65-73 Ratanui Road, Paraparaumu

Water modelling assessment for the development at 65-73 Ratanui Road, Paraparaumu

Stantec

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1 Introduction

KCDC has engaged Stantec to report on the water supply available at the proposed development of 65-73 Ratanui Road, Paraparaumu. The location of the development is shown in Figure 1-1.



Figure 1-1: Location of proposed development

1.1 Model Set Up

For our own reference, the study model used for this work is **KCDC WS MPL07 C04.**

The model is an all-mains model in WS Pro and was updated and verified in 2024. Growth scenarios have been included in the master model based on the Sense Partners growth estimates adopted by KCDC. Elevations were taken from the LINZ 2021 1m DEM LiDAR which uses the NZVD2016 vertical datum, which KCDC recently moved to.

1.2 Growth

Growth has been assigned to the future peak day (2053) scenario as per growth scenarios developed as part of the KCDC Zone Management Plan (2024). Growth for Paraparaumu is shown in Table 1-1.

Table 1-1: Predicted dwelling growth in Paraparaumu

	Paraparaumu
Residential dwellings (2023)	14,007
Residential dwellings (2053)	19,628
Change (2023 – 2053)	5,621

The demand changes for the growth scenarios for Paraparaumu are as follows:

- 2023 Current peak day (m^3/day): 9,220
- 2033 Future peak day (m^3/day): 10,634
- 2053 Future peak day (m^3/day): 12,815
- Change in demand from current to future (m^3/day): 3,595

2 Study Area

2.1 Paraparaumu Water Network

Waikanae, Paraparaumu and Raumati are all supplied by the Waikanae Water Treatment Plan (WTP), but the Paraparaumu network is hydraulically separated from Waikanae and is supplied through the Otaihanga DMA, which in turn feeds the Otaihanga Reservoir (TWL 80.8m, 5680m^3 capacity), and is pumped to the Waikanae Downs DMA and tanks, and the Nikau Valley DMA and tanks.

Water can then gravitate through the Otaihanga DMA to the Riwai Reservoir (TWL 68.4m, 11250m^3 capacity), which supplies the rest of the network through a series of 375mm mains in the area around Old SH1 and Rimu Road. Some water is pumped to the Riwai High Level Reservoir (TWL 113.3m, 400m^3 capacity) via the Panorama Drive DMA.

The proposed development sits in the Mazengarb Road DMA, which is connected to the central system through a 225mm main along Mazengarb Road. Figure 2-1 shows the Paraparaumu network schematic.

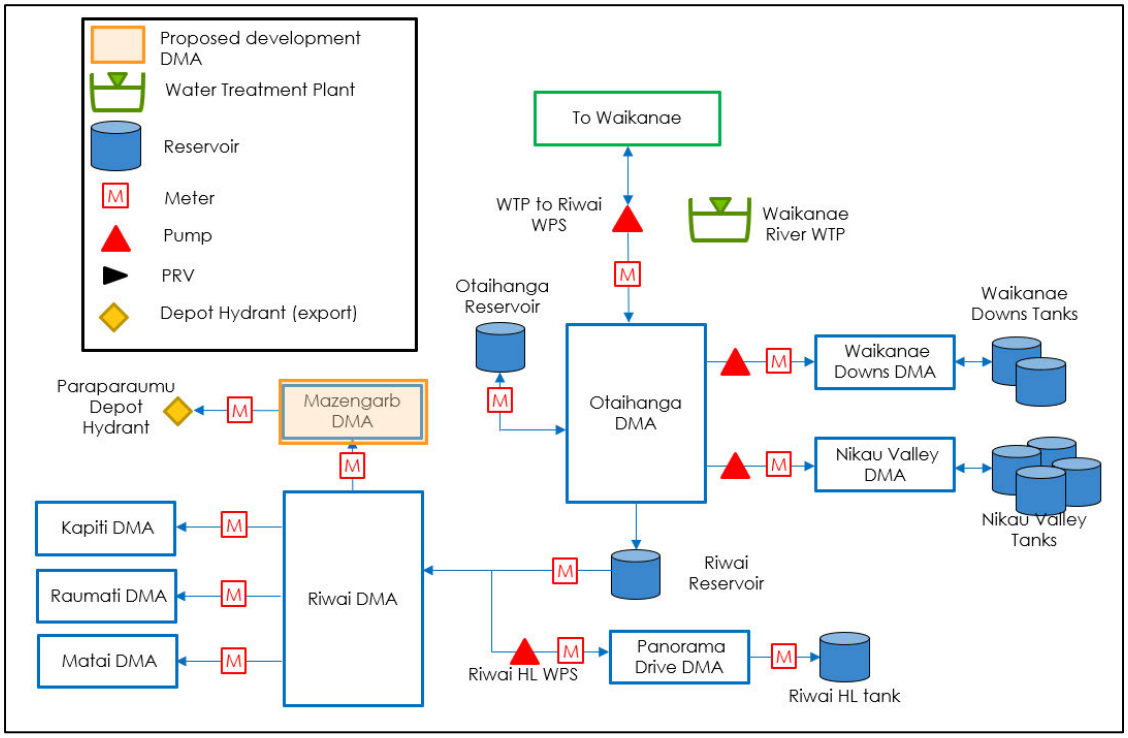


Figure 2-1: Paraparaumu Network Schematic

3 65-73 Ratanui Road development

3.1 Layout

No internal layout was provided for this assessment, and as requested by the developer assessment of the internal development network has been excluded from this report. Assessment of pressure and fire flow was done only at the connection point to the development.

The node used to represent the connection point to the development has an elevation of 6.35m AD, which was taken from the 1m DEM LiDAR dataset from LINZ.

3.2 Development Demand

Demand has been applied to the development based on unit, population and demand figures sent by the developer. These are in line with the NZS 4404 guidelines usually applied for modelling assessments, and are as follows:

Table 3-1: Preliminary Water Demand (from the developer)

Unit Type	No of Units	Population per unit	Daily demand l/person/day	Daily demand l/property/day
Independent Living Units	260	1.3	350	455
Assisted Living Suits	20	1	350	350
Memory Care Suites	0	1	350	350
Care Facility	30	1	350	350
Guests	45	1	50	50
Staff	40	1	50	50

A standard instantaneous peaking factor of 2.5 has been applied to the model and a standard residential pattern was assumed for all unit types in the proposed development.

4 Performance Criteria

Pressure and fire flow at the development connection point were reviewed in this assessment, and changes across the wider network were reviewed. Pipe head loss and storage in the wider network were also checked. Resilience of the internal network was not reviewed as this was excluded for this assessment as stated in Section 3.1.

- **Pressure:** A minimum pressure of 25m must be maintained under peak summer demand. In scenarios reflecting temporary pipe failures, lower pressure may be acceptable but must always remain positive. An absolute lower limit of 10m pressure was used to allow for model uncertainties

  A maximum pressure criterion of 90m was also set for properties in the new development and for properties affected by proposed changes in the existing network configuration.

- **Fire flow:** Fire flow has been assessed in line with NZS PAS 4509:2008 (the Fire Code). Internal fire flow inside the development was excluded for this assessment, however sprinkler flows were provided by the developer and used for assessment.

  Fire flow at the connection point has been assessed using an assumed total flow of 44l/s consisting of:

  - 25l/s hydrant flow
  - 2.3l/s for 2/3 of peak day demand
  - 17l/s for a sprinkler system (as provided by the developer).

- **Pipe head loss:** New pipes should be designed to have less than 5m/km head loss. Any other head losses which directly result in the failure of minimum pressure requirements were also identified. Assessment of pipe head loss inside the development has been excluded from this assessment.

- **Resilience:** An assessment of resilience inside the development was excluded from this assessment.

- **Storage:** Storage is considered sufficient if there is enough stored water to support both of:

  - 24 hours of demand on a peak summer day
  - An allowance for fire flow in line with Table 2 of the Fire Code (NZS4509:2008). For the Riwai / Otaihanga WSA, FW4 fire class is assumed, requiring an allowance of 540m^3 storage.

5 System Performance

5.1 Current Peak Day Scenario (2023)

The initial assessment was undertaken on the existing network current demand.

For pressure, the network can maintain levels of service with the proposed development with the network as currently modelled. There is little effect on pressure (<1m change) outside of the development and the minimum pressure at the connection point to the development is approximately 51m (Figure 5-1). Total demand for the development is approximately 165m^3/day.

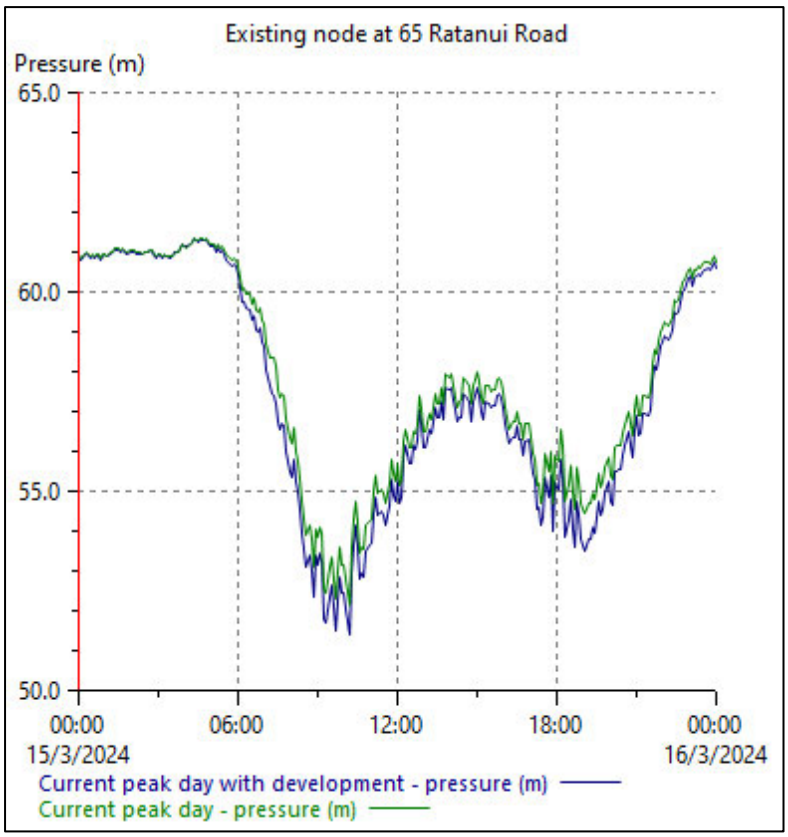


Figure 5-1: Pressure (m) under peak day demand at connection point with / without development

For fire flow, using the assumptions for sprinkler flow set out in Section 4 a fire flow of 42 l/s was applied on top of regular demand at 10am, when demand is around 2/3 peak demand. Pressure at the connection point assuming fire flow is 42l/s is around 33m (Figure 5-2).

Available fire flow at other hydrants in Ratanui Road remains at approximately 75l/s (Figure 5-3).

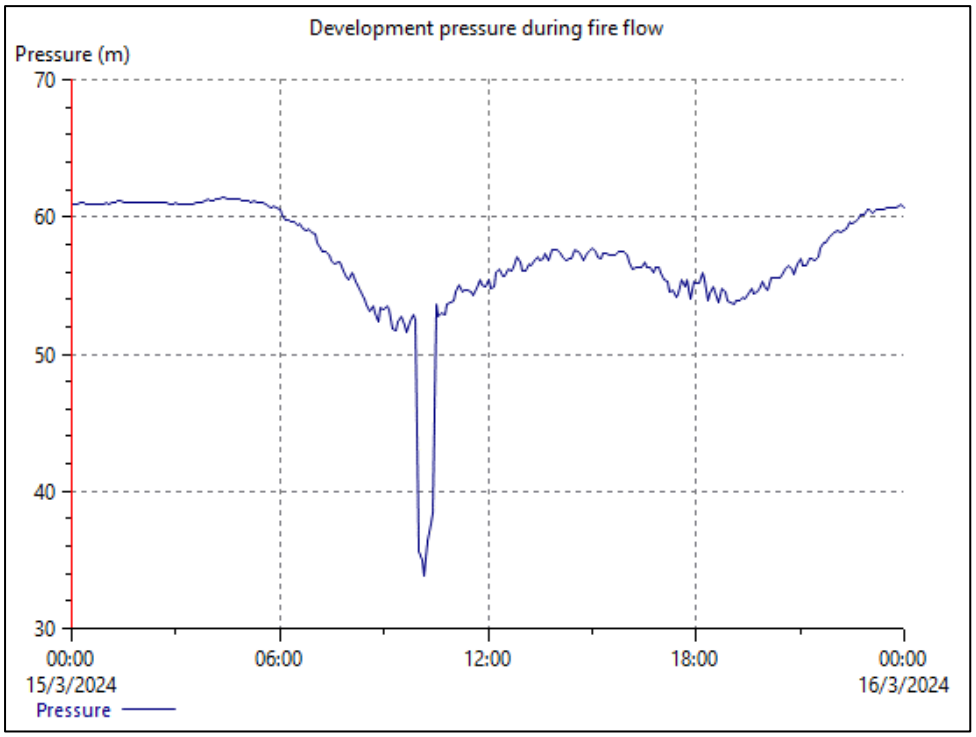


Figure 5-2: Pressure (m) at the development assuming fire flow = 42l/s

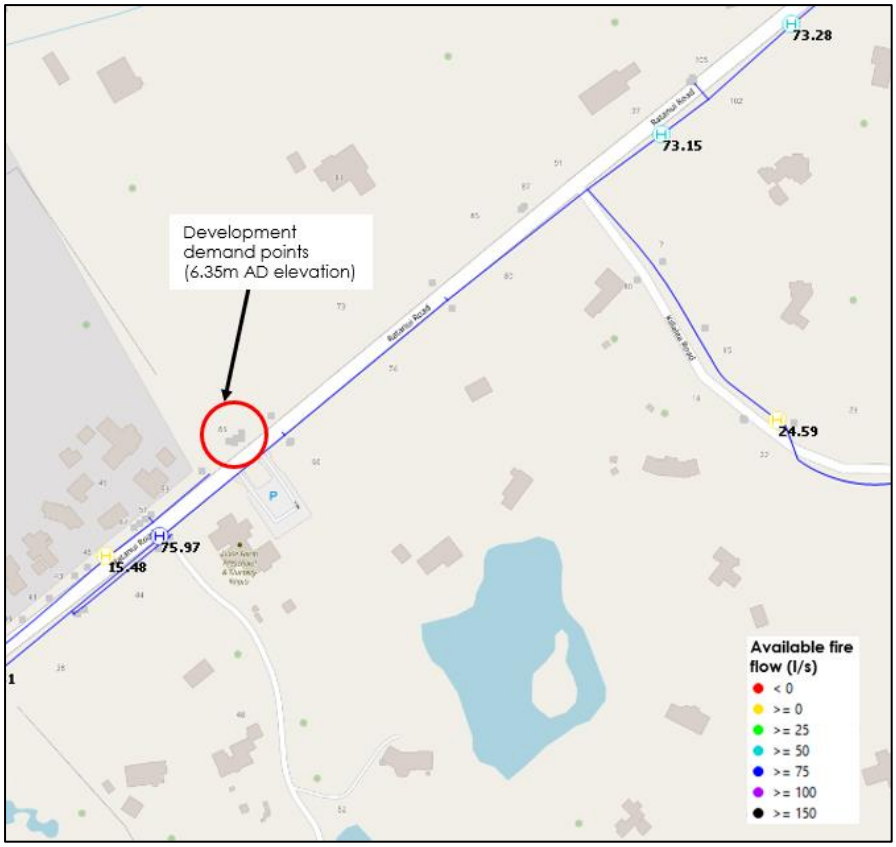


Figure 5-3: Available fire flow in the development area

5.2 Future Peak Day (2053)

The KCDC WS MPL07 2053 upgraded future peak day scenario was used for this assessment. Anticipated growth is included in this model (as described in Section 1.2) and the 65-73 Ratanui Road development was modelled in addition to the growth already in the model.

The addition of the 65-73 Ratanui Road has little effect (<1m change) on the wider network pressure and minimum pressure is approximately 48m. Pressure outside of the development is reduced by approximately 4m from current to future but this is due to growth across the wider network and is not impacted by the addition of the development.

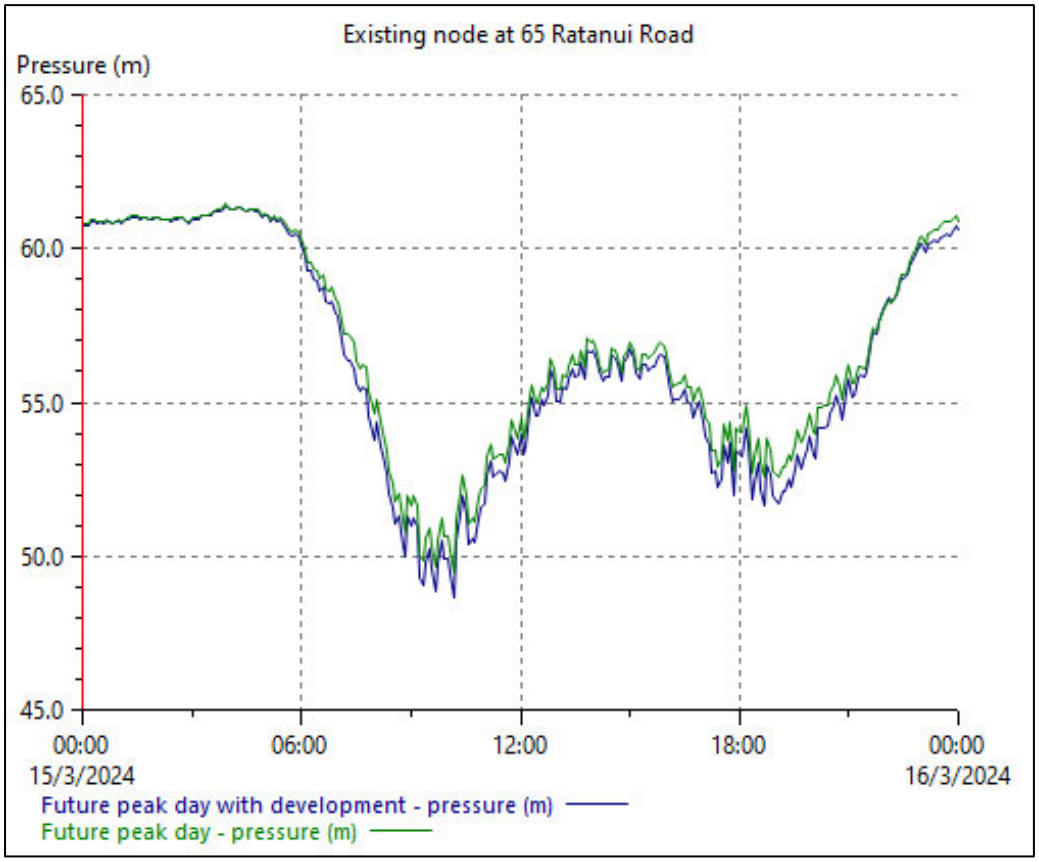


Figure 5-4: Pressure (m) – Future peak day with and without development

In future, with fire flow of 42l/s pressure at the connection point is 31m.

5.3 Future storage requirements

Future storage requirements were assessed with and without and the development as shown in Table 5-1 and Figure 5-5.

This development is considered as part of Sense Partners; therefore, we have assessed how much of the existing storage surplus is reduced by the requirement to support the development.

Table 5-1: Existing storage and storage requirements in the Otaihanga + Riwai WSA

	2023	2033	2053
Otaihanga + Riwai Existing Storage	16,930m³	16,930m³	16,930m³
Otaihanga + Riwai PDD Demand without development and 540m³ of additional fire storage	9,346m³	10,663m³	12,570m³
Storage Surplus	7,584m³	6,267m³	4,360m³
Increase in requirement (Total from Sense Partners Growth)	0	1,317m³	3,224m³
Development Requirement	0	166m³	166m³

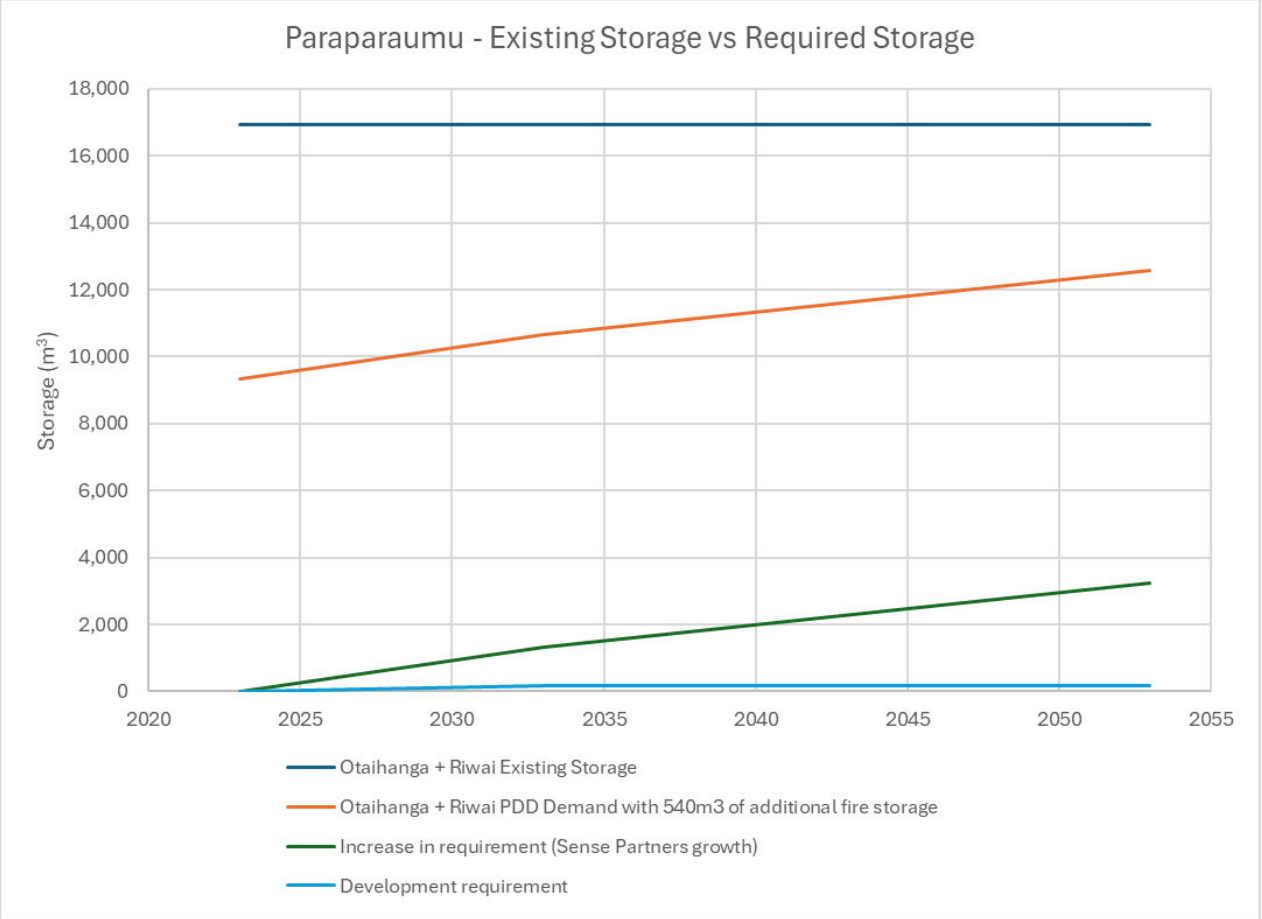


Figure 5-5: Paraparaumu - Existing storage vs Required storage with development

The table and graph indicate that the development demand of 166m³/day represents about 13% of the growth expected in Sense Partners to 2034, and the requirement consumes approximately 2% of the available surplus storage of 7,584m³ in the reservoir.

6 Conclusion

An assessment of the water supply available at the connection point to the development of 65-73 Ratanui Road was done and modelling suggests no issues with pressure or fire flow. The assessment shows that there will be little impact of the proposed development in the current and future peak day scenarios.

This development is considered part of the Sense Partners growth, and therefore the effects on the existing storage surplus relative to overall growth were calculated. Calculations suggest that the 166m^3 requirement will consume approximately 2% of the current surplus storage in the reservoirs supporting this part of the network.

It should be noted that this assessment excluded any assessment of the proposed development internal network.

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