAF 1 hydrological mitigation requirements while serving as attractive landscape

features that enhance the urban environment. All rain gardens within road reserves have a minimum surface area of 20m^2 and include appropriate access for long-term maintenance.

6.4. Network Design

The stormwater network has been designed to convey flows up to the 10-year ARI event through a piped system ranging from 225mm to 1950mm diameter. For events exceeding the pipe network capacity, overland flow paths have been incorporated into the road layout to safely convey flows toward designated discharge points. The network design ensures that building platforms maintain appropriate freeboard above the 100-year flood levels.

6.5.Discharge Management

The design includes carefully considered outfall structures to the existing streams, incorporating energy dissipation and erosion protection measures. Water quality treatment is provided through bioretention devices before discharging to the stream, with specific attention given to maintaining pre-development flow regimes to support stream health and ecology. The stormwater outfall structures will comply with the PA standards in E3.6.1.14 and is summarised in Table 12.

Table 12. Proposed Outfall Structures Compliance with AUP Rules (E3.6.1.14)

Standard	Compliance
E3.6.1.14	
Structure length to comply with: (a) the total length of any extended structure must not exceed 30m measured parallel to the direction of water flow. This includes the length of any existing structure and the proposed extension but excludes erosion or scour management works; (b) any required erosion or scour management works must not exceed 5m in length, either side of the extended structure. Such works protruding into the bed do not require a separate consent as they are authorised under this rule; and (c) a new structure must not be erected or placed in individual lengths of 30m or less where this would progressively encase or otherwise modify the bed of a river or stream	The outfall structures have been designed to have full compliance with the AUP requirements.
During construction bed disturbance upstream or downstream of the structure must not exceed 10m either side, excluding the length of the structure.	During the construction of the stormwater outfall, bed disturbance upstream and downstream of the structure will be carefully managed to ensure it does not exceed this requirement. Construction methods will be designed to minimise disturbance.
The structure must not prevent the passage of fish upstream and downstream in waterbodies that contain fish, except that temporary restrictions to fish passage may occur to enable construction work to be carried out.	Coordination is to be confirmed with T&T regarding fish passage considerations. However, the intention is to maintain fish passage.
The structure must not cause more than minor bed erosion, scouring or undercutting immediately upstream or downstream.	The design of the stormwater outfall will ensure that the structure does not cause more than minor bed erosion, scouring, or undercutting immediately upstream or downstream. Hydraulic modelling and appropriate design measures, such as erosion control and flow energy dissipation techniques, will be implemented to minimise the risk of such impacts and ensure compliance with the AUP requirements.
Construction material and ancillary structures must be removed from the bed following completion of the activity.	Upon completion of the stormwater outfall construction, all construction materials and ancillary structures will be removed in accordance with the AUP requirements. Any

	temporary works or materials used during construction will be carefully cleared to ensure that the bed is restored to its natural state, ensuring minimal environmental impact.
Other than provided for by another rule, the activity must not increase the height or storage capacity of any existing dam	Not applicable – no existing dams involved
The 1per cent annual exceedance probability (AEP) flood shall be accommodated by the structure and/or by an overland flow path without increasing flood levels up stream or downstream of the structure, beyond the land or structures owned or controlled by the person undertaking the activity	Detailed hydraulic modelling will be undertaken to confirm that flood levels will not be raised beyond the land or structures owned or controlled by the person undertaking the activity, in full compliance with the AUP requirements.
Calculation of flow rates will be made using the Auckland Council Technical Publication 108: Guideline for stormwater runoff modelling in the Auckland Region, April 1999	The calculation of flow rates for the stormwater outfall will be made in accordance with these guidelines. The design will follow the methodologies and assumptions specified in this publication to ensure accurate estimation of stormwater runoff and flow rates, in full compliance with the AUP requirements.

6.6. Stream Protection

As part of this development existing Stream A is enhanced through riparian planting and controlled discharge points. Low flows are managed to support stream ecology, while larger events are safely conveyed through outfall structures designed to prevent erosion and maintain stream stability.

6.7. Best Practice Implementation

The stormwater management approach incorporates best practice options (BPO) following Auckland Council guidelines, with particular attention to:

- Water quality treatment through bioretention systems
- Hydrological mitigation meeting SMAF 1 requirements
- Integration with landscape design and public amenity
- Protection of receiving environments
- Sustainable long-term operation and maintenance

This comprehensive stormwater management strategy ensures the development meets both regulatory requirements and environmental objectives while providing a sustainable and resilient solution for the community.

7. Wastewater

7.1. Plan References

Refer to the 4000 Series Drawing Set submitted as part of this consent application for the detailed Wastewater design.

7.2. Overview

The Stage 2 development will be serviced by connecting to the gravity wastewater network established in Stage 1 (LUC60390225, ENG60429650), ultimately draining to the existing WSL wastewater pump station located adjacent to Flanagan Road.

The design has been based on the following guidelines:

- Auckland Council Code of Practice for Land Development and Subdivision
- Watercare Water and Wastewater Code of Practice for Land Development and Subdivision Chapter 5: Wastewater

7.3. Existing Wastewater Reticulation

The Stage 1 infrastructure includes a newly constructed gravity network that connects to the Pump Station at 103 Flanagan Road (Flanagan Road Pump Station). Watercare and Veolia confirmed at a meeting on the 17/10/2023 (see Appendix 5 of the Water Supply Report for meeting minutes) that this pump station has a current interim capacity of 4,130 HUE's (Household equivalent units) or 137L/s and has been designed to be upgraded in the future to provide more capacity for the wider catchment. The pump station transfers wastewater to the WSL Southern Interceptor and ultimately to the Mangere Sewage Treatment plant.

At the meeting, it was estimated that a PWWF of 53l/s would be generated from Stage 1 and Stage 2 of the Drury Centre development. This indicates that the current pump station can service the two proposed stages in the Drury Centre development.

In verbal conversations with Watercare it was indicated that the pump station at Flanagan Road was to be upgraded in 2027 to increase the capacity of this asset as mentioned above. The development of the Drury Centre will be staged over multiple years and it is currently anticipated that the first buildings will be constructed in 2027.

7.4. Design Criteria

Flow demands for Peak Dry Weather Flow (PDWF) and Peak Wet Weather Flow (PWWF) have been calculated using the peaking factors and flow rates provided in the WSL Code of Practice (CoP) for Wastewater. The pipe flows and velocities have been calculated using the Manning's equation.

The following WSL CoP Wastewater parameters have been adopted to develop the residential and commercial wastewater demands for the Stage 2 development:

Table 13. Residential and Commercial Wastewater Demand Parameters

Demand Type	Peaking Factor (PWWF)	Peaking Factor (PDWF)	Occupancy	Flow Allowance
Commercial – office and dry retail with toilet facilities	5	2		1 person/15m2 @ 65L/P/D
Commercial – dry retail (Where kitchen/toilets are not made available to customers)	5	2		1 person/50m2 @ 65L/P/D
Commercial – wet retail	6.7	2		15L/Day/m2
Up to three storeys residential	6.7	3	3	180

* With specific approval from Watercare

The following design criteria have been implemented:

- Pipe flow during PDWF less than half full
- Depth of flow at PWWF shall not exceed 75% of pipe depth
- Minimum self-cleansing velocity of 0.75m/s during peak dry weather flow
- Maximum velocity of 3m/s during peak wet weather flow

The previously approved stage 1 residential flows were calculated to allow for comprehensive development on each superlot. The subdivision of these lots has been included in this application and is less intensive than previously anticipated. The residential Development Equivalent Units (DUE) of the residential lots in stage 1

have been reduced from 445 DUE to 292 DUE. This has reduced the total DUE in the stage 1 area, including both commercial and residential flows, from approximately 800 DUE to approximately 625 DUE or a PWWF of 26.6 l/s

The Stage 2 yields have been based on the latest masterplan by Ignite Architects, as illustrated in Figure 2. The resulting calculated peak flows are summarised in Table 14.

Table 14. Stage 2 Calculated Wastewater Flows from stage 1 and stage 2

Demand Type	PWWF (L/s)	ADWF	DUE
Commercial	11.3	1.69	271
Wet Retail	10.6	1.58	253
Residential – Stage 2	3.5	.52	83
Hotel	7.9	1.18	188
Total Stage 2	**33.3**	**4.97**	**795**
Residential – Stage 1	14.4	2.14	292
Total for this application	**47.7**	**7.11**	**1087**
Commercial – Stage 1 (not part of this consent)	12.2	1.80	343
Total Stage 1 and Stage 2 combined	59.9	8.91	1430

The total combined PWWF from stage 1 and stage 2 will therefore be 59.9l/s. This is higher than the initial estimate of 53l/s discussed with Watercare and Viola but the exact number will depend on the final detailed design of each of the lots.

The wastewater reticulation designed as part of stage 1, has been designed to have sufficient capacity for stage 2 infrastructure.

Upon completion, all wastewater infrastructure will be vested in Watercare/Veolia, with maintenance easements provided through the private road corridors and designated areas.

8. Water Supply

8.1. Plan References

Refer to the 6000 Series Drawing Set and the Water Supply Report (Appendix 1) submitted as part of this consent application for the detailed water design.

8.2. Overview

The water supply network will draw from the existing public 450mm mains in Fitzgerald Road and Flanagan Road which are supplied by the nearby Flanagan Road bulk supply point (BSP). The proposed reticulation consists of a 200 mm NB distribution main with a grid of 100 mm NB pipes in the residential area and a grid of 150 mm NB pipes in the commercial areas.

A hydraulic model was used to show that the proposed network design meets the Watercare Code of Practice requirements, which includes fireflow provision to SNZ PAS 4509:2008. The proposed network is shown in Figure 9.

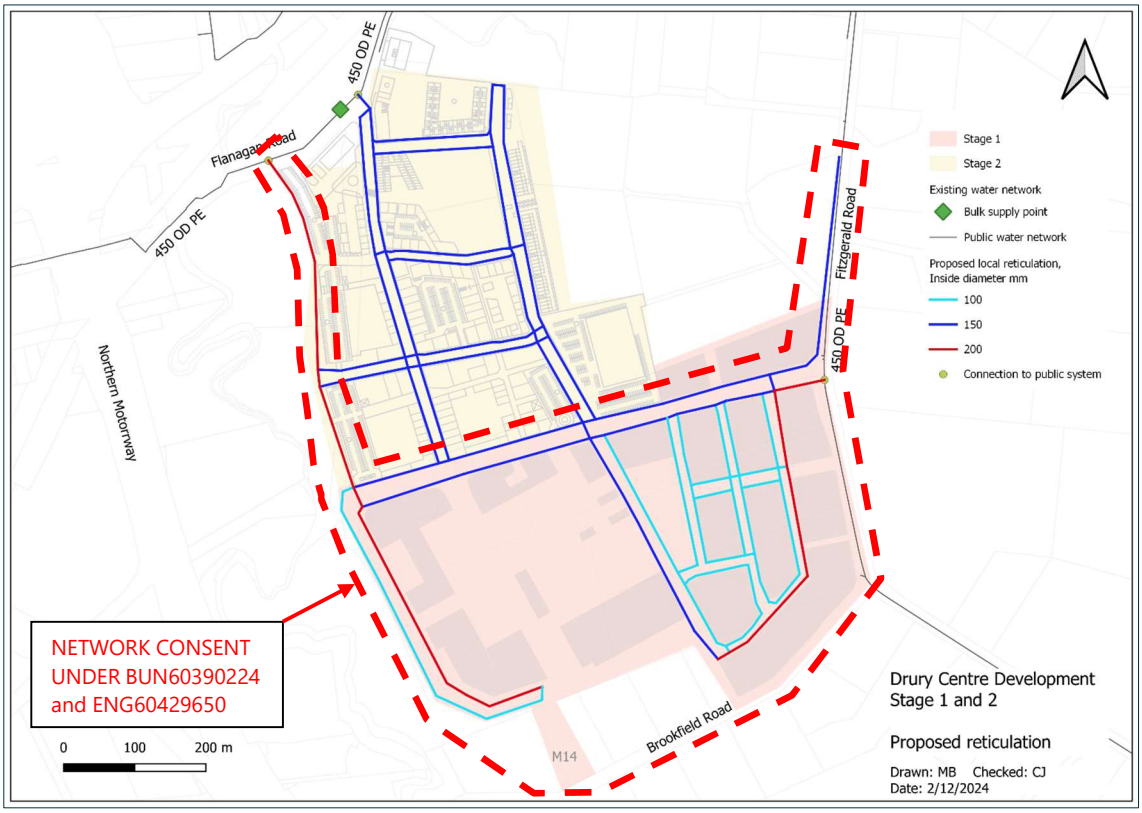

Figure 9. ***Proposed Water Supply Network***

8.3. Demand Assessment

The development is split into Stage 1 and Stage 2 with approximately 501 and 185 residential dwelling unit equivalents (DUE) respectively plus significant commercial areas, as detailed in the water supply report.

The daily residential water demand is summarised in Table 15. The flows are based on Auckland Code of Practice (CoP) Chapter 6: Water, Section 6.3.5.

Table 15. Water demands

Demand type	Demand Calculation	Stage 1	Stage 2	Total	Unit
Residential	DUE	501	185	686	DUE
	Population	1,503	555	2,058	people
	Consumption	220			l/d/person
	ADD	330.7	122.1	452.8	m^3/day
	PDD	5.7	2.1	7.86	l/s
	PHD	14.4	5.3	19.7	l/s
Commercial	Gross area	86,320	141,980	228,300	m^2
	Net area	80			%
	ADD	279.0	340.7	619.7	m^3/day
	PDD	4.8	5.9	10.8	l/s
	PHD	12.1	14.8	26.9	l/s
Total	**ADD**	**609.6**	**462.8**	**1072.4**	**m^3/day**
	PDD	**10.6**	**8.0**	**18.6**	**l/s**
	PHD	**26.5**	**20.1**	**46.5**	**l/s**

ADD - Average Day Demand

PDD - Peak Day Demand

PHD - Peak Hour Demand

DUE - Dwelling Unit Equivalent

8.4. Fire-Fighting Demands

Firefighting water supply requirements have been determined in accordance with SNZ PAS 4509:2008 and by specialist Fire Engineers as supplied to Woods by Kiwi Properties (Consultant Advice Notice, included in the water supply report). Residential areas will require a firefighting supply of 25l/s, while the commercial areas will require a minimum between 100l/s and 125l/s, both at a residual pressure of 10m (100kPa).

Whilst specific design for sprinklers has not been undertaken, analysis has been undertaken to indicate the available pressure from the network considering both hydrant and assumed sprinkler demands of 125 l/s. Sprinkler systems must be designed by the Fire Engineer.

Analysis results in the water supply report show the network can supply firefighting water in accordance with SNZ PAS 4509:2008 in the residential and commercial areas.

8.5. Network performance

The network performance during the peak day demands is summarised in Table 16. Full results are shown on thematic plots in the water supply report.

Table 16. Water Supply Network Performance

Parameter (CoP limit)	Value	CoP compliance?
Minimum pressure, m (25m minimum)	52	Yes
Maximum pressure, m (80m maximum)	69	Yes
Available fireflow l/s (25 l/s residential, 100 l/s commercial typically)	Over 150	Yes
Maximum headloss, m/km (3 to 5m/km maximum)	1.8	Yes
Maximum velocity, m/s (2m/s maximum)	0.6	Yes
Residual fireflow pressure in commercial area @ 125 l/s fireflow, m	32	N/A

The results show compliance with the code of practice limits for pressure headloss, fireflow and velocity. They demonstrate the network will supply the expected peak day demands and be able to provide fireflow to SNZ PAS 4509:2008 standard.

9. Utilities

9.1. Basis of design

As part of the Stage 1 Drury Centre Development, Woods have engaged with network utility providers to determine development servicing solutions. Woods will continue to work in close consultation with Counties Energy and Telecom utility providers to establish reticulation requirements. All utility services will be located within designated service trenches in planned road reserves. Comprehensive connection strategies and specific locations will be detailed in the Engineering Plan Approval submission. Each lot will be designed and located so that provision is made for electricity supply and telecommunications

9.2. Power

Counties Energy, as the designated power network provider for the Drury Precinct, will provide power reticulation services to the Drury Centre Stage 2 development. Woods will maintain ongoing coordination with Counties Energy to ensure appropriate power supply to each proposed lot within this development.

The power infrastructure implementation will necessitate the installation of new transformers and high-voltage network components to meet the development's power requirements.

9.3. Telecommunications

Woods will maintain continuous liaison with the project telecommunications provider to ensure connectivity solutions for all proposed lots within this development. The implementation will establish telecommunications infrastructure to support the development's future communications needs.

9.4. Gas

While natural gas infrastructure is available in the surrounding area, the Drury Centre Stage 2 development will not incorporate gas servicing.

10. Conclusion

In conclusion, the infrastructure design for Drury Centre Stage 2 has been investigated and designed to confirm that it complies with the requirements of Auckland Council, Watercare Services Limited, and Auckland Transport Codes of Practice. Site assessments confirm no significant engineering constraints, allowing the development to proceed. The design will undergo further refinement during the Detailed Engineering Plan Approval (EPA) process, with an EPA level of design that will detail the specifics of servicing the development, ensuring compliance with all the relevant regulations and standa+rds.

We have fully investigated servicing of this development and do not see any limitations, and that conditions of consent will not be required.

Appendices

Drury Centre Stage 1 and 2 Water Supply Report

Drury Centre Stage 1 and 2 Water Supply

Drury
Kiwi Property Group Ltd
28/02/2025
FINAL

Document Control

Project Number	P24-447
Project Name	Drury Centre Stage 1 and 2 Water Supply
Client	Kiwi Property Group Ltd
Date	28/02/2025
Version	V1
Issue Status	FINAL
Originator	Marcel Bear – Principal Engineer
Reviewer	Cristian Jara – 3 Waters Engineer
Approval	Thanujah Haran – Senior Civil Designer
Consultant details	Woods (Wood & Partners Consultants Ltd) Level 1, Building B, 8 Nugent St, Grafton, Auckland 1023 PO Box 6752 Victoria St West, Auckland 1142
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	woods.co.nz
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Contents

STATEMENT OF QUALIFICATIONS AND EXPERIENCE

Originator: Marcel Bear – Principal Water Supply Engineer

I am a Principal Engineer at Wood and Partners Consultants Limited (Woods). Woods is a multi-disciplinary consultancy specialising in planning, urban design, engineering, water infrastructure, and surveying. I have been employed by Woods since April 2017

I hold the qualification of Batchelor of Engineering (Honours) in Civil Engineering from the University of Auckland, which I completed in 1990. I am a Chartered Engineer with Engineering New Zealand.

I have 30 years of professional experience in water supply design and planning. My experience includes water supply design, hydraulic modelling and infrastructure master planning, for greenfield and brownfield developments such as; the Unitec site- Auckland, Northcote, Wesley and Waikowhai neighbourhoods and the Sleepyhead Development in Ohinewai.

I confirm that, in my capacity as originator of this report, I have read and abide by the Environment Court of New Zealand's Code of Conduct for Expert Witnesses Practice Note 2023.

Reviewer: Cristian Jara

I am Water Engineer within the Water Infrastructure & Planning team at Wood and Partners Consultants Limited ("Woods"). Woods is a multi-disciplinary consultancy specialising in planning, urban design, engineering, water infrastructure, and surveying. I have been employed at Woods since November 2020.

I hold the degree of Professional Civil Engineer from the Pontifical Catholic University of Chile with a Diploma in Hydraulic Engineering, which I obtained in 2013. I am member of Engineering New Zealand (MEngNZ) and Water New Zealand.

I have 10 years of professional experience in wastewater and water supply modelling and pipeline design. I have been the engineer responsible of creating/reviewing water supply models for infrastructure projects in the public and private sector. Recent projects include:

- Supporting the infrastructure development in multiple neighbourhoods for Kāinga Ora (Glen Innes, Point England and Mangere East amongst others)
- Creating and reviewing water supply models and reports to support resource consent applications for multiple Milldale development stages

I confirm that, in my capacity as reviewer of this report, I have read and abide by the Environment Court of New Zealand's Code of Conduct for Expert Witnesses Practice Note 2023.

Approval: Thanujah Haran

I am a Senior Associate Engineer within the Engineering Team at Wood and Partners Consultants Limited ("Woods"). Woods is a multi-disciplinary consultancy specialising in planning, urban design, engineering, water infrastructure, and surveying. I have been employed at Woods since 2014.

I hold a Bachelor of Civil Engineering degree from Monash University, Melbourne. I am a Member and Chartered Professional Engineer with Engineering New Zealand (Membership No. 1014439), as well as a Fellow and Chartered Professional Engineer with Engineers Australia (Membership No. EA3703650).

I have over 24 years of experience in Highways design, earthworks, roading, stormwater, wastewater and water design for land development and infrastructure projects. I have been the principal author and lead engineer for a wide range of Infrastructure and Earthworks Methodology reports to support land development projects.

I confirm that, in my capacity as reviewer of this report, I have read and abide by the Environment Court of New Zealand's Code of Conduct for Expert Witnesses Practice Note 2023.

1. Executive Summary

The Drury Centre development, located at 139 Fitzgerald Road, Drury is being developed into residential and commercial areas in two stages. The Stage 1 design was completed earlier in 2024 and this report describes Stages 1 and 2.

The entire development covers approximately 47 Ha of land. It is planned to include approximately 700 dwellings and approximately 230,000 m^2 of commercial floor area, two hotels, a library and an aquatic centre. The surrounding existing public network will supply into the area. The water network within the development has been designed and will be vested to Council.

The water supply network will draw from the existing public 450mm mains in Fitzgerald Road and Flanagan Road which are supplied by the nearby Flanagan Road bulk supply point (BSP). The proposed reticulation consists of a 200 mm NB distribution main with a grid of 100 mm NB pipes in the residential area and a grid of 150 mm NB pipes in the commercial areas.

A hydraulic model was used to show that the proposed network design meets the Watercare Code of Practice requirements. The proposed network is shown in Figure 1.

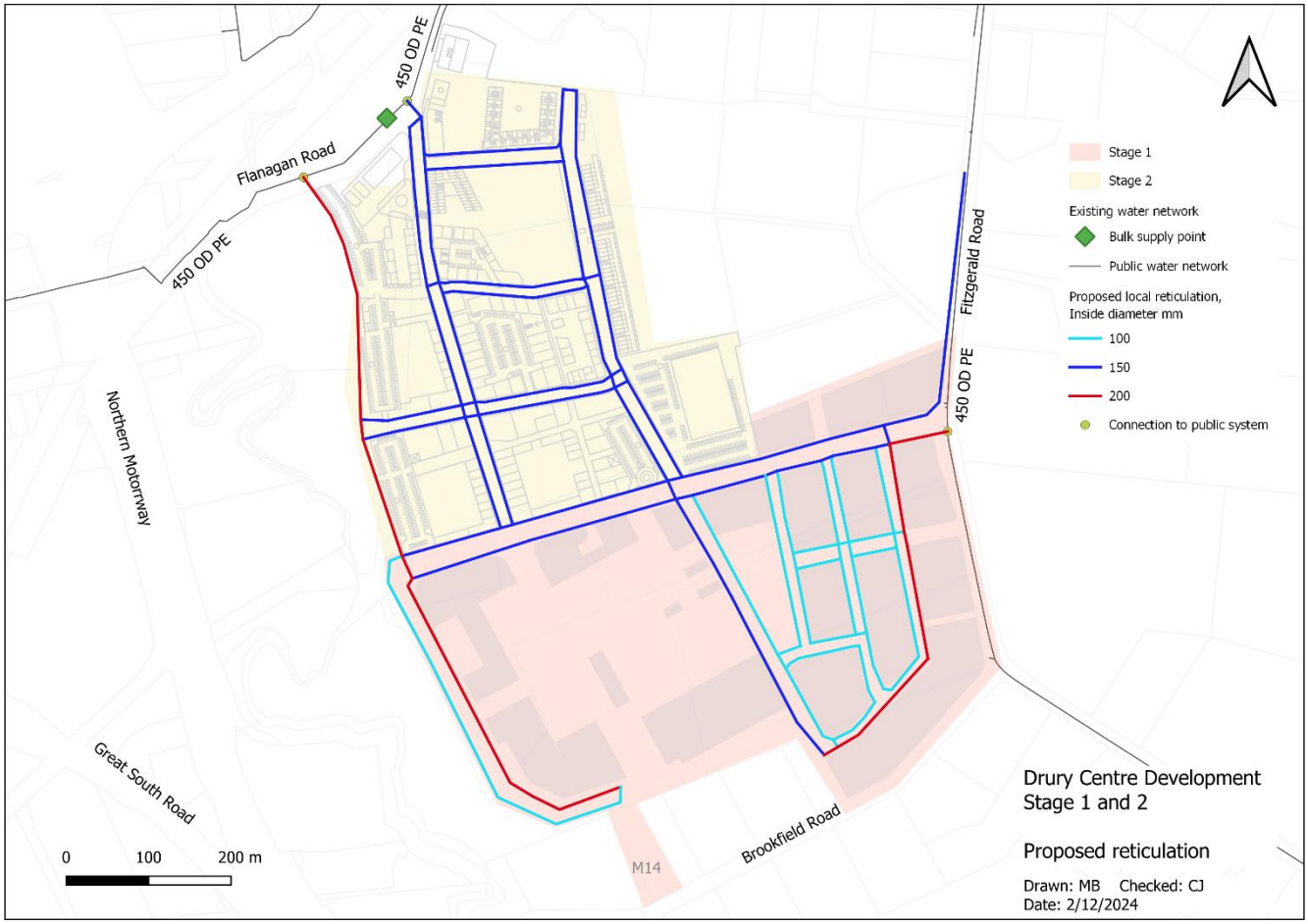

Figure 1: Proposed reticulation

2. Introduction

Kiwi Property Group Limited have commissioned Wood and Partners (Woods) to complete the water supply design for the proposed Drury Centre development, located at 139 Fitzgerald Road, Drury.

The development will be supplied by the existing watermains along Fitzgerald Road and Flanagan Road. This report confirms the required layout and sizing of the internal potable water supply needed to service the proposed residential and commercial areas.

The design was checked with a model built using Infoworks WS Pro v2024.5.1.

This report is based on the available masterplanning drawings for the proposed development included in Appendix 1. Figure 2 summarises the development stages as understood in 2023. The stage boundaries are correct however the detail of the development within each stage shown in Figure 2 has evolved since then.

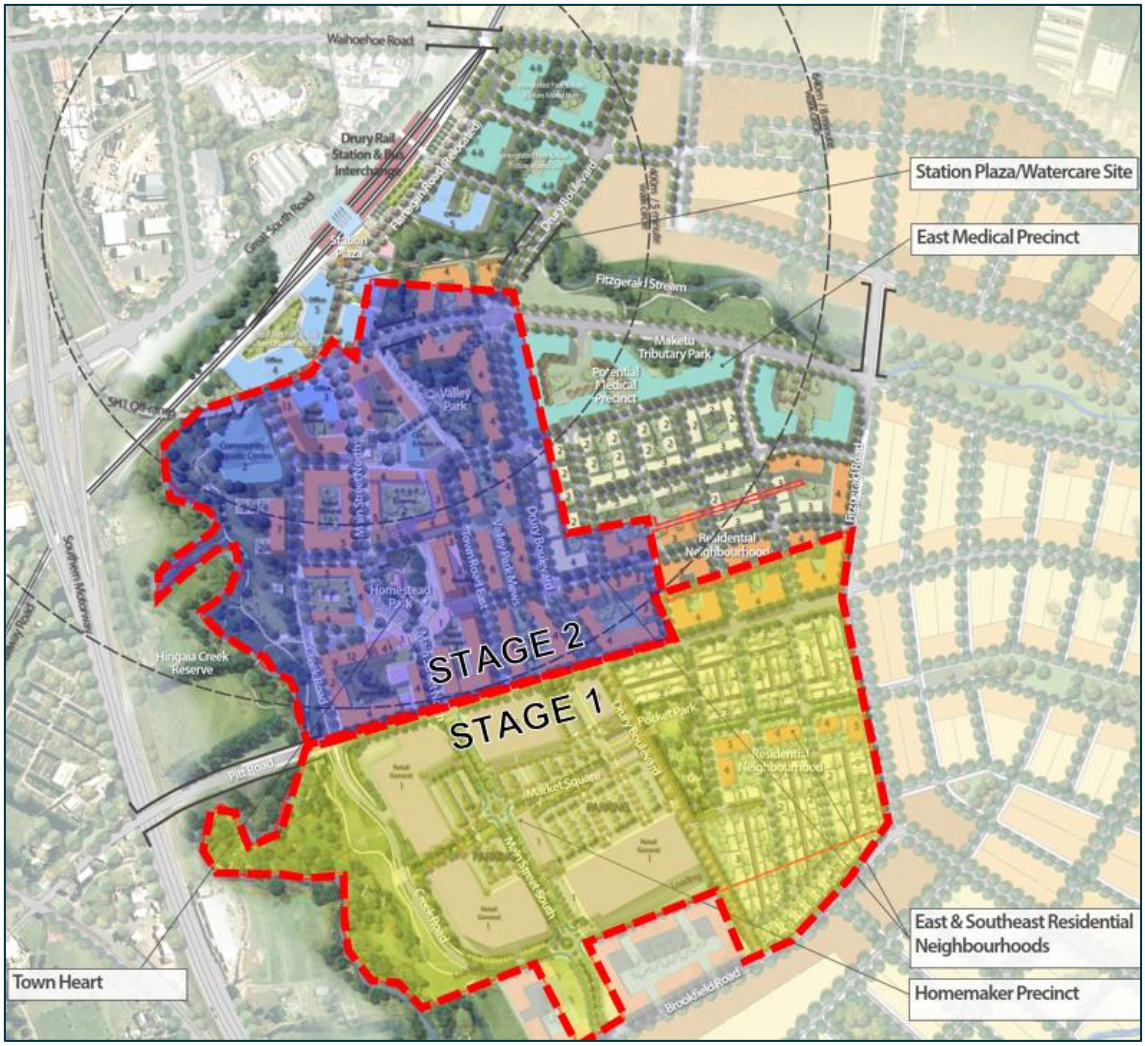

Figure 2: Drury Centre plan – Stages 1 and 2. As at 2023.

3. Development demands

3.1. Water demands

The development is split into Stage 1 and Stage 2 with approximately 501 and 185 residential dwelling unit equivalents (DUE) respectively plus significant commercial areas, as detailed in Appendix 2.

The daily residential water demand is summarised in Table 1. The flows are based on Auckland Code of Practice (CoP) Chapter 6: Water, Section 6.3.5.

Table 1: Water demand Summary

Demand type	Demand Calculation	Stage 1	Stage 2	Total	Unit
Residential	DUE	501	185	686	DUE
	Population	1,503	555	2,058	people
	Consumption	220			l/d/p
	ADD	330.7	122.1	452.8	m^3/day
	PDD	5.7	2.1	7.86	l/s
	PHD	14.4	5.3	19.7	l/s
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	Net area	80			%
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	PHD	12.1	14.8	26.9	l/s
Total	**ADD**	**609.6**	**462.8**	**1072.4**	**m^3/day**
	PDD	**10.6**	**8.0**	**18.6**	**l/s**
	PHD	**26.5**	**20.1**	**46.5**	**l/s**

ADD - Average Day Demand
PDD - Peak Day Demand
PHD - Peak Hour Demand
DUE - Dwelling Unit Equivalent

3.2. Firefighting requirements

Firefighting water supply requirements have been determined in accordance with SNZ PAS 4509:2008 and by specialist fire engineers as supplied to Woods by Kiwi Properties (Consultant Advice Notice[1], included in Appendix 3). Residential areas will require a firefighting supply of at least 25l/s, while the commercial areas will require a minimum between 100l/s and 125l/s, both at a residual pressure of 10m (100kPa).

Whilst specific design for sprinklers has not been undertaken, analysis has been undertaken to indicate the available pressure from the network considering both hydrant and assumed sprinkler demands of 125 l/s. Sprinkler systems must be designed by the Fire Engineer.

4. Modelling assumptions and boundary conditions

Pipe losses have been calculated using the Colebrook White formula, and the roughness coefficient for all pipes has been set in the model at 0.06mm.

The pressure at the Flanagan Road BSP where the development will be connected will be 700 kPa or 70m, as advised by Veolia. This equates to 82m hydraulic grade line (HGL) based on the elevation at the Flanagan Road BSP , taken as 12 mRL.

For the connections to the existing reticulation on Flanagan Road, the same supply HGL (82m HGL) was used.

The vertical datum used is NZVD2016.

[1] Consultant Advice Notice - Norman Disney & Young - 7 June 2022 - Project No 93820-001

5. Proposed network

5.1. Public Supply

The existing public reticulation around the development site consists of a 450mm NB pipe along Flanagan Road and another 450mm NB pipe along Fitzgerald Road. These are supplied via the Flanagan Road BSP from the Waikato transmission watermain along the Northern Motorway, west of the development.

In a meeting with Kiwi Properties, Veolia and Watercare on 10 October 2023 (minutes in Appendix 5), the proposed water supply concept of supplying the development from Fitzgerald Road and Flanagan Road was accepted in principle for further planning.

Available pressures at the watermains are presented in Section 4 of this report.

5.2. Proposed Network

Based on the concept water supply plan mentioned in the previous section 5.1, the proposed reticulation for the development is shown in Figure 3.

The supply consists of a 200 NB distribution main with 150 NB reticulation in the commercial areas and 100 NB pipes in the residential areas, with pipes on both sides of the road There are no 50mm rider mains, so there are no restrictions on hydrant placement in the development and all pipes can be used for service connections. The 200 NB distribution main has been placed to enable a loop to be completed in the vicinity of Brookfield Road, for additional resilience. The loop could be completed when Brookfield Road is developed. The design and analysis reported herein is based on the reticulation shown in F3, ie without the 200 NB loop being competed.

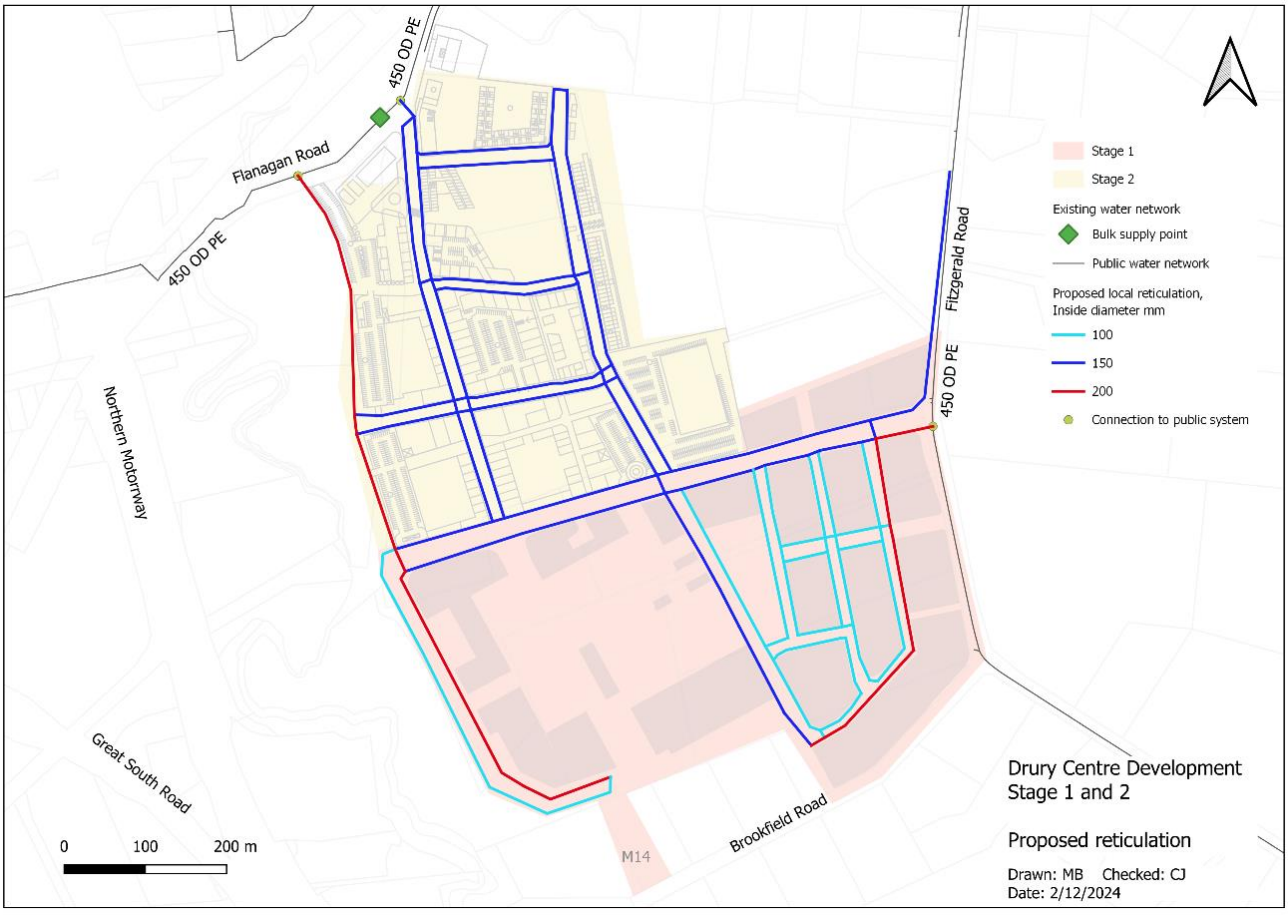

Figure 3: Proposed water reticulation

5.3. Network Performance

The network performance during the peak day demands is summarised in Table 2. Full results are shown on thematic plots in Appendix 4.

Table 2: Summary of Results

Parameter (CoP limit)	Value	CoP compliance?
Minimum pressure, m (25m minimum)	52	Yes
Maximum pressure, m (80m maximum)	69	Yes
Available fireflow l/s (25 l/s residential, 100 l/s commercial typically)	Over 150	Yes
Maximum headloss, m/km (3 to 5m/km maximum)	1.8	Yes
Maximum velocity, m/s (2m/s maximum)	0.6	Yes
Residual fireflow pressure in commercial area @ 125 l/s fireflow, m	32	N/A

The results show compliance with the code of practice limits for pressure headloss, fireflow and velocity.

Available fireflow is generally above 150 l/s, well in excess of residential and commercial requirements which are typically 25 l/s for residential (FW2) and 100 l/s for commercial (FW4).

Residual fireflow pressure has been assessed with the largest fireflow and sprinkler demand identified (125 l/s, at commercial lots M09 and M10, refer to Appendix 3). This provides a conservative estimate of the pressure that would be available for a commercial sprinkler system.

6. Conclusions and recommendations

The proposed water reticulation meets the following standards:

- Compliance with the Watercare Code of Practice:
  - Minimum pressure >25m
  - Maximum pressure < 80m
  - Maximum pipe velocity <2
  - Maximum pipe headloss <5m/km
- Fire flow compliant with NZS PAS 4509:2008

The public network along Fitzgerald Road and Flanagan Road would have capacity to deliver the demands required for the Drury Centre development.

It is recommended that:

1. The sprinkler pressure requirements are checked against the available residual fireflow pressures listed in this report.
2. The reticulation, as shown in Figure 3 (and Appendix 5), be installed to supply the potable demands.

Appendix 1 – Masterplan figures

Figure A1-1: Site Plan (used for Stage 1 residential demands)

HOUSE TYPE		QUANTITY (BY BLOCK)												
		1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
75m²	2 BED 4.5m wide 1x carpad	8	22	10	-	11	-	-	18	13	-	18	8	108
153m²	3.5 BED 6.0m wide 2x carpad	8	12	6	5	14	3	5	7	-	4	5	7	76
170m²	4 BED 7.5m wide 1x int. garage 1x carpad	3	8	-	-	-	-	-	2	4	-	5	6	28
154m²	4 BED 7.5m wide 1x int. garage 1x carpad	-	-	8	2	4	4	2	-	-	3	6	4	33
180m²	5 BED 11.5m wide 1x garage 2x carpad	-	3	-	-	-	-	-	2	-	1	2	2	10
TOTALS		19	45	24	7	29	7	7	29	17	8	36	27	255

APARTMENT TYPE		QUANTITY (BY BLOCK)												
		1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
41m²	STUDIO APARTMENT	-	-	-	6	-	6	-	6	3	9	-	-	30
50m²	1 BED APARTMENT	-	-	-	12	-	12	6	12	6	21	-	-	69
73m²	2 BED APARTMENT	-	-	-	-	-	6	-	12	12	12	-	-	42
64m²	2 BED APARTMENT	-	-	-	12	-	12	12	-	6	6	-	-	48
77m²	2 BED APARTMENT	-	-	-	12	-	12	12	-	6	6	-	-	48
94m²	3 BED APARTMENT	-	-	-	-	-	-	6	-	-	3	-	-	9
TOTALS		-	-	-	42	-	48	36	30	33	57	-	-	246

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NEW ZEALAND

CLIENT

Kiwi Property

PROJECT

DRURY TOWN CENTRE

DRAWING INFORMATION

Design KEVIN BREWER

N

DRAWING TITLE

YIELD STUDY

SITE PLAN - More Apartments

JOB No.	SCALE (A3)
3072	1:2000 @ A3
DRAWING No.	REV.
SK.01A	

Figure A1-2: Land use parcel plan (used for Stage 1 commercial demands. Stage 2 area (north of Pitt Road) superseded)

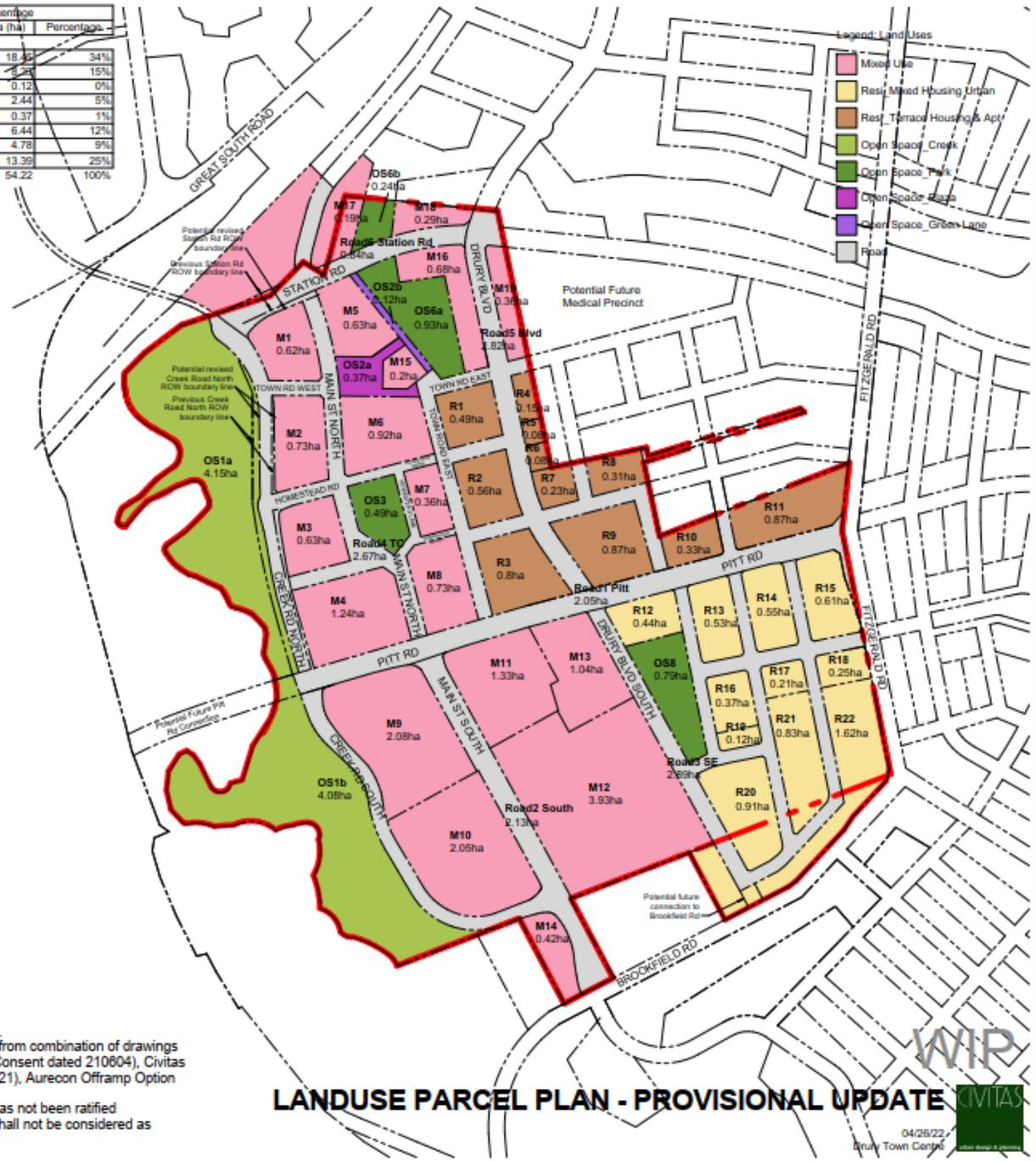
Area Schedule (MP Provisional Revised)		
ParcelID	LandUse	Parcel Area (ha)
Water Care		
	Mixed Use	1.24
	Mixed Use	0.36
	Road	0.22
		1.82
Kiwi TC		
M1	Mixed Use	0.62
M2	Mixed Use	0.73
M3	Mixed Use	0.63
M4	Mixed Use	1.24
M5	Mixed Use	0.63
M6	Mixed Use	0.92
M7	Mixed Use	0.36
M8	Mixed Use	0.73
M15	Mixed Use	0.2
OS2a	Open Space_Plaza	0.37
OS2b	Open Space_Green Lane	0.12
OS3	Open Space_Park	0.49
Road4 TC	Road	2.67
		9.72
Kiwi Southgate		
M9	Mixed Use	2.08
M10	Mixed Use	2.06
M11	Mixed Use	1.33
M12	Mixed Use	3.93
M13	Mixed Use	1.04
M14	Mixed Use	0.42
Road2 South	Road	2.13
		13
Kiwi SE Resi SuperBlock		
OS8	Open Space_Park	0.79
R12	Resi_Mixed Housing Urban	0.44
R13	Resi_Mixed Housing Urban	0.53
R14	Resi_Mixed Housing Urban	0.55
R15	Resi_Mixed Housing Urban	0.61
R16	Resi_Mixed Housing Urban	0.37
R17	Resi_Mixed Housing Urban	0.21
R18	Resi_Mixed Housing Urban	0.25
R19	Resi_Mixed Housing Urban	0.12
R20	Resi_Mixed Housing Urban	0.91
R21	Resi_Mixed Housing Urban	0.83
R22	Resi_Mixed Housing Urban	1.62
Road3 SE	Road	2.89
		10.11
Kiwi Non TC		
M16	Mixed Use	0.68
M17	Mixed Use	0.19
M18	Mixed Use	0.29
M19	Mixed Use	0.36
OS1a	Open Space_Creek	4.15
OS1b	Open Space_Creek	4.08
OS6a	Open Space_Park	0.93
OS6b	Open Space_Park	0.24
R1	Resi_Terrace Housing & Apt	0.49
R2	Resi_Terrace Housing & Apt	0.56
R3	Resi_Terrace Housing & Apt	0.8
R4	Resi_Terrace Housing & Apt	0.15
R5	Resi_Terrace Housing & Apt	0.08
R6	Resi_Terrace Housing & Apt	0.08
R7	Resi_Terrace Housing & Apt	0.23
R8	Resi_Terrace Housing & Apt	0.31
R9	Resi_Terrace Housing & Apt	0.87
R10	Resi_Terrace Housing & Apt	0.33
R11	Resi_Terrace Housing & Apt	0.87
Road1 Pitt	Road	2.05
Road5 Blvd	Road	2.82
Road6 Station Rd	Road	0.84
		21.4

TOTAL KIWI SITE:	54.22 ha
TOTAL WATER CARE:	1.82 ha
GRAND TOTAL:	56.04 ha

SCALE 1:5000 @ A3

WIP DRAFT FOR INTERNAL DISCUSSION ONLY

Kiwi Lands - Landuse Areas Percentage		
LandUse	Total Parcel Area (ha)	Percentage
Mixed Use	18.46	34%
Open Space_Creek	8.23	15%
Open Space_Green Lane	0.12	0%
Open Space_Park	2.44	5%
Open Space_Plaza	0.37	1%
Resi_Mixed Housing Urban	6.44	12%
Resi_Terrace Housing & Apt	4.78	9%
Road	13.39	25%
Grand total	54.22	100%

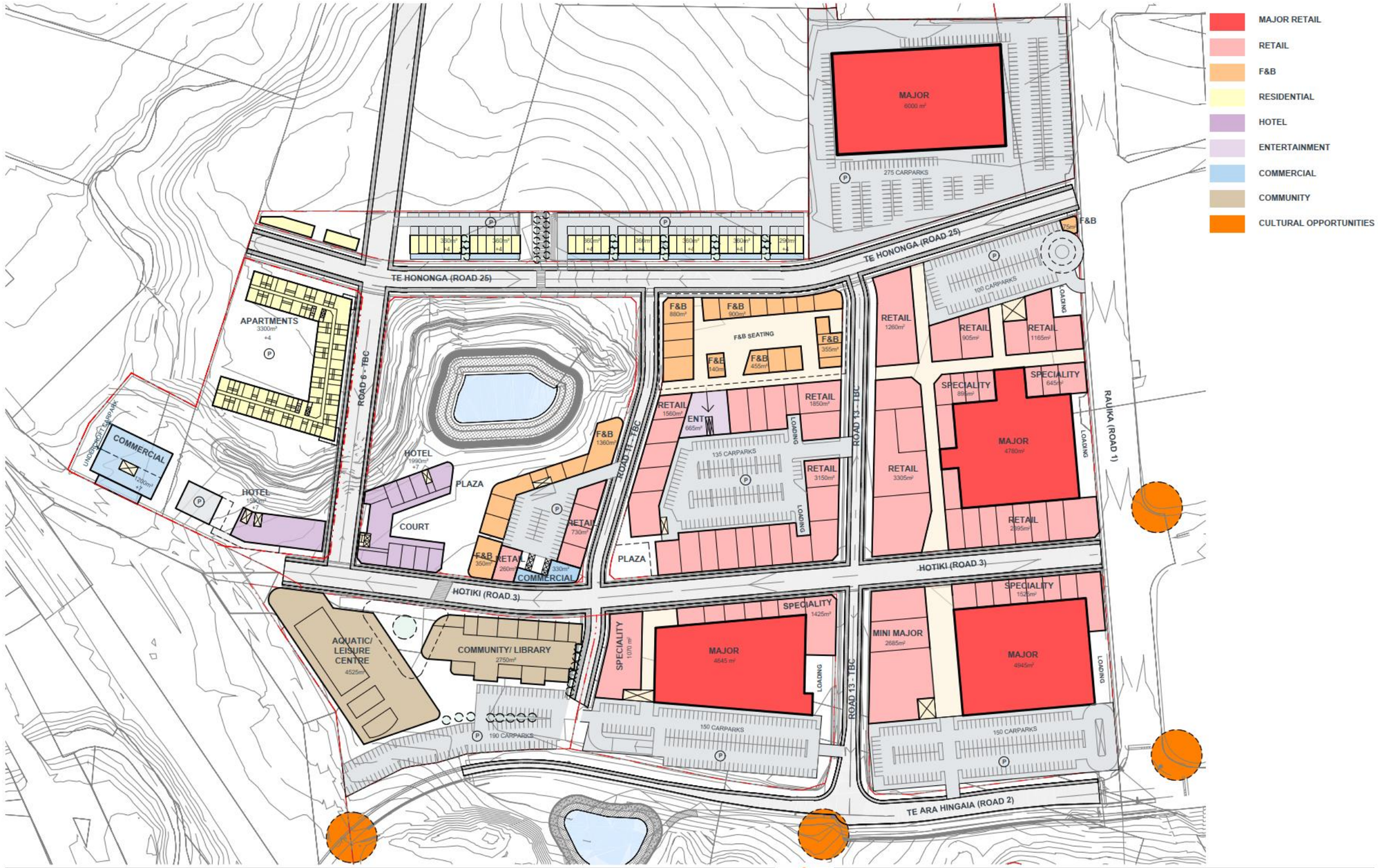


Notes:
- Boundary lines are indicative only.
- Boundary lines geometry derived from combination of drawings from Ignite Architects (Fast Track Consent dated 210604), Civitas Station Precinct Study (dated 210621), Aurecon Offramp Option Study (dated 220303).
- This plan and its boundary lines has not been ratified
- This plan and its boundary lines shall not be considered as surveyor approved.

LANDUSE PARCEL PLAN - PROVISIONAL UPDATE

04/26/22
Drury Town Centre

Stage 2 layout



KIWI PROPERTY

DRAFT 20241126

IGNITE

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Drawing Title: DRURY TOWN CENTRE - BUILDING FOOTPRINT

PROJECT NAME: DRURY TOWN CENTRE - FAST TRACK STAGE 2

DRURY, AUCKLAND

Scale: As indicated @ A1

NORTH

Original Size

Project No.: 0999-095

Drawing No.: SK001

Revision.

Appendix 2 – Water demands

Based on Auckland Code of Practice Chapter 6: Water, Section 6.3.5, as shown below.

ADD - Average Day Demand, PDD - Peak Day Demand, PHD - Peak Hour Demand, DUE - Dwelling Unit Equivalent

Type	Population (net m2/person)	Flow allowance l/person/day	Flow allowance (l/net m2/day)	PDD/ADD	PHD/PDD
Domestic	3 people/DUE	220	-	1.5	2.5
Dry retail	50 m^2/person	65	-	1.5	2.5
Dry retail w toilet	15 m^2/person	65		1.5	2.5
Wet retail	-	-	15	1.5	2.5
Hotel	Room	200		1.5	2.5
Hotel	Staff	50		1.5	2.5

Commercial Assumptions

Net Commercial Area: 80% of Gross

Commercial wet/dry split in Stage 1: 80% dry, 20% wet in stage 1, and as shown for stage 2

Stage 1 commercial typology: 2 story commercial (i.e. retail area is twice the building footprint)

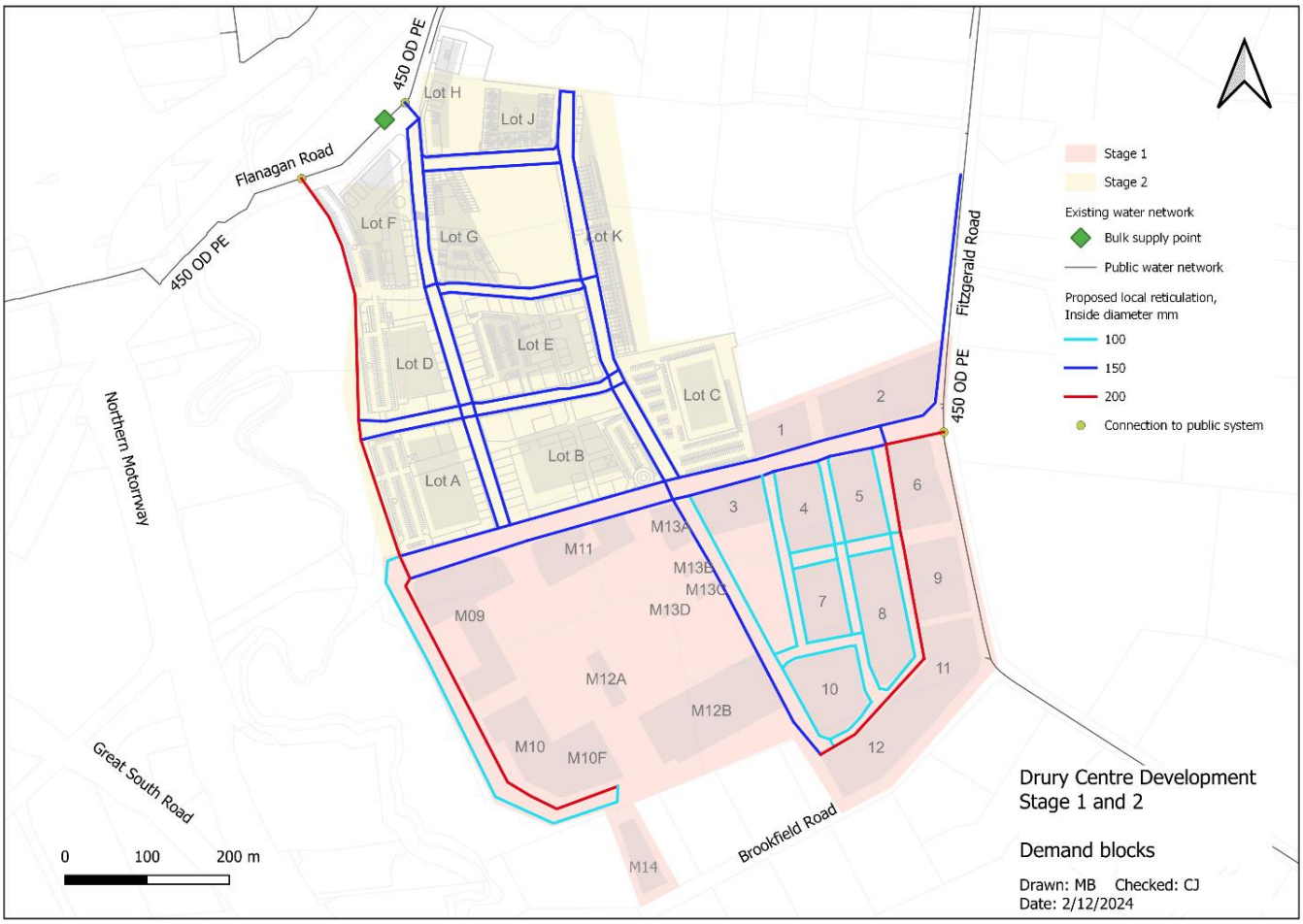

Table A2-1: Stage 1 and 2 demands

	Stage 1 Block/area	Type	Yield	Gross area	# People	Residential ADD	PDD	PHD
		Res/Com	DUE	m^2		m3/d	l/s	l/s
Stage 1	**1**	Res	19		57	12.5	0.2	0.5
	2	Res	45		135	29.7	0.5	1.3
	3	Res	24		72	15.8	0.3	0.7
	4	Res	49		147	32.3	0.6	1.4
	5	Res	29		87	19.1	0.3	0.8
	6	Res	55		165	36.3	0.6	1.6
	7	Res	43		129	28.4	0.5	1.2
	8	Res	59		177	38.9	0.7	1.7
	9	Res	50		150	33.0	0.6	1.4
	10	Res	65		195	42.9	0.7	1.9
	11	Res	36		108	23.8	0.4	1.0
	12	Res	27		81	17.8	0.3	0.8
	Stg 1 Res Subtotal		501	0	1503	330.7	5.7	14.35
			Building footprint m^2	Net dry area (2 story) m^2	Net wet area (2 story) m^2	Commercial ADD m3/d	PDD l/s	PHD l/s
	M09	Com	10200	13056	3264	65.9	1.1	2.9
	M10	Com	6400	8192	2048	41.4	0.7	1.8
	M11	Com	5000	6400	1600	32.3	0.6	1.4
	M13A	Com	1650	2112	528	10.7	0.2	0.5
	M13B	Com	375	480	120	2.4	0.0	0.1
	M13C F4	Com	375	480	120	2.4	0.0	0.1
	M12A F2	Com	1400	1792	448	9.0	0.2	0.4
	M12B F5	Com	12000	15360	3840	77.6	1.3	3.4
	M13D F3	Com	260	332.8	83.2	1.7	0.0	0.1
	M14	Com	1200	1536	384	7.8	0.1	0.3
	M10F F1	Com	4300	5504	1376	27.8	0.5	1.2
	Stg 1 Com Subtotal		43160	55245	13811	279.0	4.8	12.1
	Stage 1 Res Com total					609.6	10.6	26.5
Stage 2	**Stage 2**		Building footprint m2	Net dry area m2	Net wet area m2	ADD m3/d	PDD l/s	PHD l/s
	Lot A	Dry Retail	12290	9832		12.8	0.22	0.6
	Lot B	Dry Retail	34110	27288		35.5	0.62	1.5
	Lot B	Wet retail	75		60	0.9	0.02	0.0
	Lot C	Dry Retail	6000	4800		6.2	0.11	0.3
	Lot D	Dry Retail	10225	8180		10.6	0.18	0.5
	Lot E	Dry Retail	21925	17540		22.8	0.40	1.0
	Lot E	Wet retail	3230		2584	38.8	0.67	1.7
	Lot E	Res	2880	30	DUE	19.8	0.34	0.9
	Lot F	Library Dry Retail	5225	4180		5.4	0.09	0.2
	Lot F	Aquatic Centre Wet Retail	7000		5600	84.0	1.46	3.6
	Lot G	Dry Retail	10720	8576		11.1	0.19	0.5
	Lot G	Wet Retail	1820		1456	21.8	0.38	0.9
	Lot G	Hotel	1990	147	Rooms	29.4	0.51	1.3
	Lot G	Hotel		75	Staff	3.8	0.07	0.2
	Lot H	Dry Retail	8400	6720		8.7	0.15	0.4
	Lot H	Hotel	10485	210	Rooms	42.0	0.73	1.8
	Lot H	Hotel		100	Staff	5.0	0.09	0.2
	Lot J	Res	13200	80	DUE	52.8	0.92	2.3
	Lot K	Res	7530	75	DUE	49.5	0.86	2.1
	Lot K	Dry Retail	1730	1384		1.8	0.03	0.1
	Total Stage 2	Res	23610	185	DUE	122.1	2.1	5.3
		Com	135225			340.7	5.9	14.8
Stg 1+2		Res		686	DUE	452.8	7.9	19.7
	Total Stg 1+2	Com	178385		m2	619.7	10.8	26.9
	Grand total					**1072.4**	**18.6**	**46.5**

Appendix 3 – Fire-fighting requirements report

Norman Disney & Young
A TETRA TECH COMPANY

CONSULTANT ADVICE NOTICE

Project: Drury Town Centre - Stage 1- Large Format Retail **CAN No:** F-001[1.0]

Date: 7 June 2022 Project No: 93820 - 001 Pages: 5

Name		Company	Email
To:	Brad Hooker	Norman Disney & Young Limited	b.hooker@ndy.com
	Jayson van Tonder	Pragmatix Limited	jaysonvt@pragmatix.co.nz
	Gerry Tyrrell	Ignite Architects	gerryt@ignitearchitects.com
	Raymond Qiu	Crossfire	raymond@xfire.co.nz

Fire-fighting Water Supplies

This CAN is provided for initial coordination of the Civil, Fire Engineering and Fire Protection services requirements for fire-fighting water supplies.

The demands are based on the concept provided by Crossfire for buildings M09-M13.

SPECIFIED FIRE SYSTEMS

The concept fire engineering design specifies the fire systems to be installed as per the table below:

TABLE 1 – FIRE SAFETY SYSTEMS

Building	Fire Safety Systems	Highest Fire Hazard Classification	Largest Fire Cell Size	Water Supply Classification	Total Network Capacity Required ($Q_{sprinklres} + Q_{hydrants}$)
M09 max*	Type 7	FHC4	Any	FW2	(100 + 25) = **125 L/sec**
M09 limitations	Type 7	FHC4	Any	FW2	(65 + 25) = **90 L/sec**
M10 max*	Type 7	FHC4	Any	FW2	(100 + 25) = **125 L/sec**
M10 limitations	Type 7	FHC4	Any	FW2	(65 + 25) = **90 L/sec**
M11	Type 7	FHC3	Any	FW2	(60 + 25) = **85 L/sec**
M12 <3m storage	Type 4	FHC2	<599m^2	FW4	(0 + 100) = **100 L/sec**
M12 >3m storage	Type 6	FHC3	Any	FW2	(25 + 25) = **50 L/sec**
M13A <3m storage	Type 4	FHC2	<599m^2	FW4	(0 + 100) = **100 L/sec**

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NORMAN DISNEY AND YOUNG COMPANY NO. AK336379

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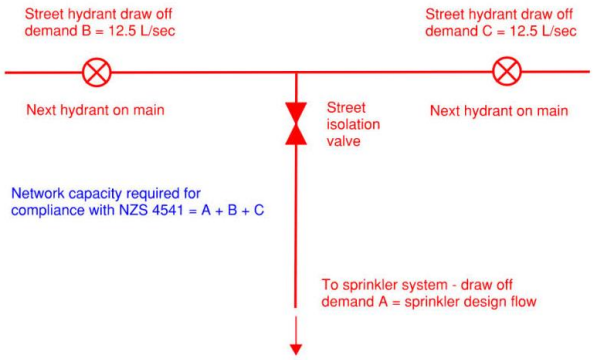
Building	Fire Safety Systems	Highest Fire Hazard Classification	Largest Fire Cell Size	Water Supply Classification	Total Network Capacity Required ($Q_{sprinklres} + Q_{hydrants}$)
M13A >3m storage	Type 6	FHC3	Any	FW2	(25 + 25) = **50 L/sec**
M13B-D	Type 4	FHC2	<399m²	FW3	(0 + 50) = **50 L/sec**

NOTE: Only a single event is required to be considered. *Denotes maximum storage flexibility option.

For buildings fitted with a sprinkler system the demand is at the point of connection as shown in figure 1 below:

FIGURE 1 – TOWN-MAIN CONNECTION



For un-sprinklered buildings the network demand for fire-fighting water supplies shall be as per SNZ PAS 4509 Code of Practice Table 2.

ESTIMATED FIRE-SPRINKLER SYSTEM WATER SUPPLY CAPACITY

This is the conservative water supply requirement for the building fire sprinkler system and is in accordance with NZS 4541 with the capacity and duration determined by factors such as hazard category of commodities, occupancy use, and building floor to ceiling height.

The table below is based on typical assumptions, occupancy classifications can be higher for storage rooms etc. but these are usually restricted in water demand by limitations in fire cell areas.

- Maximum retail storage height of up to 3.0m for Countdown type stores
- Maximum retail storage height of up to 3.7m for Warehouse type stores
- Higher storage can be catered for by going from Ordinary Hazard Group 4 to Extra High Hazard protection criteria as provided in an option below.

TABLE 2 – FIRE SPRINKLER DESIGN CRITERIA FACTORS AND DEMAND REQUIREMENTS

Building Type	Occupancy Classification	Commodity Classification	Maximum Storage Height	Floor to Ceiling Height	Total Flow Rate (approx.)
M11 - Small to medium retail	Ordinary Hazard Group 3	Up to Category 4 (standard mercantile products)*	2.2m	N/A	1,500 L/min
M09 and M10 - Large retail	Ordinary Hazard Group 4	Up to cartoned Category 6 expanded plastics*	3.0m	<4.6m	3,500 L/min
				<9.1m	5,000 L/min
			3.7m	<4.6m	3,750 L/min
				<9.1m	6,000 L/min
M09 and M10 large drop ceiling sprinklers - Retail and Retail Storage	Extra High Hazard	Up to cartoned Category 6 expanded plastics*	900mm clearance	<9.1m	6,000 L/min

*Based on typical arrangements – refer to commodity classifications for typical NZ retail tenants in Table 4

Below are the conditions for a single water supply, for buildings (or groups of connected buildings) where over 11,000m^2 in floor area only an 'all-out' evacuation system is permissible. The fire engineer will need to confirm that the boundary conditions in NZBC C/AS2 are met for a single supply also.

TABLE 3 – CONDITIONS FOR SINGLE WATER SUPPLY AS PER NZS 4541

Maximum size of building	Managed Evacuation?	Greater than 45m high?	Dual Water supply Mandated by NZS 4541?	Water supply Duration from Town-main
M09 and M11 <11,000m^2	N/A	No	No	60 mins
M10 >11,000m^2	Not permitted	No	No	60 mins

NOTE: Building M10 is currently measured at just over 11,800m^2

MERCANTILE COMMODITY CLASSIFICATIONS

The water supply capacities are based on the expected goods commodity classifications for typical New Zealand merchants. These are the classifications as provided in NZS 4541.

We have based our initial advice on typical prospective tenants from the master lease plan.

TABLE 4 – TYPICAL RETAIL COMMODITY CLASSIFICATIONS

Prospective Tenants	Typical Commodity Classification	Example Higher Risk Goods	Comments
Restaurants / Cafes	Up to Category 4	▪ Food products ▪ Food packaging (bulk and retail)	
General retail shops (for example): ▪ Bank ▪ Hairdresser ▪ Dairy ▪ Florist	Up to Category 4	▪ General mercantile goods	Excludes high piled storage and significant quantities of foam, plastics, and flammable liquids.

Prospective Tenants	Typical Commodity Classification	Example Higher Risk Goods	Comments
▪ Chemist			Special consideration to be given to shoe shops and other stores such as Plastic Box
The Warehouse	Up to Category 6 cartoned expanded plastics	▪ Hanging garments ▪ Foam products ▪ Plastic containers ▪ Flammable liquids ▪ Gas cannisters ▪ Furnishings ▪ Polystyrene beans ▪ Fireworks	Generally, apart from display items it is expected that any expanded plastic products will be cartoned/packaged
Torpedo 7	Up to Category 6 cartoned expanded plastics	▪ Hanging garments ▪ Foam products ▪ Plastic containers ▪ Flammable liquids ▪ Gas cannisters ▪ Furnishings	Generally, apart from display items it is expected that any expanded plastic products will be cartoned/packaged
Noel Leeming	Up to Category 5 cartoned unexpanded plastics	▪ General electronic and electrical home products	
Freedom Furniture	Up to Category 6 cartoned expanded plastics	▪ Soft and hard furnishing ▪ Bedding including mattresses	Special consideration to be given to mattresses and bulk storage of other foam products
Rebel Sports	Up to Category 6 cartoned expanded plastics	▪ Hanging garments ▪ Foam products ▪ Shoes ▪ Plastic products	Special consideration to be given to products with a high plastic/foam content and bulk storage of other foam products
Briscoes	Up to Category 6 cartoned expanded plastics	▪ Fabrics ▪ Foam products ▪ Plastic containers ▪ General electrical goods ▪ Soft furnishings	Special consideration to be given to products with a high plastic/foam content and bulk storage of other foam products

SUMMARY

We have assessed the development of needing a fire-fighting water supply network capacity between 100 and 125 L/sec. This range is based on several factors including commodity classification, floor to ceiling heights and retail storage and display arrangements. Restricting the floor to ceiling heights and the storage heights will reduce the water supply demand.

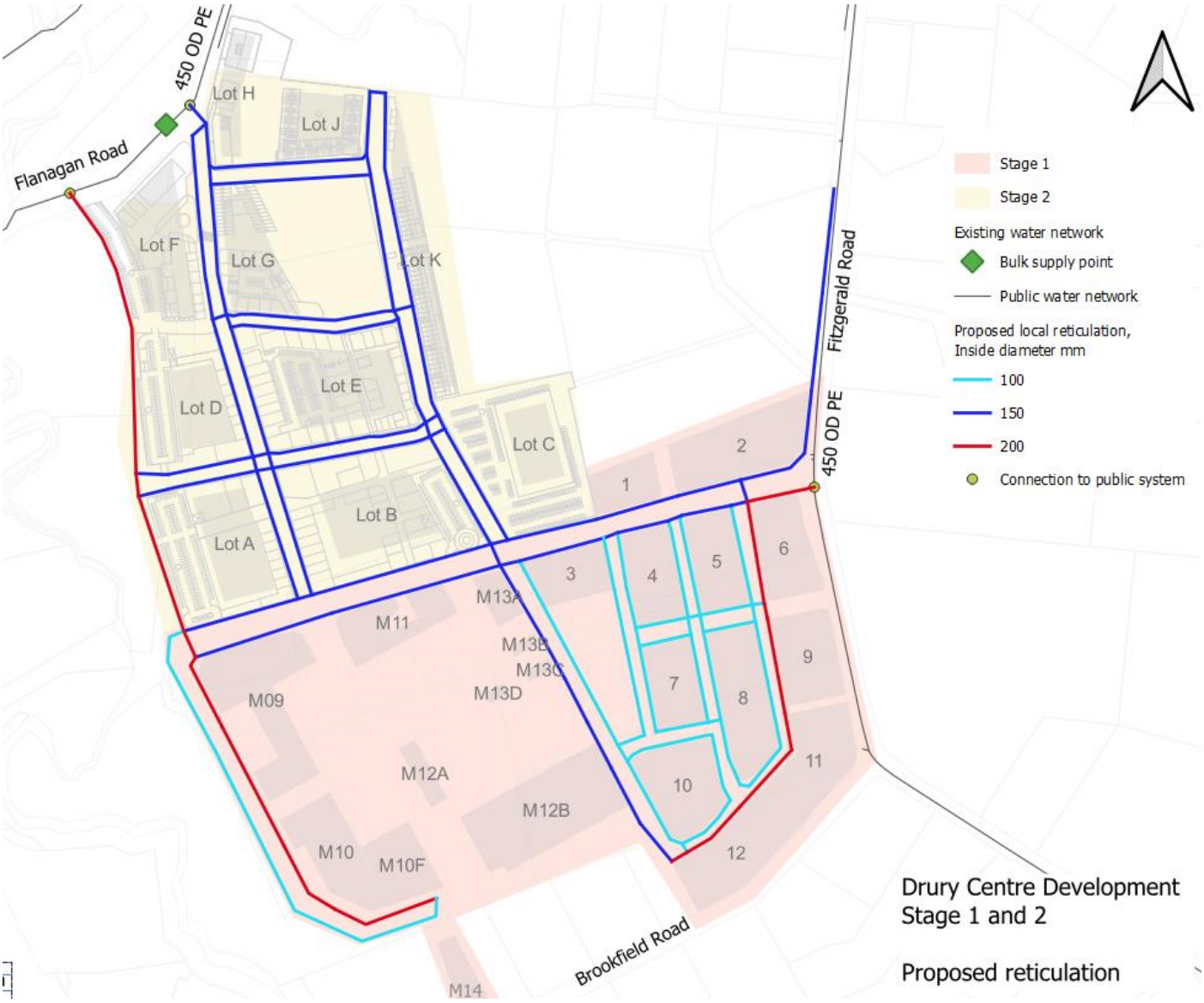
FIGURE 2 – FIRE SAFETY SYSTEMS PER BUILDING

NORMAN DISNEY & YOUNG

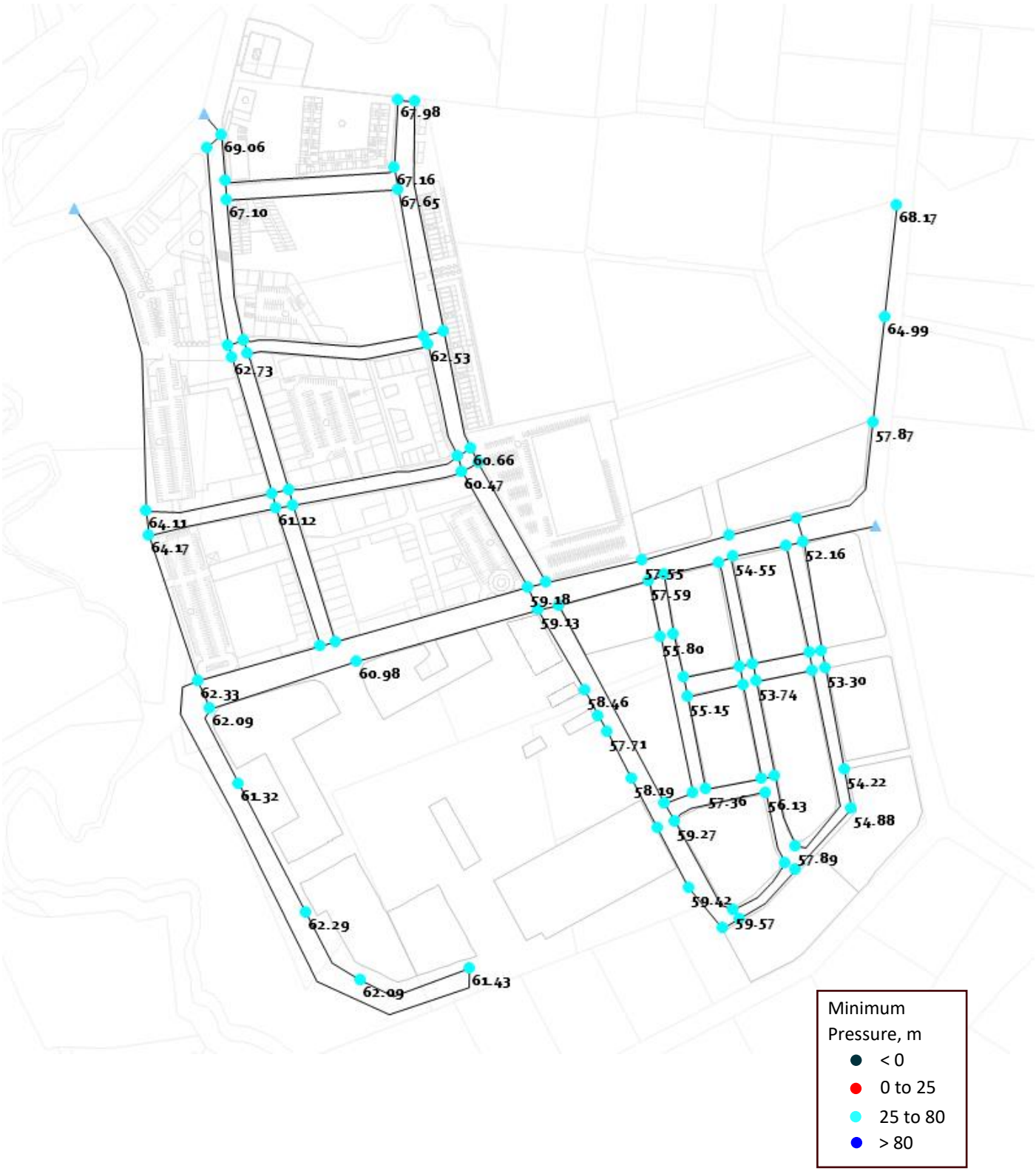
Peter Thompson | Senior Associate
p.thompson@ndy.com

Appendix 4 – Results for peak demand

Proposed reticulation



Minimum pressure m



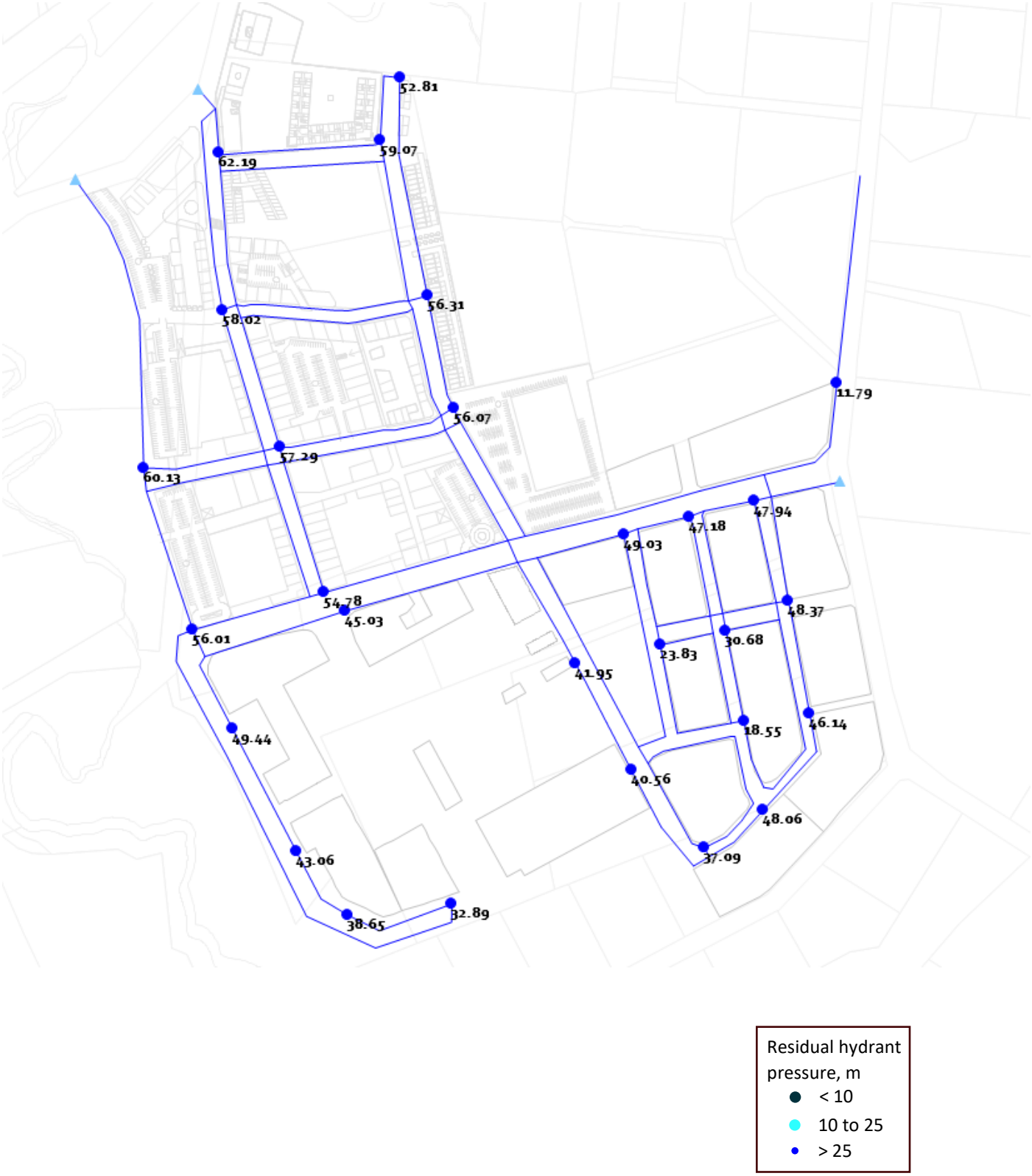
Maximum pressure m

Maximum headloss m/km

Maximum velocity m/s

Available fireflow l/s at 10m residual pressure

Residual pressure (m) at 125l/s fireflow



Appendix 5 – Meeting minutes

Meeting Minutes - 17/10/2023

Drury Centre Stage 1 and 2 Water Supply

Location	Teams			
Time & Date		17/10/2023	**Taken by**	Cristian Jara
Attendees	**Initials**	**Name**		**Company/role**
	DS	David Schwartfeger		Kiwi Property Group Ltd Project Director Drury
	SM	Sanjeev Morar		Veolia NZ Developments Manager
	KS	Kerryn Swanepoel		Watercare Major Developments Programme Lead
	TH	Thanujah Haran		Woods Senior Civil Designer
	GW	Glenn Wright		Woods Senior Civil Designer
	MB	Marcel Bear		Woods Principal Water Engineer
Apologies	**Initials**	**Name**		**Company**

Introduction

Meeting to discuss the Drury Centre development water supply and wastewater servicing concepts with Veolia. The meeting objective is to seek feedback on the broad principles of the network concepts prior to advancing the design.

Refer the attached presentation that was given at the meeting.

Minutes

1) DS introduced the development in the context of the surrounding area, adjacent developments and medium to long term plans for developing Drury.

Wastewater

2) The following points were presented and there was general agreement by SM that the wastewater servicing was feasible as described in the presentation.
    - **Existing Pump Station Capacity**: The current wastewater pump station in Flanagan Road, as confirmed by Watercare (WSL), has an interim capacity to service 4,130 HUEs (137 litres per second).
    - **Initial Stages of Drury Centre Development**: This capacity is adequate to meet the sewer flow of the initial stages of the Drury Centre development.
    - **Wastewater Flow**: The projected upper bound wastewater flow (PWWF) from the Drury Centre development is 53 litres per second.
    - **Adequate Capacity**: The existing interim capacity of 137 litres per second is well above the projected PWWF of 53 litres per second.
    - **Conservative Design Approach**: The system's capacity takes into account a conservative design approach, which ensures that there is room for potential increases in wastewater flow or other contingencies.
3) The site earthworks will make gravity drainage of wastewater to the Flanagan Rd pumpstation possible, generally eliminating the need for local pumpstations.

Water Supply

4) The supply points and distribution pipe routes as shown in the presentation were discussed. There was agreement the points presented below were accepted:

   - **Existing Trunk Capacity**: Significant with the proximity of the Flanagan Rd BSP and 450 main
   - **Peak hour demands:** Stage 1 26 l/s, Stage 2 allowance 15 l/s, total 41 l/s.
   - **Proposed distribution pipe routes:** Looped and future proofed to service Stage 2
   - **Design Approach**: Network sized for residential, commercial, hydrant flow and sprinkler flow

5) SM said a new BSP was planned for the corner of Great South and Quarry Roads. For this to supply the site a pipe crossing Hingaia Stream would be needed. Given the proximity of the existing BSP at Flanagan Rd and the existing 450 main along Fitzgerald Rd, it is unlikely a connection to the proposed BSP at Gt South/Quarry Rd would be used

6) The proposed distribution layout was accepted by DS as a workable starting point to supply Stage 1 and 2 of the development. The Stage 1 distribution pipes would form a loop with the Flanagan BSP, heading south along Creek Rd and then east along the main access to the site to the 450mm pipe in Fitzgerald Rd. An additional north/south pipe connection to the rerouted Flanagan Rd is proposed in the future, to supply Stage 2 (approximate timeframe 10 years).

7) The meeting concluded the supply concepts for water supply and wastewater were accepted in principle and could be used for further planning of the local network within the development

Cristian Jara

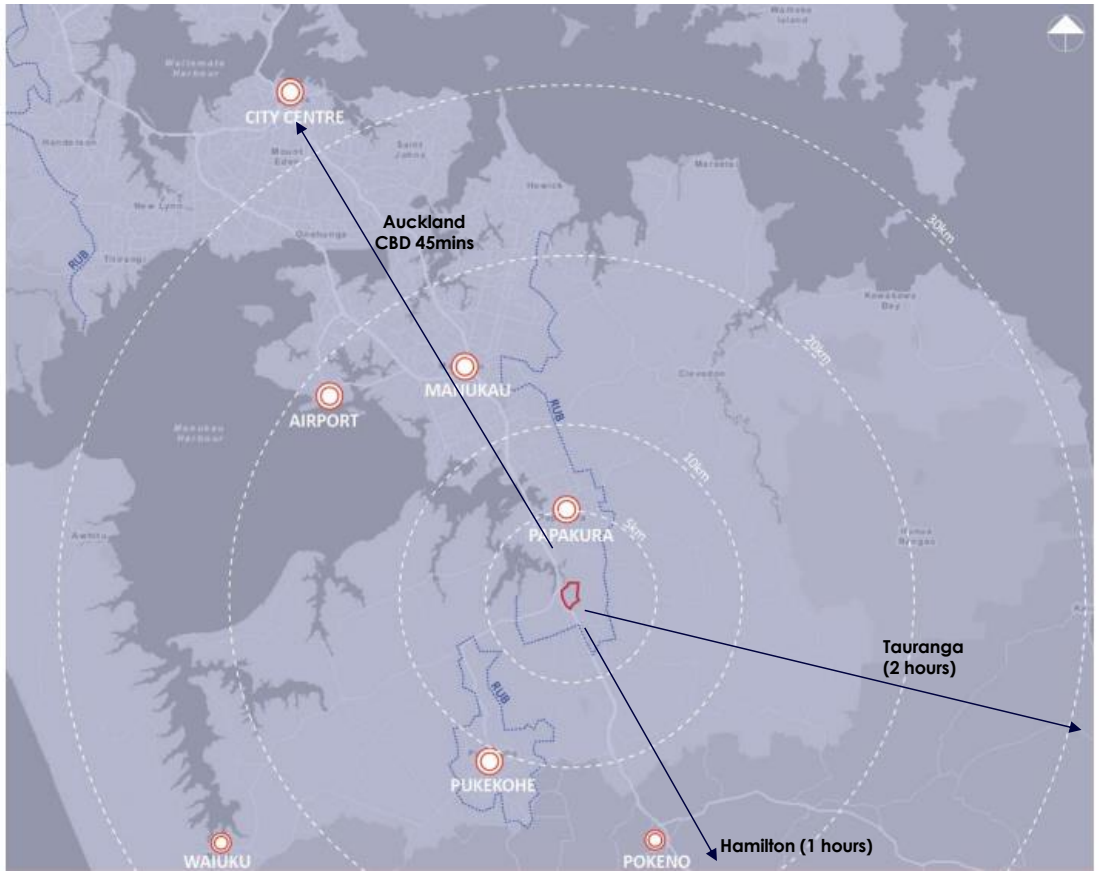
Principal Water Engineer

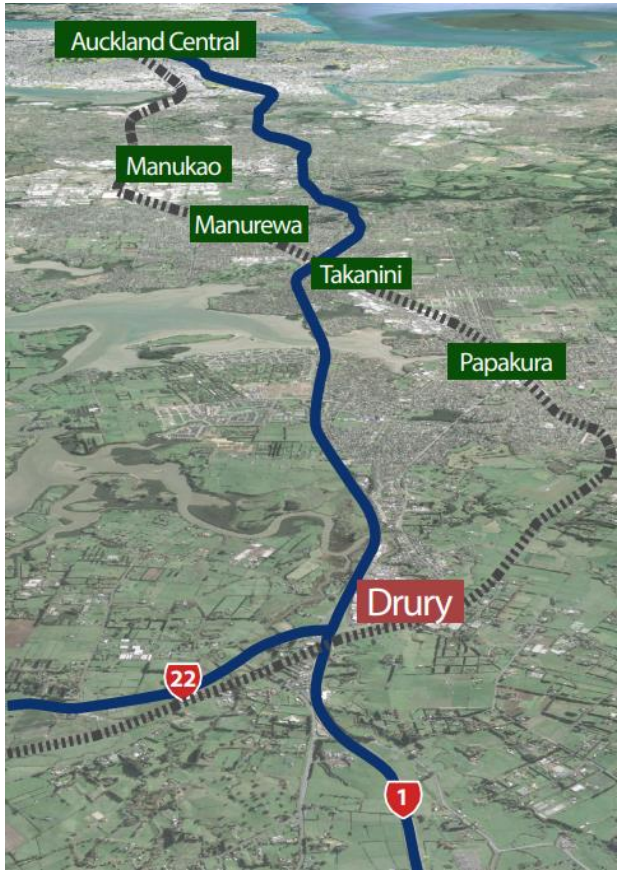
Approved as true and accurate record of meeting

Drury

July 2023

Kiwi Property





Drury – Nationally Significant

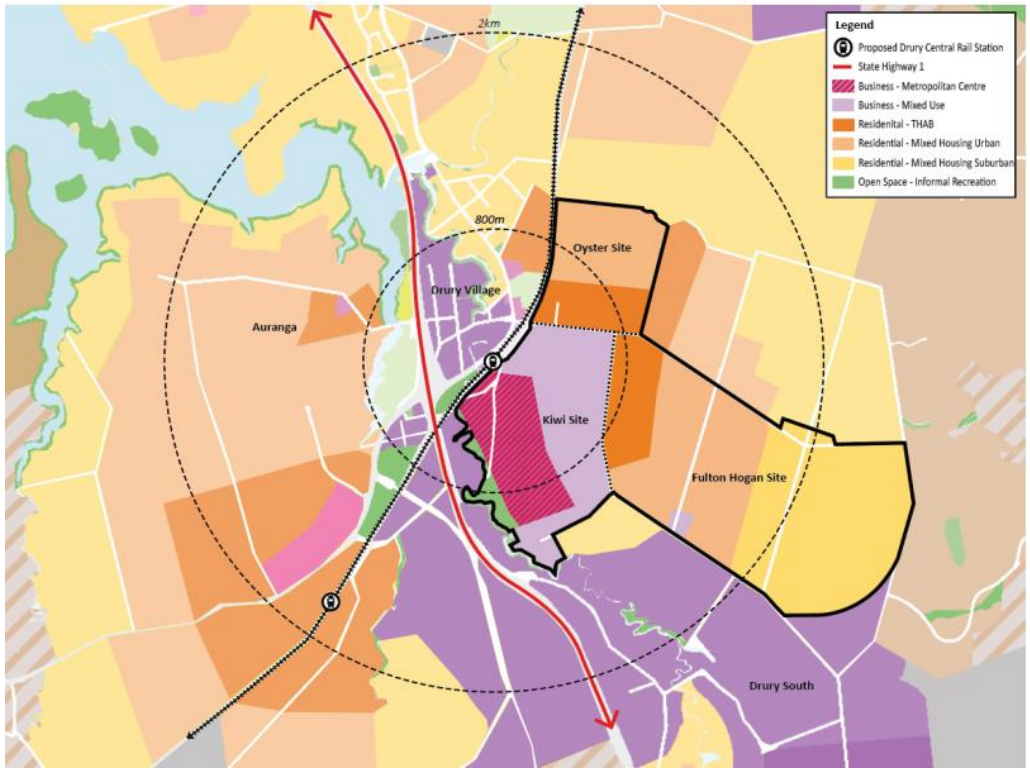
Drury – Development with scale

Highlights

- **$2.9 billion in Central Govt Support**
  - Papakura to Pukekohe electrification (under construction)
  - Drury train station (under construction)
  - SH1 Upgrade to Drury (under construction)
  - Mill Road (modified scope)
  - Waihoehoe Road/Great South Road (partial funding)

- **Why Drury**
  - Zoned and identified for growth
  - Drury is recognized as a project to national significance
  - SH1 - 60,000 cars per day *
  - Drury offramp – 10,000 cars per day
  - Tauranga 2 hrs / Hamilton 1 hr
  - Golden triangle holds 50% of NZ's population
  - Golden triangle projected to account for 35% of NZ's growth over the next 25 years

*Northwest 20,000 per day/ Westgate ramp 8,000 per day



What is Proposed at Drury East?

Once urban zonings are in place the Drury East development will enable:

- approximately **7,000** new dwellings
- accomodating **19,000** new residents
- approximately **58,000m²** GFA of new office space
- approximately **119,000m²** GFA of new retail space
- supporting **5,000-6,000** additional jobs
- **1 Rail Station.** Stations in Drury Central and Drury West have been allocated $247 million in funding.
- **1 Bus Interchange** integrated with Drury Central Rail Station and frequent routes along Great South Road.
- Provision for a Regional **Hospital** Precinct.
- Provision for **3 Schools** consisting of two primary and one Secondary.
- approximately **10ha+** of new public open spaces, along with a new library, civic spaces and schools.
- segregated **cycleways** along all arterial and connector roads and shared paths within new open spaces

Drury – Metropolitan Centre

Highlights

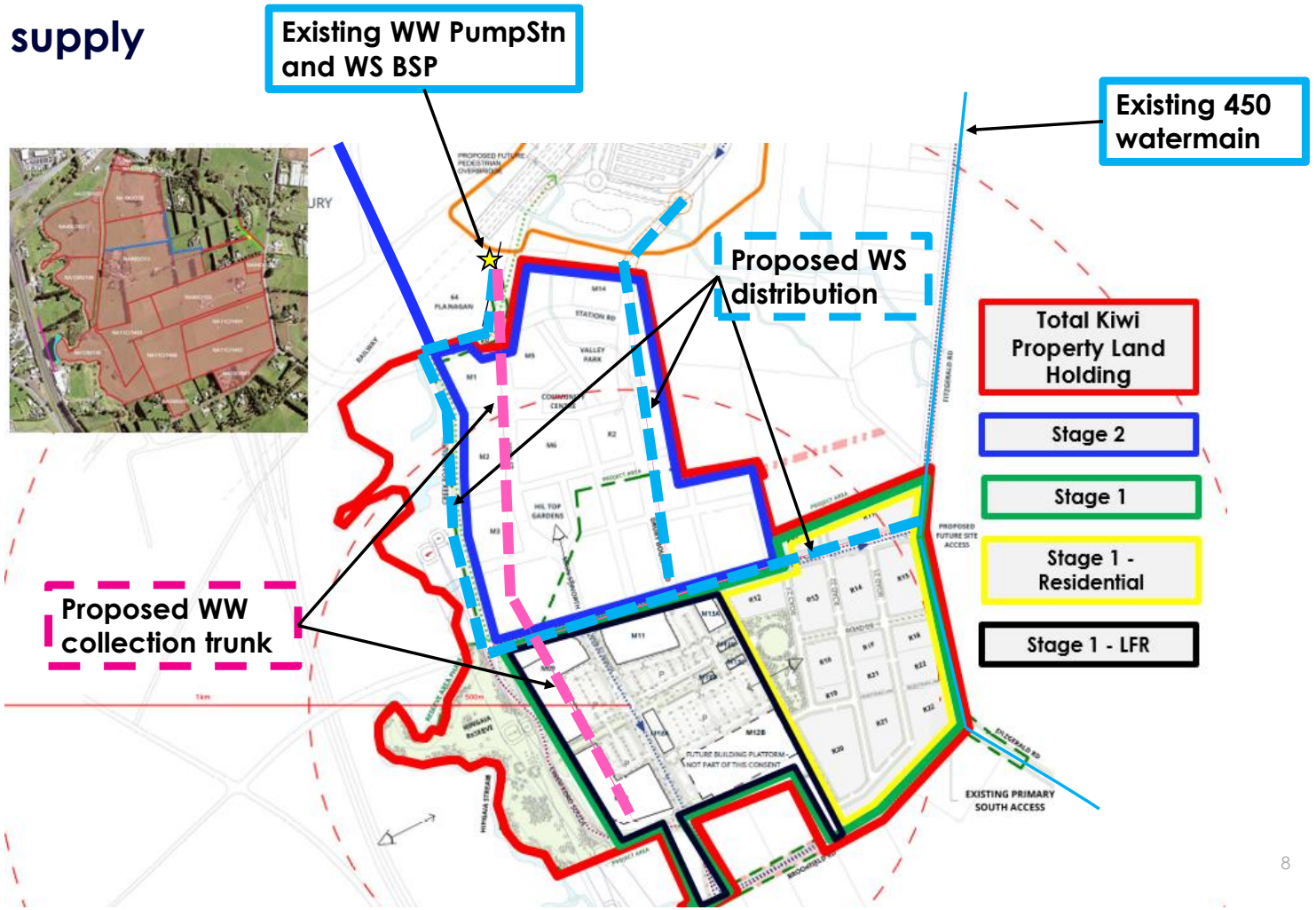
- **General framework**
  - Zoned Metro site
  - Infrastructure available
  - Flat regular shaped site
  - Ground condition known
  - Strategic location
  - Immediate hole in the existing catchment

- **Why now**
  - SH1 works due for completion 2024
  - Train Station due for completion 2025
  - Drury offramp 2025

Staging


Total Kiwi Property Land Holding
Stage 2
Stage 1
Stage 1 - Residential
Stage 1 - LFR
EXISTING PRIMARY SOUTH ACCESS
FUTURE BUILDING PLATFORM - NOT PART OF THIS CONSENT
PROPOSED FUTURE SITE ACCESS
STATION RD
VALLEY PARK
COMMUNITY CENTRE
HIL TOP GARDENS
FITZGERALD RD
CREEK ROAD SOUTH

Bulk supply

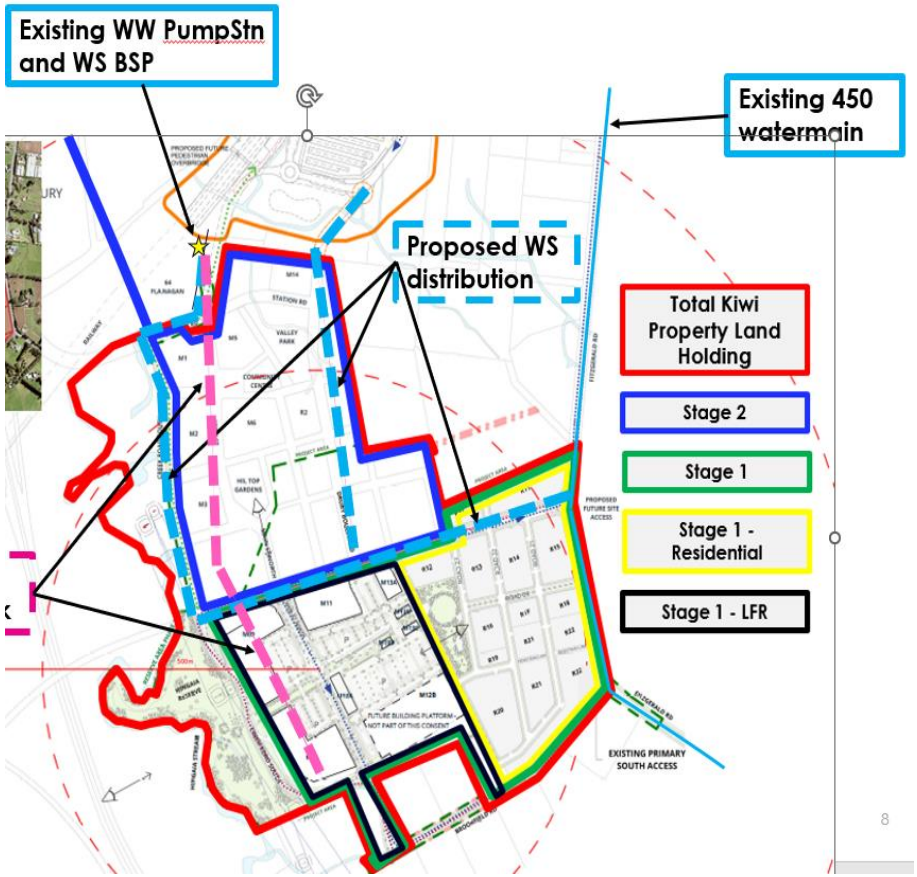

Existing WW PumpStn and WS BSP
Existing 450 watermain
Proposed WS distribution
Proposed WW collection trunk
Total Kiwi Property Land Holding
Stage 2
Stage 1
Stage 1 - Residential
Stage 1 - LFR
EXISTING PRIMARY SOUTH ACCESS

Wastewater network capacity

- ***Existing Pump Station Capacity**: The current wastewater pump station in Flanagan Road, as confirmed by Watercare (WSL), has an interim capacity to service 4,130 HUEs (137 liters per second).*
- ***Initial Stages of Drury Centre Development**: This capacity is adequate to meet the sewer flow of the initial stages of the Drury Centre development.*
- ***Wastewater Flow**: The projected upper bound wastewater flow (PWWF) from the Drury Centre development is 53 liters per second.*
- ***Adequate Capacity**: The existing interim capacity of 137 liters per second is well above the projected PWWF of 53 liters per second.*
- ***Conservative Design Approach**: The system's capacity takes into account a conservative design approach, which ensures that there is room for potential increases in waste water flow or other contingencies.*

Water network servicing

- ***Existing Trunk Capacity**: Significant with the proximity of the Flanagan Rd BSP and 450 main*
- ***Peak hour demands:** Stage 1 26 l/s, Stage 2 allowance 15 l/s, total 41 l/s.*
- ***Proposed distribution pipe routes:** Looped and future proofed to service Stage 2*
- ***Design Approach**: Network sized for residential, commercial, hydrant flow and sprinkler flow*



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Thank you

Kiwi Property