

Johnston Street Waitara, Subdivision Feasibility Report

for Hareb Investments Ltd

Rev A - 16-09-2018

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Reviewed

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31/08/2018

Date

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1 SUMMARY

The proposed development area at Johnston Street in Waitara (Lot 3 DP 446773) is deemed to be able to be serviced by and connected to all of the required Council infrastructure to enable residential development, and the land is appropriate to provide stable and flood free building platform for residential development. Specifically:

- Except for one of the testing locations where Peat material was detected, a stable and flood free building platform is available over the large majority of the site.
- The existing topography and natural drainage channel provide ample capacity for on-site stormwater detention to enable a hydraulically neutral development.
- Except for one of the testing locations where Peat material was detected, shallow (3.0m deep) on-site stormwater disposal soak holes can be constructed if required.
- The existing potable Water Supply in Waitara has sufficient capacity for urban residential development in the proposed development area.
- The existing Wastewater reticulation in Waitara has sufficient capacity for urban residential development in the proposed development area.

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2 INTRODUCTION

Civil Infrastructure Consulting (CIC) has been engaged by Hareb Investments Limited to investigate and report on an area of land in Waitara for the suitability of the land to be developed to an urban residential standard, and to be serviced by (and connected to) existing Council infrastructure.

The proposed development area of land is currently zoned FUD (Future Urban Development) in the operative NPDC district plan, and is bordered by Raleigh Street and Johnston Street in Waitara.



Figure 2.1: Location Plan – Waitara

2.1 Objectives of this Report

The objective of this report is to provide a summary to NPDC for the planning of council infrastructure for this area. This report covers aspects including:

- Stormwater management
- Water reticulation
- Sanitary sewer

A Roading and Transport analysis for this area was carried out by Stantec Limited, titled “*Integrated Transport Assessment, Residential Plan Change, Waitara September 2018*” and is attached as Appendix A to this report.

A Building Platform analysis for this area was carried out by Stanley Gray Limited, titled “*Feasibility Report Raleigh Street, Waitara September 2018*” and is attached as Appendix B to this report.

3 STORMWATER

The proposed development area is currently pasture covered, with stock being grazed over the entire area. There is a significantly sized gully (approximately 1.6 ha) that commences at the southern corner of the proposed development area, and drains to the northern corner of the proposed development area.

3.1 Stormwater Effects on the Waitara Stormwater System

The Waitara West Stormwater Catchment Management Plan Report compiled by Opus in November of 2015 Section 5.5.1.1 details concerns about the proposed development area (referred to as “Area D” in the Opus Report). Specifically mentioned is the development of the proposed development area, which is stated would increase surface stormwater runoff into the “Brookes” catchment, and thereby further compound flooding in the Makere Street area which is at the greatest risk of property damage due to flooding.

However, as can be seen in Figure 3.1 below, the stormwater runoff from the proposed development area naturally drains north into the “Norman” catchment. Any new development in the proposed development area would continue to dispose of Stormwater into the Norman Catchment.

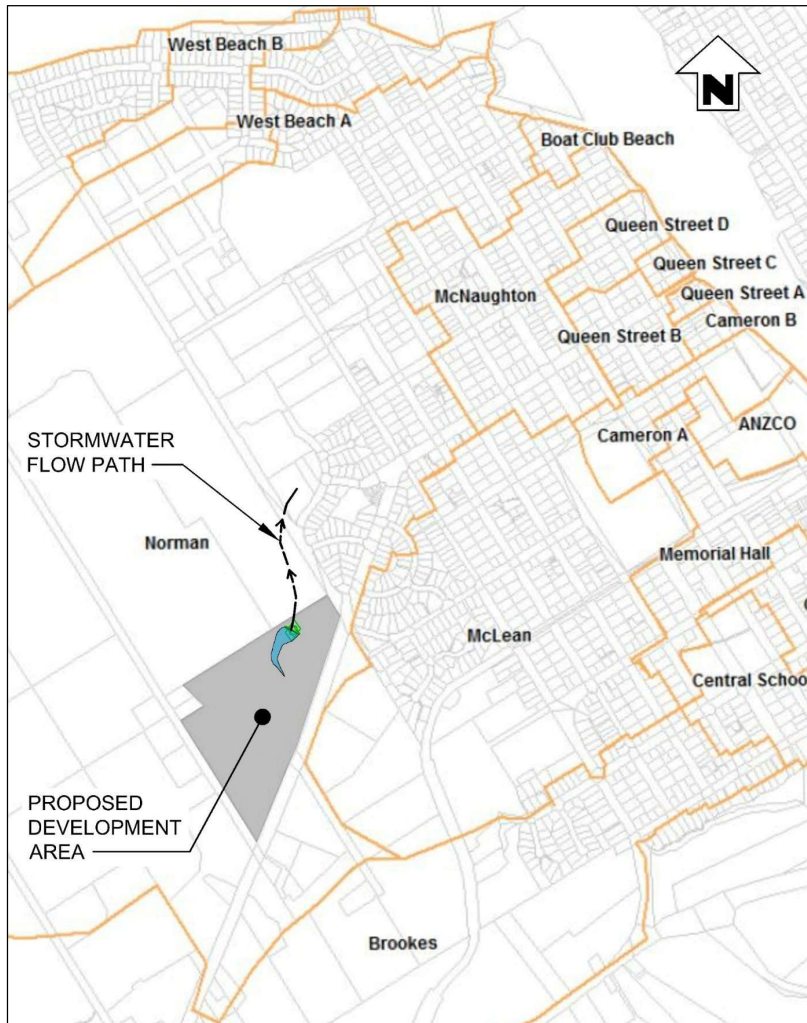


Figure 3.1: Stormwater Catchment Disposal

3.2 Stormwater Detention

The existing gully that extends the length of the proposed development area, from south to north, provides an opportunity to construct a stormwater detention area, to mitigate against any increased surface stormwater flows from the development.

As illustrated in Figure 3.2 below, a stormwater detention bund with a top RL of 29.0m would provide approximately 2,950m³ of stormwater detention; Far in excess of the additional 244m³ (as detailed in Section 3.5) of stormwater runoff that would be generated by the site if it were to be fully developed.

Additionally, given the ability to provide a large volume of stormwater detention within the proposed development area by way of a new detention pond, additional stormwater detention could be provided within a new detention pond to reduce the existing flooding problems experienced downstream of the proposed development area in the Norman Catchment, these are discussed in the Waitara West Stormwater Catchment Management Plan Report compiled by Opus in November of 2015.

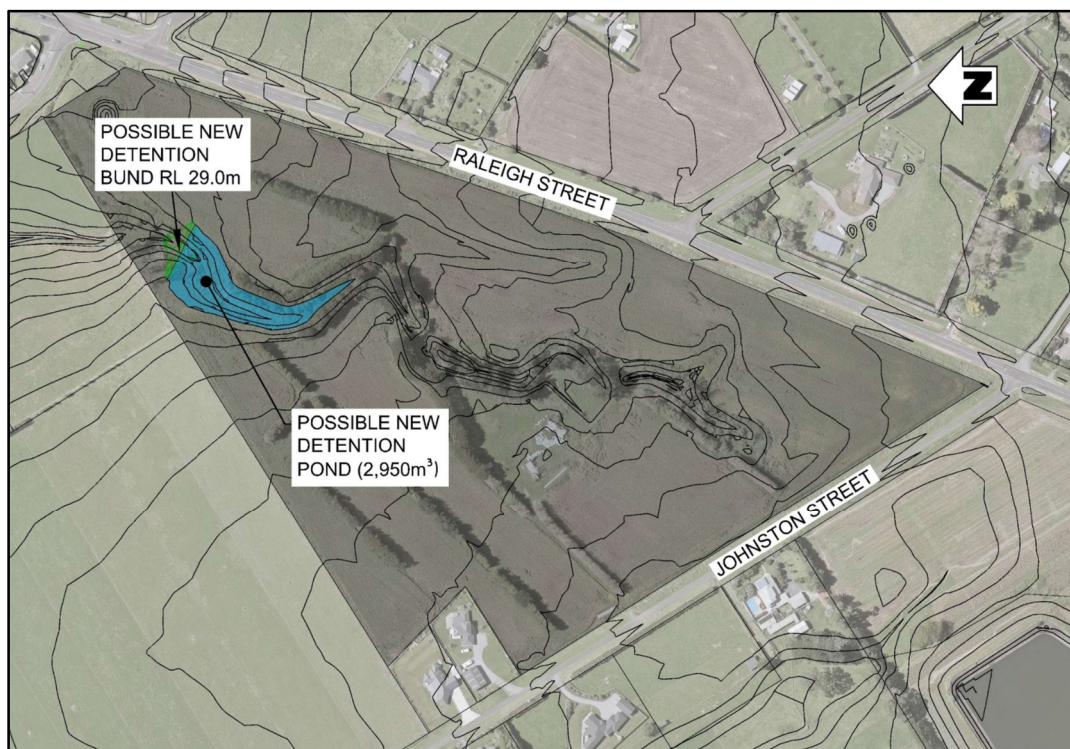


Figure 3.2: Possible New Detention Bund and Pond

3.3 Water Table

The existing water table levels were recorded at the time the Opus Soil Investigation was carried out on 13th and 14th August 2018, after a relatively wet winter period. The water table was detected at between 2.6m and 3.6m below existing ground level.

3.4 On-Site Stormwater Disposal

The large majority of the upper soil layer of the subject site is comprised of a firm Taranaki Volcanic Ash layer of approximately 3.0m to 3.2m in thickness, which is well draining in terms of on-site stormwater disposal.

Given the depth of the water table below existing ground level as discussed in Section 3.3 , shallow soak pits or rain cells are a viable option for surface stormwater runoff from residential building roofs, hardstand areas and road pavement.

Alternatively, a stormwater detention pond (as discussed in Section 3.2) could be designed to attenuate additional stormwater flows from residential building roofs, hardstand areas and road pavement if required.

3.5 Existing and Proposed Stormwater Flows and Volumes

Stormwater calculations have been carried out to compare the existing stormwater volumes with the fully developed stormwater volumes. HIRDS was utilised, with an a 2.1 degrees Celsius increase in temperature to allow for climate change.

Table 3.1: Existing and Proposed Peak SW Flows and Total Volumes

	Area (ha)	Runoff Coefficient (C)	Time of Concentration (min)	1% Rainfall Intensity (mm / hr)	Peak Flow (L/s)	1% Rainfall Depth (mm)	Total Volume (m3)
Existing	11.32	0.25	45	97	763	72	204
Proposed		0.55	10	182	1,432	72	448
Additional Roof Runoff	3.3	0.9	10	182	1,503	72	213

The difference in total volume between the existing site coverage and a fully developed site as tabulated in Table 3.1 for the 1% AEP event (1 in 100 year Storm) is 244m³.

3.5.1 Additional Roof / Hardstand Stormwater Runoff

If required, an additional 213m³ of stormwater runoff from new dwellings and hardstand surfaces from each property (as detailed in Table 3.1) could also be disposed of to a new stormwater detention area (as discussed in Section 3.2). This additional stormwater runoff was calculated assuming:

- 110 total properties
- 200m² roof area
- 100m² concrete driveway
- Runoff coefficient of 0.9

3.6 Conclusions

The existing topography and natural drainage channel provide an opportunity to construct a new stormwater detention pond with ample capacity for on-site stormwater detention, to enable a hydraulically neutral development.

Except for one of the testing locations where Peat material was detected, shallow (2.0m deep) on-site stormwater disposal soak holes can be constructed if required.

4 WATER

4.1 Existing Waitara Water Supply and Reticulation

Waitara is currently supplied treated potable water from the New Plymouth Water Treatment Plant via the Mountain Road Reservoir, with a total volume of 4,500m³ and a top water level (TWL) of 99.0m, located near the intersection of Mountain Road State Highway 3A and Manutahi Road.

Water is supplied to the Waitara township from the Mountain Road reservoir via a 500mm diameter concrete lined steel (CLS) trunk main. An existing 150mm diameter asbestos cement (AC) pipe along Waitara Road also connects the 500mm diameter trunk main with the Waitara town reticulation at Raleigh Street.

Raleigh Street properties are currently supplied water from a 1.1km length of 63 OD PE water main and a 200m length of 150mm diameter AC water main, consecutively connected from Tate Road to Stafford Street.

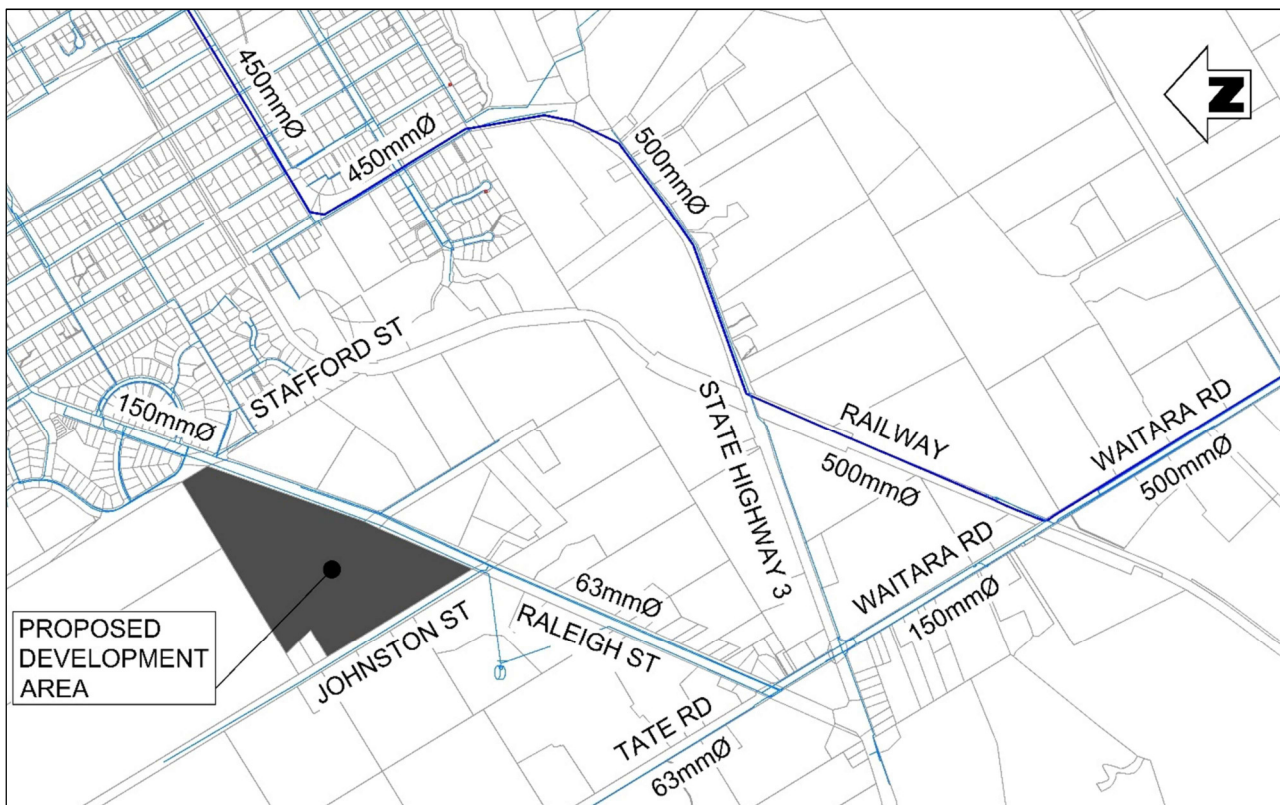


Figure 4.1: Waitara Water Reticulation

4.2 Water Demand

The peak water demand for the proposed development area has been calculated based on NZS4404:2010 with Amendment No. 1, Clause 6.3.5.3 and 6.3.5.6, including:

- Area for Residential development is 9.2 ha,
- The maximum property density for the area is estimated to be 12 Lots per hectare,
- The maximum number of properties (proposed Structure Plan area) = $9.2 \times 12 = 110$
- Average daily residential demand = 840 L/property/day,
- Peaking factor = 5.

Therefore,

$$Q (\text{peak}) \text{ subject area} = \left(\frac{840}{(24 \times 60 \times 60)} \times 110 \times 5 \right) = 5.3 \text{ L/s}$$

4.3 Fire Flow Requirements

As defined in SNZ PAS 4509:2008, residential dwellings can be provided fire water under two categories, namely FW1 and FW2. NPDC has advised that the NPDC Asset Management Plan specifies that infrastructure is designed and constructed to provide FW3. The requirements for each class is as follows:

Table 4.1: Fire Water Requirements

Fire Water Classification	Definition	Required water flow within a distance of 135m	Additional water flow within a distance of 270m	Maximum number of hydrants to provide flow
FW1	Single family homes with a sprinkler system installed to an approved standard	7.5 L/s	-	1
FW2	Housing: Includes single family dwellings, but excludes multi storey apartment blocks	12.5 L/s	12.5 L/s	2
FW3	-	25 L/s	25 L/s	3

4.4 Water Supply to Proposed Area

4.4.1 Static Head

The Mountain Road water reservoir which supplies water to the Waitara township has a top water level (TWL) of 99.0m. The higher elevation of the proposed development area has a reduced level (RL) of 38.0m. Therefore, there is a static head of approximately 61.0m of pressure head (600 kPa).

4.4.2 Water Reticulation to Proposed Area

The proposed development area is located within the extents of the existing Waitara water supply reticulation, and immediately adjacent to existing water reticulation installed along Raleigh Street, as shown in Figure 4.1).

The northeast end of the proposed development area is bordered by an existing 150mm diameter AC water main on Raleigh Street, which is then connected into an existing 63 OD PE water main to the south along Raleigh Street. This 63 OD PE water main extends for another 680m past the south end of the proposed development area along Raleigh Street, where it is then connected onto an existing 150mm diameter AC water main at Tate Road / Waitara Road.

The existing 150mm diameter AC water main to the northeast of the proposed development area is connected into larger size water mains within the Waitara township, before ultimately connecting into the 450mm diameter and 500mm diameter trunk mains to the south of the township.

The existing 150mm diameter AC water main on Tate Road / Waitara Road to the south of the proposed development area is connected into the 500mm diameter concrete lined steel (CLS) trunk main on Waitara Road, some 700m to the south of Raleigh St.

4.4.3 Proposed Water Supply Main

To ensure the proposed development area can be provided with water for normal residential use (as discussed in Section 4.2) and the minimum Fire Water Supply (as discussed in Section 4.3), it is recommended that the existing 1,080m length of 63 OD PE water main on Raleigh Street be paralleled by a new 150mm diameter water main.

Additionally, at the time of consent, it is recommended on-site hydrant flow testing be carried out to confirm available hydrant flows.

4.5 Conclusions and Recommendations

The existing potable Water Supply in Waitara has sufficient capacity for urban residential development in the proposed development area as required by NPDC.

It is recommended that the existing 1,080m length of 63 OD PE water main on Raleigh Street be paralleled by a new 150mm diameter water main.

If NPDC has any concerns regarding lack of capacity, with either the water storage reservoirs, or water trunk mains that supply water to the proposed development area, it is recommended that NPDC provide this information to the Civil Infrastructure Consulting Ltd for further consideration.

5 WASTE WATER

5.1 Waitara Wastewater System

Sewage from the Waitara township is both drained under gravity and pumped from both sides of the Waitara river to the Waitara Wastewater Pump Station, located at the southern end of Queen Street on the western side of the Waitara River.

The sewage is then pumped via a 400mm diameter PE main to the New Plymouth Wastewater Treatment Plant for treatment.

5.2 Wastewater Reticulation

The proposed development area is located to the west, and immediately adjacent to the existing wastewater reticulation. The elevation of the proposed development area varies roughly between 28.0m and 38.0m above Mean Sea Level.

The Waitara township and existing wastewater reticulation to the east of the proposed development area generally falls to the east, toward the Waitara River and the Waitara Wastewater Pump Station.

Wastewater reticulation from the proposed development area (ground levels approximately 28.0m – 38.0m) could be constructed to drain sewage from west to east, and connect into the existing wastewater reticulation at Manhole reference WA-RALEI0029SH, with a lid level of RL 25.79m, and pipe invert level of 23.82m.

5.3 Peak Sewage Flow and Total Daily Volumes

It has been identified that the proposed development area could have a maximum density of 12 Lots per hectare. At this density, the potential additional sewer flow for the proposed development area is:

- 9.2 ha, 12 Lots per Hectare = 110 Lots maximum
- An average house population of 2.6 people per dwelling
- ADWF of 250 L / person / day
- Dry weather diurnal peak factor of 2.5
- Infiltration factor of 2.0

$$Q \text{ (peak) proposed development area} = \left(\frac{110 \times 2.6 \times 250 \times 2.5 \times 2}{(24 \times 60 \times 60)} \right) = 4.1 \text{ L/s}$$

$$V \text{ (ADWF daily volume) proposed development area} = \left(\frac{110 \times 2.6 \times 250}{1000} \right) = 71 \text{ m}^3/\text{day}$$

5.4 Existing Sewer Reticulation

As discussed in Section Section 5.2 , the nearest and most logical existing Wastewater Manhole to connect into and drain sewage from the proposed development area is Manhole reference WA-RALEI0029SH on Raleigh Street.

The wastewater reticulation downstream of Manhole reference WA-RALEI0029SH consists of:

- 150mm diameter concrete sewer pipe – Raleigh St
- 225mm diameter AC sewer pipe – Strange St
- 225mm diameter AC sewer pipe – McNaughton St

The 300mm diameter sewer trunk main on McNaughton Street, and 900mm diameter sewer trunk main on Queen Street which discharge sewage to the Waitara Wastewater Pump Station are deemed adequate to accommodate the additional sewage generated from the proposed development area considering the small proportion of additional sewage being added.

If NPDC has any concerns regarding lack of additional sewer capacity relevant to this proposed development area, either with the gravity sewer trunk mains or pumped sewer trunk mains discussed within this report, it is recommended that NPDC provide this information to Civil Infrastructure Consulting Ltd for further consideration.

5.5 Sewer Capacity

As identified in Section 5.4 , the existing sewer trunk mains;

- 150mm diameter concrete sewer pipe – Raleigh Street,
- 225mm diameter AC sewer pipe – Strange Street,
- 225mm diameter AC sewer pipe – McNaughton Street

need to be assessed to evaluate what additional capacity (if any) is available to transport additional sewage volumes from the proposed development area to the Waitara Wastewater Pump Station.

5.5.1 Peak Sewer Flows

Existing peak sewer flows for each existing sewer mains identified above in Section 5.5 have been calculated using NZS4404:2010 with amendment No. 1 Section 5.3.5.1, and are tabulated below in Table 5.1 .

Table 5.1: Existing and Proposed Peak Sewer Flows

Pipe	Max Capacity (L/s)	Area Fully Developed (L/s)	Capacity Available (L/s)	Peak Sewage from Proposed Development (L/s)	Enough Capacity?
150mm dia – Raleigh Street	25	4.1	20.9	4.1	Yes
225mm dia Strange Street	33	14.0	19.0	4.1	Yes
225mm dia McNaughton Street	48	23.0	25.0	4.1	Yes

5.6 Conclusions

The existing Wastewater reticulation in Waitara has sufficient capacity for residential development in the proposed area.

REFERENCES

NZS4404:2010 with Amendment No. 1

SNZ PAS 4509:2008 New Zealand Fire Service Firefighting Water Supplies Code of Practice

APPENDIX A INTEGRATED TRANSPORT ASSESSMENT

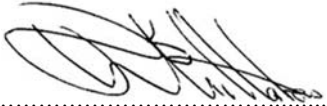

INTEGRATED TRANSPORT ASSESSMENT
RESIDENTIAL PLAN CHANGE, WAITARA

PREPARED FOR HAREB INVESTMENTS

19/11/2018

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Residential Plan Change, Waitara

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APPENDICES

Appendix A Outline Development Plan

1. Introduction

Hareb Investments Ltd is proposing to lodge a Private Plan Change to the New Plymouth District Council ("Council") to rezone 11.3 hectares of its land at 2 Johnston Street, Waitara, from the current Rural zoning to one that accommodates Residential activity.

The development site is identified within the operative New Plymouth District Plan ("District Plan") as part of the Future Urban Development ("FUD") area, which signals the intent of developing such land for residential use, with supporting land use activities.

An Outline Development Plan ("ODP") has been developed for the site which sets out a vision for the residential subdivision that will be enabled by the rezoning. It is envisaged the site could accommodate between 100-120 dwellings, likely to be developed over a period of five to ten years. Access to and from the development is proposed principally via two new intersections connecting onto Raleigh Street.

This report includes an assessment of the transport related elements of the proposed development, including details of the development plan, access to the wider network, expected traffic generation levels, as well as consideration of the pedestrian and cycle connectivity to the adjacent Waitara urban area to the north.

2. Site Location

The proposed Plan Change site is located at 2 Johnston Street, to the immediate south of the existing residential development extent of Waitara. **Figure 2-1** shows the location of the site in the context of the Waitara urban area.

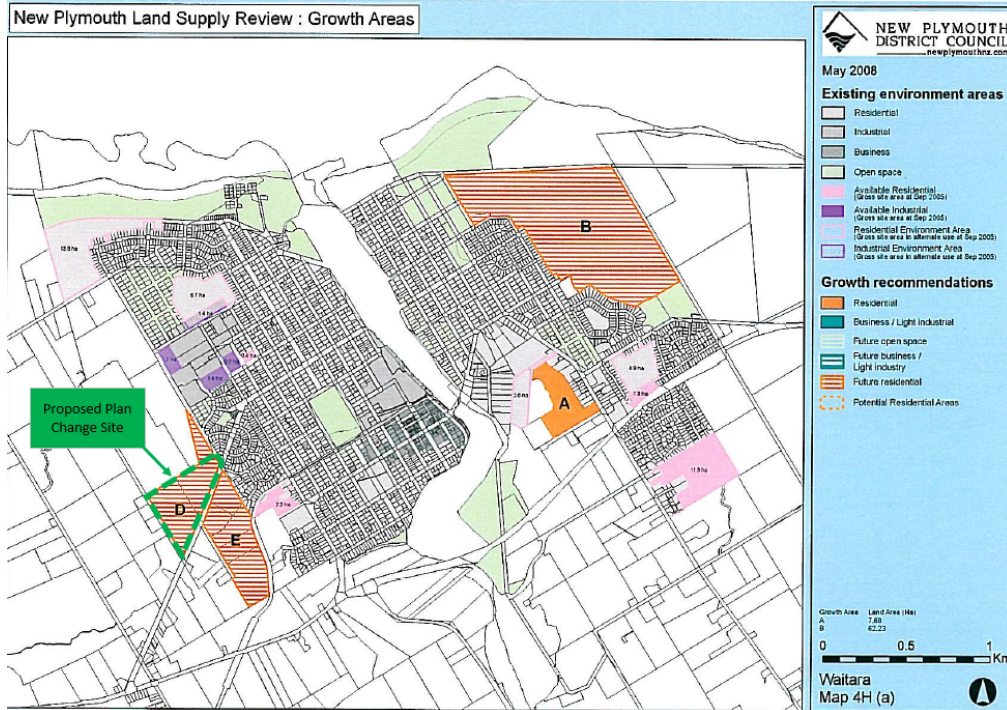


Figure 2-1: Site Location (Source: New Plymouth Land Supply Review 2007-2017 Addendum 4)

As shown, the site is situated on the edge of the existing urban boundary and is therefore ideally positioned to facilitate a natural extension of the existing Waitara residential area, as evidenced by its inclusion within the 'New Plymouth Land Supply Review 2007-2027'¹ as one of the identified FUD areas.

The site currently has a 'Rural' zoning within the District Plan, as does the land to the immediate south and west. Land to the north and east is zoned Residential. The site context within the surrounding land use is shown within the aerial photograph included as **Figure 2-2**, below.

¹ Addendum Waitara Map 4



Figure 2-2: Aerial Photograph of Site (Source: Emap)

3. Location in the Transport Network

Located some 1.5km from central Waitara, the site has road frontage to both Raleigh Street and Johnston Street. It is proposed that access to the site will be achieved principally off Raleigh Street, via two new priority give-way intersections. Lots fronting Raleigh Street will be accessed via individual vehicle crossings, helping to establish the transition to a more residential road environment along the site frontage, on the inbound approach to the Waitara urban area.

The operative District Plan classifies Raleigh Street as an Arterial Road², from the intersection with Stafford Street north towards Waitara town centre. South of this intersection, the district wide road hierarchy map does not identify Raleigh Street as either an arterial or collector, which appears to be an anomaly in the District Plan maps. It is noted that Raleigh Street forms part of the Heavy Vehicle bypass route for Waitara. Under the NZTA One Network Road Classification, Raleigh Street is identified as a 'Primary Collector' between State Highway 3 ("SH3") and Stafford Street, and a 'Secondary Collector' to the north of this.

Johnston Street, which forms the site's western boundary, is classified as a Local Road within the District Plan, providing access to half a dozen residential dwellings and a farm.

3.1 Bus Transport

Waitara is served by Service Number 20 (Waitara / Bell Block / New Plymouth), which operates five services in either direction Monday through Friday, including a commuter service. The route operates along McLean Street, Cracroft Street and Raleigh Street (passing the site frontage), connecting to SH3 and continuing through to New Plymouth. Established bus stops are located on Raleigh Street some 300m north of the site.

3.2 Active Modes

The existing Waitara cycle network includes provision of on-road cycle lanes along McLean Street, to the east of the site, which subsequently connect with the riverside trail. Beyond the trail, cyclists are typically accommodated within the traffic lanes.

The pedestrian network in the vicinity of the site includes footpaths on at least one side of the carriageway on Raleigh Street, north of Stafford Street. South of this, pedestrians are currently required to utilise the grass berms, in common with the rural context.

² District Plan - Planning Map B40

4. Existing Transport Infrastructure

4.1 Raleigh Street

Raleigh Street adjacent to the site is a two-lane road (single traffic lane in either direction) with a generally straight and level alignment. The carriageway typically comprises a 6.5m seal width and includes edge lines and a centreline, with narrow sealed shoulders and grass berms on either side of the road. The general carriageway environment on Raleigh Street is shown within the detail of **Photograph 1** below.



Photograph 1: Raleigh Street – view south from Ranfurly Street intersection

Two-thirds of the way along the site boundary (heading north) the speed limit changes from 80km/h to 50km/h, just south of the Stafford Street intersection.

4.2 Johnston Street

Johnston Street comprises a sealed 4m carriageway with grass berms on either side. As such, in accommodating two-way traffic flow opposing vehicles are required to slow and partly utilise the berm in instances when two vehicles need to pass each other.

4.3 SH3

Raleigh Street connects with SH3 some 800 metres to the south of the site, via a stop-controlled T-intersection. This existing intersection arrangement provides for separate left and right turn exit manoeuvres from Raleigh Street, with dedicated left and right turn lane provision included on SH3 for vehicles entering Raleigh Street.

These existing intersection arrangements are shown within the detail of the aerial photograph included as **Figure 4-1** below.



Figure 4-1: Raleigh Street intersection with SH3 (source: New Plymouth GIS)

It is noted that historically, Raleigh Street traffic accessed SH3 via Tate Road, which connected with the highway at a four-way intersection with Waitara Road. However, this arrangement was altered to close off access to SH3 at Tate Road, in favour of creating two staggered T-intersections.

NZTA is currently undertaking a review of the SH3 corridor in this location. A number of improvements are planned, which are described in more detail in Chapter 8.

5. Existing Traffic Patterns

Table 5-1 below summarises the latest available traffic count data recorded by the Council (and NZTA) for the roads in the vicinity of the site.

Table 5-1: Daily Traffic Volumes

ROAD	LOCATION	COUNT DATE	ADT
Ranfurlly Street	West of Raleigh St	June 2015	130
Stafford Street	East of Raleigh St	June 2015	1,000
Raleigh Street	Bwtn Johnston St & Stafford St	March 2015	2,700
Johnston Street	West of Raleigh St	July 2013	25
SH3	East of SH3A (ID:00300227)	2017	15,500

As can be seen, traffic volumes on the road network adjacent to the site are not large. Daily flows on Raleigh Street are shown to sit well within the typical volumes for a Collector route.

Figure 5-1 below provides the daily traffic flow patterns for directional volumes on Raleigh Street, as recorded most recently by the Council in March 2015.

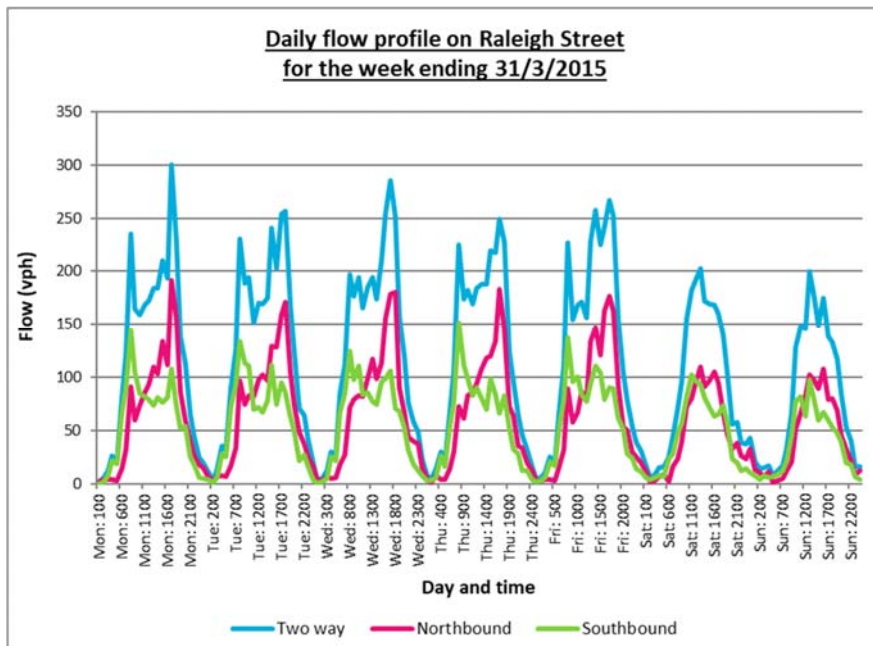


Figure 5-1: Daily Traffic Profiles for Raleigh Street

As shown, weekly traffic flow profiles on Raleigh Street include characteristic weekday AM and PM commuter peak period trips³, with peak flows of between 250 and 300 vehicles per hour ("vph") during the PM. Volumes recorded on the weekend are somewhat lower with associated peak two-way flows of around 200vph.

³ Higher southbound flows recorded in the AM and higher northbound flows in the PM indicating prevalence for work trips to and from New Plymouth

6. Road Safety

For the purpose of reviewing the road safety in the vicinity of the Plan Change site, an examination of the NZTA's national Crash Analysis System database has been undertaken with a view to identifying any pre-existing safety issues. The search area captured any crashes that occurred for the latest complete five-year period (2013-2017) within the length of Raleigh Street adjacent to the development area, and extending some 200m beyond the site on either side.

Just two incidents were recorded within the study area, as follows:

- Crash ID 201430828 - Raleigh Street, 100m north of Borthwick Street (16-Jan 2014, 00:22): Car 1 northbound lost control and left the road, alcohol was recorded as a contributing factor, no injuries were sustained; and
- Crash ID 201836588 – intersection of Raleigh Street / Ranfurly Street (23-Mar 2018, 04:35): Vehicle travelling north on Raleigh Street lost control turning right and collided with building, alcohol was again recorded as a causal factor along with evading enforcement, no injuries were recorded.

As shown, the five-year crash record for the road network adjacent to the site does not indicate any existing safety concerns, that are in need of addressing by the Council.

By way of providing an indication of the road safety record across the wider network, a review of the Raleigh Street intersection with SH3 to the south, has also been undertaken. This search, which again included all accidents recorded in the last five years, shows a total of 13 crashes. These can be summarised as follows:

- nine crashes involved eastbound vehicles on SH3 colliding with vehicles turning right onto SH3 from the left, with these right turning vehicles failing to give-way (one involving alcohol as a contributing factor). Two crashes resulted in injury (one minor and one serious), whilst the balance were damage only;
- two accidents involved collisions between westbound vehicles on SH3 and vehicles merging from the right, with drivers failing to notice joining vehicles. Neither of these crashes resulted in injury.
- one rear end crash occurred involving an eastbound vehicle on SH3 failing to notice the vehicle in front slowing for a queue; no injuries were recorded as a result; and
- one accident involved a vehicle towing a trailer colliding with a roadside post / pole, as a result of the driver misjudging the speed and / or trailer load. No injuries were recorded.

Again, NZTA is currently reviewing the safety and efficiency of this intersection as part of a wider SH3 corridor study, with a view to implementing improvements to the existing arrangements. A discussion of this project and associated outcomes is included later at Chapter 8.

7. Speed Limits

It is acknowledged that development of the Plan Change site, which has been identified as effectively providing for an extension of the current urban form of Waitara, will influence the function of the adjacent transport network, both in respect of traffic accessing the site and also pedestrian and cycle connectivity.

In this regard, the NZTA's Speed Management Guide⁴ ("SMG") requires that a Road Controlling Authority ("RCA") must review a speed limit when "*there is significant change in the nature, scale of intensity of land use adjacent to a road*". The proposed Plan Change, in comprising development of more than 100 dwellings, can be considered to trigger such a requirement to reassess the speed limit along the adjacent section of Raleigh Street.

7.1 Identifying Appropriate Road Speed

The SMG assessment approach utilises the Infrastructure Risk Rating ("IRR"), which considers a number of key criteria for determining appropriate speed limits, as follows:

- Road stereotype;
- Alignment;
- Carriageway width;
- Roadside hazards;
- Land use;
- Intersection density;
- Access density; and
- Traffic volume.

Each factor is coded for the subject road, with the scores then combined to give an overall IRR and associated 'risk category'. This risk category is then combined with the function and safety metrics for the road being assessed, to provide an indication of safe and appropriate speed.

7.2 Assessment of Raleigh Street

As part of this assessment, a review of the existing speed limit on the adjacent section of Raleigh Street has been undertaken. The calculated IRR of 1.6 gives a 'medium-high' rating, which when assessed against the land use ("Rural Residential") identifies the safe and appropriate speed as <80km/h (as compared to the current 80km/h speed limit).

The NZTA's SMG⁵ no longer supports the introduction of a permanent speed limit of 70km/h (or 90km/h), which is considered appropriate only as an interim intervention where crash risk is high (until safety improvement can be implemented), or where cost of intervention to lower operating speeds cannot be justified in place of dropping the speed limit by 20km/h (rather than by 10km/h). Reasons identified within the SMG for this approach are that adjustments of 10km/h (from 80>70, or 100>90) should be avoided given the difficulty for people travelling at higher speeds to differentiate small changes of 10km/h, as well as the need to create a more consistent and intuitive speed environment, with fewer incremental changes.

In this manner, the calculated speed for this section of Raleigh Street of <80km/h (identified through application of the SMG methodology above) indicates the safe and appropriate speed should currently be 60km/h.

Accordingly, this assessment indicates two things, firstly that the current speed limit on Raleigh Street in the vicinity of the site is higher than that assessed using NZTA's guidelines, and secondly that there is clear justification for a reduction in the speed limit commensurate to the changing nature of the carriageway function that Raleigh Street will serve, following residential development of the Plan Change site (i.e. introduction of new intersections and vehicle crossings for property access).

⁴ Which in turn is referenced in the Land Transport Rule 'Setting of Speed Limits 2017'

⁵ Speed Management Guide Table 2.4 'Interim Speeds' 70km/h & 90km/h

8. Future Changes to the Transport Network

The NZTA's current 'SH3 Waitara to Bell Block' ("W2BB") project aims to address some of the existing corridor issues including safety and level of service ("LoS") at intersections along the route. The project is currently at the 'finalising options' stage, with physical works expected to begin in 2019.

The latest plans (available off the NZTA website⁶) show some key changes are proposed for the SH3 corridor in the vicinity of Raleigh Street, which are shown in **Figure 8-1** below. Firstly, the current give-way intersection of Raleigh Street is closed, and a new roundabout introduced at the Tate Road/ Waitara Road intersection with SH3, providing an alternative safer connection between the highway and the local road network. Secondly, a review of the existing 100km/h along the length of SH3 between Bell Block and Waitara is being undertaken.



Figure 8-1: Proposed NZTA SH3 Improvements

The proposed changes will significantly improve both the safety and efficiency of the connection points for local traffic onto the key SH3 route, with the planned new roundabout at the Tate Road / Waitara Road intersection with SH3 providing generous capacity that can absorb future traffic growth and be relied on by traffic associated with residential development of the Plan Change site, and other FUD areas within Waitara.

⁶ NZTA website Waitara to Bell Block safety and efficiency improvements 'Information Sheet two (December 2017)

9. Plan Change Proposal

9.1 Overview

It is proposed to rezone the 11.3-hectare site at 2 Johnston Street from Rural to Residential. The site is currently undeveloped and has historically operated in part as horticultural gardens. An existing gully runs through the central area of the site, which will be retained as a recreational reserve.

An ODP which shows a concept subdivision layout has been prepared to inform the re-zoning and is included at **Appendix A**. The plan shows that 100-120 lots could be developed within the site.

The site sits on the existing urban limits of Waitara and is identified within the District Plan as being a FUD area. The transportation elements of the ODP are described in detail below.

9.2 Proposed Access Arrangements

The ODP shows two new local road intersection connections to the subdivision off Raleigh Street. Those lots with direct frontage to Raleigh Street would access via individual driveways. Raleigh Street adjacent to the site has a generally level and straight alignment, conducive to achieving good visibility for new vehicle access points.

The northern Raleigh Street intersection is situated inside the 50km/h speed limit, at the existing urban boundary, some 15-20 metres from the Stafford Street intersection located on the opposite side road. It is noted this arrangement mimics that in place on Raleigh Street to the north, at the existing Ranfurly Street and Watene Crescent staggered t-intersections.

For 50km/h speed environments the District Plan sets out an anticipated separation distance of 30m for new vehicle access points from existing intersections. Whilst the proposed arrangements represent a marginal shortfall (as does the existing intersections to the north), it is noted such separation distances are typically aimed at avoiding confusion between vehicles turning into and out of intersections on the same side of the road; i.e. a vehicle waiting to exit a side road misinterpreting the intentions of an approaching vehicle on the main road which is indicating to turn, but in to the downstream side road rather than the immediate side road, presenting the risk that the first vehicle may pull out into its path. Such a risk is removed where intersections are on opposite sides of the road. As such, the small shortfall is not expected to present any safety issue, noting also that there is a lack of any such crashes having occurred at the similar intersection arrangements to the north.

The proposed southern intersection is situated within the current 80km/h speed limit, approximately 110m south of the Borthwick Street intersection (and roughly 110 metres north of the Johnston Street intersection), which satisfies the 105m separation distance requirement⁷ of the District Plan.

No new road connections on to Johnston Street are proposed, with the only development site access being the small number of lifestyle lots (approximately 6) having direct frontage to the street. Accordingly, the associated traffic generated by this small number of dwellings will not be significant and is not anticipated to have any discernible impact on the safety or performance of the road or of the subsequent intersection with Raleigh Street.

Overall, it is considered that the proposed new subdivision intersections can be designed at the subdivision stage in general accordance with the District Plan Rules and Standards, and in manner that will ensure they operate safely and efficiently.

9.3 Internal Rooding Arrangements

The internal rooding arrangements illustrated in the ODP include a north-south spine road which connects onto Raleigh Street via two new intersections, as described above, with a secondary loop road connecting off this serving the western portion of the site.

It is anticipated that within the subdivision the road cross-sections will be provided in accordance with the standards set out in Table 3.2 of the NZS 4404:2010 'Land Development and Subdivision Infrastructure' ("NZS 4404"), as illustrated within Appendix A. These internal road typologies, associated with Suburban 'Live and Play' land use activity, can be summarised as follows:

⁷ Taking the adjacent section of Raleigh Street as a 'Local Road' – as identified in the operative District Plan.

- Primary Roads – Figure 'E12' (main spine and loop road): 5.5-5.7 metre trafficable width, additional recessed width for parallel parking; minimum 1.5 metre footpath on at least one side of the street; 19 metre road reserve;
- Secondary Roads – Figure 'E11' (western loop connection, adjacent to the reserve): 5.5-5.7 metre trafficable width, pedestrians and cyclists share the movement lane; 15 metre road reserve;
- Access Lane - Figure 'E10' (access to rear lots): 2.75-3.0 metre trafficable width; pedestrians and cyclists shared in movement lane.

9.4 Pedestrians and Cyclists

The ODP shows the various pedestrian / cycle routes provided through the subdivision. With footpaths provided on all primary roads within the site, and pedestrians able to either walk on berms or share the carriageway with vehicles on the secondary roads and access lanes, in accordance with the practice of NZS4404, these provisions will ensure a good level of accessibility and permeability within the subdivision. In addition to the street network, the plans show the inclusion of an off-road walkway connecting through the site (between Johnston Street and Ranfurly Street) alongside the reserve.

Along the Raleigh Street frontage of the site, it is proposed to provide a new footpath and berm, delivering pedestrian connectivity between the site and the established footpath network on the residential streets to the north.

Commensurate with the low density and low speed environment within the subdivision, which is achieved through adoption of the chosen road typologies (and absence of long straight sections of carriageway), dedicated cycle facilities are not proposed and rather it is anticipated that cyclists can safely share the carriageways with vehicular traffic.

9.5 Public Transport

It is expected that whilst public transport uptake by residents of the future subdivision would be low, the existing bus service that operates between Waitara and New Plymouth could potentially serve some demand from the site. With the nearest bus stops currently located some 300m to the north of the site, most residents could access these within a 5-minute walk.

10. Transport Network Effects

10.1 Traffic Generation

Table 10-1 below provides forecast daily and peak hour traffic generations anticipated from residential development of the Plan Change site (assuming full development of the 120 residential lots). These rates are based on a combination of industry sources including survey data recorded within the Trips Database Bureau for residential dwellings for a number of sites across New Plymouth, and the RTA Guide to Traffic Generating Developments ("RTA Guide") for dwelling houses. These rates are considered to be representative of the nature and locality of the proposed residential development, as compared with the more generic values contained in the Planning Policy Manual, and have therefore been adopted accordingly.

Table 10-1: Subdivision Traffic Generation (120 Dwellings)

PERIOD	TRAFFIC GENERATION RATE	FORECAST TRIPS
Daily	9.0 vehicles per dwelling	1,080vpd
Peak Hour	0.85 vehicles per dwelling	102vph

10.2 Traffic Distribution

In reviewing the surrounding traffic flows and catchments, it is considered a significant proportion of subdivision trips during the peak hours would be to and from the south (i.e. commuter trips to / from New Plymouth). Accordingly, a 70:30 split of trips routing to and from the south versus to and from Waitara (to the north), has therefore been adopted for the purposes of this assessment.

Of those trips between the subdivision and the south, the majority can be expected to be left turn in / right turn out movements on Raleigh Street and at the SH3 intersection (i.e. again, commuters travelling to and from New Plymouth).

Based on typical residential development traffic patterns, the following inbound/outbound trip proportions has been estimated:

- AM Peak Hour: 20% inbound / 80% outbound; and
- PM Peak Hour: 70% inbound / 30% outbound.

Adopting the above traffic generation and distributions, the number of additional vehicle movements during the peak hours on Raleigh Street at the two new site intersections, and at the SH3 intersection to the south, can be calculated as shown in **Table 10-2**.

Table 10-2: Additional Peak Hour Subdivision Traffic (Full Development)

INTERSECTION	APPROACH	MOVEMENT	AM PEAK HOUR	PM PEAK HOUR
Northern site access /Raleigh St	Raleigh St – North	Right	3	8
	Site	Left	9	4
		Right	21	8
Raleigh St – South	Left	6	19	
Southern site access /Raleigh St	Raleigh St – North	Right	3	8
	Site	Left	9	4
		Right	21	8
Raleigh St – South	Left	6	19	
Raleigh St / SH3 ⁸	SH3 - North	Right	3	10
	Raleigh St	Left	11	4
		Right	45	17
SH3 - South	Left	13	41	

It is noted that for the purposes of this assessment, subdivision trips have been assigned equally to each of the two site intersections.

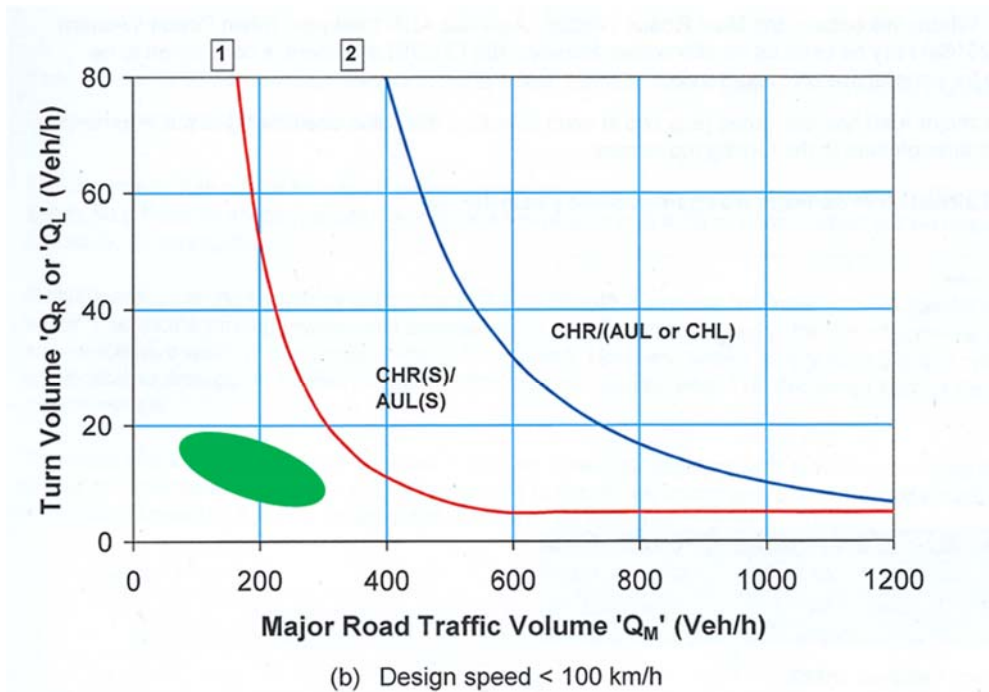
10.3 Road Network Performance

As shown, peak hour traffic additions generated by the proposed subdivision are not large, with the equivalent of 1-2 vehicles per minute added during the peak hours. This equates to an increase to existing traffic volumes on Raleigh Street of around 30 vehicles per hour to the north of the site, and around 70 vehicles per hour to the south of the site, during the peak hours, once the site is fully developed. It is also noted these traffic additions will be incremental, occurring over an approximate five to ten-year period of site development, rather than all at once.

Given the moderate number of vehicle trips generated by the proposed subdivision, and modest through traffic volumes on Raleigh Street adjacent to the site, the two proposed new intersections providing access to the majority of dwellings at the site can be designed to operate well. With good available capacity on the existing Waitara roading network, site traffic routing to and from the north will be adequately accommodated and distributed across the Waitara urban roads.

Consideration has been given to the form of the new site intersections, in respect of the proposed turning movements that would be accommodated at each during the site peaks. The graph included as **Figure 10-1** below is extracted from the Austroads 'Guide to Road Design Part 4' and illustrates the capacity thresholds where dedicated left and right turn lane provisions should be included. As shown by the green oval marked on this graph, the combination of the entry site turning volumes / through traffic flows lie well below the published thresholds, confirming the two site intersections can operate satisfactorily without specific turn lane provisions.

⁸ These forecast traffic movements at SH3 include all subdivision trips i.e. not just those trips in/out of the two site intersections, but the balance of lots which access directly onto either Raleigh Street or Johnston Street



Source: Arndt and Troutbeck (2006).

Figure 10-1: Thresholds for Turn Treatments at intersections accessing onto Roads with Design Speeds of <100km/h

To the south, the intersection of Raleigh Street and SH3 will experience an increase in traffic turning to and from the highway, with around one extra vehicle a minute during the AM and PM peak hours. Noting the proposed improvements that are currently being planned for this intersection, the roundabout option described in the NZTA's W2BB project will provide improved safety and capacity for trips between the local road and state highway networks. Such intervention is expected to more than adequately accommodate the proposed development traffic additions, in combination with realisation of other FUD areas in Waitara and other ongoing traffic growth.

In again noting that the subdivision would occur over time, it is recognised there is some ability to revisit the effects of development traffic on the Raleigh Street intersection with SH3 to the south, if NZTA's programmed improvement works are delayed. Such a contingency could appropriately be provided for at the resource consent stage, through implementation of associated consent conditions which required assessment of the intersection's performance over time, relative to the levels of subdivision traffic that could be added to the network.

Overall, it is assessed that the effects of development of the scale intended by the Plan Change will have no material effects on the transport network.

11. Planning Requirements

This section of the report assesses how the proposed Plan Change aligns with the relevant transport principles, requirements, objectives and policies of the District's various strategy and planning documents.

11.1 Land Supply Review

In 2006 the Council undertook the first comprehensive review of land supply since the District Council came into effect (in 1989). The study culminated in the Framework for Growth ("FFG"), which aimed to ensure that there was adequate land available to meet the residential and industrial demands expected over the course of the next two decades. The FFG was subsequently adopted by the Council in 2008, and further amended later that year to include specific recommendations for growth in Waitara, including two additional FUD areas, being the area to the east of Raleigh Street along with the proposed Plan Change site (on the west side of Raleigh Street).

As described, the Plan Change site is well located in respect of the existing Waitara township urban area, and benefits from good accessibility to the adjacent primary road network (as acknowledged within the FFG by its inclusion as a FUD.)

11.2 Council's Long-Term Plan

The New Plymouth District's Long-Term Plan ("LTP") sets out the vision for the district over the coming decade, including in respect of residential growth. The recently completed LTP 2018-2028 includes the following statement:

"Over the next 10 years we have included \$207m of capital expenditure on our infrastructure and reserves to ensure we have enough serviced land available for residential and commercial development"

The 2018 Draft Strategic Overview document, which forms part of the supporting information for the LTP 2018-2028, includes specific reference to 'significant forecasting assumptions', including *"The rate of new dwellings in the district will fluctuate annually over the life of the 10-Year Plan. We expect 387 houses to be built per annum in the first five years of the Plan and 353 houses per annum in the following five years. However, taking into consideration the Government's National Policy Statement on Urban Development Capacity, our planning provides infrastructure and land supply for 464 new houses to be built per annum from 2018 to 2023, and 424 new houses per annum from 2023 to 2028"*.

Accordingly, there is a clear ambition to develop at a rate that can keep pace with the expected population growth for New Plymouth, which is forecast to be more than 10% over the next 10⁹ years (i.e. 9,000 individuals).

In this manner, the proposed Plan Change, which includes provision for development of around 120 dwellings over approximately the next five to ten years, aligns well with the targets for delivering new housing in the short to medium term, with minimal associated requirements for public roading infrastructure investment from the Council.

11.3 New Plymouth District Plan

Since the Draft District Plan has no legal status or weight at present it is considered appropriate to undertake an assessment of the ODP against the Operative District Plan. As such, at an assessment level suited to his Plan Change application, **Table 11-1** below provides a summary of the relevant policies included in the Operative District Plan, under the 'Traffic and Transport' and 'Areas for Future Urban Development' sections, along with an assessment of the proposed Plan Change's alignment with these policies.

⁹ LTP 2018-2028 NF1 (Page 4)

Table 11-1: District Plan Policy Compliance Assessment

POLICY #	REQUIREMENT / COMPLIANCE
TRAFFIC AND TRANSPORT	
Policy 20.1	<p><i>The movement of traffic to and from a site should not adversely affect the safe and efficient movement of vehicles, both on-site, onto and along the road transportation network.</i></p> <p>As described earlier in the report, the proposed access strategy has been developed to provide safe and efficient movement to and from the site for all modes including vehicles, pedestrians and cyclists, providing safe connections with the wider transport network.</p>
Policy 20.2	<p><i>The safe and efficient operation of the road transportation network should not be adversely affected by land use activities that have insufficient or substandard parking or loading areas.</i></p> <p>The proposed residential subdivision will adequately accommodate the quantum of parking demand generated by the development, either on the properties or at the road side. Servicing activities, such as rubbish collection and occasional furniture trucks will be appropriately accommodated within the internal roading typologies, which have been designed to align with the industry standard NZS4404.</p>
Policy 20.3	<p><i>Potential conflict between vehicles, pedestrians and cyclists moving on the road transportation network should be minimised to protect safety and efficiency of road and footpath users.</i></p> <p>The proposed ODP includes internal road typologies which provide dedicated footpaths or appropriate shared space low speed environments, as well as off-road walking and cycleways, which collectively provide for safe movement of the various modes within as well as to and from the subdivision site. Furthermore, development of the Raleigh Street frontage to provide specific off-road improved amenity for pedestrians will serve to 'knit' the development into the neighbouring land use, particularly the established residential area to the immediate north.</p>
Policy 20.7	<p><i>Subdivision should not adversely affect the safe and efficient operation of the road transportation network.</i></p> <p>As per responses to Policies 20.1-20.3 listed above, the ODP has been specifically designed to be cognisant of industry best practice for residential subdivision including a safe site access strategy that, with the modest number of additional vehicle trips generated on the network, would not affect the safety of existing drivers on Raleigh Road. In addition, the development supports the use of active modes and provides some improvements over the current arrangements with respect to providing an off-road pedestrian route along the Raleigh Road frontage.</p>
AREAS FOR FUTURE URBAN DEVELOPMENT	
Policy 23.1	<p><i>To control the design and layout of future urban areas through structure plans to allow for the comprehensive development of the area by ensuring:</i></p> <p>a) <i>The type, location and density of the development is suitable for the site;</i></p>

	<p><i>b) Infrastructure is provided in a co-ordinated manner by considering location, type and staging;</i></p> <p><i>c) The development considers topography and minimises changes to landform; d) That the constraints are identified and managed to ensure resilient and safe communities.</i></p> <p><i>e) Interfaces with surrounding land-uses are assessed and adverse effects are mitigated;</i></p> <p><i>f) Open space, parks and esplanade reserves or strips are provided for;</i></p> <p><i>g) Connectivity and accessible urban form is provided for; and</i></p> <p><i>h) That special features are recognised and that those features of particular significance are protected.</i></p>
	<p>As described throughout the various sections of the report, the ODP has taken appropriate consideration of the design elements listed above, including the density of the subdivision; provision of a suitable internal roading network that best provides for the demands of the site; safe and efficient connection to the wider network, including dedicated pedestrian and cycle connectivity; provision of open space within the subdivision site; and the retention of important special natural features.</p>

As shown, the proposed Plan Change supports the outcomes sought through the District's LTP strategy for population growth and associated development of new dwellings, and aligns well with the intentions of the transportation related policies set out within the Operative District Plan.

12. Conclusions

The proposed Plan Change area is well located for residential development from a transportation perspective. It has been identified by Council as a FUD area and aligns well with the transport outcomes expected and with the directions of the Operative District Plan.

Good connectivity will be possible to the surrounding land use with walking and cycling connections provided between the site and the established Waitara urban area. Across the wider area, the site is well situated for accessing the primary road network, with the SH3 corridor in close proximity to the south. Access and circulation within the subdivision itself has been designed to deliver a high level of amenity for all transport modes, in the manner anticipated by the New Zealand Standard 4404.

An assessment of the current speed limit on Raleigh Street adjacent the site has shown the current 80km/h speed limit is higher than that recommended by the NZTA Speed Management Guidelines. Whilst it is noted that the process to revise speed limits sits outside of the District Plan and Resource Consent process, the additional development facilitated by this Plan Change would further reinforce the appropriateness of reducing the speed limit on this part of the network.

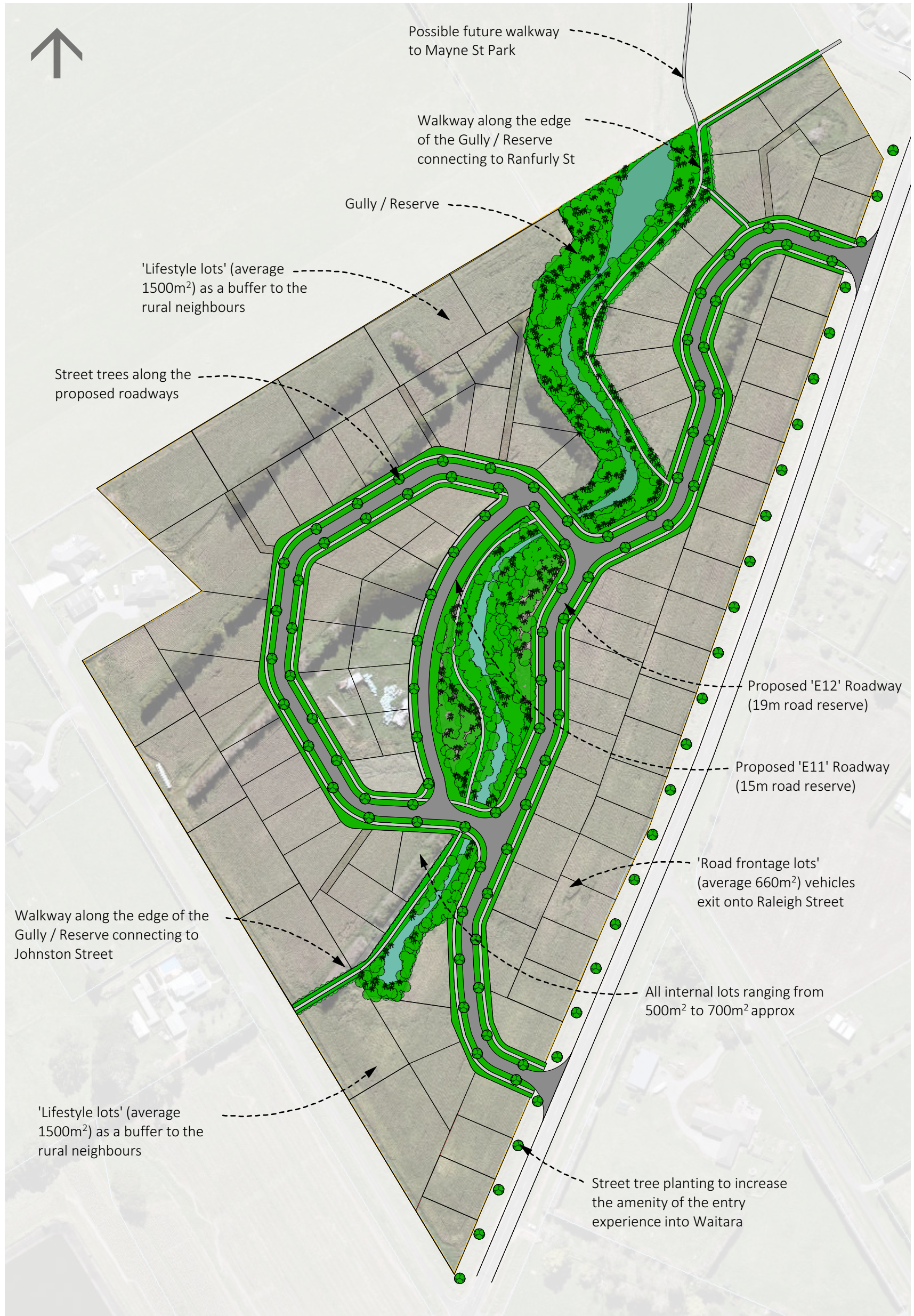
An assessment of the likely traffic generation levels associated with the residential subdivision indicates modest additions of around 1-2 extra vehicles on the network during the daily peak hours. Traffic from the subdivision in the proposed Plan Change area would be dispersed across the adjacent road network, with local trips to the Waitara town centre to the north and district trips via SH3 to the south. The planned changes to the SH3 corridor between New Plymouth and Waitara, including connections for local traffic, will provide benefits to the both current traffic as well as that associated with new development such as that enabled under the Plan Change.

Overall, it is assessed that the proposed Plan Change to provide for development of the site for residential subdivision would not cause the function, safety or capacity of the surrounding road network to be compromised, and that an appropriate transportation outcome for all modes and users can be delivered in this location.

Appendices



Appendix A Outline Development Plan



PROJECT: Raleigh Street
Proposed Subdivision

DRAWING TITLE: LANDSCAPE PLAN

DRAWING NO: L1.0
REVISION: 01

SCALE: 1:2000@A3
DATE: AUG 2018
FILE NO.: 3077



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PROJECT: Raleigh Street
Proposed Subdivision

DRAWING TITLE: **STRUCTURE PLAN**

DRAWING NO: L2.0
REVISION: 01

SCALE: 1:2000@A3
DATE: AUG 2018
FILE NO.: 3077



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APPENDIX B BUILDING PLATFORM REPORT

STANLEY GRAY LTD

Feasibility Report

Raleigh Street, Waitara

Job Name: Raleigh Street Subdivision

Address: Raleigh Street Waitara

Job No: 100-18-140

Date: Sept 2018

29 September 2018

RE: PROPOSED SUBDIVISION OF LOT 3 DP 446773, Raleigh Street, Waitara

1.0 Introduction

It is proposed to subdivide the property, LOT 3 DP 446773, Raleigh Street, Waitara. Refer to Landpro drawing titled 'Initial Draft - Proposed Subdivision of LOT 3, DP 446773, Raleigh Street, Waitara dated Jan 2018.

2.0 Scope

The following report provides a preliminary engineering assessment of ground bearing capacity for feasibility stage of the proposed subdivision.

Soil investigations were completed at 8 different locations across the site in locations as shown in Figure 1. The purpose of the soil testing was to provide enough preliminary information to confirm that suitable stable flood free building platforms can be created in accordance with New Zealand Building – Acceptable Solutions B1/AS4 of approved Documents B1/4: Structural Foundations.



Figure 1.

3.0 Soil Investigation

Wsp Opus were engaged to carry out the on-site testing and they visited the site on 13-14 August 2018. Borehole, shear vane and Scala Penetrometer tests were carried out in all 8 test locations.

3.1 Borehole Results

The test results across 7 of the test holes (Test holes 1, 2, 4, 5, 6, 7, 8), were consistent with 100mm to 350mm of topsoil overlying firm Clay Silt. Stiffness typically increased with depth. Test hole 3 identified peat underlying 200mm of topsoil and met refusal at 2m.

Groundwater levels were encountered at depths ranging from 2.4m to 3.6m below existing ground levels.

4.0 Limitation

4.1 Subsoil Variation

The opinions and recommendations which are contained in this report are based on the site conditions as they presently exist and further assume that the exploratory holes are representative of current subsurface conditions throughout the site i.e. inferences about the nature and continuity of ground conditions away from the bore holes have been made in the preparation of this report. It is assumed that subsurface conditions everywhere are not significantly different from those disclosed by the investigation.

We should be notified of any subsurface conditions, which appear to be different from those as disclosed by this investigation so that these conditions may be reviewed, and our recommendation reconsidered where necessary.

5.0 Conclusion

Peat was encountered in one of the test holes, but with the exception of this test hole, the test results confirm that there is firm clay silt present throughout a large portion of the site. Subsequently, we consider that suitable stable flood free building platforms can be created on the site, in accordance with New Zealand Building – Acceptable Solutions B1/AS4 of approved Documents B1/4: Structural Foundations.

Regards

Stanley Gray Ltd

Paul Stanley

Paul Stanley BE(Hons), CMEngNZ, CPEng, IntPE(NZ)
STANLEY GRAY LTD