

# TARADALE HILLS / TIRONUI DRIVE & SURROUNDS

Greenfield Growth in the Hills:  
High Level Structure Plans

For: Napier City Council  
September 2020

**B&A**  
Urban & Environmental

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# Executive summary

Napier City Council is currently investigating options for ‘Greenfield Growth in the Hills’ to inform the upcoming reviews of the Heretaunga Plains Urban Development Strategy (‘HPUDS’) and the Napier District Plan. This

## Scope and Approach

In developing the structure plans, the following methodology has been applied:

- Undertake planning, design and engineering site and context analysis to understand key opportunities and constraints.
- Develop conceptual land use, density and connectivity strategies for each study area and identify areas that are best suited to standard residential development (opportunity areas).
- Develop concept plans/yield studies for opportunity areas, including road and lot layouts and local amenities.

## High Level Strategies for the Study Areas

In undertaking the site and context analysis, it is evident that there are extensive areas of significant slope (greater than 20%) throughout both study areas. Standard residential development in these areas is challenging for the following reasons:

- Difficult and costly to achieve complying gradients for public roads.
- High cost of potable water and/or wastewater servicing due to requirements for multiple reservoirs or pump stations to overcome topography.
- High cost of earthworks and retaining required to deliver roads and building platforms, and more complex foundation designs for houses.
- The extent of earthworks and retaining required to deliver necessary infrastructure can reduce the extent of potentially developable land for residential uses.

Ribbons of flatter land are dispersed throughout the study areas along ridgelines and valleys. Developing these narrow areas would be challenging as they would not support compact urban form objectives and would also be difficult and expensive to access.

report provides the next step in that investigation by setting out high level structure plans for Taradale Hills and Tironui Drive and Surrounds.

- Determine the transport and three waters infrastructure required to support the opportunity areas and the likely cost.
- Consider opportunities for further expansion of the study areas where they would provide long term growth potential and assist to reduce infrastructure cost.
- Based on the above findings, develop high level structure plans for the study areas.
- Outline how the high-level structure plans could be implemented through the HPUDS and District Plan review.

Slope is the key constraint of the study areas and is the primary driver of a high-level land use and density strategy that has been developed. This strategy can be summarised as:

- Applying a Main Residential zone to areas of flatter land that can be developed to typical residential densities (15 dwellings per hectare).
- Applying a Lifestyle Character or more intensive rural residential zone to steeper areas that are located close to existing services and that have potential to connect to the new networks required to service the proposed Main Residential areas.
- Maintaining the Rural Residential zone to all other areas, generally with slopes greater than 20% and disconnected from existing or proposed residential developments.

High level connectivity strategies have also been developed that illustrate how transport and open space connections can be provided within and adjoining the study areas.

## Concept Plans for Opportunity Areas

There are two areas that are more suitable for standard residential development in the study areas including:

- 63 hectares of land west of Tironui Drive of which 36 hectares is part of a contiguous area flatter land – Tironui Drive Extension.
- 26 hectares of land west of Churchill Drive of which 12 hectares is part of a contiguous area flatter land – Churchill Drive Extension.

## Infrastructure Costs

The infrastructure costs for each opportunity area are summarised below:

### *Tironui Drive Extension*

- Strategic infrastructure (Council funded): \$71 million
- Private infrastructure (Developer funded): \$86 million
- Total CAPEX: \$157.3 million
- **Cost per lot based on 650 lots / \$242,000 per lot.**

### *Churchill Drive Extension*

- Strategic Infrastructure (Council funded) - \$23.5 million
- Local Infrastructure (Developer funded) - \$16.5 million
- Total CAPEX: \$40 million
- **Cost per lot based on 140 lots / \$285,000 per lot.**

## Wider Growth Potential

Given the moderate level of residential growth anticipated within the study areas and the high cost of infrastructure to support it, consideration has been given to whether there are opportunities for additional growth in the wider area.

## High Level Structure Plans and Implementation

On the basis of the above, high level structure plans have been developed for the study areas that detail the land use, connectivity and infrastructure strategy. The report recommends further consideration of these structure plans through the HPUDS review prior to finalising the zoning approach for the District Plan review.

The concept plan developed for the Tironui Drive Extension shows that there is capacity for approximately 680 new dwellings, with provision for a supporting local centre, open space network and a school, if required. The southerly orientation of this area may however negatively impact its market attractiveness.

The concept plan for the Churchill Drive Extension shows there is capacity for approximately 170 new dwellings. Parts of this area also have a southerly orientation, which may negatively impact its market attractiveness.

These costs exclude any land acquisition necessary for required infrastructure, and exclude land purchase costs by a private developer (presuming current landowners are unlikely to undertake the development themselves).

To provide context for these figures, benchmarking of infrastructure costs for recent residential developments in New Zealand shows an **average infrastructure cost per lot of \$117,000**. Furthermore, vacant lots in similar Napier developments are currently selling for around \$300,000. This price incorporates land costs, taxes, professional fees and profit in addition to infrastructure costs.

These comparisons indicate that development in the Tironui Drive Extension and Churchill Drive Extension areas is unlikely to be feasible at this time, without a significant reduction in infrastructure costs in order to bring them closer to current market averages. These areas would also not assist meeting Napier’s requirement to provide sufficient housing capacity over the short to medium term, and possibly longer term, as required by the National Policy Statement on Urban Development.

The report identifies potential for large scale development to the west of the study areas in the flatter land in the Hastings District. Developing in this area would assist to provide infrastructure more efficiently and reduce the cost per lot but would likely still require significant upfront capital costs by Council. We recommend that this be assessed in more detail through the HPUDS review.

**01**

**Introduction**

# 1.1

## Background



Above: Hill and valley system in the Tironui Drive & Surrounds study area.

### Brief

Napier City Council (**'NCC'**) is in the early stages of undertaking a full District Plan review. This process along with an upcoming review of the Heretaunga Plains Urban Development Strategy (**'HPUDS'**) provides the opportunity to plan for future urban growth of the city. The potential for future urban expansion into the hills to the west of Napier and Taradale – 'Greenfield Growth in the Hills' - is one of six key outcomes identified for the District Plan Review.

This report provides high level structure planning for two potential areas for residential expansion in the Western Hills: Taradale Hills and Tironui Drive & Surrounds.

The purpose of this report is:

- *Feasibility assessment:* To assess the feasibility of residential development in each area, having regard to

### Outputs

Outputs of this report are:

- High level structure plans for Taradale Hills and Tironui Drive & Surrounds, identifying land that is suitable for housing and supporting land uses, such as neighbourhood centres, reserves, roads and walking and cycling links.
- A yield analysis of what yields and density can be achieved in each structure plan area and where.

### Approach to production of the Structure Plans

A focus of assessment during the production of the Structure Plans has been consideration of land within the study areas that can:

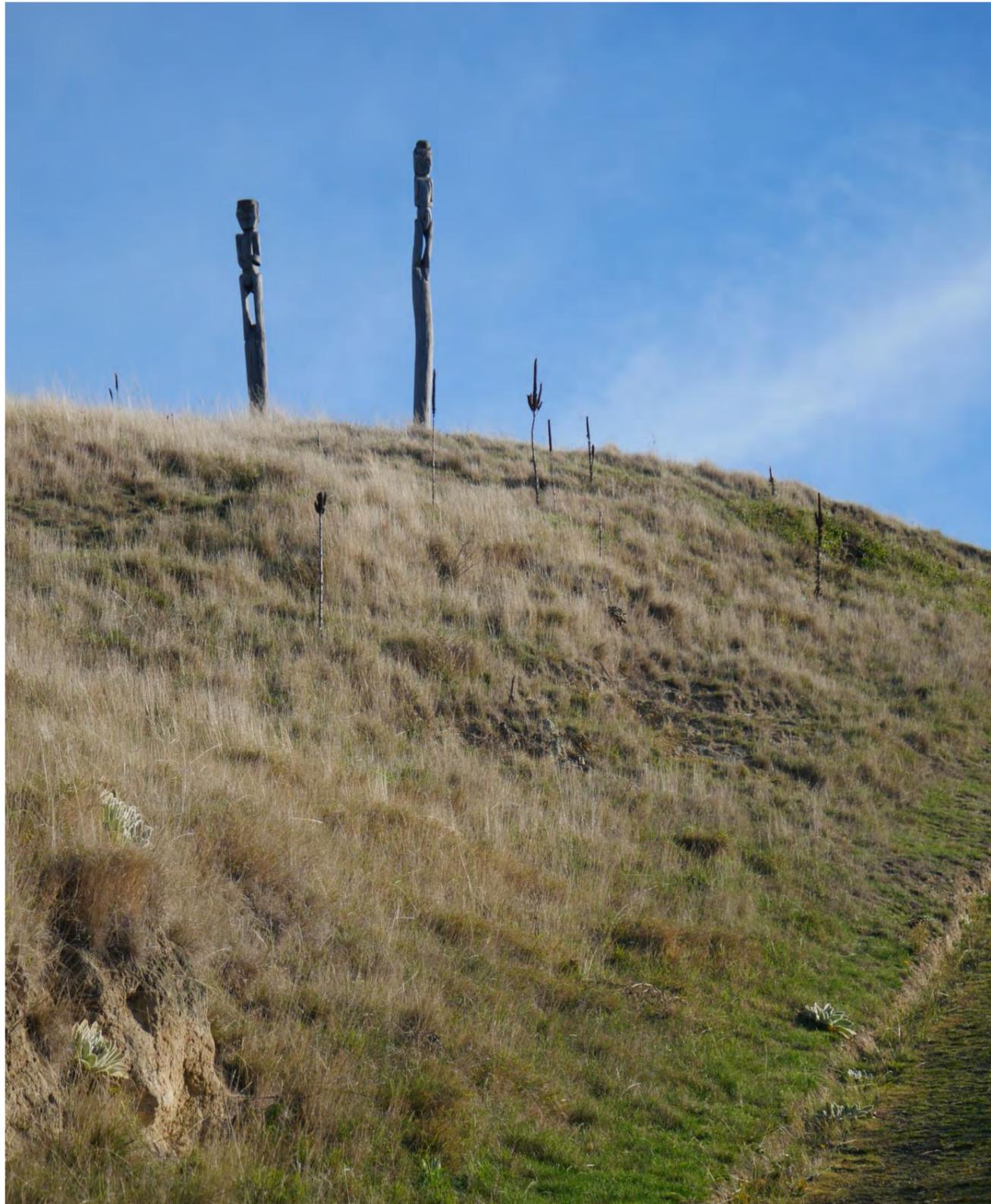
- produce high yield
- at a low infrastructure servicing cost
- with a high degree of consistency with the Hawke's Bay Regional Policy Statement's Structure Planning requirements

a range of planning, urban design and infrastructure matters.

- *Infrastructure planning:* To inform the development of NCC's 30 year wastewater and stormwater masterplans and Asset Management Plans for Transportation, Parks & Reserves, Water, Wastewater and Stormwater, currently being prepared as inputs to the 2021-2031 Long Term Plan and the 30 year Infrastructure Strategy.
- *District Plan Review:* To identify key connection corridors, which may include new roads, public open space, ecological and cultural heritage links, to ensure these corridors are appropriately recognised in the new District Plan.

- Infrastructure reporting setting out how the areas can be serviced and how this would integrate with Council's infrastructure masterplans.
- Indicative infrastructure costings for servicing of residential development in the study areas.
- High level analysis of growth opportunities in the wider area.
- Recommendations on planning implementation and what further work is required to inform the District Plan and HPUDS reviews.

Analysis has therefore targeted, as a key factor, areas of land of slope up to 20%. This is based on standard residential development practices in New Zealand, which can deliver to the market serviced residential lots on land of this slope in a relatively straight forward and cost efficient manner.



Above: View to Ōtātara Pā Historic Reserve

### Assumptions

An understanding leading into analysis has been that large parts of both study areas have significant slope. Therefore, as a starting point, key assumptions have been:

- That not all parts of the study areas will be able to achieve a 15 lots per hectare density.

### Methodology

The following methodology has been used in production of the Structure Plans:

1. Review relevant planning documents, including HPUDS, the Operative District Plan and Structure Planning requirements in the Hawke's Bay Regional Policy Statement.
2. Review existing technical reporting on the Western Hills, including expert reporting undertaken as part of the upcoming District Plan review.
3. Map contour information for both study areas to show both land of up to 20% degrees slope and land with greater slope.
4. Map and remove from consideration areas subject to District Plan designations, scheduled sites, Sites of Significance to iwi, and Significant Natural Areas.
5. Map and document all other opportunities and constraints to development of the two study areas, including: aspect, location of productive soils, location of amenities (schools, centres and public open

### Report limitations

An output of this report is a cost per lot for residential yield within the Structure Plan areas and a comparison of this cost to industry standard 'benchmark' costs. Comment is made in the report on these comparative figures in terms of 'viability.' Ultimately, however, the matter of viability of development in the study areas, in

- However, that analysis may demonstrate that areas of high slope may be able to achieve residential densities greater than currently enabled under the Operative District Plan.

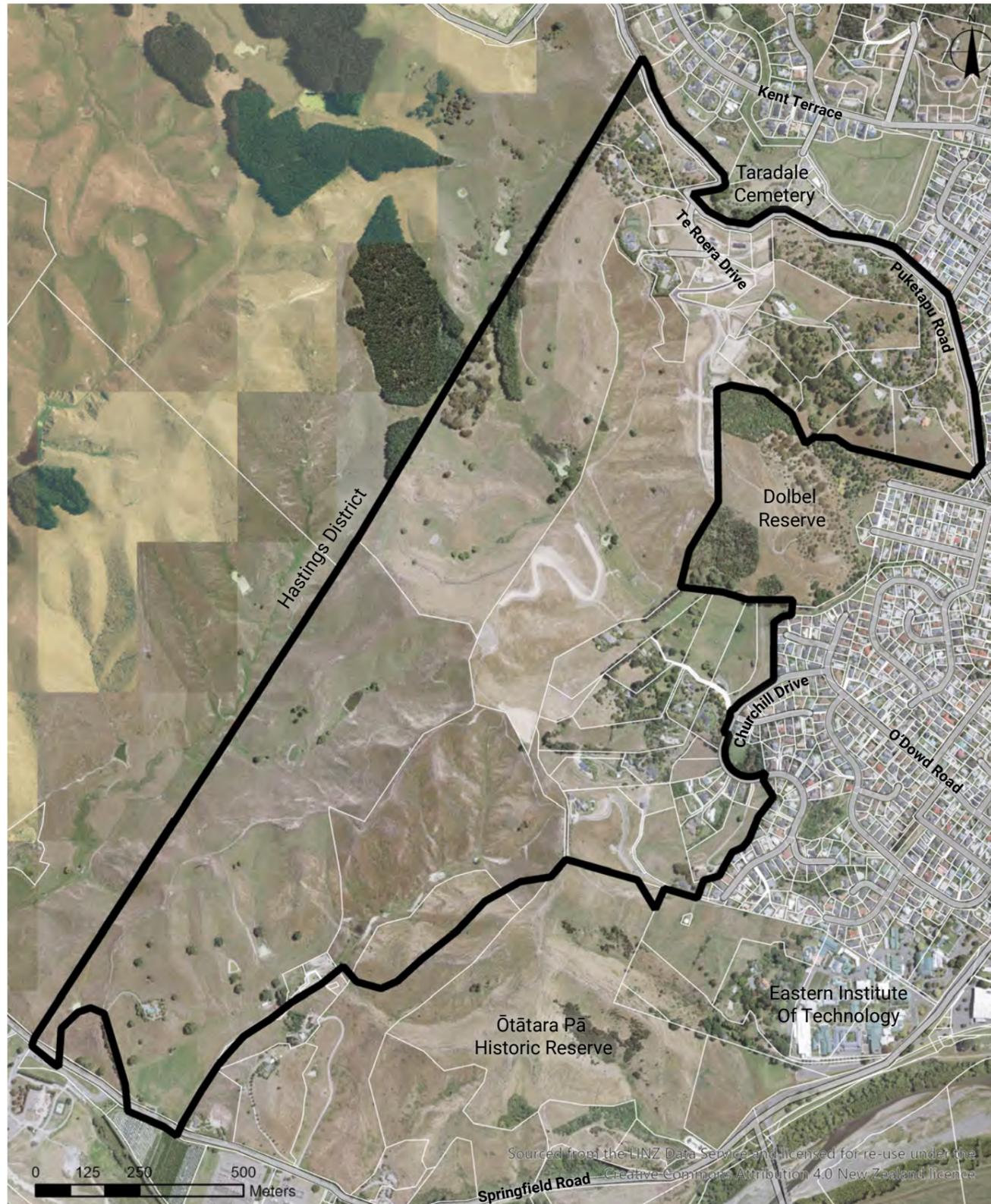
space), areas of identified landscape value, and areas subject to natural hazards.

6. Identify 'opportunity areas', with characteristics (such as slope less than 20%) most able to deliver residential development of at least 15 lots per hectare.
7. Produce subdivision concept plans showing land uses, residential densities, and key connection corridors.
8. Undertake yield analysis of opportunity areas based on subdivision concept plans and scheme tests for each opportunity area to a superblock level, showing roads, open space and other supporting services as appropriate.
9. Based on the yield analysis, estimate total infrastructure servicing costs for the opportunity areas and costs per dwelling.
10. Benchmark infrastructure costs per dwelling against recent local and NZ residential subdivisions.

terms of cost, is for NCC to determine. As is detailed in this report, a robust determination of both feasibility and viability will likely need a similar process of structure planning and infrastructure cost analysis to be undertaken in other identified and potential growth areas - both greenfield and brownfield.

# 1.2

## Taradale Hills study area



Top left: View of Taradale Hills ridgeline with Napier coast in the background.

Top right: Looking north up a valley from the vicinity of Springfield Road.

Bottom: Looking east towards Taradale over a valley to the immediate west of Dolbel Reserve.

### Study area context

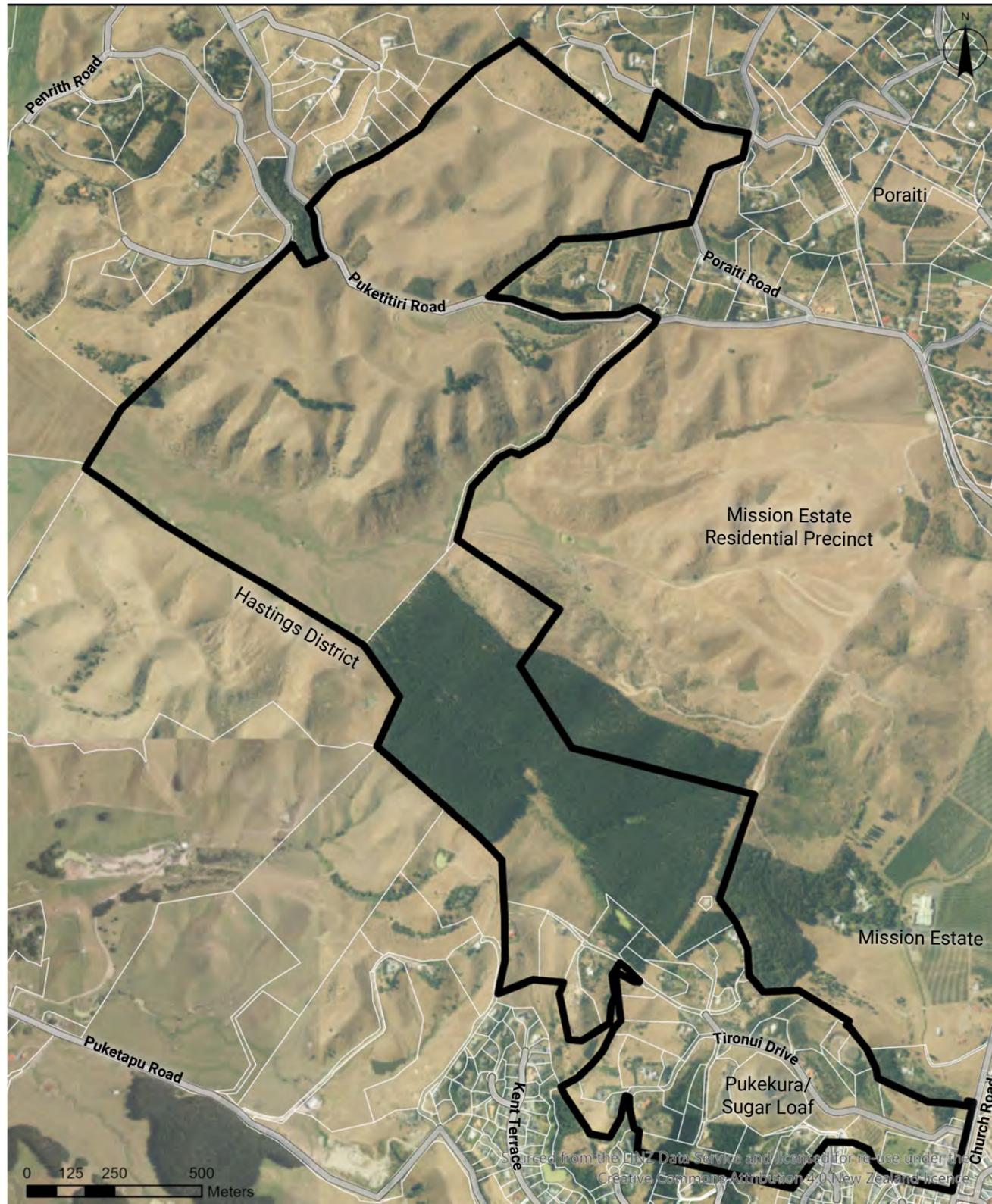
Taradale Hills is directly to the west of the established suburb of Taradale and is at the southern end of the Western Hills. It forms a visual and physical edge to the existing Napier-Taradale urban area.

The size of the study area is 215-ha. The area is predominantly in large rural lots, with the majority formed by just four individual lots. There are two established areas of rural residential lots - one off Churchill Drive and the other off Puketapu Road. There is also a recently established rural residential subdivision on the private road off Te Roera Drive, accessed from Puketapu Road, which follows a ridgeline at the northern end of the study area.

Major surrounding roads are Puketapu Road to the north and Springfield Road to the south. Existing suburban residential development climbs up slopes adjoining the eastern flanks of the area around Churchill Drive. The area partly encircles Dolbel Reserve and Ōtātara Pā Historic Reserve directly to the east and south respectively. Tūtaekuri River is directly to the south. The western boundary of the study area adjoins Hastings District.

# 1.3

## Tironui Drive & Surrounds study area



Top left: Views out over farmland in the Tironui Hills & Surrounds study area.  
Top right: Views to the east towards the coast from the study area.  
Bottom: Looking over hill and valley system in the western part of the study area..

### Study area context

The 260-ha study area of Tironui Drive & Surrounds extends west from Church Road, with Hastings District on parts of its southern and western borders. On its eastern side, it adjoins Mission Estate, which has recently been rezoned to provide for approximately 550 houses.

Pukekura / Sugar Loaf is a dominant landscape feature at the eastern end of the study area. Puketitiri Road, which connects Napier with the small settlement of Puketapu, cuts through the study area's northern end. There are otherwise no through roads. Tironui Drive provides

access to rural residential lots at the southern end of the study area. It is otherwise in large land-holdings.

**02**

**Context**

# 2.1

## Strategic planning context

There are multiple national and regional planning policies that direct how growth should occur in Napier in order to achieve a range of social, cultural, economic and environmental outcomes (refer also to Figure 2 overleaf). The key policies include:

- National Policy Statement: Urban Development (2020);

- The pending National Policy Statement: Highly Productive Land;
- Hawke’s Bay Regional Policy Statement; and
- Heretaunga Plains Urban Development Strategy (2016).

These policy documents provide a framework for evaluating options for urban development in the study areas and are explained below.

### National Policy Statement: Urban Development (2020)

The National Policy Statement: Urban Development (**‘NPS-UD’**) was introduced in August 2020 and replaces the National Policy Statement: Urban Development Capacity. It is directive about how growth must be provided for, and has broad ranging implications for spatial and statutory planning (refer to Table 1). It

requires councils to produce a Future Development Strategy (**‘FDS’**), that identifies where growth will occur, informed by a robust evidence base. The upcoming HPUDS review will need to be consistent with the FDS requirements.

### National Policy Statement: Highly Productive Land

The Government released a discussion document and proposed National Policy Statement for Highly Productive Land in 2019. It is likely that the National Policy Statement will come into effect in 2021.

- Policy direction that allows the benefits of urban development on highly productive land to be considered where it is needed to meet the NPS-UD requirements;
- Policy direction to manage rural lifestyle subdivision to maintain the productive capacity of land; and
- Policy direction to ‘avoid’ inappropriate subdivision, use and development on highly productive land.

As part of the HPUDS review, the productive capacity of land for all identified growth options will need to be considered carefully, and balanced with the need to provide for additional development capacity that is feasible and market attractive.

Key provisions may include:

- Policy direction seeking to protect highly productive land for productive uses;
- Requirements for regional councils to map highly productive land based on criteria;
- An interim definition of highly productive land based on land use classifications;

### Hawke’s Bay Regional Policy Statement

The Hawke’s Bay Regional Policy Statement (**‘RPS’**) sets out a range of policies that are relevant to growth options in the study areas. Two policies are of particular relevance: Policy UD4.2 sets out a number of criteria that new greenfield residential growth areas must satisfy; and Policy UD8 sets out a yield expectation of an average

yield of 15 dwellings per hectare in greenfield residential growth areas.

These criteria have been used to assess the two structure plan study areas in Section 4 of this report. It is noted that the RPS growth related objectives and policies will need to be reviewed to give effect to the requirements of the NPS-UD.

NPS-UD KEY REQUIREMENTS	KEY IMPLICATIONS FOR NAPIER CITY COUNCIL
<b>Development capacity</b>	
<p>Councils must provide land with sufficient capacity to meet expected urban development demand over the short, medium and long term that:</p> <ul style="list-style-type: none"> <li>• is plan enabled;</li> <li>• is feasible and reasonably expected to be realised by the market; and</li> <li>• includes a buffer that supports the competitive operation of the land market.</li> </ul>	<ul style="list-style-type: none"> <li>• A greater amount of serviced development capacity will be required to meet expected demand.</li> <li>• NCC will need to work closely with the development sector to determine if development is feasible.</li> <li>• A greater focus on the market will mean that infrastructure planning and funding will need to be continuously monitored and reviewed.</li> </ul>
<b>Planning for growth</b>	
<p>Councils must prepare a FDS that:</p> <ul style="list-style-type: none"> <li>• identifies broad locations for development;</li> <li>• identifies environmental constraints;</li> <li>• identifies required infrastructure;</li> <li>• considers different growth scenarios;</li> <li>• includes a statement of iwi and hapū aspirations; and</li> <li>• is regularly reviewed.</li> </ul>	<ul style="list-style-type: none"> <li>• NCC will need to demonstrate thorough evaluation of a range of growth scenarios and locations based on robust evidence, including market information.</li> <li>• A requirement for an Annual Implementation Plan provides a regular opportunity to track progress and evaluate market responsiveness to growth areas.</li> <li>• Identification of greenfield growth areas through the HPUDS and District Plan reviews will need to be consistent with FDS requirements.</li> </ul>
<b>Responsive Planning</b>	
<ul style="list-style-type: none"> <li>• Councils must be responsive to Plan Changes where those Plan Changes would add significantly to development capacity, contribute to well-functioning urban environments and meet criteria which needs to be set out in the Regional Policy Statement.</li> </ul>	<ul style="list-style-type: none"> <li>• NCC’s growth strategy will need to be responsive to the market.</li> <li>• Working closely with developers, evaluating all growth options in detail as part of the FDS, and effective monitoring, will minimise the risk of out-of-sequence development coming forward.</li> </ul>
<b>Intensification</b>	
<ul style="list-style-type: none"> <li>• Councils must enable heights and densities commensurate with the greater of the level of accessibility or relative demand for housing or business land.</li> </ul>	<ul style="list-style-type: none"> <li>• NCC will need to evaluate accessibility and demand within urban areas.</li> <li>• In areas with high accessibility or high demand, increased heights and densities will need to be considered.</li> </ul>

**Table 1: Summary of NPS- UD requirements and implications for Napier City Council**

## Heretaunga Plains Urban Development Strategy (2016)

HPUDS is the key document informing when and where greenfield growth can occur in Napier and Hastings. It was last updated in 2017 and is due to be updated in 2021, although it is understood that the partner councils are proposing to start the review process this year (2020) partly in response to the release of the new NPS-UD. HPUDS identifies the following greenfield growth areas in Napier (refer to Figure 1):

- Te Awa
- Riverbend
- The Loop
- Mission Estate
- Parklands
- Park Island
- Bay View
- South Pirimai (reserve area).

Several of these development areas are nearing build-out. Other areas, including The Loop, Riverbend and South Pirimai, have not yet been subject to the development of structure plans demonstrating how they should be best developed for urban development. Any constraints that may impact on these areas would need to be further evaluated through the next HPUDS review. Both of these factors mean that additional greenfield and brownfield sites will need to be identified as suitable for urban

### Napier District Plan review

Napier City Council has begun a review of the Operative District Plan and intends to release a Draft Plan for public consultation in late 2020. The Draft Plan will need to integrate the requirements of the National Policy Statements outlined above and implement the FDS determined through the HPUDS review. This is of particular importance for greenfield growth areas that

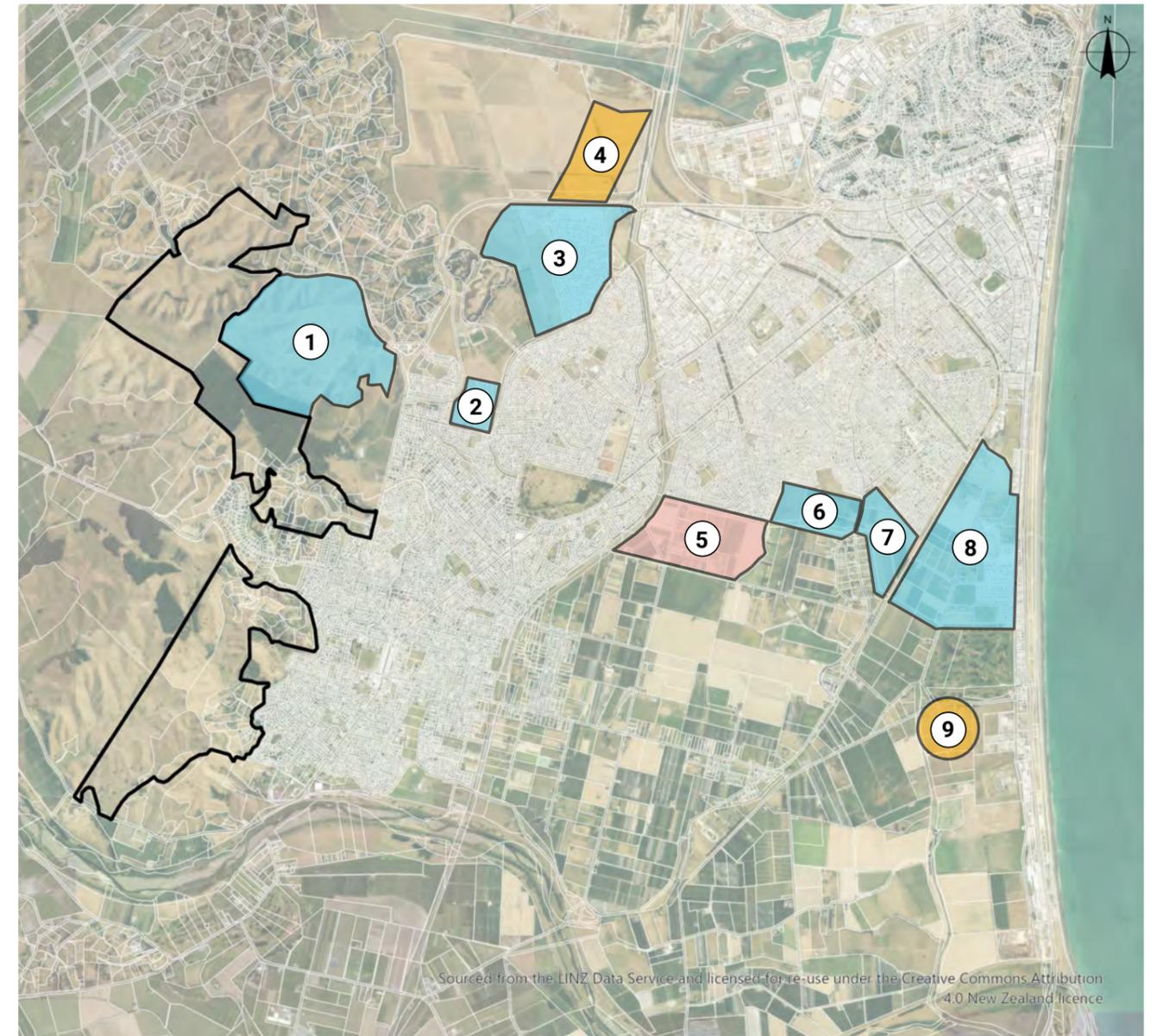
development in the short, medium and long term to collectively accommodate a 30-year growth horizon.

To inform the next HPUDS review, Napier City Council updated its Housing and Business Capacity Assessment in 2020. This update has resulted in increased demand projections for Napier within brownfield (infill) and greenfield areas as follows:

- Greenfield: 150 dwellings required annually / 1,500 over the short and medium term (10 years); and
- Brownfield/infill: 125 dwellings required annually / 1,250 over the short and medium term (10 years).

Of this growth, approximately 30% to 40% is expected to be demand created by the retirement sector. This sector has particular housing needs, including good access to centres, public transport, amenities, and - in particular - to healthcare. In addition, the major developers in the sector are well established and require sites that are efficient and feasible to service. Whether the study areas meet the needs of the retirement sector is an important consideration.

the FDS may identify, as appropriate mechanisms will need to put in place to protect these areas for future development. We comment on this further in Section 5.



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- |                         |                                    |
|-------------------------|------------------------------------|
| 1. Mission              | 6. Riverbend                       |
| 2. Park Island          | 7. The Loop                        |
| 3. Parklands            | 8. Te Awa.                         |
| 4. Napier Business Park | 9. Awatoto Industrial (Indicative) |
| 5. South Pirimai        |                                    |

**Figure 1: HPUDS 2016 growth areas in proximity to Study Areas**

## Infrastructure

Determining the extent and likely cost of upgraded and new infrastructure required to service potential growth areas is fundamental to evaluating their feasibility, and whether development is reasonably expected to be realised by the market.

Infrastructure can typically be grouped into two categories:

- **Strategic infrastructure:** Significant infrastructure generally provided by a council that opens up development of a growth area - e.g. transport corridors, centralised wastewater treatment, centralised water supply and integrated stormwater solutions.
- **Local infrastructure:** Infrastructure provided by developers (often vested in councils) required to provide services *within* a development - e.g. local roads, three waters reticulation and decentralised treatment.

There are a range of mechanisms available to Napier City Council to fund the strategic infrastructure required to support the development of potential growth areas including the study areas. These are:

- **Development contributions:** A levy on new development that can be taken for reserves, network infrastructure and community infrastructure under the Local Government Act 2002. The levy is taken as part of the consenting process, enabling the Council to recover the costs of upfront investment in strategic infrastructure.
- **Financial contributions:** A levy on new development that can be in money or land and imposed as a

condition on a resource consent to offset any adverse effects of development. Care needs to be taken to ensure financial contributions do not overlap with development contributions.

- **Council rates:** General rates or targeted rates can be used to fund infrastructure investment, where the costs are spread across all or part of the community. This is typically required for new or upgraded strategic infrastructure, with a portion of costs being recovered later through financial and development contributions.
- **Development agreements:** Agreements between Council and developers to jointly fund strategic infrastructure can be used, particularly where developments are large-scale and will trigger the need for upgrades.
- **Infrastructure levy model:** The Infrastructure Funding and Financing Act 2020 allows the Council or developers to establish a Special Purpose Vehicle ('SPV'). The SPV is able to borrow funds from the private market, which importantly, can be ring-fenced from Council's budget and therefore not affect Council's debt levels or credit rating. The SPV is responsible for financing and constructing the infrastructure. Once constructed, the infrastructure is vested to Council, and the Council collect a levy (essentially a targeted rate) from landowners within the development area over a maximum 50-year timeframe.

## Greenfield Growth in the Hills - stakeholder engagement

As part of the Napier District Plan review, Napier City Council has consulted with the community on the concept of 'Greenfield Growth in the Hills.' The Council has received a range of feedback. Key themes of the feedback include:

- Support for growth in the hills from landowners in the area;
- The need to develop balanced communities with housing and jobs that respect environmental values;
- The need for retail and other commercial activities to support development;
- Support for development in Taradale Hills and Poraiti Hills;
- The need to respect the landscape values of the eastern-facing hills; and
- The need to evaluate a range of growth options for Napier through the HPUDS review.

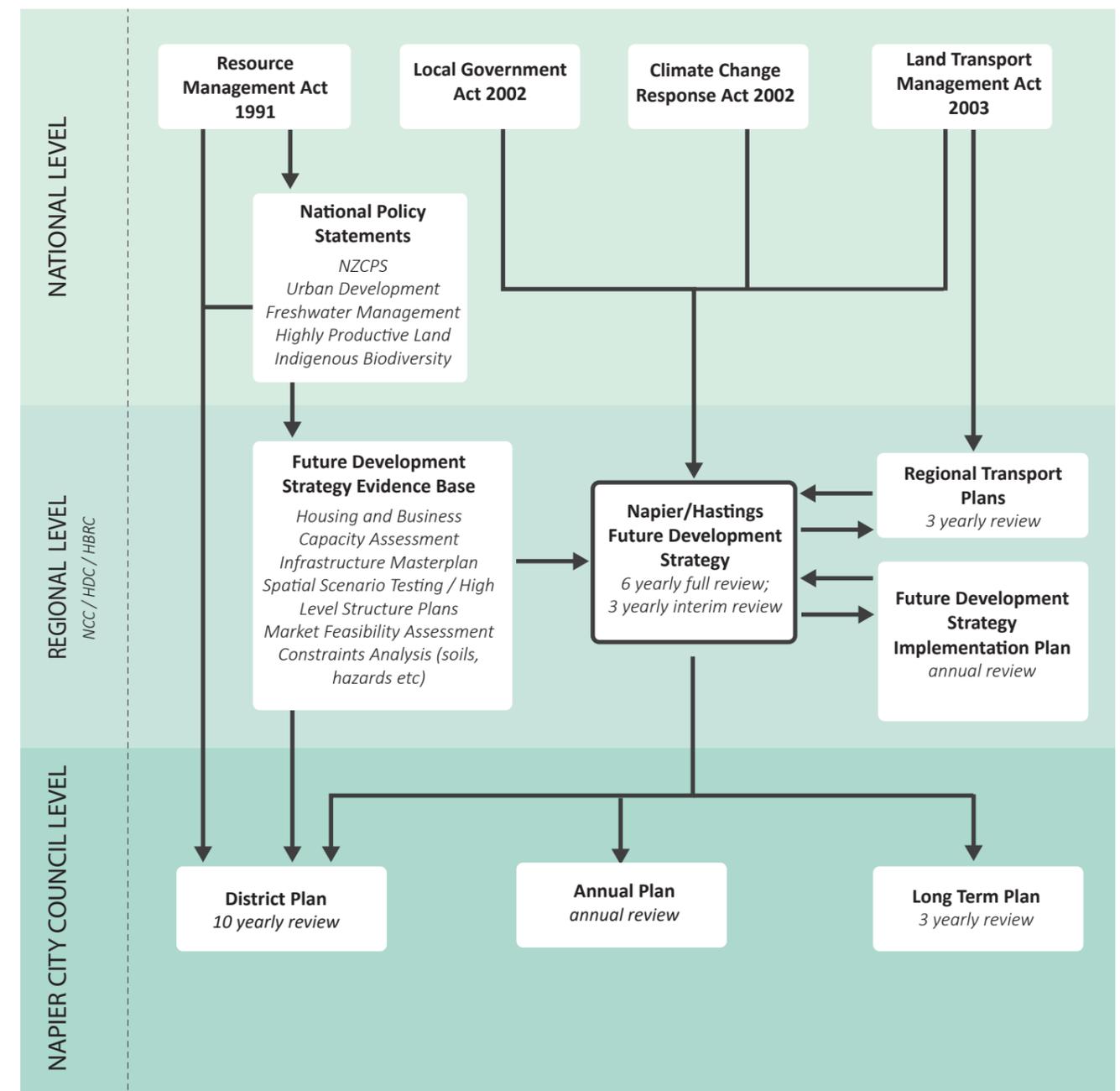


Figure 2: Hierarchy of national and council level planning documents

# 2.2

## Sub-regional context

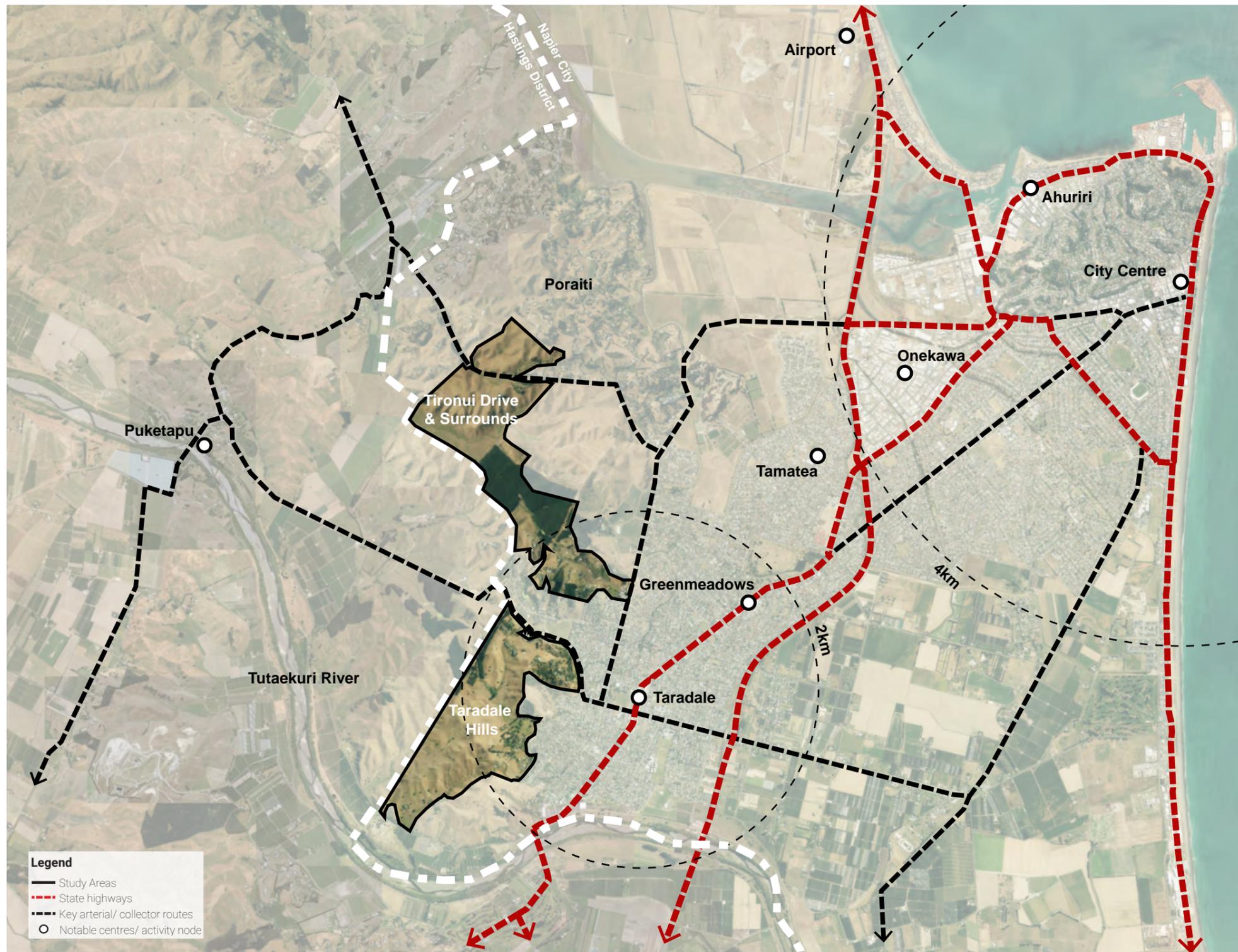


Figure 3: Sub-regional context

Both the Tironui Drive & Surrounds and Taradale Hills study areas are part of the Western Hills. These geographic features form a visual and physical backdrop to the existing urban areas of Napier and Taradale and part of the boundary with Hastings District.

The Western Hills stretch from Esk River in the north, behind the former lagoon of Te Whanganui-ā-Orotū, through to the Tūtaekuri River in the south. Key landmarks include the Ahuriri Estuary, immediately flanked by the Poraiti Hills, the distinctive conical shape of Pukekura / Sugar Loaf adjacent Mission Estate, and the prominent knoll of Ōtātara Pā, at the southern end of the Taradale Hills.

The study areas are approximately 7km south-west of Napier City Centre and directly to the west of Taradale town centre.

# 2.3

## Local context

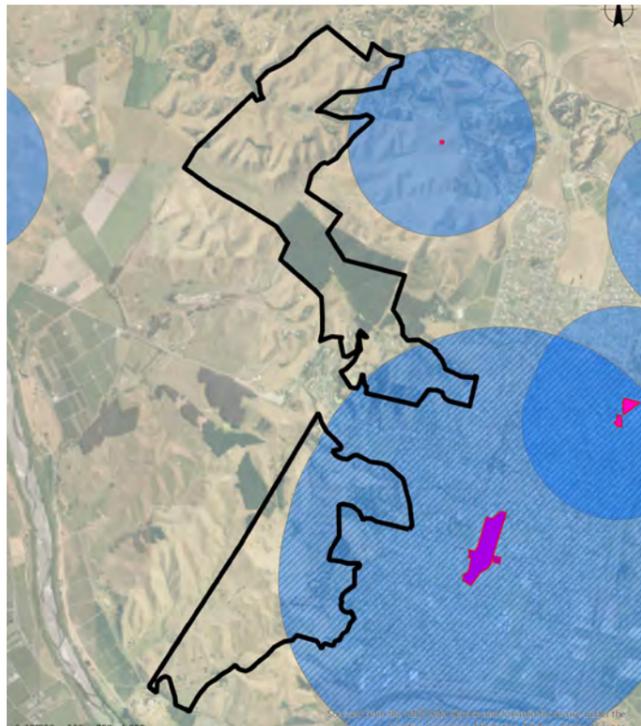


Figure 4: Study areas centres catchment

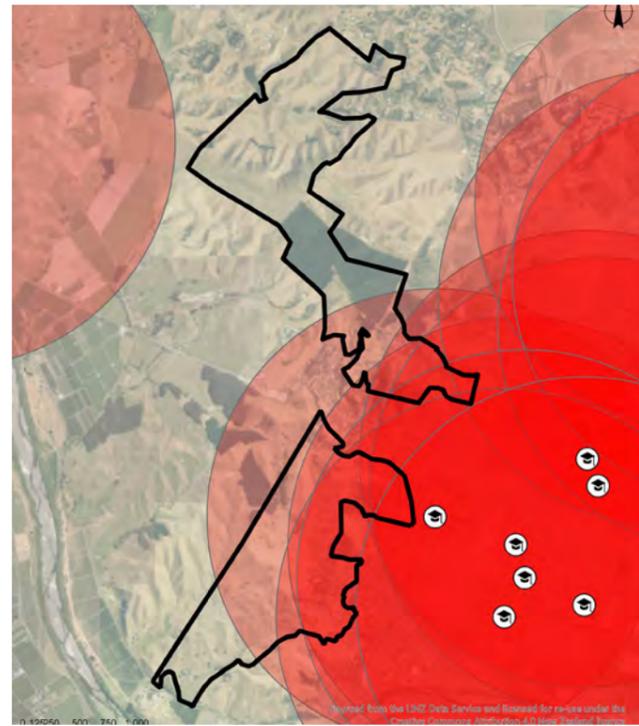


Figure 5: Study areas schools catchment

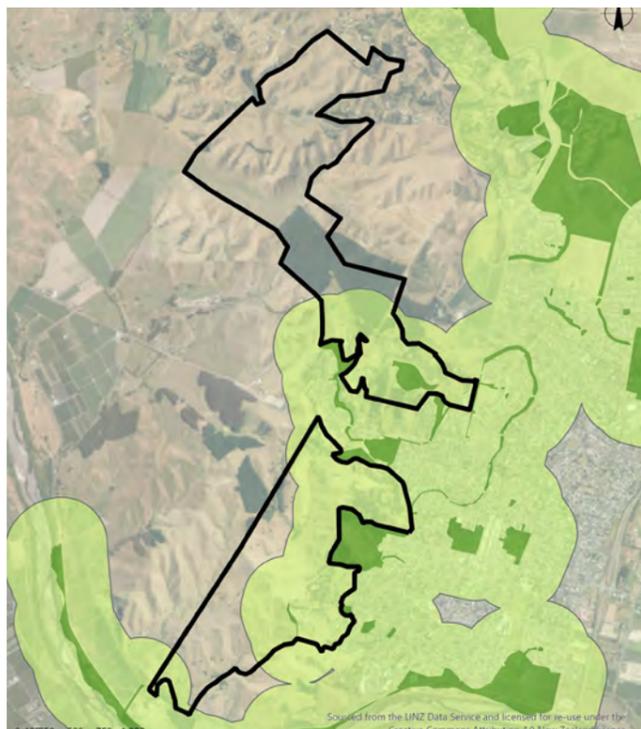


Figure 6: Study areas opens space catchment

### Amenities

To support a compact urban form, reduce dependence on private motor vehicles and encourage active modes of transportation (e.g.: walking and cycling), consistent with RPS requirements for greenfield growth residential areas, it is important that communities have good access to day-to-day amenities within a reasonable distance, including commercial and civic services, educational facilities and open space. This section analyses the level of access the study areas have to existing amenities. This is used to inform the extent of any additional amenities provided for within the high-level structure plans.

The following catchments have been used for:

- **Open space: 400m radius**

This is a commonly used catchment for open space, with 400m being equivalent to a 5 minute walk;

- **Centres: 800m radius for small (i.e.: local/ neighbourhood centre) and 1.6km for larger centre (i.e.: town centre)**

These distances recognise the need for local day-to-day convenience services within a short distance and a wider range of services within a medium distance and are based on medium walking distances or short car journeys.

- **Schools: 2km radius**

This is based on a maximum walking distance of 20 minutes or a short car journey. Studies indicate that rates of walking to schools drop off significantly over 2km.

### Taradale Hills

The majority of the Taradale Hills study area is located close to existing amenities needed to support residential development, including commercial and civic services, educational facilities and open space.

Large parts of the area are within a 2km catchment of a number of schools and within a 1.6km radius of Taradale town centre

The study area directly adjoins the passive recreational space of Dolbel Reserve and is close to public walking

tracks around Kent Terrace (Maggie's Way). It also directly adjoins the open space of Ōtātara Pā. The southern part of the study area is within a short walk of the Tutaekuri River and the walkway and cycleway on its river stop bank.

Slightly further afield, but within a 1.6km distance, are the sports fields of Taradale Park.

### Tironui Drive & Surrounds

The eastern end of Tironui Drive & Surrounds is within 1.6km distance of Taradale town centre, within 2km of schools in the Napier / Taradale area and within 400m of Sugar Loaf reserve and a public walkway system north of Kent Terrace

The majority of the study area, however, is outside catchments for open space, centres and schools. This is largely because the north-west orientation of the area draws it away from the Napier-Taradale urban area into existing rural land.

This lack of existing access to amenities needed to support residential development means that any development of this area will need to provide such services. Consideration would need to be given, for example, to provision for a new primary school. This would require discussions with the Ministry of Education to appropriately forward plan for such an asset.

# 2.4

## District plan provisions

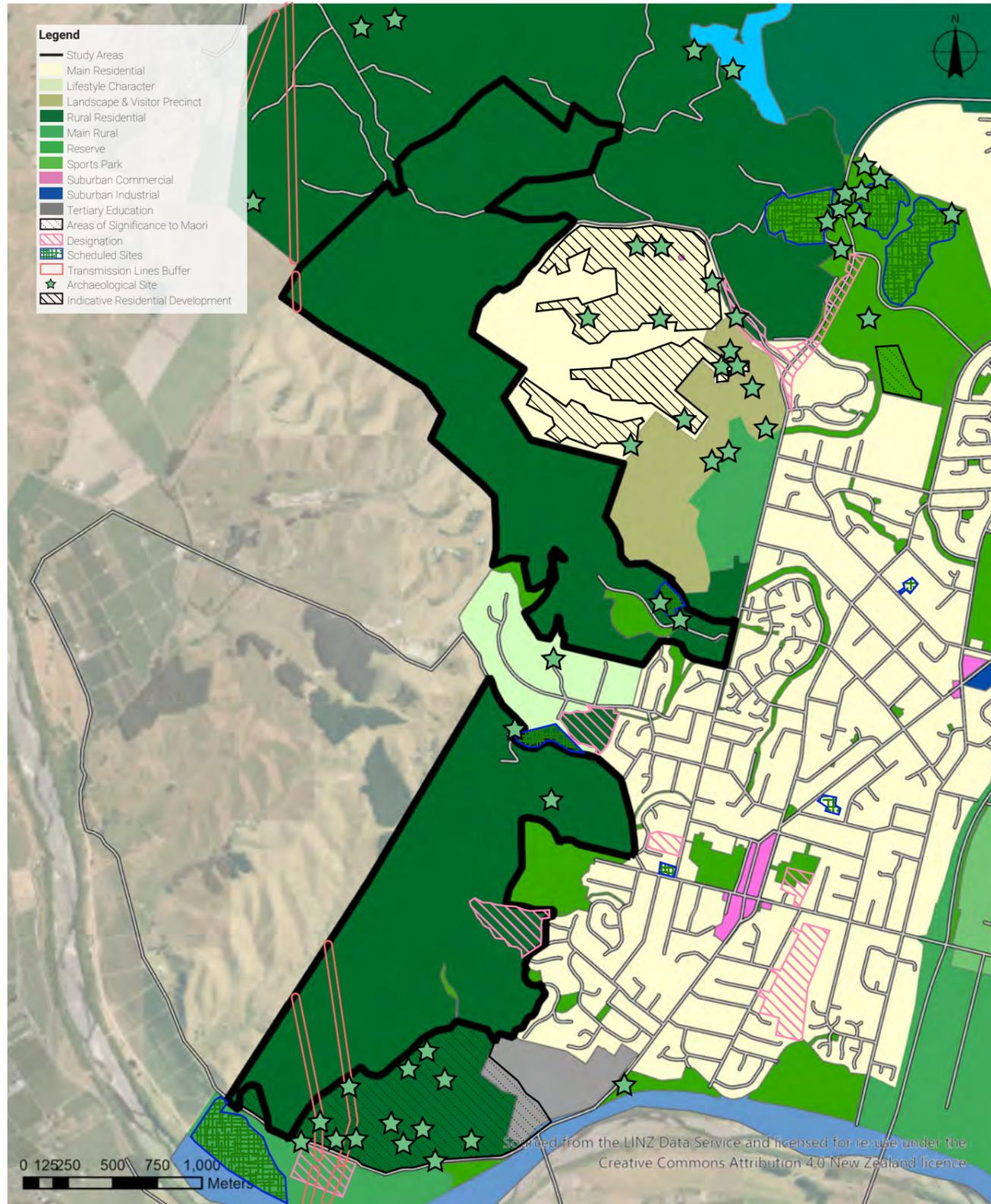


Figure 7: Operative Napier District Plan zones and overlays



Top: Existing development patterns in the Rural Residential Zone near Churchill Drive.

Bottom: Existing Development patterns in the Lifestyle Character Zone around Kent Terrace.

The study areas are within the Rural Residential zone under the Operative Napier District Plan. The minimum lot size allowed in this zone is 5,000m<sup>2</sup> and the minimum average lot size is 1.5 hectares. Rural residential development is currently underway at the northern end of the Taradale Hills study area and development has already occurred in eastern parts of Tironui Drive & Surrounds.

Designations for Transpower transmission lines pass over the southern end of the Taradale Hills study area and the western corner of the Tironui Drive & Surrounds study area.

At the eastern end of the Tironui Drive & Surrounds study area there is a scheduled site and archaeological sites and there is an archaeological site at the western end of the area. In the Taradale Hills study area there are archaeological sites at its northern end. There is also a designation for a Hawke's Bay Regional Council stormwater management facility adjoining Churchill Drive. Ōtātara Pā, directly to the south of the Taradale Hills study area, is a Site of Significance to Maori and has within it several archaeological sites.

# 2.5

## Soils

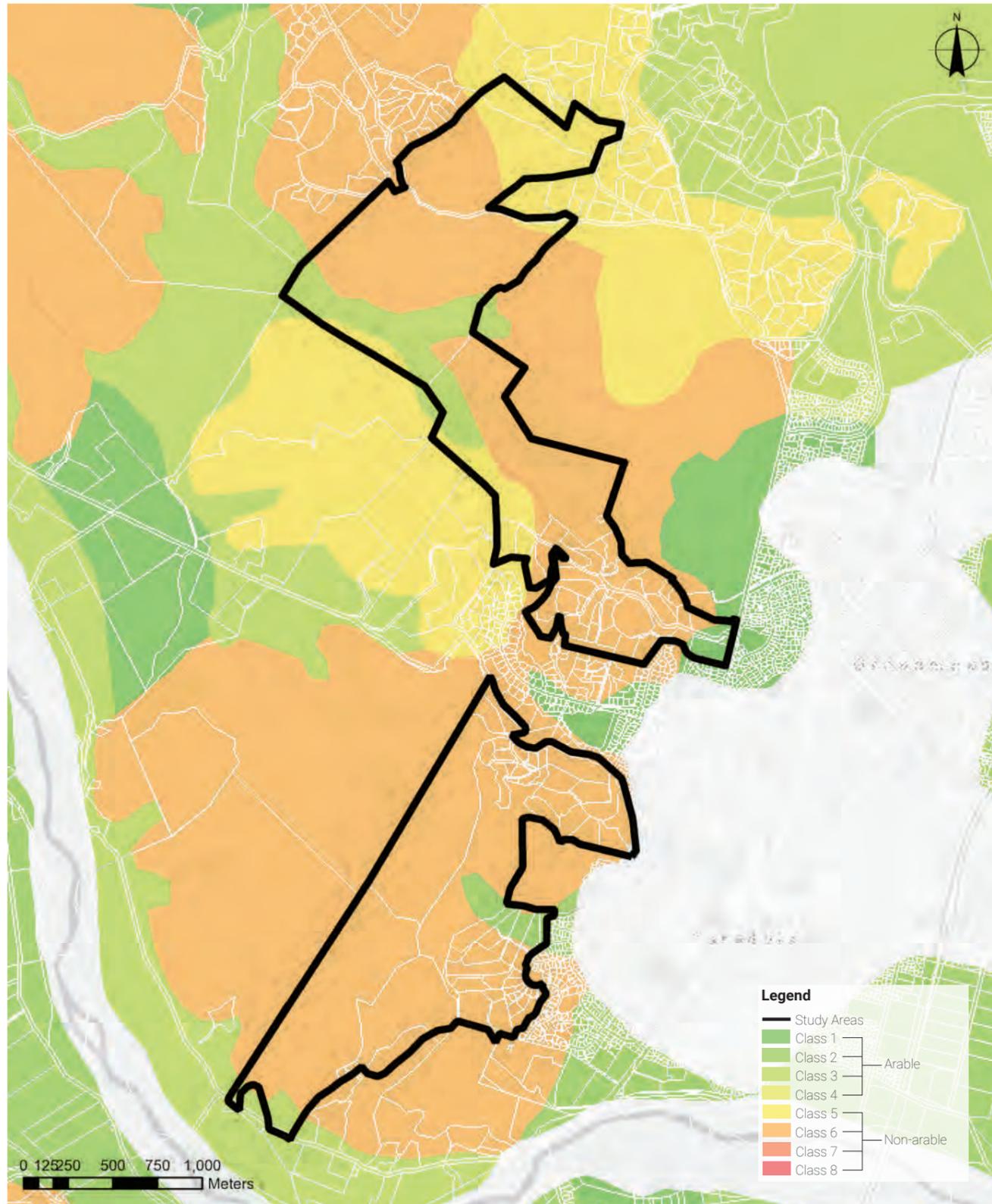


Figure 8: Western Hills Land Use Capability

The Land Use Capability (LUC) system classifies non-urban land into eight classes and is used across New Zealand to help inform the sustainable use of land. Classes 1 to 4 are classified as arable land, with Class 1 representing the highest quality land for cropping/ horticultural uses. In contrast, Class 8 land has a number of physical limitations and is not suitable for arable uses.

The majority of both study areas feature land which is currently within Class 6 - Non-arable land with moderate limitations for use under perennial vegetation such as pasture. There are also large areas of Class 5 land. The large valley floor extending westward from Tironui Drive falls within Class 3 while the valley which extends westwards from Churchill Drive is Class 2 land. Both Class 2 and 3 land fall within the interim definition of high productive land within the National Policy Statement for Highly Productive Land.

The LUC ratings were derived from mapping exercises undertaken between 1973 and 1979 and is based on aerial photography, published and unpublished reference material as well as field work. Due to the date of this data and the scale at which it was produced, further site specific investigations would be required to determine whether any of the land within either study area, especially those currently identified as Class 2 or 3, are worthy of protection as highly productive land.

### Land Use Capability

1. Land with virtually no limitations for arable use and suitable for cultivated crops, pasture or forestry.
2. Land with slight limitations for arable use and suitable for cultivated crops, pasture or forestry.
3. Land with moderate limitations for arable use, but suitable for cultivated crops, pasture or forestry.
4. Land with moderate limitations for arable use, but suitable for occasional cropping, pasture or forestry.
5. High producing land unsuitable for arable use, but only slight limitations for pastoral or forestry use.
6. Non-arable land with moderate limitations for use under perennial vegetation such as pasture or forest.
7. Non-arable land with severe limitations to use under perennial vegetation such as pasture or forest.
8. Land with very severe to extreme limitations or hazards that make it unsuitable for cropping, pasture or forestry.

# 2.6

## Topography



Figure 9: Taradale Hills Topography & Slope Assessment



Top: Existing accessways within the study area.  
Bottom: Looking south towards the Te Roera Drive subdivision.

### Taradale Hills

The topography of the Taradale Hills study area is characterised by a steep hill and valley system. This is incised with drainage channels and some flatter areas associated with flood plains. The gradient of slopes varies from steep valley sides to flatter hilltops and ridgelines. Much of the area is too steep to support accessible gradients for public roads (maximum 1:8 / 12.5%).

Approximately a third of the study area has a slope of 20% or less. Much of this land, however is stretched along narrow ridgelines or gullies, creating issues of accessibility. Some flatter areas are dispersed, small parcels of insufficient size to support typical residential development. A 12ha area within the central part of Taradale Hills, to the west of Churchill Drive, has topography that is favourable to urban development (20% slope or less).

The balance land has a slope of more than 20%, presenting significant challenges for residential development at urban densities (15 dwellings/ha). There are a range of reasons for this including:

- Inability to achieve complying public road gradients (maximum 1:8 / 12.5%);
- Cost of providing public infrastructure, including wastewater in particular;
- Potential for adverse effects on the landscape due to the extent of earthworks and land modification required to construct roads and complying building platforms;
- Typically, the need for bespoke architectural housing design that would likely increase costs; and
- Difficulty in achieving connected and walkable neighbourhoods.

These factors combined are likely to significantly increase the costs of developing in the study area. Overall, the topography of the area, even around flatter land, would require significant earthworks to accommodate infrastructure and roading, and cutting and filling in order to provide appropriate building platforms for development.

We note that existing residential development in hilly areas is not uncommon in Napier and other New Zealand cities. Many of these areas, for example - Napier Hill, were developed at a time when engineering code and building code standards were different than today (or non-existent) and would be difficult to develop under current building industry and accepted council standards.



**Figure 10: Tironui Drive & Surrounds Topography & Slope Assessment**



*Top: The varied hill and valley systems of the Tironui Drive & Surrounds study area.*

*Bottom: A valley of flatter land in the study area, to the west of Mission Estate.*

### **Tironui Drive & Surrounds**

Similar to Taradale Hills, the topography of the Tironui Drive & Surrounds study area is characterised by steep hills, incised with drainage channels and flatter areas associated with flood plains along with some areas of rolling hills.

A total of approximately 45% of the area is of a slope of 20% or less. Much of this more gently sloping land is stretched out in ribbon form along ridgelines and hilltops, with its linear nature making it challenging to service.

The largest area of contiguous land with slope of 20% or less is approximately 36ha in size, and is located to the west of the Mission Estate, accessible via existing farm tracks from the Estate and Puketitiri Road. The topography around this area will likely require significant earthworks to provide public road access in accordance with Council's engineering standards through the area from Tironui Drive.

# 2.7

## Aspect

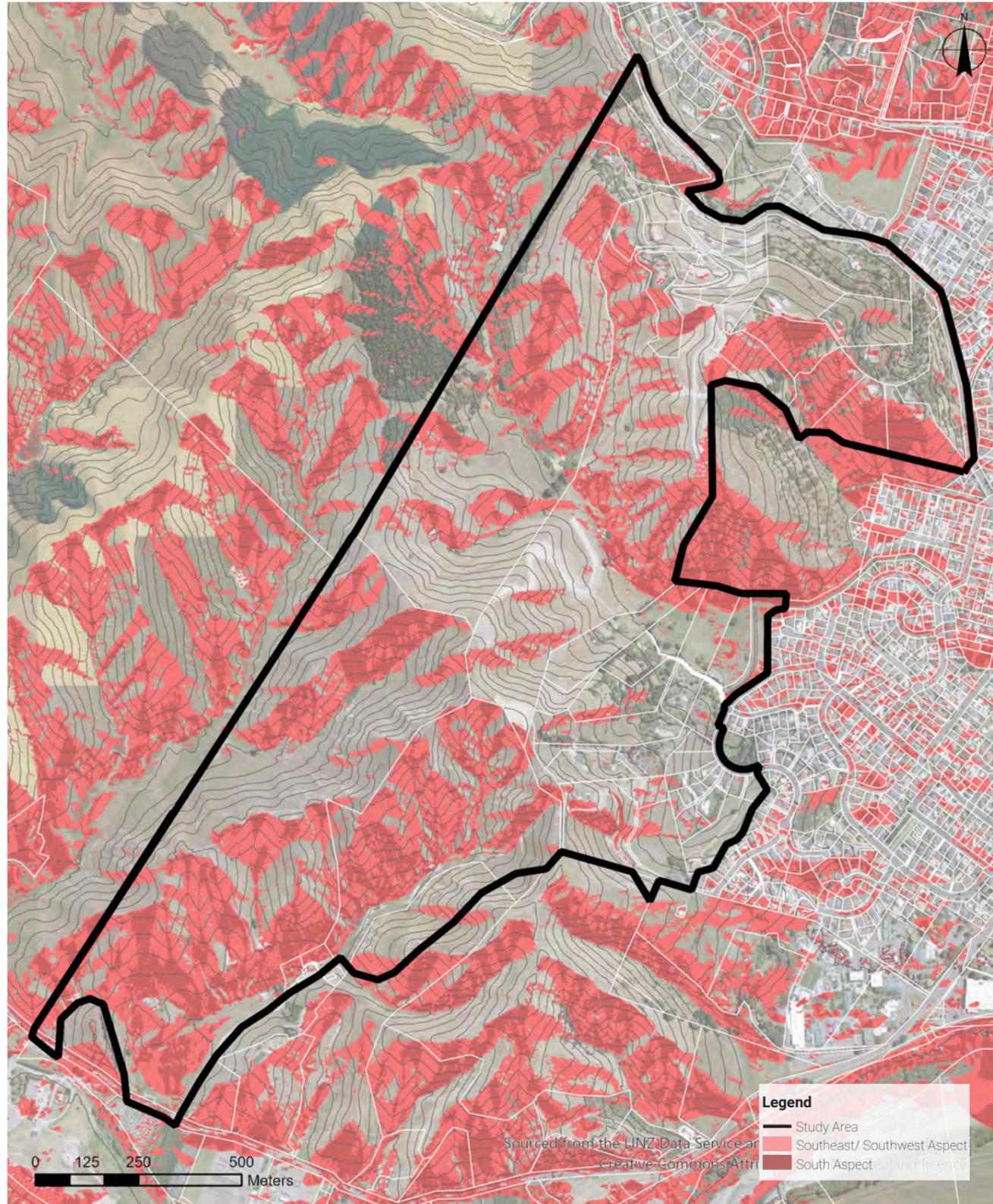


Figure 11: Taradale Hills Aspect Assessment

### Taradale Hills

Aspect is an important amenity consideration for housing and residential development. Lots with a north-facing aspect are typically more attractive to the market.

Linked to the nature of the topography, the Taradale Hills study area features extensive areas of south-facing slopes. These slopes receive less direct sunlight and are typically cooler than north-facing slopes. During winter months, portions of south-facing slopes with a gradient greater than 50% will likely remain shaded throughout the day due to the low angle of the sun.

At lower elevations and areas directly south of the large hills throughout the study area it is likely that areas will remain in prolonged shading during winter months, impacting on potential liveability.

The need for significant earthworks or retaining to construct building platforms and access roads could exacerbate shading issues.

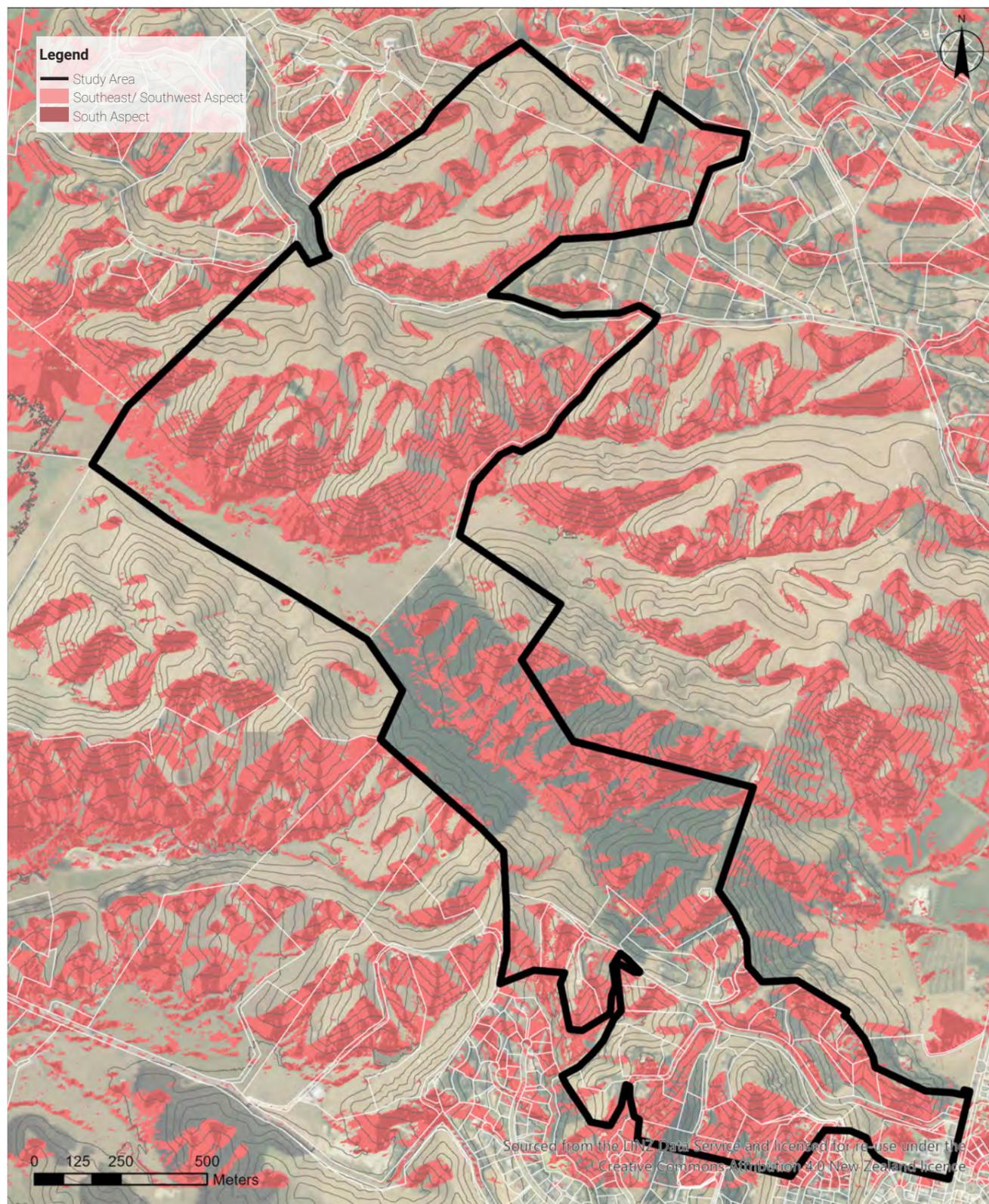


Figure 12: Tironui Drive & Surrounds Aspect Assessment

### Tironui Drive & Surrounds

As with Taradale Hills, this study area also features extensive areas of south-facing slopes.

These slopes receive less direct sunlight and are typically cooler than north-facing slopes. During winter months, portions of south-facing slopes with a gradient greater than 50% will likely remain shaded throughout the day due to the low angle of the sun.

At lower elevations and areas directly south of the large hills throughout the study area (which includes the largest contiguous area of flatter land across both study areas) it is likely that areas will remain in prolonged shading during winter months impacting on potential liveability.

The need for significant earthworks or retaining to construct building platforms and access roads could exacerbate shading issues.

# 2.8

## Landscape and cultural values

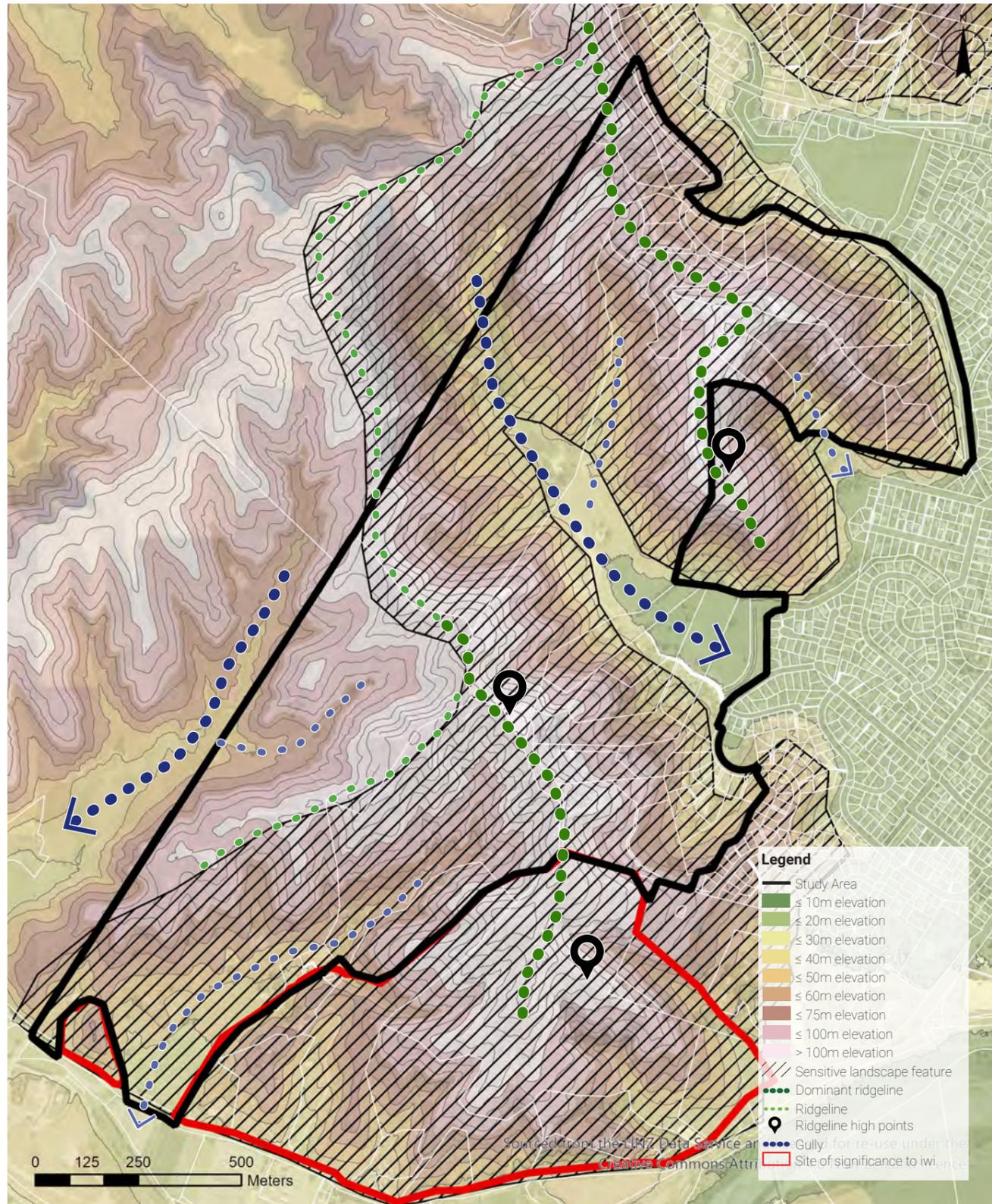


Figure 13: Taradale Hills Landscape Assessment



Top: Looking west from the Taradale urban area to the backdrop of the Taradale Hills.  
Bottom: Otātara Pā

### Taradale Hills

With a variation in elevation of approximately 130m, the study area forms part of the rural backdrop to Taradale and the wider Napier urban area, which lies between the Western Hills and the coast. It is widely visible from Taradale / Napier, contributing to the area's sense of place.

This topography, in turn provides for good views from the study area east across to the coast and also to the west/afternoon sun. The hills are largely in pasture, with mature vegetation mainly located along drainage corridors or in areas where rural residential subdivision has occurred. This vegetation serves to 'absorb' existing residential development, helping the area to retain a predominantly rural feel.

Immediately adjacent to the study area, the Otātara Pā Historic Reserve is a prominent landmark that acts as a book-end to the Western Hills and also serves as a gateway feature when approaching Napier from the south. The site is culturally significant to local iwi and is registered as a Category 1 Heritage Place. The site encompasses two pā, Hikurangi and Otātara. Together, these formed the largest pā complex in the district, covering over 40 hectares, benefiting from a strategic location on high ground, accessible to the coast, and next to the Tūtaekuri River.

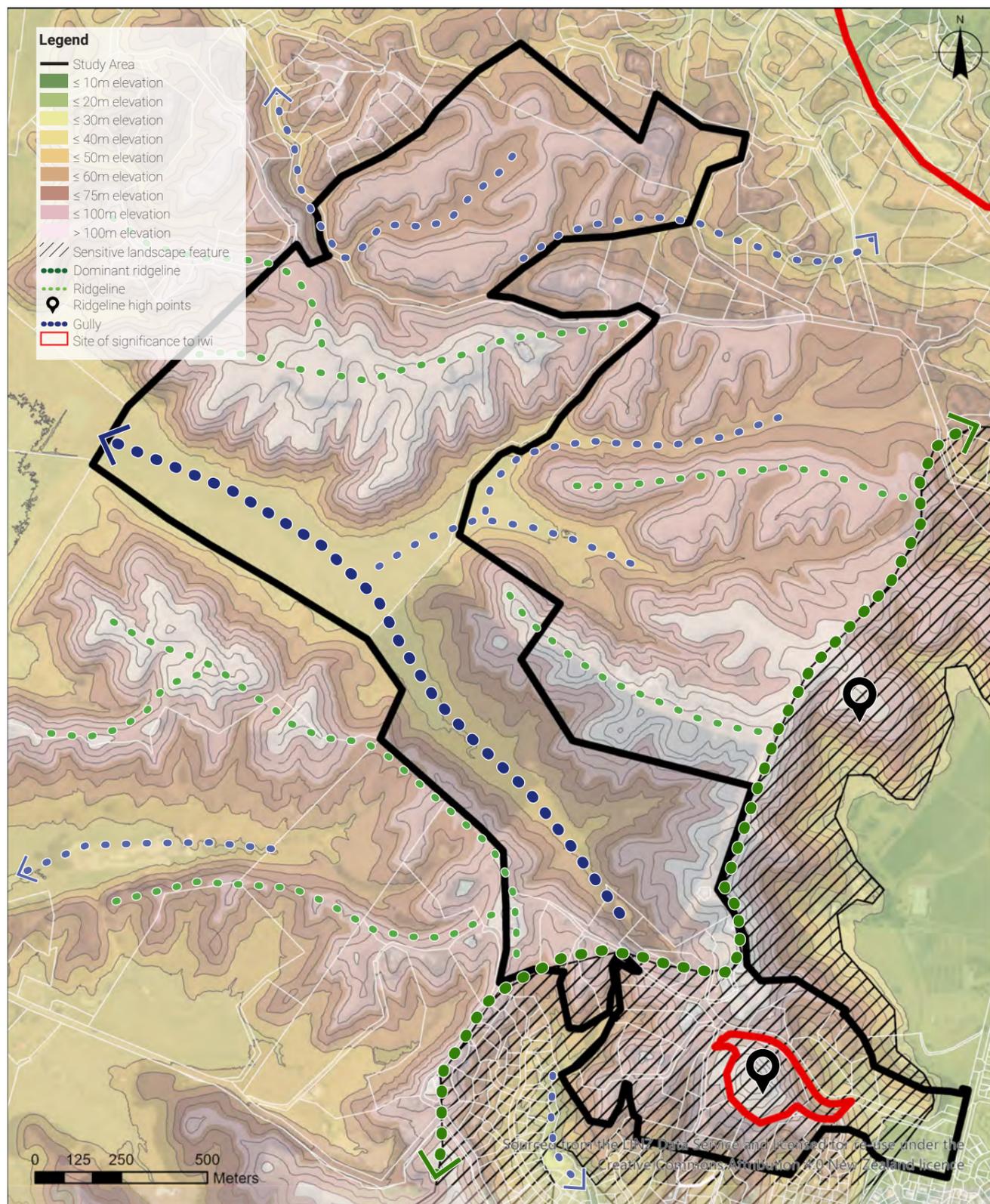


Figure 14: Tironui Drive & Surrounds Landscape Assessment



Top: Looking west from Church Road towards Pukekura/Sugar Loaf.  
 Bottom: Looking west over the Mission Estate Winery towards the wooded ridgeline which forms the study area boundary.

### Tironui Drive & Surrounds

The majority of this study area is located on the western side of the Western Hills and does not form part of the same visual catchment as the majority of Napier.

Within the eastern extremity of the study area, Pukekura / Sugar Loaf forms one of the most distinctive landmarks along the Western Hills skyline. Although not much higher than the nearby hills, Pukekura is prominent and memorable because it stands forward of the main ridge and has a distinctive symmetrical shape with steep sides and a flat summit. The summit reserve provides expansive views over Taradale towards Napier and the coast, and also inland over hill country toward the Kaweka Ranges. As with the Taradale Hills, this ridgeline (which largely traverses the Mission Estate) provides an important rural backdrop to the City.

As well as being a prominent physical landmark, Pukekura was the site of a pā and may have been the site of a whare wānanga. These were places of instruction for tohunga, which were commonly located at places considered to have spiritual significance to tangata whenua.

# 2.9

## Natural Hazards

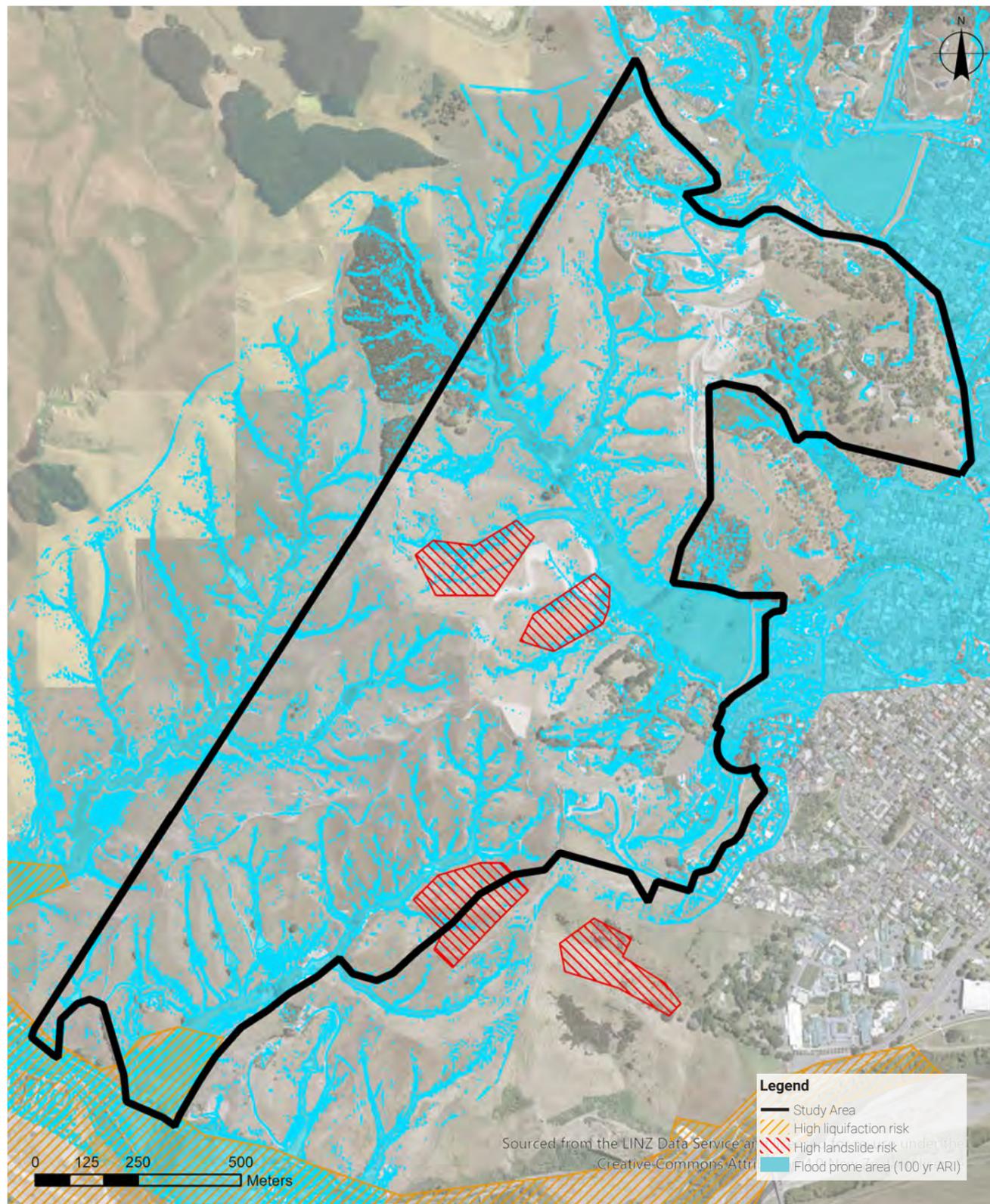
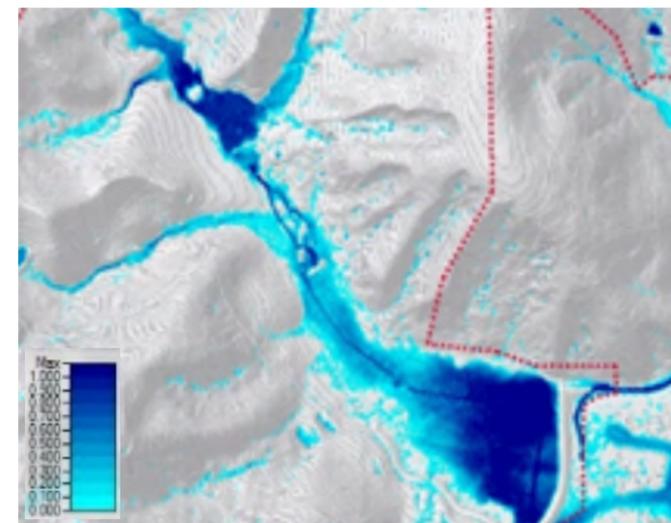


Figure 15: Taradale Hills Hazards Assessment



Top: Flood depth modelling (refer to Appendix 1).  
Bottom: Liquefaction damage following the Canterbury earthquakes.

### Taradale Hills

The main natural hazard of relevance to the Taradale Hills study area is flooding. Flood modelling undertaken to inform stormwater management for any future development within the area indicates that flooding is prevalent across the gully systems that traverse the site during the 100-year flood event. The Hawke's Bay Regional Council stormwater management facility adjacent to Churchill Drive, as well as an area around an existing stormwater pond upstream of the facility, have been identified as being subject to flood depths of up to 1m.

Urbanisation of the area has the potential to exacerbate these issues through increased impermeable surface coverage, as well as modification of natural drainage patterns resulting from the establishment of building platforms and roads.

Unsurprisingly, given the nature of the topography on the site, landslide risks have been identified in some areas of more steeply sloping land. The flatter land at the southern portion of the study area has also been identified as having a high risk of liquefaction.

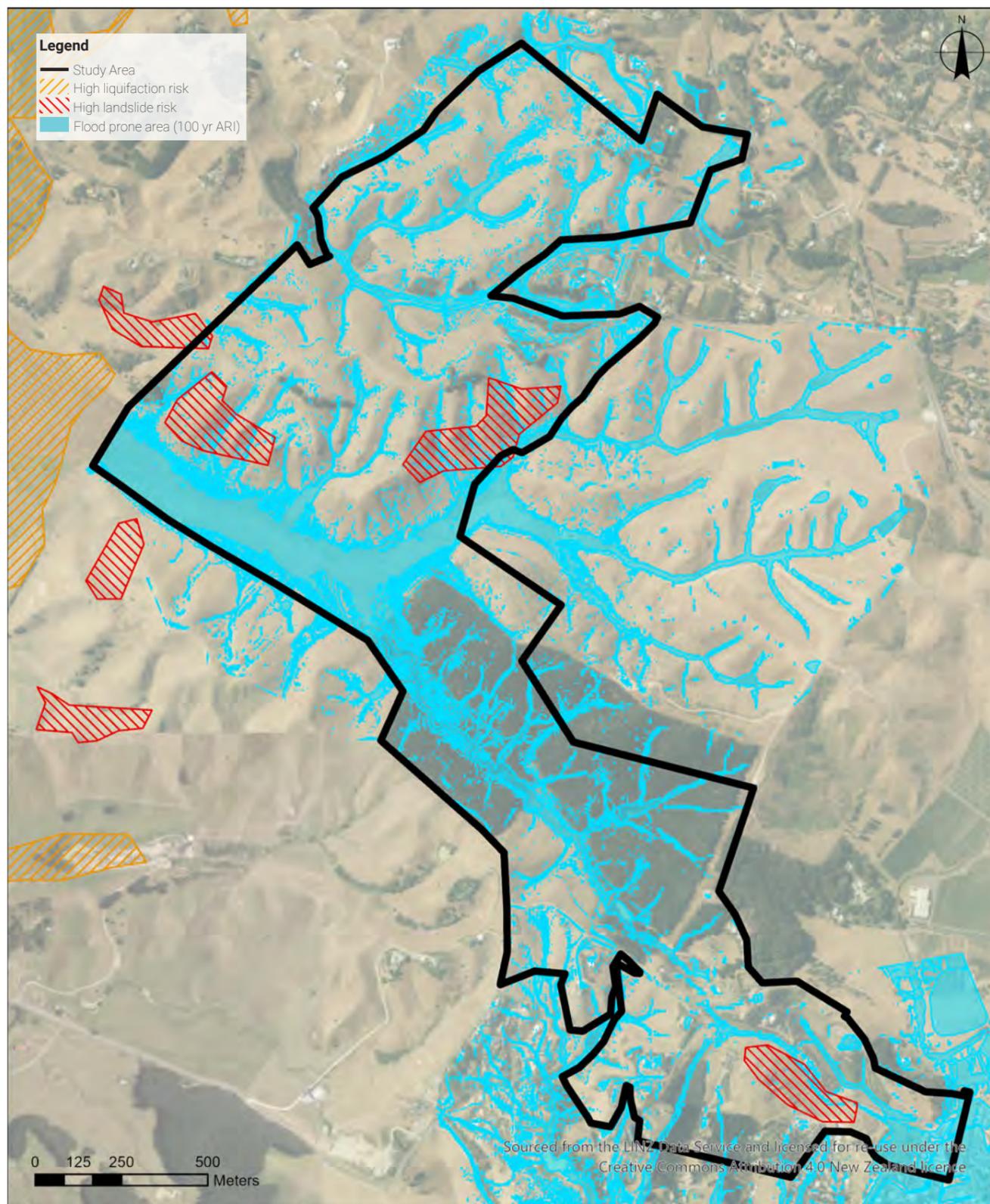
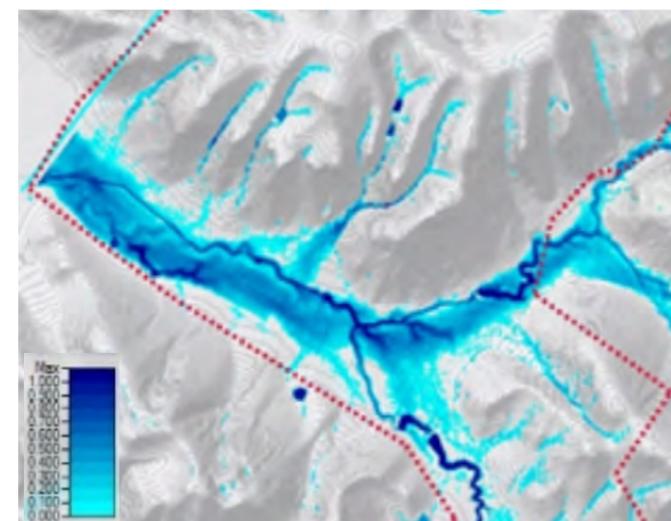


Figure 16: Tironui Drive & Surrounds Hazards Assessment



Top: Flood depth modelling (refer to Appendix 1).  
Bottom: Evidence of land instability in the study area.

### Tironui Drive & Surrounds

The main natural hazard of relevance to the Tironui Drive & Surrounds study area is flooding. Flood modelling undertaken to inform stormwater management for any future development within the area indicates that flooding is prevalent across the gully systems that traverse the site during the 100-year flood event. The majority of the area identified as being susceptible to flooding is subject to sheet flows only, with depths ranging from 100mm - 300mm.

Urbanisation of the area has the potential to exacerbate downstream flooding issues in Hastings District. To address this, at-source detention and downstream flood works will likely be required. Green corridors alongside existing drainage channels should also be considered to help provide flood storage and conveyance of overland flows.

As with Taradale Hills, given the nature of the topography on the site, landslide risks have been identified in some areas of more steeply sloping land and land-uses within the vicinity of these areas will need to avoid or mitigate this risk.

# 2.10

## Infrastructure

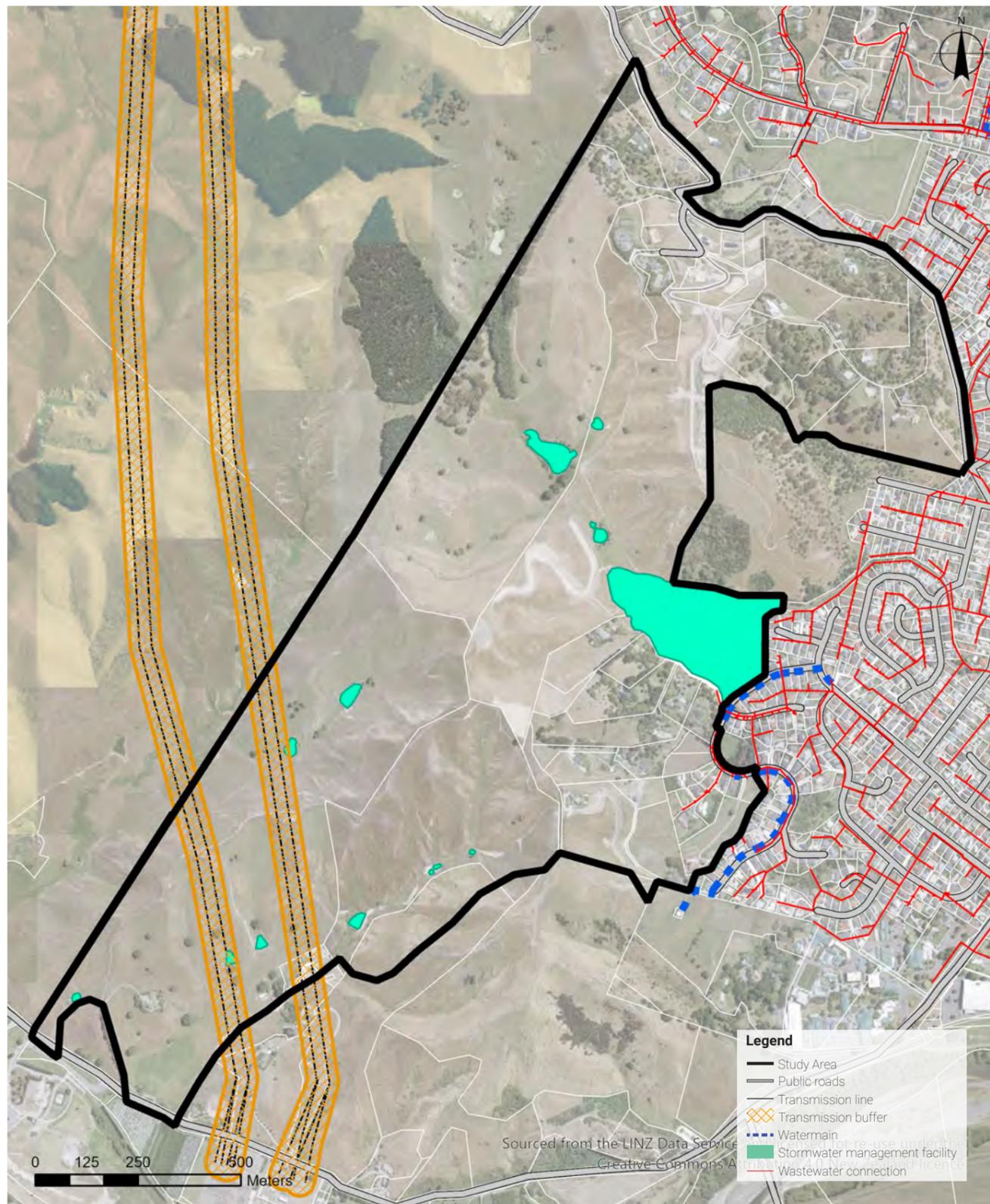


Figure 17: Taradale Hills Infrastructure Summary



Top: Transpower transmission lines passing over the study area.

Bottom: Existing stormwater pond in a valley of flatter land to west of Churchill Drive.

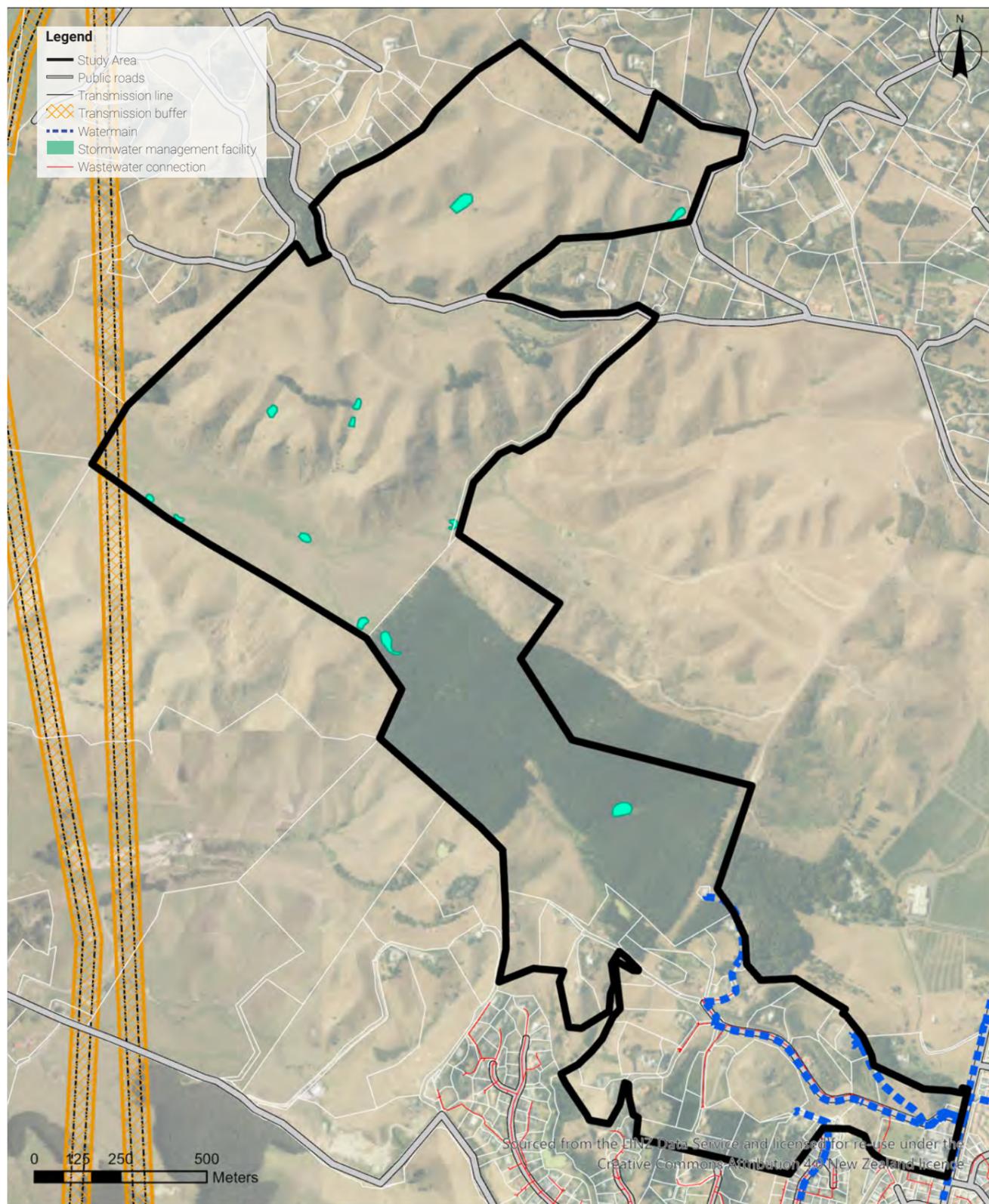
### Taradale Hills

The study area is bordered by a number of 'urbanised' roads including Puketapu Road, Churchill Drive and Springfield Road. There are, however, no public road connections through the site, with access being primarily via farm tracks which traverse several ridgelines and valleys. Access to existing rural residential subdivisions within the study area is via a series of private roads and/or right-of-ways.

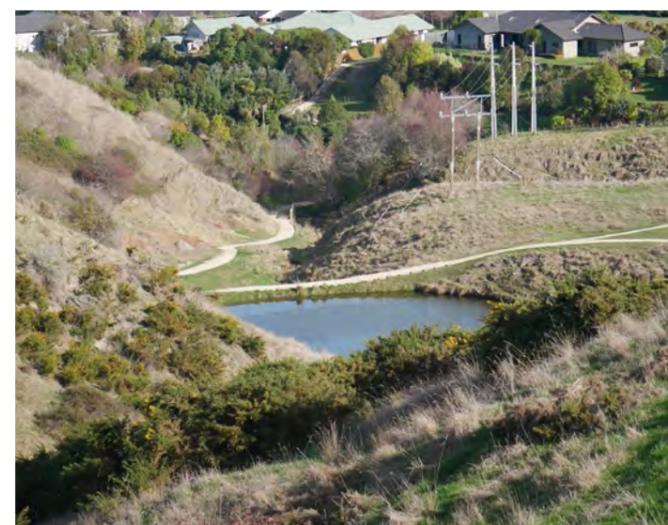
In terms of three waters infrastructure, the eastern end of the study area, where rural residential development has already occurred, is support by reticulated water via a reservoir near Ōtātara Pā. These properties are also connected into the wastewater network which feeds back into the existing urban area.

Adjacent to Churchill Drive, Hawke's Bay Regional Council operates a stormwater management facility which is designed to prevent downstream flooding in the adjacent subdivision. The vast majority of the study area has no proximate access to existing water infrastructure.

Two 110kv Transpower transmission corridors pass over the southern portion of the study area. Transpower requires a 37m setback for any development from these transmission lines.



**Figure 18: Tironui Drive & Surrounds Infrastructure Summary**



*Top: Route of an unformed paper road extending into the study area.*

*Bottom: Existing stormwater pond constructed as part of the Kent Terrace/ Maggie's Way development, adjacent to the study area.*

### **Tironui Drive & Surrounds**

Vehicular access to the study area is currently very limited due to the topography and the nature of existing landholdings and development. Public roads are limited to Tironui Drive, at the eastern end of the study area, and Puketitiri Road, which passes through the northern part of the study area. Puketitiri Road is classed as a rural road. Existing farm tracks traverse the study area, often on ridgelines or in valleys.

There is an existing 'paper road' which extends south-west from Puketitiri Road towards the flatter valley floor along the southern boundary of the study area. Limited public transport services are accessible via Church Road.

In terms of three waters infrastructure, the eastern end of the study area, where rural residential development has already occurred, is supported by reticulated water via a series of reservoirs around Pukekura /Sugar Loaf. These properties are also connected into the wastewater network which feeds back into the existing urban area. The vast majority of the study area has no proximate access to existing water infrastructure.

A 110kv Transpower transmission corridor passes over part of the western edge of the study area, with a requirement for a 37m setback for any development from it.

# 2.11

## Taradale Hills opportunities

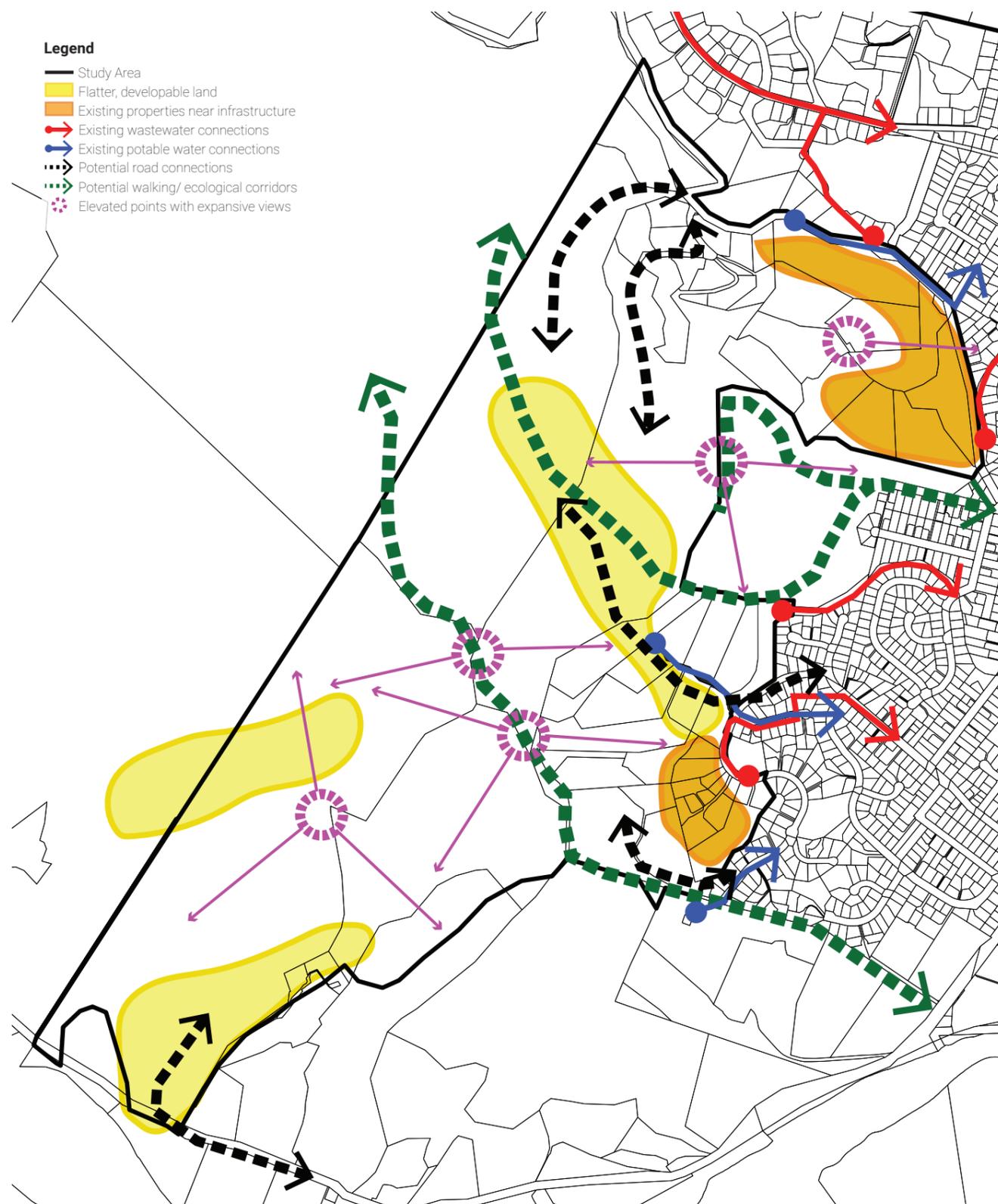


Figure 19: Taradale Hills Opportunities Diagram



Top: View to valley area of flatter land to the west of Churchill Drive.  
Bottom: View from eastern planted hills of study area towards the coast.

### Taradale Hills opportunities

- There are three areas that are of a size and slope (20% or less) potentially suitable for standard residential development: in a valley that stretches north-west from Churchill Drive, south of the Hawke's Bay Regional Council stormwater management facility; in an area to the south adjoining Springfield Road and Ōtātara Pā; and on the western side of the study area.
- There is good proximity to existing infrastructure at the northern end of the study area adjoining Puketapu Road and also around the Churchill Drive area.
- Opportunities for new roads exist in valley systems and areas of less incline adjoining Puketapu Road, the Churchill Drive area, and Springfield Road.
- Land slope limits the potential for direct road connections east-west back to the existing urban area of Taradale and the Taradale town centre. However, there are opportunities for new recreational walking routes from Taradale into the study area. These include paths along valleys and ridgelines - the latter taking advantage of views across the Heretaunga Plains and to the coast - connecting to existing walkways in Dolbel Reserve and through to Ōtātara Pā and Churchill Drive.
- The area generally has good access to existing amenities including the Taradale town centre, sports fields and schools.

# 2.12

## Taradale Hills constraints

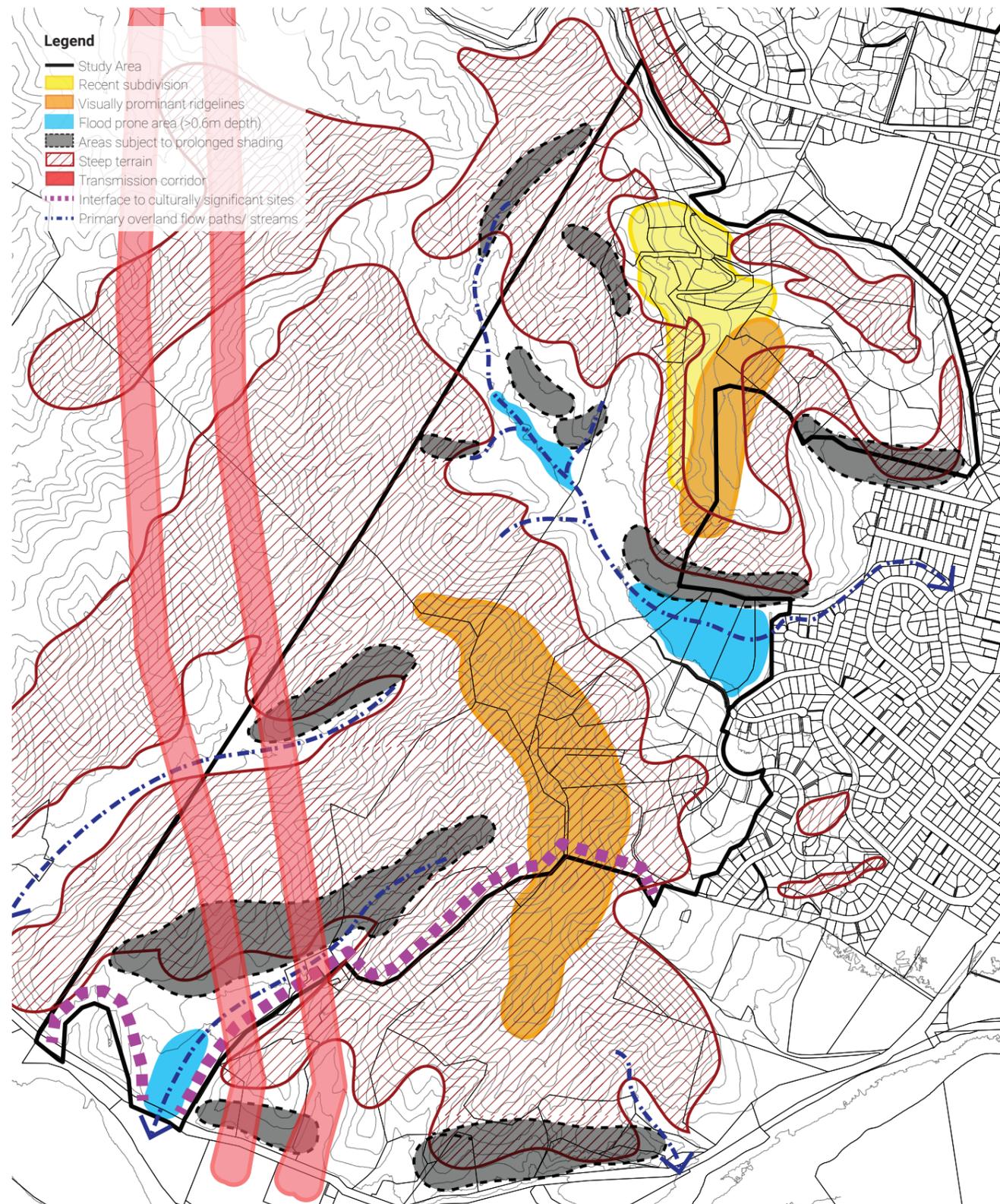


Figure 20: Taradale Hills Constraints Diagram



Top: Low lying land adjacent the Hawke's Bay Regional Council stormwater management facility, subject to some flooding.  
Bottom: View of study area steep valley and gully system.

### Taradale Hills constraints

- Most of the land in the Taradale Hills study area has slope of 20% or more. The topography of these areas makes them unfeasible for standard residential development. Areas of flatter land (20% or less) are generally small in size and form narrow ribbons, leading to increased infrastructure servicing costs relative to potential yield and a disconnected urban form.
- Some areas of steep slope are combined with a southerly aspect, which is prone to higher levels of shading.
- Areas of flatter land, more suitable for standard residential development, are also within flood plains.
- Ridgelines to the west of Dolbel Reserve and from Ōtātara Pā stretching to the north form a prominent and visually sensitive backdrop to the existing Napier / Taradale urban area. Any housing development on top of these ridgelines, without suitable mitigation, would be highly visible from the existing urban area.
- Ōtātara Pā is a site of significant cultural importance. This, and the visibility of land directly adjoining it from the wider area makes a 'buffer' for any development around it desirable.
- Recent land fragmentation into rural residential lots has been undertaken in the Te Roera Drive residential development at the northern end of the study area.
- Transpower transmission lines cut across flatter land at the southern end of the study area, reducing development potential in these locations.

# 2.13

## Tironui Drive & Surrounds opportunities

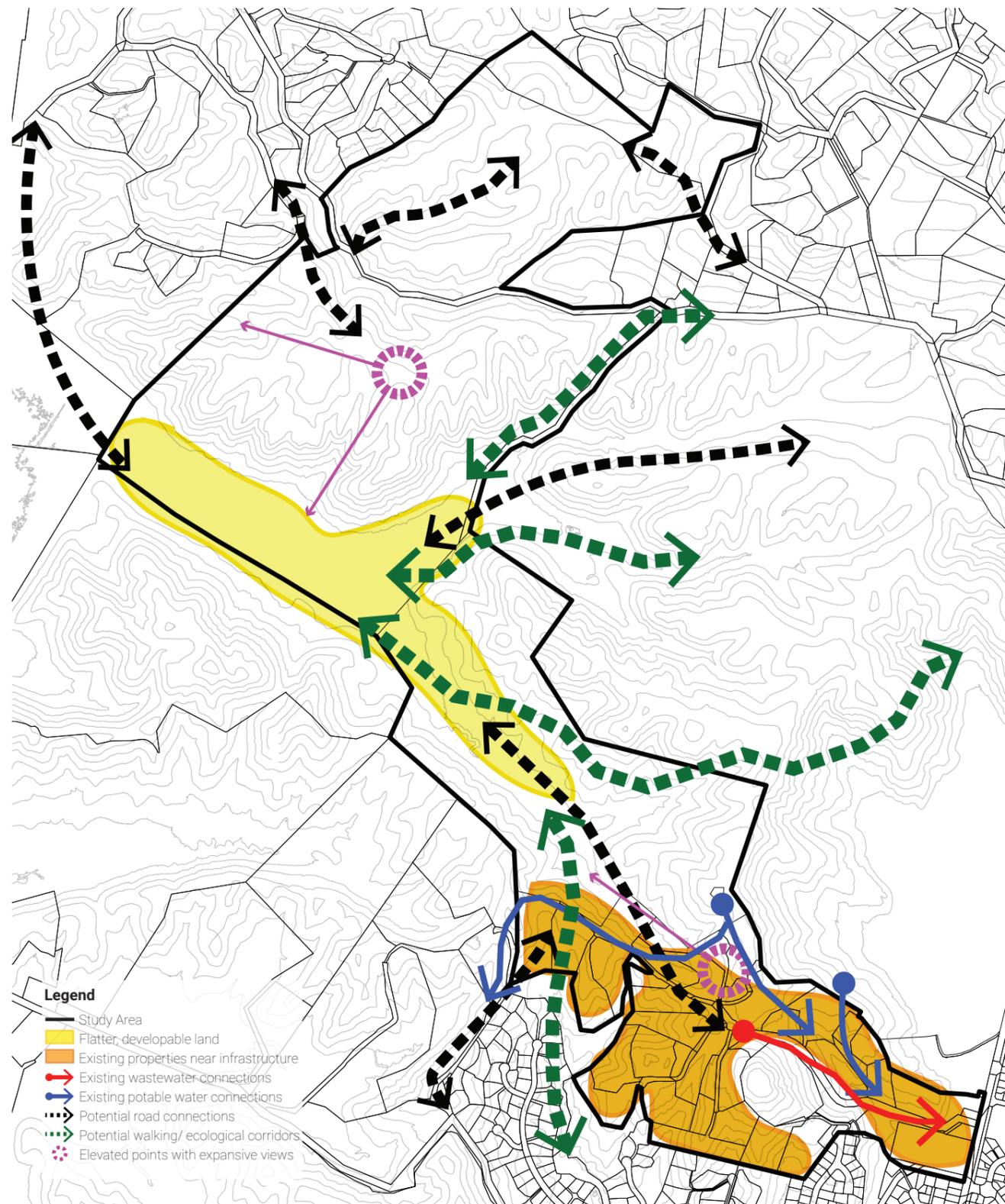


Figure 21: Tironui Drive & Surrounds Opportunities Diagram



Top: View to valley of flat land to the west of Tironui Drive.  
Bottom: Existing end to Tironui Drive.

### Tironui Drive & Surrounds opportunities

- A large valley to the west of Tironui Drive is of a sufficient size and has slope (20% or less) potentially suitable for standard residential development.
- There is good proximity to existing infrastructure at the eastern end of the study area off Tironui Drive.
- High points to the west of Pukekura / Sugar Loaf and south of Puketitiri Road offer expansive views out over a wider landscape of hills and valleys.
- The main potential road access into the area is through an extension to the end of Tironui Drive into the flatter land of the western valley system. At the western end of this valley there is the potential for a road link through to Puketapu Road, west of its connection to Puketitiri Road. To the north-east, there is a potential link to new roads planned in Mission Estate. At the northern end of the study area, short new links offer the potential for improved connection between existing roads.
- There are opportunities for walking routes on land otherwise too steep for roads, connecting back to Mission Estate, Kent Terrace and Puketitiri Road.

# 2.14

## Tironui Drive & Surrounds constraints

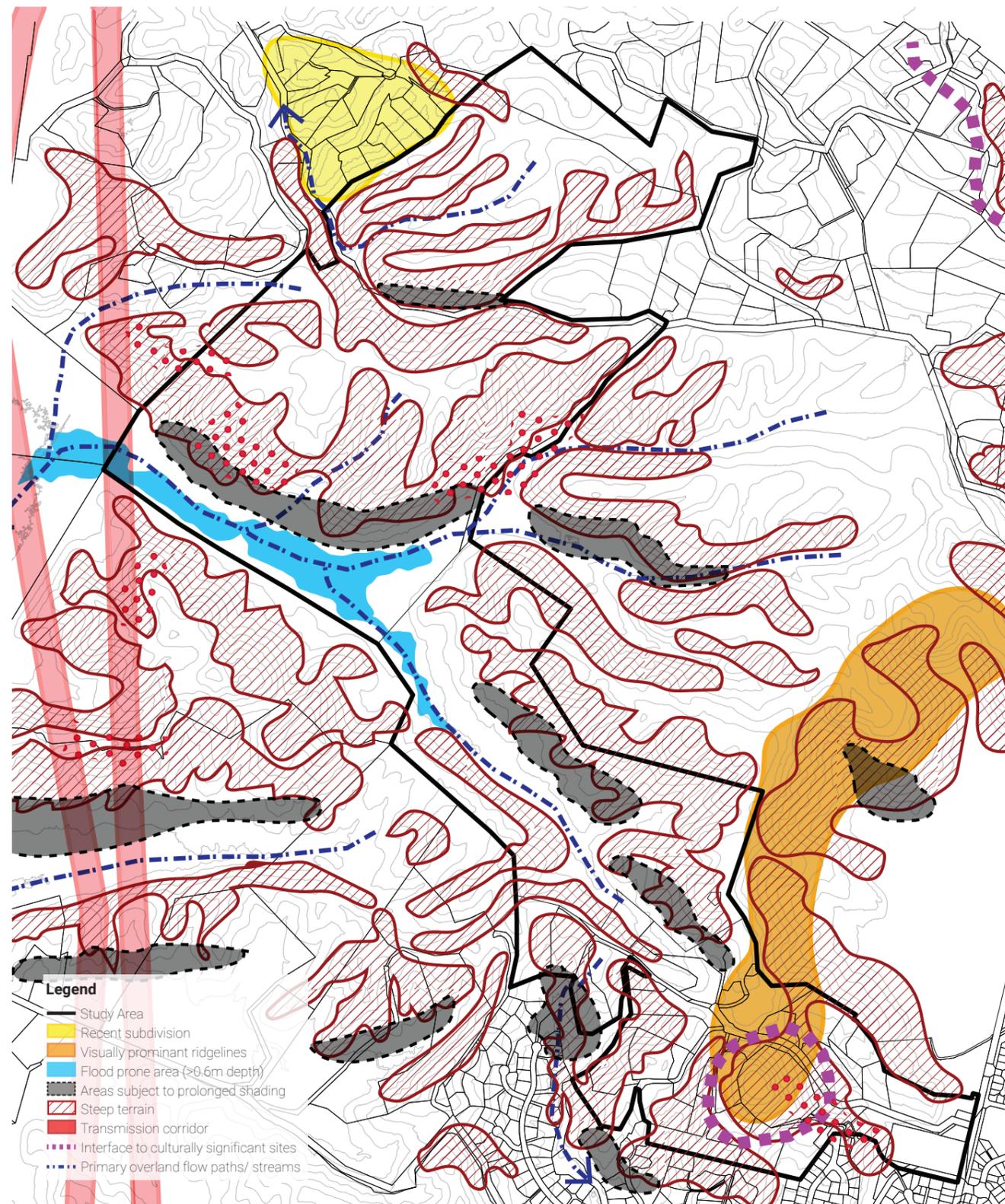


Figure 22: Tironui Drive & Surrounds Constraints Diagram



Top: Areas of steep slope within the study area.  
Bottom: Existing alignment of an unformed paper road. Substantial earthworks would be required to construct a road to Council engineering standards..

### Tironui Drive & Surrounds constraints

- Most of the land in the Tironui Drive & Surrounds study area has slope of 20% or more. The topography of these areas makes them unfeasible for standard residential development. Areas of flatter land (20% or less) are generally small in size and form narrow ribbons, leading to increased infrastructure servicing costs relative to potential yield and a disconnected urban form.
- The largest area of contiguous flatter land is also a flood plain.
- There are several areas of south-facing slope, subject to high degrees of shading.
- Most of the land is further west than the hills which form a direct backdrop to the Napier's existing urban area and is therefore not highly visually sensitive. A prominent ridgeline cuts north-south through part of the study area behind Mission Estate through to Pukekura / Sugar Loaf. However, this is at the eastern extremity of the study area.
- Hill sides above the area of large flatter land in the valley system are subject to landslide risk, as are the slopes of Pukekura.
- The area is not well served by existing amenities, and new amenities would need to be provided to support a future community.

**03**

**Analysis**

# 3.1

## Overall approach

### Approach

Drawing on the strategic planning context, along with the site and context analyses, the following approach has been used to develop the high-level structure plans for each of the study areas:

1. Develop conceptual land use, density and connectivity strategies for each study area and identify opportunity areas that are most suitable for standard residential development (refer Figures 23-25);
  2. Develop concept plans for each opportunity area including road and lot layouts, and the size and location of required local amenities (refer Figure 26-28);
  3. Determine the transport and three waters infrastructure required to service each opportunity area and the likely cost (refer to Appendix 1 and 2);
  4. Based on the findings of (1), (2) and (3) above, develop high-level structure plans for the study areas;
  5. Consider opportunities for further expansion of the study areas where they would provide longer term potential for western growth and assist in reducing infrastructure costs.
- This section of the report addresses the findings of each of these tasks.

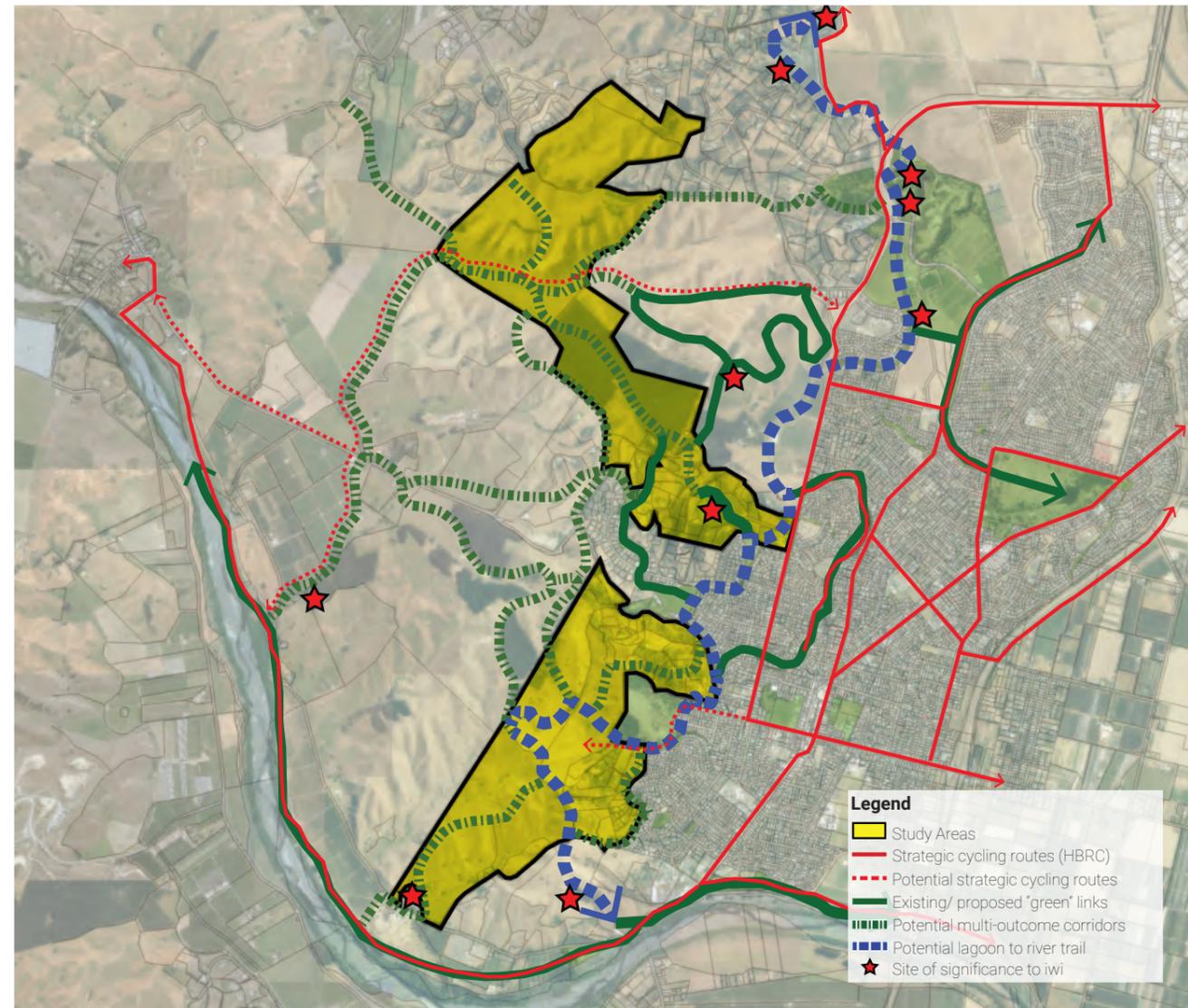


Figure 23: Multi-outcome Corridor Exploration

### Connectivity

A key consideration was how the study areas could be integrated back into the adjoining existing urban areas and to the wider surrounding rural area.

To this end connection corridors that could serve multiple functions along all or part of their length were explored (refer to Figure 23). These functions included active transport (walking and cycling), vehicular, stormwater and open space, and linking functions between ecological and cultural sites around the study areas, such as Ōtātara Pā.

This process also enabled the identification of key roading corridors to provide vehicular access throughout each study area (refer to Figure 24). Indicative road alignments were then tested to determine their viability

in providing new connections in accordance with Napier City's engineering standards for greenfield subdivision (e.g. gradients of no more than 1:8/ 12.5% for public roads).

This resulted in several potential vehicle connections being discounted as suitable or feasible options to serve potential development areas (e.g. the unformed paper road in Tironui Drive & Surrounds).

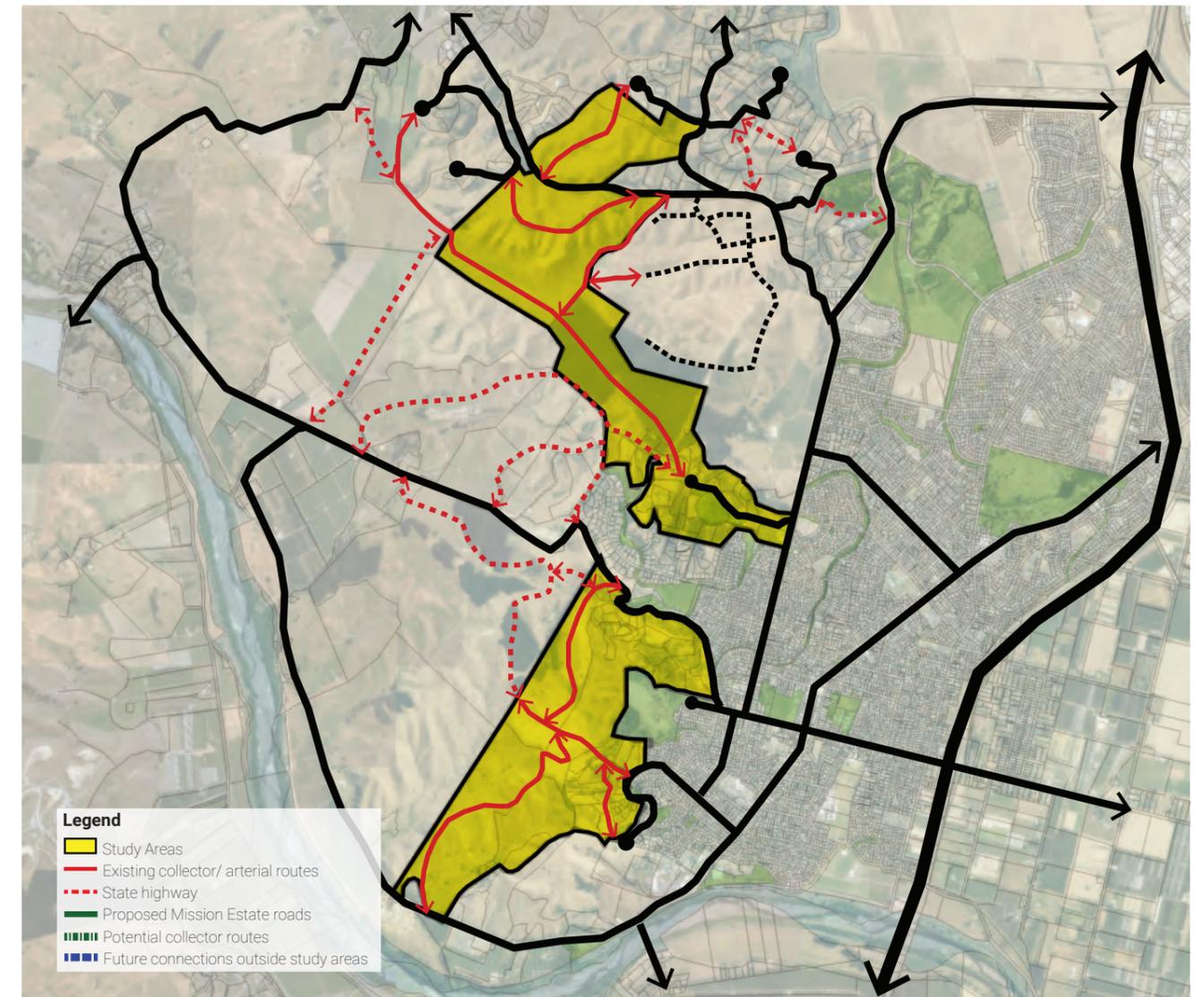


Figure 24: Road Connection Exploration

## Infrastructure Servicing

Key infrastructure requirements to be identified or considered as part of the structure plan process relate to roading, wastewater, potable water and stormwater.

### Roading

For the purposes of this report, consideration of roading infrastructure focussed on the provision of key access/collector routes to unlock areas of potential growth (as opposed to the wider local road network providing access to individual properties). As part of this process, high level alignments were identified based on topography and/or location of existing public or private roads. Alignments were then tested to determine whether appropriate grades could be achieved in line with Council standards.

### Wastewater

In terms of wastewater, reticulated, communal and at-source (or combinations thereof) where considered.

Due to the nature of the topography of the Tironui Drive & Surrounds area, connection into the existing reticulated network will be challenging. It is expected that any wastewater discharge would need to be into a newly created pump station and rising main with eventual discharge of the network into a newly created Wastewater Treatment Plant to the west of Napier.

Community treatment systems were determined to not be suitable to support growth in these areas. These systems are most efficient for small grouped clusters of houses and less so for larger areas of housing likely in a standard residential development, because of the land needed for the treatment systems. They are also less efficient for low density housing of the type found in rural residential areas, because of the spread-out and dispersed nature of the housing. Due to topography and downstream stormwater flooding constraints a decentralised wastewater solution will also have limitations in finding suitable land for disposal outside of areas subject to flooding.

Due to their impact on yield, at-source wastewater treatment devices were only considered appropriate in areas where large lot sizes in the region of 5,000m<sup>2</sup> would be retained to provide for a sufficient secondary treatment area. Disposal areas also require relatively flat land and are not suitable in areas subject to flooding.

### Potable Water

Both study areas will be required to be provided with a suitable means of potable water supply and firefighting supply necessitating the need for a reticulated network. There are a number of public water mains and reservoirs within or adjacent to both study areas.

### Stormwater

The overall preference would be for stormwater to be managed as close to source as possible. Options to address both the quality and quantity of stormwater have included:

- At source stormwater quality control (e.g.: Inert roofing materials; reduction of impervious areas; or lot development supported by approved propriety devices);
- Treatment of public roads and right of ways via approved propriety devices (e.g.: raingardens or swales);
- Sub-catchment wide stormwater quality provision through detention basins and wetlands; and
- Planting of riparian areas and protection of any notable existing bush features within the study areas.

### Summary

Based on the above, the following approach was used to infrastructure servicing for each of the study areas:

- For proposed areas of where standard residential densities may be appropriate, all three waters infrastructure to be reticulated.
- In addition to the above, adopt low impact design, stormwater detention and treatment measures (e.g. permeable paving, raingardens, tree pits).
- For proposed areas where larger lot residential densities may apply, utilise proximity to planned/ existing three waters infrastructure in existing or proposed Residential areas.
- For areas where rural residential use would continue to apply, require on-site servicing, due to cost of infrastructure provision on highly sloping land.
- Across all areas, stream/ drainage corridors are identified and protected to assist in providing the required flood storage volume and conveyance of overland flows.

An in-depth review of the existing potable and wastewater networks has not been undertaken. However, capacity upgrades and new infrastructure is likely to be required to potable water networks as existing storage has been designed to cater for existing or medium-term demand. Similarly, for wastewater it can be assumed that downstream capacity upgrades are likely to be required as NCC have identified that the existing reticulated network and treatment is near capacity and will require upgrades to be able to incorporate the flows from growth areas across the City. Key infrastructure requirements required to support growth in each study area are identified in Sections 3.3 and 3.4 of this report.

## Land-use configuration

Slope was a prime determinate of where various ranges of residential density would be appropriate along with a consideration of what could feasibly be accessed. This was followed by proximity to existing or proposed infrastructure, and consistency with good planning and urban design outcomes, as reflected in RPS greenfield growth structure planning criteria.

The Operative Napier District Plan's residential zonings of Main Residential, Lifestyle Character and Rural Residential were used as general categories of residential density to apply to the study areas, due to their established use in Napier and their general applicability to the outcomes sought by the project brief and characteristics of the study areas. The following density has been assumed for these categories:

- Main Residential: provides for standard residential development of generally 15 dwellings/hectare.
- Lifestyle Character: provides for more intensive rural residential (e.g. Kent Terrace) of densities between 3 to 10 dwellings/ hectare.
- Rural Residential: provides for rural residential at low densities at an average of 0.66 dwellings/ hectare.

These land use categories were chosen to ensure consistency with existing District Plan provisions and were applied to the study areas as follows (refer also to Figure 25):

- Larger areas of land with a slope less than 20% that are contiguous and well connected with the existing urban area were determined to be suitable for Main Residential;
- Lifestyle character was applied to areas of higher slope around 20% where they adjoined proposed Main Residential areas or were proximate to existing urban areas, and therefore could access either existing infrastructure or infrastructure that would be required to serve the new Main Residential areas;
- Rural Residential was retained on balance areas of slope greater than 20%, given the challenges described earlier in this report on servicing land of this slope and developing to standard residential densities.

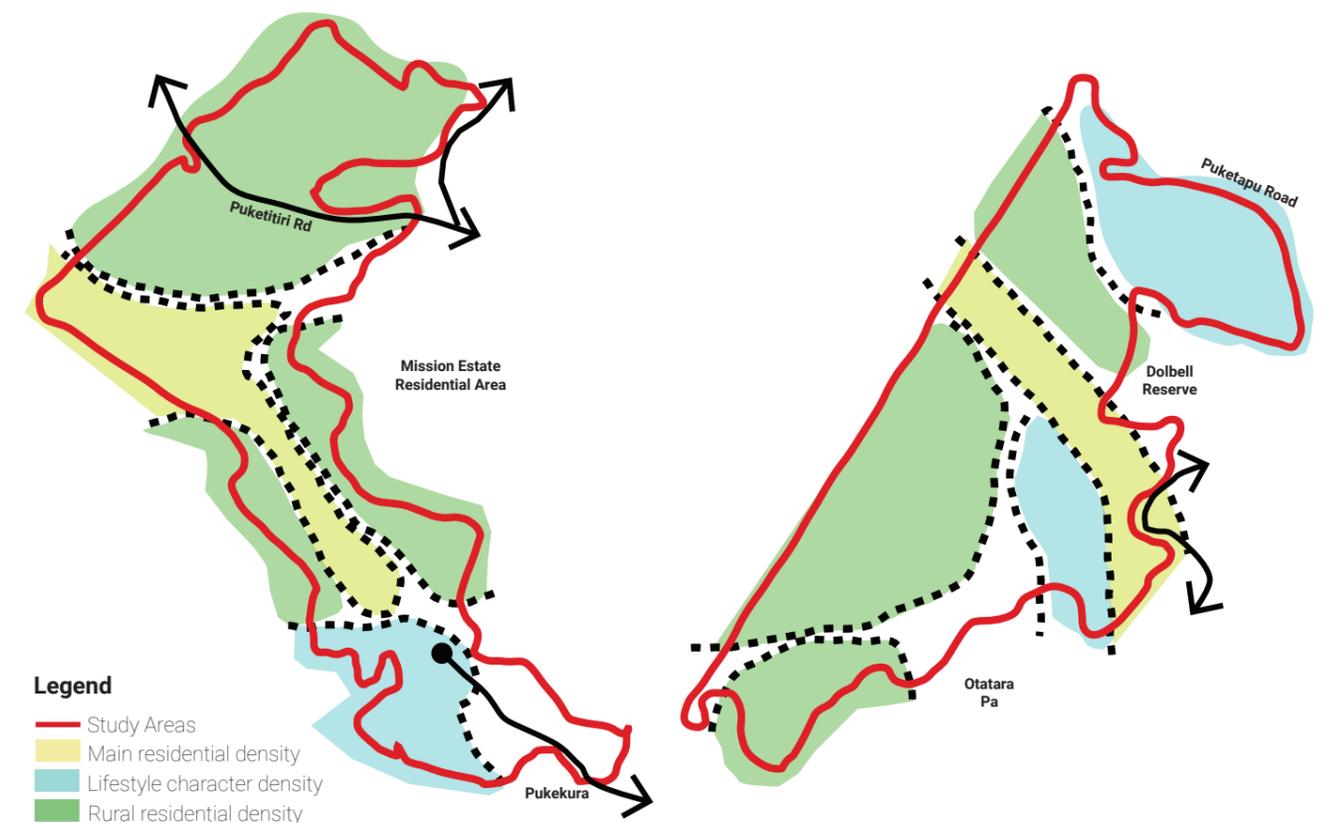


Figure 25: High level density strategy

# 3.2

## Concept Plans for Opportunity Areas

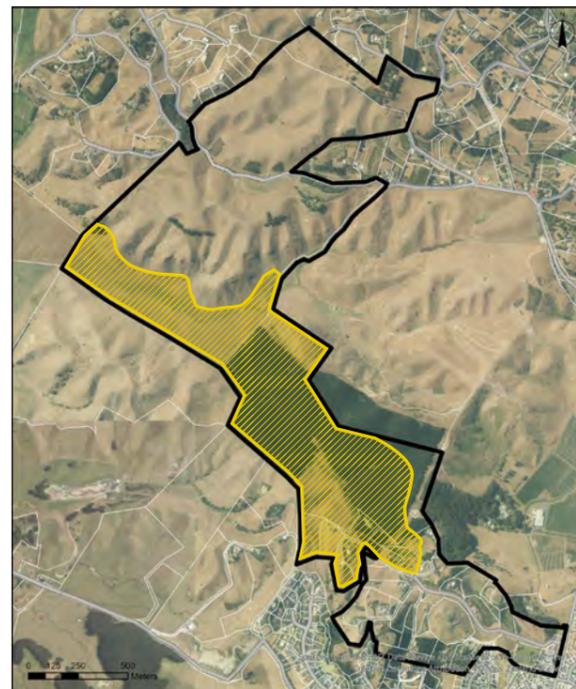
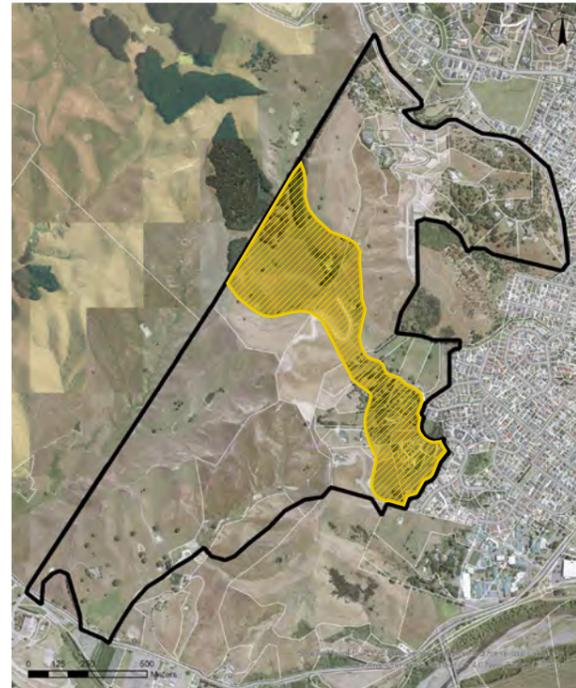
### Opportunity Areas

The conceptual land use and connectivity strategies identified two areas that would best support standard residential densities, being 'Churchill Drive Extension' and 'Tironui Drive Extension', given their more favourable topography.

### Churchill Drive Extension

Churchill Drive Extension encompasses an area of approximately 26ha, 12ha of which is part of a contiguous area of flatter land (20% slope or less). The majority of this area is currently in pasture, although it also captures existing Rural Residential subdivisions adjacent to Churchill Drive. The area has proximate access to existing public water, stormwater, wastewater and transport infrastructure off Churchill Drive.

The eastern portion of this area has been developed as rural residential lots accessed off Kokako Place. The western portion of the area is undeveloped and is owned by two entities. The fragmented land ownership and the narrow width of the existing private right-of-way would present some challenges to providing transport connections through to the area.



Top: Churchill Drive Extension concept plan area.  
Bottom: Tironui Drive Extension concept plan area.

### Tironui Drive Extension

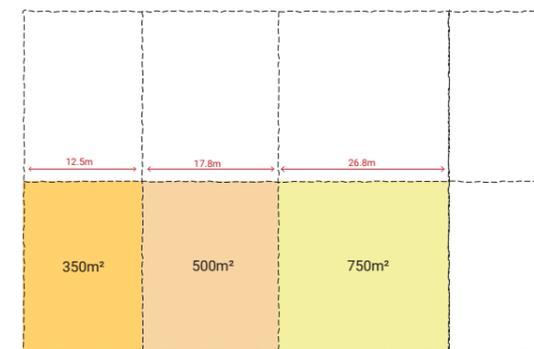
Tironui Drive Extension, located to the south and west of the Mission Estate residential precinct, encompasses an area of approximately 63ha, 36ha of which is part of a contiguous area of flatter land (20% slope or less) - the largest across both study areas. The majority of this area sits in a separate visual and water catchment from the existing Napier urban area, being located to the west of the main ridgeline which runs along the Western Hills. The area is currently in pasture, with steeper land formerly in plantation forestry. Access to parts of this area is currently available from Tironui Drive, Puketitiri Road and Poraiti Road.

Like the Churchill Drive Extension, the majority of this opportunity area is undeveloped and under the ownership of only two entities (including Marist Holdings Limited who previously advanced the Mission Residential Precinct). Sites in the eastern portion of this area around Tironui Drive and the private roads that extends from it have been developed as rural residential lots. The fragmented land ownership in this area would present some challenges to providing transport connections through to the more developable areas of flatter land identified.

### Developing the concept plans

Having identified opportunity areas for standard residential development where sufficient yields could be achieved to support growth, concept plans were prepared, which included yield testing for the purpose of infrastructure servicing cost estimations. To inform this, where possible, a simple modular system of flexible superblocks was defined. Blocks of 58m width were used, on the basis that these allow a high level of flexibility to facilitate a range of residential densities, by varying lot width but ensuring depth remains relatively consistent.

Possible lot size scenarios on such superblocks range from 350m<sup>2</sup> lots, which might be appropriate close to potential services, up to 1,500m<sup>2</sup> lots on sloping land at the edge of a subdivision. This approach enabled quick comparisons between density scenarios to inform infrastructure servicing costings.



In addition, within each opportunity area, consideration was given to wider potential connections (transport, ecological, stormwater) with the existing urban area, consistent with the structure planning requirements set out in the RPS. This resulted in additional developable land being set aside for non-residential purposes, ultimately reducing potential yield.

It should be noted that the yield testing undertaken to inform this structure planning process represents one possible scenario for future development in these areas. It is likely that there are a range of different ways each of these areas could come forward. The purpose of these concept plans is to provide realistic yields that align with the RPS greenfield growth criteria and to inform a more detailed infrastructure strategy with costings.

Figure 26: Diagrammatic example of flexible densities and lot sizes that can be achieved on a 58m wide lot

### Infrastructure Cost : Benchmarking

To provide context for the infrastructure costs and to evaluate market feasibility at a coarse scale, it is important to understand how the infrastructure costs on a per lot basis compare with similar greenfield developments in Napier and New Zealand. It is also important to understand current sale prices for greenfield sites in Napier to understand how a development in the opportunity areas would compare.

#### Cost per lot comparisons

The following developments provide a benchmark for infrastructure costs on a per lot basis and include both strategic and local infrastructure:

- Lockerbie Estate, Waikato: \$136,000 per lot
- Richmond, Auckland: \$96,000 per lot
- Harbour Ridge, Bay of Plenty: \$113,000 per lot
- Sanctuary Point, Bay of Plenty: 122,000 per lot.

The average infrastructure cost per lot of these development is **\$117,000**.

#### Local sale prices

The Parklands and Oak Road developments in Napier provide a good indication of the current market rate for vacant lots:

- Parklands: vacant lots between 500m<sup>2</sup>-600m<sup>2</sup> are selling for approx. \$290,000 - \$315,000
- Oak Road: vacant lots between 500m<sup>2</sup>-2000m<sup>2</sup> are selling for approx. \$350,000+.

It should be noted that the above figures would, in addition to infrastructure servicing costs, capture several additional costs. These include general land costs, developer profits, and professional service fees (e.g. real estate commission).

# 3.3

## Concept Plan : Churchill Drive Extension

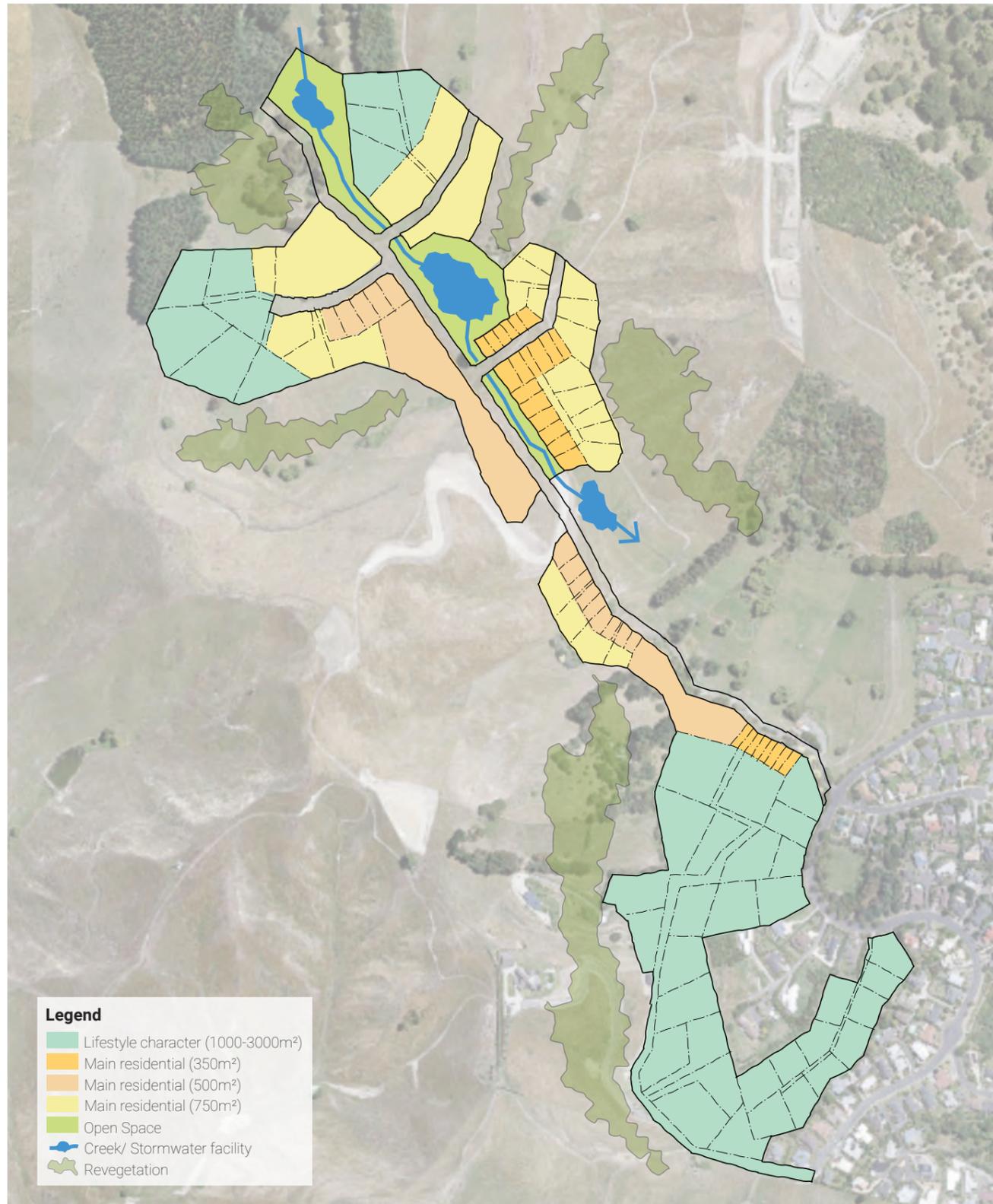


Figure 26: Concept plan for Churchill Drive Extension (note: lot boundaries are indicative)

### Development Metrics

Land Use	Area (ha)	Percentage
Main Residential	10.74	41.8%
Lifestyle Character	10.14	39.5%
Roads	2.28	8.9%
Open Space/ Stormwater	2.51	9.8%
<b>Total</b>	<b>25.66</b>	<b>100%</b>

### Summary

RPS Policy UD8 requires an average yield of 15 dwellings per hectare for greenfield residential development, where appropriate. Taken across the 10.74ha of Main Residential zoned land, this equates to a base requirement for 161 dwellings in the Churchill Drive Extension area.

Concept scheme testing indicates that there is potential for up to 140 standard residential lots to be accommodated in this area, with lot sizes ranging between 350m<sup>2</sup> - 750m<sup>2</sup>. A range of site sizes were used, consistent with what is typically available in the market. This is a yield of 13 dwellings per hectare - slightly less than the RPS requirement, although the predominance of larger lot sizes reflects the slope of the land around the margins of this area.

On sloping land (close to or above 20%) to the north and south (adjacent to Churchill Drive) of the flatter core, concept testing indicates a potential additional 20-30 larger lots of between 1000m<sup>2</sup> - 3,000m<sup>2</sup>, reticulated to existing infrastructure on Churchill Drive and Puketapu Road.

### Infrastructure Servicing

The following strategic infrastructure would be required to unlock development in this area:

- 1.1km of new road from Churchill Drive.
- New water reservoir (or upgrade Churchill reservoir) including a new booster pump station.
- Wastewater connections into Churchill Drive, and additional capacity to the Churchill Drive wastewater network may be required.

The potential for typical residential development within the area of existing Rural Residential lots adjacent to Churchill Drive was explored. However, the slope in this area would require significant earthworking to achieve compliant public roads, which would also compromise the ability to deliver feasible building lots.

Key features of the concept scheme include:

- Extension of Churchill Drive through the area.
- Provision of an open space corridor of at least 20m along the alignment of an existing overland flow path.
- Open space is integrated with the stormwater network. Additional open space was not proposed given the scale of development proposed and the close proximity to Dolbel Reserve.

A limitation of the Churchill Drive Extension area, as shown on the concept scheme, is the narrow width of the area. This means that the need to accommodate an access road takes up a higher percentage of developable land, reducing potential yield.

- Stormwater can be managed and treated within the catchment, noting that the stormwater management facility to Churchill Drive may require upgrading.

A summary of the costs required to unlock the growth potential of Churchill Drive Extension are:

- Strategic Infrastructure (Council funded) - \$23.5m
- Local Infrastructure (Developer funded) - \$16.5m
- **Total CAPEX - \$40m.**

Appendix 2 includes detailed cost breakdowns of the required strategic infrastructure, including earthworks, transport, stormwater, wastewater, potable water and construction costs. They do not include costs for any land acquisition required to construct infrastructure. Land acquisition may be required to widen and vest Kokako Place as discussed above.

Indicative costs for local infrastructure are estimated to provide a realistic picture of the overall CAPEX cost.

The single largest cost associated with development of this area relates to the need to upgrade or expand existing potable water reticulation at an estimated \$5.8m. An upgrade of the Hawke's Bay Regional Council stormwater management facility on Churchill Drive may also be required. Further investigation would be needed to determine the effects development would have on this facility and the likely cost of any upgrade.

#### Infrastructure cost by type

The following provides a breakdown of the costs of the physical works for strategic infrastructure by type:

- Potable water: \$5.88 million / 53% of the total physical works cost
- Stormwater: \$1.5 million / 14% of the total physical works cost
- Wastewater: \$719,000 / 6.5% of the total physical works cost
- Transport: \$2.8 million / 26% of the total physical works cost.

Over half of the total strategic infrastructure cost is associated with the upgrade to the existing potable water reticulation. As a next step, we would recommend exploring how this cost could be reduced to enable a reduction in the overall infrastructure cost, including greater on-site rainwater reuse.

#### Infrastructure cost per lot

This equates to approximately \$285,000 per lot, based on a 140-lot subdivision. On a pro-rata basis, should opportunities for additional 'infill' Rural Residential lots be taken up in the adjoining area (a potential 30 additional lots), this would reduce cost to \$235,000 per lot.

This is high compared to the benchmarking cases (\$117,000) identified in section 3.2. The projected infrastructure costs alone represent 85%-95% of comparable land sale prices in Napier. However, the sale prices currently seen in Napier also includes other costs that need to be factored into a final sales price. These include:

- land costs (purchase and holding);
- profit (typically around 20%);
- GST (15%);
- sales and marketing; and
- legal fees.

#### Conclusion

Based on the cost of development per lot within the Churchill Drive Extension area when compared with typical development costs, redevelopment of the area to standard residential densities is unlikely to be viable at this point in time. However, we recommend that the Council investigate how the costs to provide potable water supply to service this area could be further reduced given that this represents over 50% of the total physical works cost.



Looking west across the Churchill Drive Extension opportunity area from the end of the right-of-way at 12-20 Churchill Drive..

# 3.4

## Concept Plan : Tironui Drive Extension

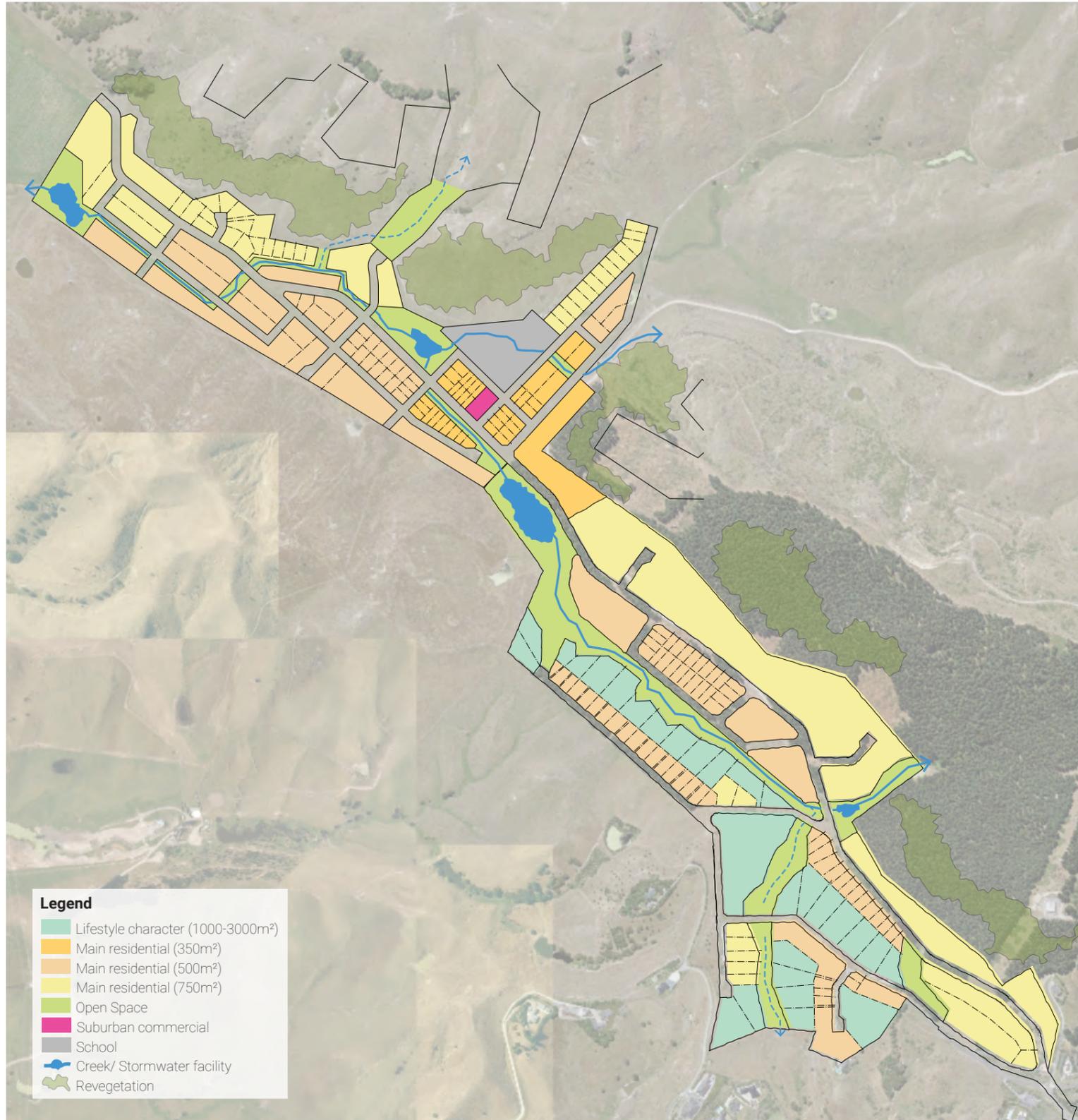


Figure 27: Concept plan for Tironui Drive Extension (note: lot boundaries are indicative)

### Development Metrics

Land Use	Area (ha)	Percentage
Main Residential	32.11	51.1%
Lifestyle Character	8.74	13.9%
Roads	10.94	17.4%
Open Space/ Stormwater	9.48	15.0%
School	1.50	2.4%
Commercial Zone	0.16	0.2%
<b>Total</b>	<b>62.92</b>	<b>100%</b>

### Summary

RPS Policy UD8 requires an average yield of 15 dwellings per hectare for greenfield residential development, where appropriate. Taken across the 40.85ha of residential zoned land, this equates to a base requirement for 612 dwellings in the Tironui Drive Extension area

Concept scheme testing indicates that there is potential for up to 650 standard residential lots to be accommodated in this area, with lot sizes ranging between 350m<sup>2</sup> - 750m<sup>2</sup>. This is a yield of 16 dwellings per hectare.

On sloping land (close to or above 20%) immediately surrounding the flatter core, concept testing indicates a potential additional 30-40 larger lots of between 750m<sup>2</sup> - 3,000m<sup>2</sup> would be possible, reticulated to new infrastructure servicing the standard residential area.

Key features of the concept scheme include:

- Using existing overland flow paths as stormwater corridors to: help manage and treat stormwater generated both by the development and from the neighbouring Mission Estate; and as part of an open space system and wider walking network through the area.

- Provision for open spaces integrated with the stormwater network that provide flat useable space for recreation. Additional open space for recreation may be required depending on the ultimate yield.
- Provision for a small centre and a primary school, given the distance from such existing services and the number of residents the development might enable.

Note:

- Any development of a new school in this location would be subject to discussions with the Ministry of Education.
- If a school were not constructed in the area, the land otherwise allocated to it (1.5ha) would enable another 20-40 dwellings.

## Infrastructure Servicing

The following strategic infrastructure would be required to unlock development in this area:

- 2.6 km of new road from Tironui Drive.
- Wastewater pump station, rising main and associated reticulation to a new wastewater treatment plant situated near Puketapu (as per the Wastewater Masterplan).
- Upgrade to existing reservoirs or provide new reservoirs to reinforce water supply.
- Stormwater can be managed and treated within the catchment e.g. by provision of detention/wetland capacity and stream protection/diversions.

A summary of the infrastructure costs required to unlock the growth potential of Tironui Drive Extension are:

- Strategic Infrastructure (Council funded) - \$71.7m
- Local Infrastructure (Developer funded) - \$85.6m
- **Total CAPEX - \$156.3m.**

Appendix 2 includes detailed cost breakdowns of the required strategic infrastructure, including earthworks, transport, stormwater, wastewater, potable water and construction costs. They do not include costs for any land acquisition required to construct infrastructure. Land acquisition may be required to widen and vest Tironui Drive extension as discussed above.

Indicative costs for local infrastructure are estimated to provide a realistic picture of the overall CAPEX cost. Substantial earthworks would be required to provide public road access to the area. The single largest cost associated with the area's development, however, is the provision of wastewater pumping stations, rising main and associated reticulation at an estimated \$14.5m. These costs exclude the need for the construction of a new satellite treatment facility west of the area at a further estimated cost of \$45m, which is being addressed through Napier City Council's wider Wastewater Masterplan. That upgrade is relevant for the wider growth options assessed later in this report.

### Infrastructure cost by type

The following provides a breakdown of the costs of the physical works for strategic infrastructure by type:

- Potable water: \$6.8 million / 20% of the total physical works cost
- Stormwater: \$3.1 million / 10% of the total physical works cost
- Wastewater: \$14.5 / 44% of the total physical works cost

- Transport: \$8.5 million / 25% of the total physical works cost.

Nearly half of the total strategic infrastructure cost is associated with the new wastewater pump stations and rising main, with transport and potable water also representing a reasonable proportion of the overall cost. As a next step, we would recommend exploring how the wastewater, transport and water supply costs could be reduced to enable a reduction in the overall infrastructure cost.

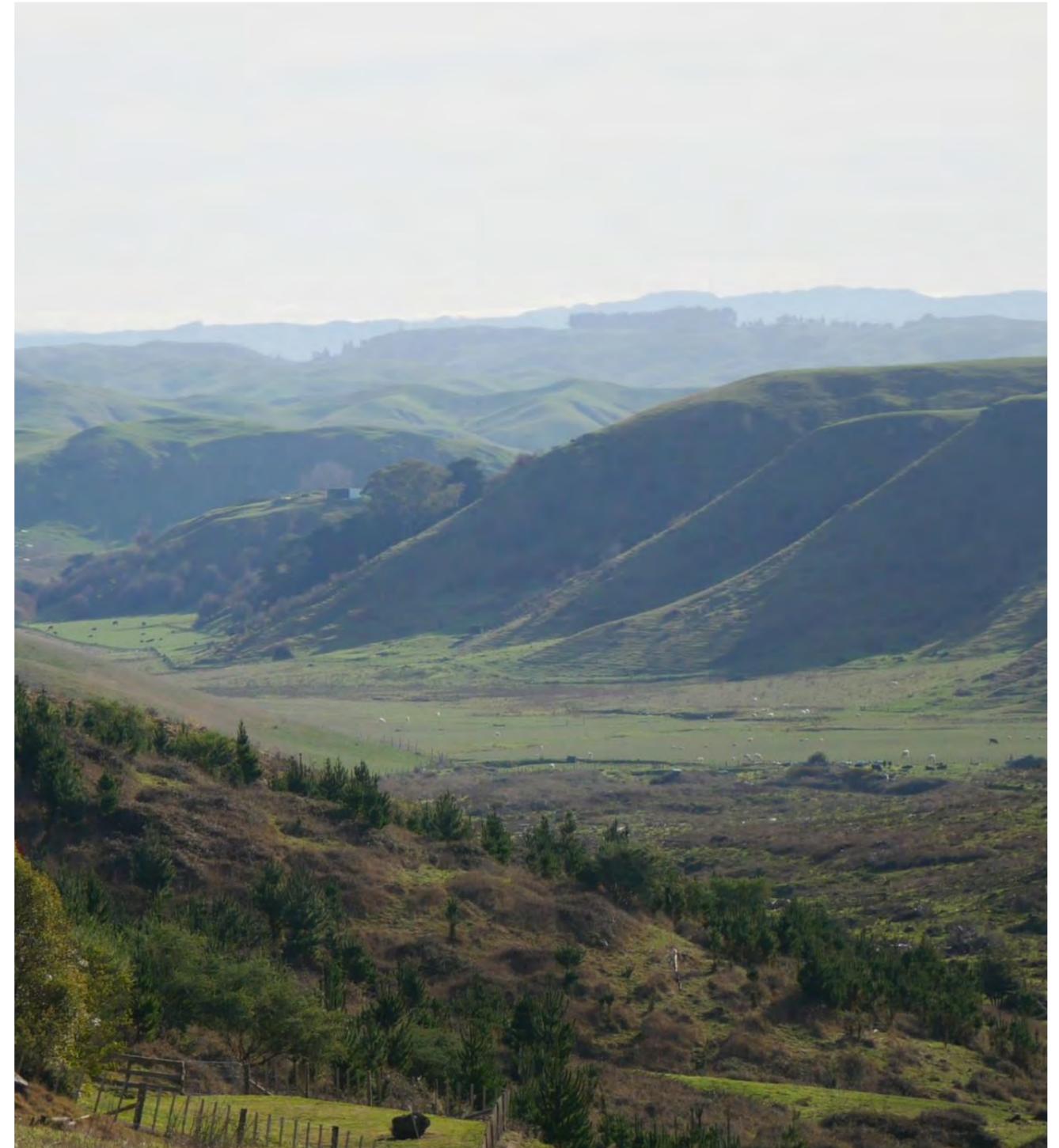
### Infrastructure cost per lot

The total capex of \$156.3m equates to approximately **\$240,000 per lot**, based on a 650-lot development. Assuming a school was not required and adding potential larger lots on sloping land around the residential core could add up to an additional 40 lots. This would reduce cost to approximately **\$226,000 per lot**.

As with Churchill Drive Extension, this is high compared to the benchmarking cases (\$117,000) identified in section 3.2. The projected infrastructure costs alone represent 70%-80% of comparable land sale prices in Napier. However, as previously discussed the sale prices currently seen in Napier also includes other costs that need to be factored into a final sales price. Based on these costs, development in the study area is unlikely to be viable at this time, unless the infrastructure costs can be significantly reduced.

### Conclusion

Based on the cost of development per lot within the Tironui Drive Extension area when compared with typical development costs, redevelopment of the area to standard residential densities is unlikely to be viable at this point in time. However, we recommend that the Council investigate how the costs to provide wastewater primarily to service this area could be further reduced given that this represents nearly 50% of the total physical works cost for strategic infrastructure.



Looking west across the Tironui Drive Extension opportunity area from the end of Tironui Drive.

# 3.5

## Concept Plans : Conclusions

### Churchill Drive Extension

Within the Taradale Hills study area, development of 'Churchill Drive Extension' to standard residential densities is likely to be very challenging given the low yield and high infrastructure cost. Concept scheme testing shows a potential yield lower than the 15 lots per hectare

### Tironui Drive Extension

Within the Tironui Drive & Surrounds study area, development of 'Tironui Drive Extension' to typical residential densities is more affordable than 'Churchill Drive Extension', however is still likely to be very challenging in terms of viability. This conclusion is reached based on a \$240,000 per lot development cost, as compared to a benchmark of \$117,000 per lot for recent residential development. This base level price for infrastructure provision also does not compare

### Implications on requirements of the NPS-UD

Based on the analysis undertaken in this report, at this stage we do not consider that development within the opportunity areas could be considered feasible or reasonably expected to be realised at this point in time due to the constraints imposed by topography and the cost to service these areas. Further advice from the development sector would be beneficial as a next step, particularly with respect to other factors such as aspect, outlook and local amenity, which will further impact development feasibility and whether the enabled yield is reasonably expected to be realised.

The NPS-UD requires that in the short to medium term (3-10 years) development capacity is enabled by the zoning and can be serviced by infrastructure that is in

### Wider Context

When viewed in isolation, it will be challenging for the study areas to accommodate the level of residential growth necessary to cater for projected greenfield demand in Napier given the relatively low yield and high cost of providing infrastructure. Further, topography and locational constraints mean it is unlikely either opportunity area will provide an attractive option for

### Further Growth Potential outside Napier

Given the challenges of viability for standard residential development within the study areas, a high-level assessment of the urban development potential of rural land to the west of the study areas, which is within Hastings District, has been undertaken (refer to Figure 29). In principle, this would have a number of benefits:

set for greenfield residential development in the RPS. Furthermore, a development cost per lot is \$285,000 per lot is high, as compared to a benchmark of \$117,000 per lot for recent residential developments.

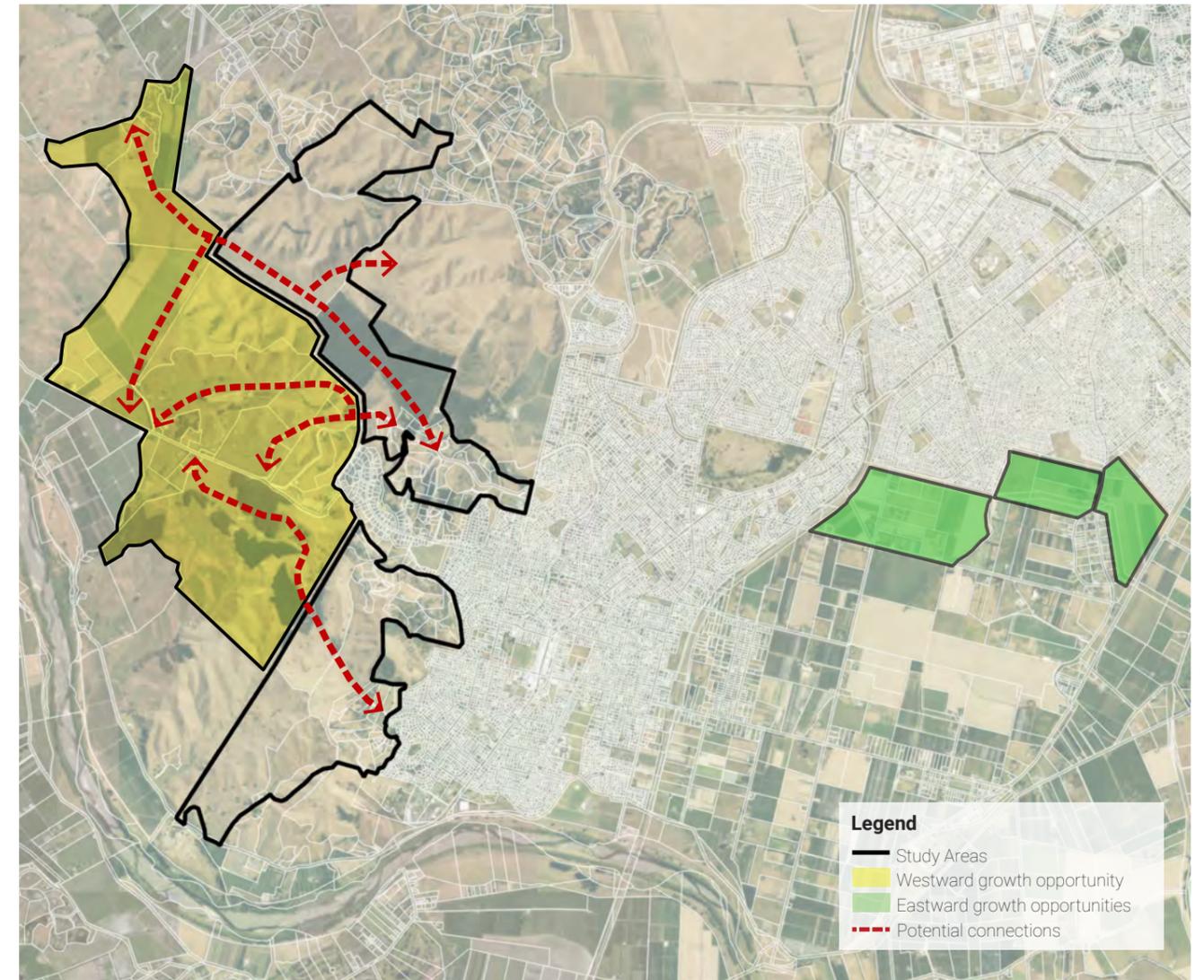
favourably with the total sale price for existing vacant lot subdivisions in the Napier area.

Further considerations such as the site's distance from existing amenities within the Napier urban area are also likely to reduce the potential market attractiveness of development in this location (at least in the short to medium term).

place or funded in the LTP. In the long term (10-30 years) supporting infrastructure needs to be identified in the Council's infrastructure strategy. Given the indicative costs of servicing the opportunity areas, in our view, it is unlikely that the supporting infrastructure could be funded in the short to medium term, and even if development were enabled by the zoning, it would not contribute to Napier's short to medium term development capacity, and other options would need to be considered to address any shortfall. In the long term it is possible that development will become feasible if there are innovations in infrastructure design, although topography will be an enduring constraint on development across both areas.

typical retirement living options which itself is a major component of projected demand for new housing in Napier over the medium term. However, further consideration will need to be given as to how growth in the study areas compares with other potential greenfield areas within the Napier City boundaries through the HPUDS review.

- Potential to provide a large-scale greenfield growth option that would provide development capacity over the short, medium and long term;
- Greater residential yield may reduce the cost per lot of required infrastructure; and
- The flatter topography in the west is more feasible for urban development.



**Figure 29: Urban growth opportunities in Hastings District relative to the study areas.**



*Left: Flatter land, north of Puketapu Road, to the west of the Taradale Hills study area.*

# 3.6

## Sub-regional growth opportunities

### Summary

- There is land to the west of the study areas that could provide additional capacity for urban development, which has potential to integrate well with development in the study areas. Initial estimates show that there is potential for 3,000 + dwellings in this area.
- A high-level assessment of infrastructure costs for development indicate that the additional yield would enable the cost per lot to be significantly reduced to a level that while still above current market averages is within the 'ballpark' of them. Significant upfront capital costs from local, regional and central government would likely be required to support the scale of development.

### Further Growth Potential

Figure 30 shows the high-level spatial considerations for growth in the vicinity of the study areas but is outside of Napier's jurisdictional boundary. These are summarised as follows:

1. There is flatter land (20% slope or less) to the west that can connect with the Tironui Drive Extension and Churchill Drive Extension areas.
2. Areas of steeper slope around the study areas would result in a disconnected urban form in some areas.
3. Elite soils are present closer to Puketapu which would need to be protected.
4. The Transpower transmission corridor crosses the area, which would limit, in part, developable area and the ability to achieve an integrated urban form.
5. Land fronting Puketapu Road would integrate most efficiently with Napier's existing urban area, but areas of slope would present some challenges.
6. There are some known flooding and ground condition issues within this area. At a conceptual level, it is considered that there would be a number of feasible engineering solutions that could be used to address these.

To test the effect of this extension on the feasibility of developing in the study areas, an initial yield estimate was calculated, using an average density of 15 dwellings per hectare, across 439 hectares of potential developable land (gross). It is important to stress that this is a very preliminary simple scoping assessment for the purpose

- The western growth option may have merit when compared with further expansion on the plains south of the City but it will require further evaluation through the HPUDS review. This would need to include whether the option would support a compact urban form with defensible urban boundaries relative to other growth options.
- A boundary adjustment with Hastings District Council may be required to more efficiently deliver this growth option.

of testing how a significant increase in yield could support a reduction in infrastructure costs on a per lot basis within the structure plan areas. This calculation produced a potential yield of 3,250 dwellings.

High-level infrastructure costs were then estimated based on potential water, wastewater, stormwater and transport requirements. These costs were calculated based on a pro-rata rate from the more detailed costings undertaken for the Churchill Drive Extension and Tironui Drive Extension areas. This showed that in principle, increasing yield in the developable parts of the study areas and immediately beyond would potentially reduce the cost per lot for infrastructure by potentially \$100,000 per lot, making development more feasible and more in line with current market trends.

In light of this, we would recommend investigating this opportunity further through the HPUDS review. This would include investigating site specific environmental and physical constraints, feasible infrastructure and servicing options and determining development areas and urban boundaries.

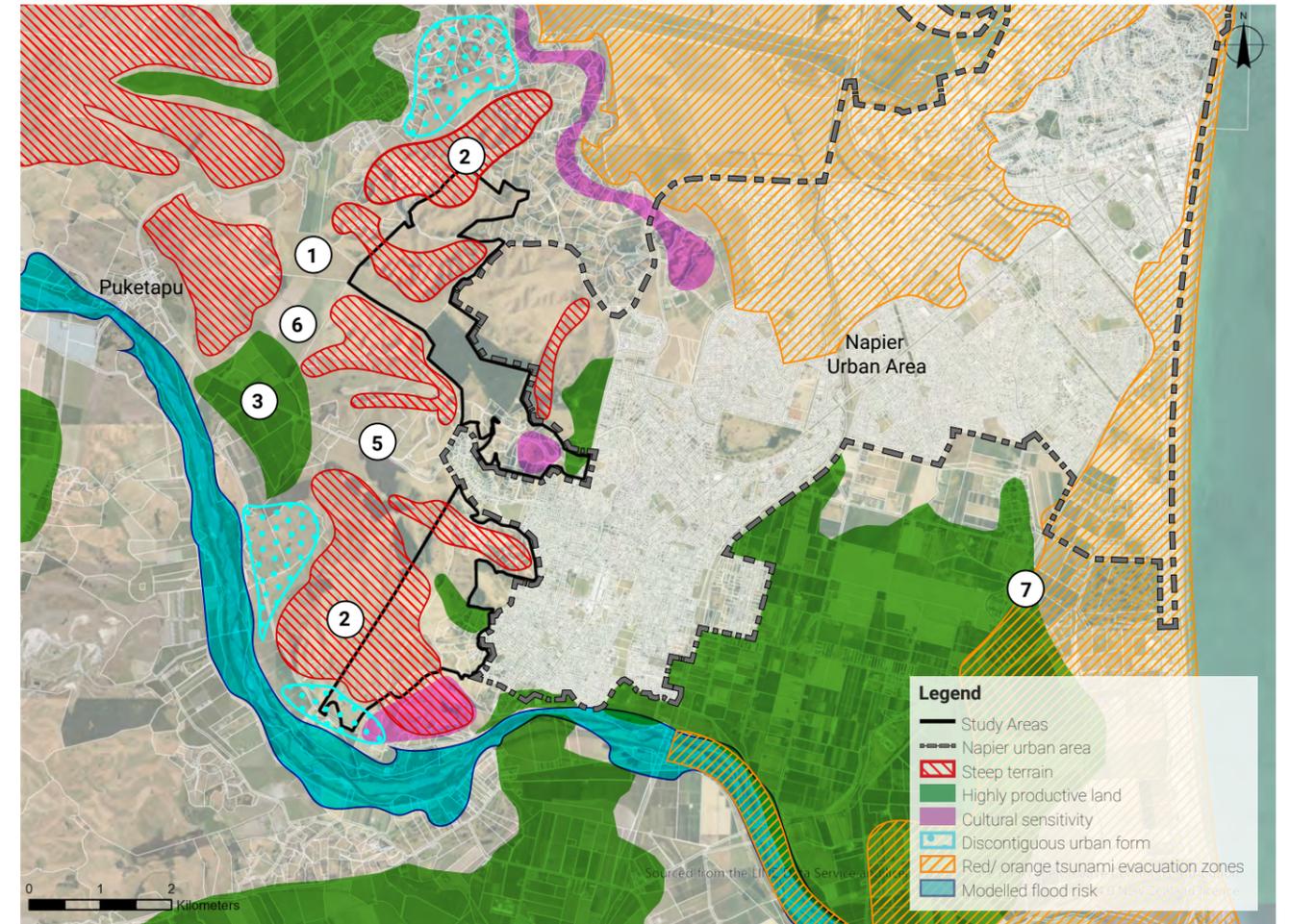


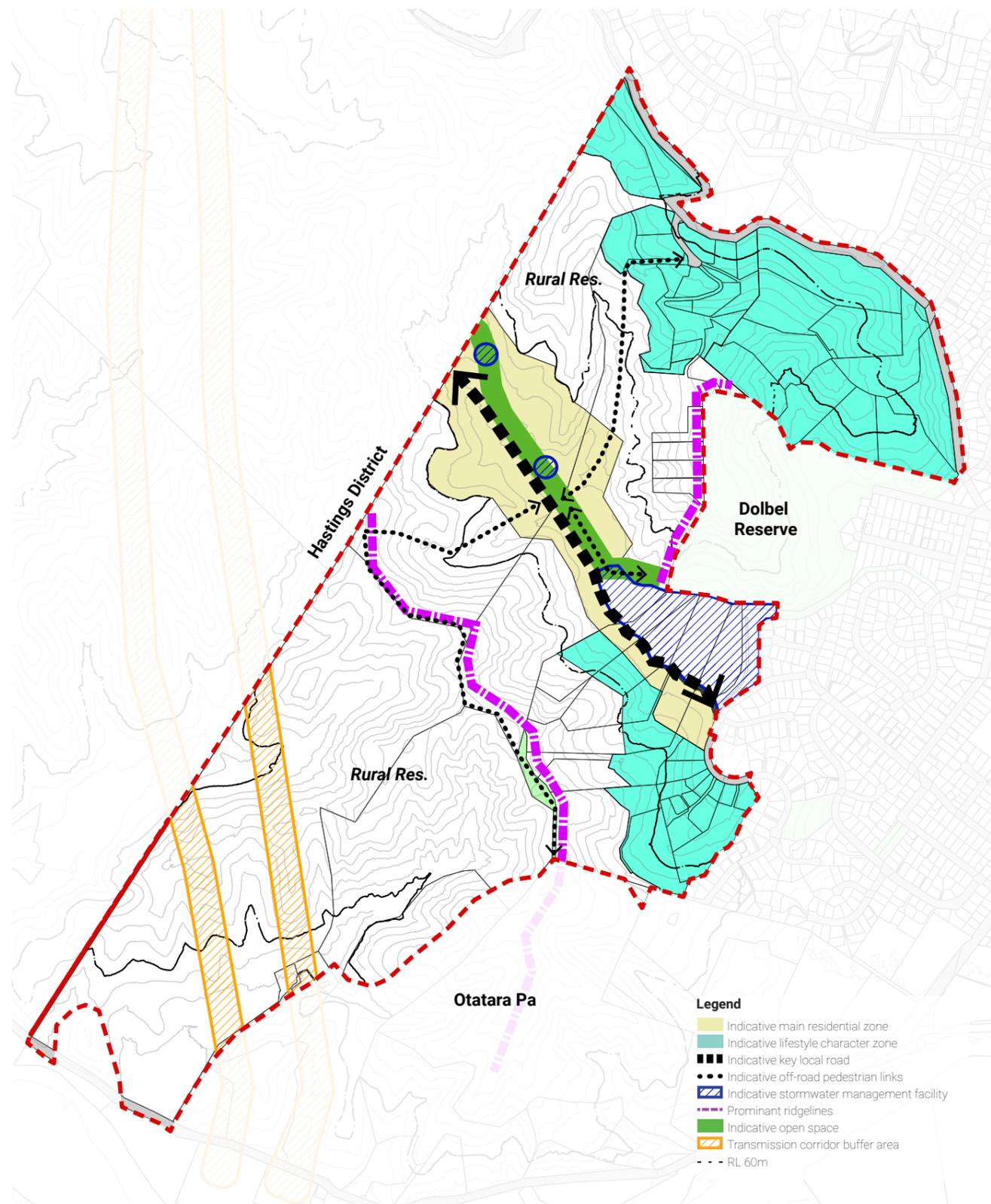
Figure 30: Constraints on further growth opportunities

**04**

**High Level  
Structure Plans**

# 4.1

## Taradale Hills Structure Plan



### Taradale Hills Structure Plan summary

The previous section of this report noted the challenging feasibility of residential development in the Taradale Hills area. However, when considered against further assessment of other potential growth areas and what Council may determine as critical outcomes, it is plausible that the Taradale Hills area could still be determined to be both necessary and appropriate to support Napier's growth requirements. There is also potential for development in this area to connect with a wider western growth option as set out in Section 3.6 of this report.

In light of this, a Structure Plan for Taradale Hills has been prepared to inform future growth in a manner that responds to the identified opportunities and constraints of the area. Key aspects of the Structure Plan include:

#### Land Use

- Main Residential is applied to a valley to the west of Churchill Drive, where flatter land enables more standard residential development. A yield of 140 dwellings could be achieved in this area, being the equivalent of approximately 1 year of Napier's projected greenfield housing demand (this compares with a potential yield of 8 dwellings that would be possible under this area's operative Rural Residential zoning).
- Lifestyle Character is applied to areas where moderate to steep slope means that urban residential densities are not possible, but some intensification can occur due to proximity to existing infrastructure.
- Rural Residential is retained for areas with slopes greater than 20% and those areas which are not contiguous with the existing urban area or that are not practically accessible.
- Additional controls on Rural Residential development near prominent ridgelines would be appropriate to help maintain the area's contribution to the rural backdrop of Napier.

#### Residential Densities

- A minimum density of 15 dwellings per hectare (net) / 500m<sup>2</sup> average, is anticipated within the Main Residential area
- Lot sizes within the Lifestyle Character area would be in the range of 1,000m<sup>2</sup>-3,000m<sup>2</sup> depending on the slope of the site and proximity to existing services.
- Lot sizes within the Rural Residential area would be approximately 5,000m<sup>2</sup> depending on the slope of the site and the ability to provide complying on site wastewater services.

#### Connections

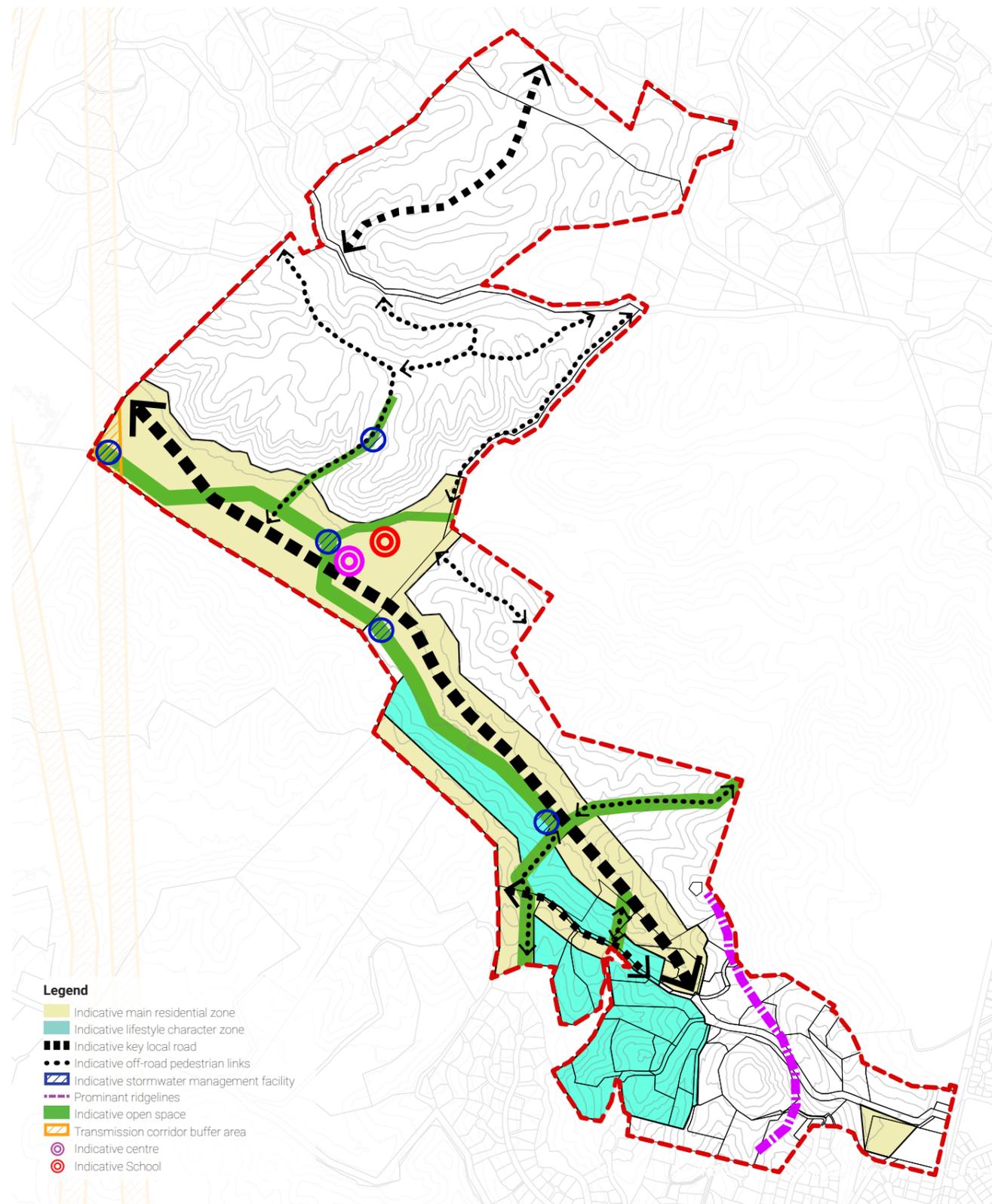
- A 'key local road' is required (indicative position shown on Structure Plan) connecting the central area of Main Residential with Churchill Drive along the alignment for the existing private access road serving 12-20 Churchill Drive.
- Indicative walking routes connecting with neighbouring sites and Ōtātara Pā are provided for.
- An open space corridor is required along the margins of the existing farm drain/ stream which traverses the site. This corridor includes indicative stormwater management/ treatment facilities subject to detailed design and investigation.

#### Infrastructure

- Development of the area is dependent on the delivery of a new potable water reservoir or upgrade to the existing Churchill Road reservoir.
- Development of the areas identified for Lifestyle Character adjacent to Churchill Drive and Puketapu Road have been assumed to be able to connect into existing infrastructure services without any additional upgrades.

# 4.2

## Tironui Drive & Surrounds Structure Plan



### Tironui Drive & Surrounds Structure Plan summary

The previous section of this report noted the challenging feasibility of residential development in the Tironui Drive & Surrounds area. However, when considered against further assessment of other potential growth areas and what Council may determine as critical outcomes, it is plausible that the Tironui Drive & Surrounds area could still be determined to be both necessary and appropriate to support Napier's growth requirements. In light of this, a Structure Plan for Tironui Drive & Surrounds has been prepared to inform future growth in a manner that responds to the identified opportunities and constraints of the area. There is also potential for development in this area to connect with a wider western growth option as set out in Section 3.6 of this report.

Key aspects of the Structure Plan include:

#### Land Use

- Main Residential is applied to a flatter central area along a valley floor to the west of Tironui Drive, where urban residential densities can be achieved without extensive earthworks or retaining.
- An overall yield of 650 dwellings could be achieved in this area, being the equivalent of 4 years of Napier's required greenfield growth. This compares with a potential yield of 53 dwellings that would be possible under the operative provisions of the Rural Residential zone.
- Lifestyle Character is applied to moderate to steeply sloping land immediately adjacent to Tironui Drive, where slope means that urban residential densities are not possible, but some intensification can occur due to proximity to existing infrastructure.
- Rural Residential is retained for areas with slopes greater than 20%, where slope means it is not possible to achieve urban residential densities.
- Indicative locations for a neighbourhood/local centre and potential future school are identified.

#### Residential Densities

- A minimum density of 15 dwellings per hectare (net)/ 500m<sup>2</sup> average, is anticipated within the Main Residential area
- Lot sizes within the Lifestyle Character area would be in the range of 1,000m<sup>2</sup>-3,000m<sup>2</sup> depending on the slope of the site and proximity to existing services.

- Lot sizes within the Rural Residential area would be approximately 5,000m<sup>2</sup> depending on the slope of the site and the ability to provide complying on site wastewater services.

#### Connections

- A 'key local road' is required (indicative position shown on Structure Plan) extending from Tironui Drive in the east, with a connection to Penrith Road in the west.
- Indicative walking routes connecting with neighbouring sites are provided for.
- An open space corridor is required along the margins of existing overland flow paths. This corridor includes indicative stormwater management/ treatment facilities subject to detailed design and investigation.

#### Infrastructure

- Development of the area is dependent on the delivery of a new satellite wastewater treatment plant, west of the Napier City boundaries.

# 4.3

## Structure Plan RPS evaluation criteria

### Taradale Hills

RPS EVALUATION CRITERION	COMMENTS
Supports a compact urban form	Contiguous with the existing urban area but the location and configuration of the Structure Plan's Main Residential area will mean there will be a reasonable distance to local services – more than a 20 minute walk.
Clear natural boundaries	Topography provides clear natural boundaries for the Main Residential area. Low risk of further sprawl.
Delivers an average density of 15 lots/ha	Average densities of 15 lots/ha could be achieved within the proposed Main Residential area. However, overall infrastructure servicing costs for this area, together with a potential lack of market demand for smaller lot sizes in this location, may make this density unviable.
Will meet future housing needs and provides housing choice	Provides options for both urban and rural residential living. The area is unlikely to be attractive to the retirement sector given distance to existing services and topography.
Land has low soil versatility	Low soil versatility due to slope, with higher classifications in flatter areas to be evaluated through HPUDS review.
Avoids or mitigates locational constraints	Residential development is concentrated on flatter land away from major constraints. Further investigations on stormwater/ flooding effects and land stability is required.
Can integrate with the transport network	Opportunities to connect with the existing urban area via Churchill Drive. A through route or further connections with the transport network would be challenging.
Promotes/integrates with social infrastructure	Location and configuration of the proposed Main Residential area will mean there will be a reasonable distance to social infrastructure – more than a 20 minute walk.
Can be serviced at a reasonable cost	Servicing cannot be provided at a reasonable cost to the proposed Main Residential area and development is unlikely to be feasible.
Is market attractive and reasonably expected to be realised	Current infrastructure costs negatively impact feasibility for urban residential. More intensive unserviced Rural Residential in steeper area may be market attractive initially.

### Tironui Drive & Surrounds

RPS EVALUATION CRITERION	COMMENTS
Supports a compact urban form	Contiguous with the existing urban area and the size of the proposed Main Residential area means that local services can be provided within the Structure Plan area.
Clear natural boundaries	Topography provides clear natural boundaries to the north and south but there is not a strong natural boundary to the west and there is potential for expansion there.
Delivers an average density of 15 lots/ha	Average densities of 15 lots/ha could be achieved. However, overall infrastructure servicing costs for this area, together with a potential lack of market demand for smaller lot sizes in this location, may make this density unviable.
Will meet future housing needs and provides housing choice	Provides options for urban and rural residential living. The reasonable size of the proposed Main Residential area and the potential for local services and amenities improves market attractiveness for the retirement sector.
Land has low soil versatility	Low soil versatility due to slope, with higher classifications in flatter areas to be evaluated through HPUDS review.
Avoids or mitigates locational constraints	Residential development is concentrated on flatter land away from major constraints. Further investigations on stormwater/ flooding effects and land stability is required.
Can integrate with the transport network	Can connect into the existing network via Tironui Drive and Penrith Road. Limited potential for northern or southern connections due to topography.
Promotes/integrates with social infrastructure	Potential for local social infrastructure within the proposed Main Residential area.
Can be serviced at a reasonable cost	Servicing cannot be provided at a reasonable cost to the proposed Main Residential area and development is unlikely to be feasible.
Is market attractive and reasonably expected to be realised	Current infrastructure costs and southerly aspect would negatively impact feasibility for urban residential. More intensive unserviced Rural Residential in steeper areas may be market attractive initially.

**05**

**Implementation**

# 5.1

## Planning implementation

### HPUDS Review and NPS-UD Requirements

The HPUDS review is planned for 2021 and will determine the combined growth strategy for Napier and Hastings and will be jointly prepared by Napier City Council, Hastings District Council and Hawke's Bay Regional Council.

The NPS-UD includes extensive new requirements for growth planning that the HPUDS review will need to address, including:

- Must identify broad locations where development capacity will be provided;
- Must identify supporting infrastructure;
- Must identify areas with environmental constraints;
- Must consider different growth scenarios through spatial scenario testing; and
- Must include a statement of iwi and hapū aspirations.

A key task for the HPUDS review, required by the NPS-UD, is the need to consider different spatial

### District Plan Review

The Napier District Plan review will implement the growth strategy confirmed through the HPUDS review and will direct the level of intensification to occur within the existing urban area and any identified greenfield areas.

For any greenfield growth areas confirmed through the HPUDS review, the new District Plan could either protect the land for future development through the use of a Future Urban zone, or could 'live zone' it if the land is infrastructure ready and is supported by detailed environmental assessments.

#### Future Urban zone

The Future Urban zone is typically applied to rural land that is identified as suitable for urbanisation in the future. Its key purpose is to prevent further land fragmentation, given that land ownership has a significant impact on the ability to redevelop land.

In addition to preventing further land fragmentation, the Future Urban zone has a couple of practical impacts:

- It raises community expectations that urbanisation will occur (and that the land is suitable to do so). This can result in the local authority being pressured to 'live

scenarios for growth and evaluate these in detail based on infrastructure requirements and environmental constraints. This would likely require:

- A long list of growth options to be developed and evaluated against criteria.
- Following the long list of evaluation, a short list of growth options to be developed and evaluated. This would require a high-level structure plan or similar to be prepared for each option or group of options to assess and compare their relative feasibility, benefits and costs.
- Confirmation that the range of growth options selected would meet the short, medium and long term feasible development capacity requirements.

The Taradale Hills and Tironui Drive & Surrounds Structure Plan will form part of the evidence base for evaluating the various spatial growth scenarios for Napier / Hastings as part of the HPUDS review.

zone' the land for urban development and provide infrastructure sooner than planned.

- It can increase land values given that the zone signals urban development will occur. This can have the flow-on effect of increasing the cost to a local authority of land acquisition required for new infrastructure such as roads and open space.

These factors mean that councils require a high degree of certainty that the land is suitable for urbanisation and is feasible to develop before applying a Future Urban zoning.

### Implications for the Western Hills

#### Churchill Drive & Tironui Drive Extensions

These flatter areas may be suitable for urban development, but presently the infrastructure costs to service them are too high for the development to be feasible. This will need to be evaluated further through the HPUDS review, relative to the infrastructure costs associated with other growth options. We recommend awaiting the outcome of the HPUDS review prior to making a decision on the appropriate zoning.

#### Other areas

Outside of the Churchill Drive and Tironui Drive Extensions, the land within the study areas is unlikely to ever be suitable for urban development to standard residential densities given the cost and practicalities of achieving complying infrastructure and lot design that supports a compact urban form.

In our view it would not be appropriate to apply the Future Urban zone to these areas and Rural Residential or Lifestyle Character is likely to be the most appropriate zoning framework. There may be opportunity to enable a modest level of additional development in these areas by reducing the minimum and average site size for

### Summary

- The new NPS-UD includes extensive new growth planning requirements that Napier City Council will need to address through the HPUDS and District Plan reviews.
- The HPUDS review in 2021 will enable all growth options for Napier and their relative costs and benefits to be considered in the context of the wider Napier / Hastings area.

subdivision, particularly in areas close to existing services with less severe slope. Any reduced lot size would need to take into account the slope and ability to provide servicing on-site.

Consideration could be given to requiring the transport and amenity connections identified on the Structure Plans as part of any new development, and maintaining the landscape values of the eastern facing hills, to ensure that the social and cultural well-being of the future community is provided for. These matters can be considered further through the HPUDS review.

- This could include the following broad options: greenfield growth in the Western Hills; greater urban infill/intensification; and greenfield growth at Te Awa/ The Loop/South Pirimai.
- The outcome of the HPUDS review and the additional work that is now required under the NPS-UD will inform the District Plan review. More time may be needed for the District Plan review to respond to this.



Above: looking west over Napier from the Mission Estate Residential Precinct.

**06**

**Conclusion**

# 6.1

## Conclusions and recommendations

### Summary

This report has investigated options to support Napier City Council's strategy for 'Greenfield Growth in the Hills' as part of upcoming reviews of the Heretaunga Plains Urban Development Strategy ('HPUDS') and the Napier District Plan.

In undertaking the site and context analysis, it is evident that the majority of both study areas are unsuitable for urban development. This is largely driven by the topography of each study area which is characterised by ridge and valley systems with extensive areas of very steeply sloping land (greater than 20%). Urban development in these areas is challenging for a number of reasons, including:

- Difficult and costly to achieve complying gradients for public roads, right-of-ways and driveways.
- There is a high cost associated with the provision of potable water and/ or wastewater networks due to

### Concept plans for opportunity areas

Despite the challenges identified above, two areas have been identified as being potentially suitable for urban development in the study areas. This includes:

- 63 hectares of land west of Tironui Drive of which 36 hectares is part of a contiguous area flatter land – 'Tironui Drive Extension'.
- 26 hectares of land west of Churchill Drive of which 12 hectares is part of a contiguous area flatter land – 'Churchill Drive Extension'.

### Infrastructure costs

The infrastructure costs for each opportunity area are summarised below:

#### Tironui Drive Extension

- Strategic infrastructure (Council funded): \$71 million
- Private infrastructure (Developer funded): \$86 million
- Total CAPEX: \$157.3 million
- **Cost per lot based on 650 lots / \$242,000 per lot.**

#### Churchill Drive Extension

- Strategic Infrastructure (Council funded) - \$23 million
- Local Infrastructure (Developer funded) - \$16 million
- Total CAPEX: \$40 million
- **Cost per lot based on 140 lots / \$285,000 per lot.**

requirements for multiple reservoirs or pump stations to overcome topography.

- High cost of earthworks and retaining required to deliver roads and building platforms, and more complex foundation designs for houses.
- The extent of earthworks and retaining required to deliver necessary infrastructure can reduce the extent of potentially developable land for urban uses.

A further challenge to development in each study area is that the ribbons of flatter land are dispersed along ridgelines and valleys. Developing these narrow areas would be difficult as they would not support compact urban form objectives and would also be difficult and expensive to access.

Concept plans development for both opportunity areas shows that there is potentially capacity for 850 new dwellings (680 for Tironui Drive Extension and 170 for Churchill Drive Extension). This would be equivalent of approximately 5 years' worth of greenfield growth required for Napier.

These costs exclude any land acquisition necessary for required infrastructure. When compared with other recent residential developments in New Zealand and the current sale prices of vacant lots within Napier, it is considered that development in the Tironui Drive Extension and Churchill Drive Extension opportunity areas is unlikely to be feasible at this time without a significant reduction in infrastructure costs.

The NPS-UD requires that in the short to medium term (3-10 years) development capacity is enabled by the zoning and can be serviced by infrastructure that is in place or funded in the LTP. In the long term (10-30 years) supporting infrastructure needs to be identified in the Council's infrastructure strategy. Given the indicative costs of servicing the opportunity areas, in our view, it is unlikely that the supporting infrastructure could be funded in the short to medium term, and even if development were enabled by the zoning, it would not contribute to Napier's short to medium term development capacity, and

other options would need to be considered to address any shortfall.

Based on the moderate level of residential growth anticipated within each of the study areas and the high cost of infrastructure to support it, some consideration has been given to whether there are opportunities for additional growth in the wider area. It is considered that there would be some merit in further investigations of the potential for larger scale residential development to the west of the city in the flatter land in the Hastings District

### High Level Structure Plans and Implementation

The report recommends further consideration of these structure plans and a comparison with other potential greenfield growth areas through the HPUDS review prior to finalising the zoning approach for the District Plan review.

Despite the above, high level structure plans have been developed for the study areas should they be determined

adjacent to Puketapu Road and around the now drained Turirau Swamp. Developing in this area would assist to provide infrastructure more efficiently and reduce the cost per lot of development within the study areas. We recommend that this be assessed in more detail through the HPUDS review.

to be both necessary and appropriate to support Napier's growth requirements when the constraints and costs of developing other areas are taken into consideration. These structure plans detail the land use, connectivity and infrastructure strategy necessary to support future urban development.



Above: looking west over Taradale from Ōtātara Pā Historic Reserve

**07**

**Appendices**

# Appendix 1

# Infrastructure Report



INFRASTRUCTURE REPORT



# Napier City Council Growth in the Hills Structure Plan

CIVIL ENGINEERING ▼ SURVEYING ▼ LAND DEVELOPMENT



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# 1. Introduction

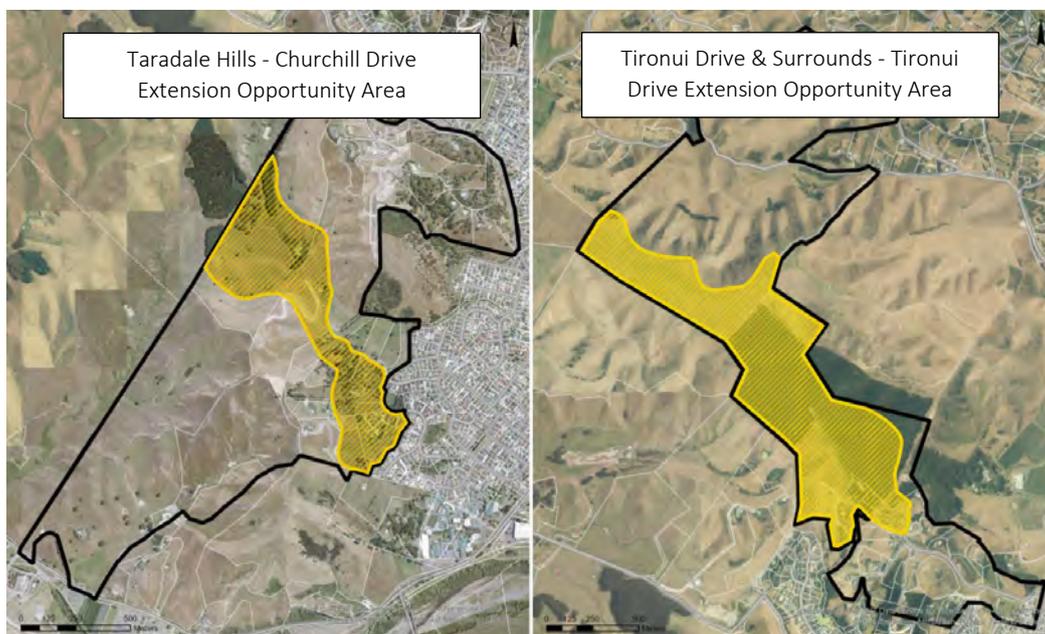
## 1.1. Background

Napier City Council is undertaking a full District Plan review, providing it with the opportunity to zone land for future urban growth. One of the six key outcomes of the review is Greenfield Growth in the Hills which supports the development of urban areas to the Western Hills of Napier.

Maven Associates (Maven) and Barker & Associates (B&A) have been engaged by Napier City Council (NCC) to provide a high-level Structure Plan to further explore the feasibility of this outcome. The high-level Structure Plan is intended to provide developed planning, engineering, and financial assessments against the Growth in the Hills Study areas that NCC have identified in the Western Hills: Taradale Hills, and Tironui Drive & Surrounds.

## 1.2. Purpose of this report

The purpose of this report is to provide an initial summary of infrastructure associated with the development of the Study Areas identified below.



The design and layout of the structure plan areas (concept plan prepared by Barker & Associates) has been developed through on-going consultation and collaboration with NCC.

The calculations and assessments included in this report are a 'desktop' analysis and are preliminary in nature based on information available at time of issue. Depending on the outcome of the high-level Structure Plan, further community; stakeholder engagement; and feasibility investigations, including engineering design and calculations, will be required to determine the suitability of the areas proposed for residential development.

## 2. Earthworks

The terrain of both Study Areas contains land unsuitable for typical residential development with a large percentage of the Study Areas having slopes greater than 20%, over which the cost of residential development increases due to several contributory factors such as the need to introduce large scale earthworks and design specialist foundations to mitigate the effect of land instability.

Land that has been identified as suitable for residential development consists of rolling hills and low-lying valleys prone to flooding. Within these areas the extent of earthworks will vary considerably depending on demand and yield driving design considerations such as developable lots, transport corridors, and protection and mitigation from flooding and overland flow.

Development of the Study Areas should be supported through all stages by an Earthworks Management Plan which should be designed in accordance with all relevant earthwork standards including Napier City Councils Code of Practice for Subdivision of Land Development; Chapter 52A “Earthworks” of the City of Napier District Plan and other relevant standards and documents related to the implementation of earthworks construction.

Detailed geotechnical investigation and analysis of the existing ground and the proposed earthworks will also be required prior to any development taking place.

## 3. Stormwater

A high-level Stormwater Management Plan (appended to this report) has been developed for both study areas to set out the high-level, best practice approach to stormwater management within the respective catchments.

### 3.1. Suggested Outcomes

Proposed objectives of the stormwater strategy are:

- Consideration of future public networks required in support of the Study Areas.
- Existing overland flowpaths identified and investigated.
- Existing flood hazards investigated, mapped, and summarised.
- An option-based assessment for water quality treatment in support of the future development of the Study Areas.
- Consideration and requirement for extended detention in support of the future development of the Study Areas to avoid any downstream flooding, erosion and scouring.
- Confirming the need for attenuation of peak flow during storm events up to the 100-yr events.
- On-site retention (volume reduction) to ensure pre-development runoff rates and volumes are maintained within catchments and streams.
- Recommendations to guide future Plan Change application(s) to ensure positive environmental outcomes are achieved.

### 3.2. Reticulation

Development of the study areas will be supported by new public stormwater networks. The future public networks would be constructed by developers, will be subject to Resource Consent and Engineering Approval before being vested to Napier City Council, post construction. Where possible, the network will be designed and constructed within public roads. A summary of the likely future public networks is provided for within the Stormwater Management Plan.

## 4. Wastewater

Both study areas will be required to be provided with a suitable means of wastewater disposal.

### 4.1. Reticulation

Maven Associates have undertaken a desktop study to identify the most suitable wastewater connection point for both study areas.

For Taradale the preferred connection point to the existing network is via an extension to the existing line in Churchill Drive.

Due to topography constraints, no opportunities exist for Tironui to dispose of wastewater through existing infrastructure. It is expected that discharge of the network will be into a newly created pump station and rising main with eventual discharge of the network into a newly created Wastewater Treatment Plant to the west of Napier.

### 4.2. Wastewater Capacity and Treatment

Any new drainage will be designed to have capacity for the design flow of the proposed development and upstream catchment (where applicable).

We have not undertaken an in depth review of the existing network however it can be assumed that downstream capacity upgrades are likely to be required as Napier City Council have identified that the existing town reticulation network and treatment is near capacity and will require upgrades to be able to incorporate the flows from growth areas. Upgrades to the wastewater network have been proposed by the Wastewater Masterplan produced by GHD (July 2020) and by the Wastewater Treatment Plant Masterplan undertaken by Beca (July 2020).

At source and decentralised wastewater treatment solutions were considered, but discounted, as reduced yield to allow for treatment options potentially renders development in the area unfeasible.

At source wastewater treatment devices will significantly reduce the available yield that can be achieved due to the need for large lot sizes in the region of 5000m<sup>2</sup> to provide for sufficient secondary treatment area per household unit.

It is observed that land requirements for a decentralised solution would also reduce the available yield that can be achieved due to the need for larger lots to accommodate initial treatment capacity (at source septic systems) and large downstream land holdings for secondary treatment and disposal of primary treated effluent. Due to topography and downstream stormwater flooding constraints a decentralised solution will also have limitations regarding suitable land for disposal outside of natural hazard areas.

## 5. Water

Both study areas will be required to be provided with a suitable means of potable water supply and firefighting supply.

### 5.1. Reticulation and Capacity

Napier City Council GIS Maps identify several existing public watermains and reservoirs within or adjacent to the study areas.

We have not undertaken an in depth review of the existing network however it can be assumed that capacity upgrades or new infrastructure is likely to be required to reinforce both areas as dedicated storage will have been designed to cater for existing or medium term demand such as the proposed Mission Estate Subdivision.

## 6. Conclusions

Stormwater drainage can be provided for the proposed study areas and flooding and overland flow paths can be managed. An overarching stormwater strategy has been developed for both study areas to set out the high-level, best practice approach to stormwater management within the respective catchments.

Wastewater drainage can be provided for the proposed study areas though this will be challenging and require investment to implement due to the topography of Tironui and the downstream capacity constraints of Taradale.

There are multiple public water supply infrastructure surrounding the site. Additional supply will be required to reinforce the study areas.

Additional investigation work and detailed reporting for three waters and earthworks will be required for both Study Areas to support future Structure Plans.

## Appendix A – Stormwater Management Report



## STORMWATER MANAGEMENT PLAN



# Napier City Council Growth in the Hills Structure Plan



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# 1. Introduction

## 1.1. Background

Napier City Council is undertaking a full District Plan review, providing it with the opportunity to zone land for future urban growth. One of the six key outcomes of the review is Greenfield Growth in the Hills which supports the development of urban areas to the Western Hills of Napier.

Maven Associates (Maven) and Barker & Associates (B&A) have been engaged by Napier City Council (NCC) to provide a high-level Structure Plan to further explore the feasibility of this outcome. The high-level Structure Plan is intended to provide developed planning, engineering, and financial assessments against the Growth in the Hills Study areas that NCC have identified in the Western Hills: Taradale Hills, and Tironui Drive & Surrounds.

## 1.2. Purpose of this Report

The purpose of this report is to provide a high-level overarching Stormwater Management Plan (SMP) to guide the future development of the two Study Areas identified within Figure 1 Locality Plan (below).

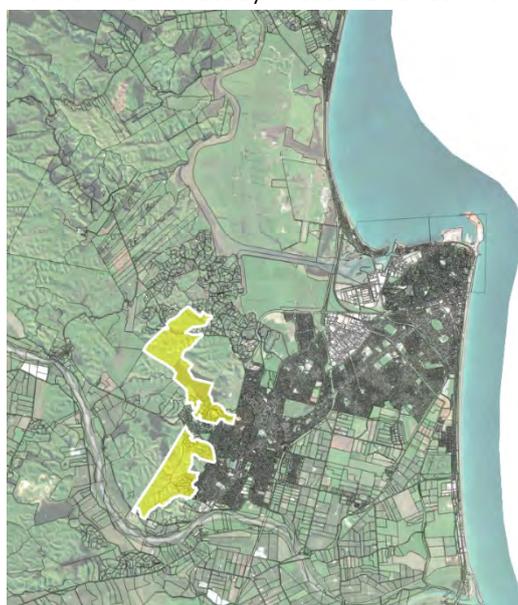


FIGURE 1: LOCATION OF STUDY AREAS

The design and layout of the structure plan areas (concept plan prepared by Barker & Associates) has been developed through on-going consultation and collaboration with NCC.

This report supports the potential for rezoning of the study areas and provides the framework for the future stormwater management.

The calculations and assessments included in this report are a ‘desktop’ analysis and are preliminary in nature based on information available at time of issue. Depending on the outcome of the high-level Structure Plan, further community; stakeholder engagement; and feasibility investigations, including engineering design and calculations, will be required to determine the suitability of the areas proposed for residential development.

The purpose of this SMP is to ensure that the receiving environment is protected and enhanced if it undergoes change from the current rural environment to an urban, residential form.

### 1.3. Objectives

As part of the structure plan process, an overarching SMP has been developed for both study areas. The SMP sets out the high-level, best practice approach to stormwater management within the receiving catchments of the study areas.

The strategy for the future stormwater management is outcome focused. The SMP provides a solution-based approach for the receiving environment. Consideration and emphasis is given to the inclusion of Water Sensitive Urban Design principles, with the overall goal of developing environmentally conscious outcomes which help address and mitigate known and future constraints of the region.

Proposed objectives of the SMP are outlined below:

- Consideration of future public networks required in support of the Study Areas. The report confirms discharge location and provides a design methodology which will guide future development of the areas.
- Existing overland flowpaths identified and investigated. Design parameters are set which will ensure existing overland flowpaths are allowed for in future development up to and for the 100-yr event.
- Existing flood hazards investigated, mapped, and summarised. Flood mitigation strategies are developed for each of the catchments. This framework will enable the development of the structure plan areas and will guide future development controls and identifies areas which require additional investigation.
- The SMP provides an option-based assessment for water quality treatment in support of the future development of the Study Areas. A review of the relevant statutory framework is undertaken before a high-level strategy is provided for both catchments. Ultimately these controls will govern how the future structure plan areas will develop and will ensure compliance with the Regional Policy Statement and Regional Resource Management Plan.
- The consideration and requirement for extended detention in support of the future development of the Study Areas to avoid any downstream flooding, erosion and scouring. Specific flood mitigation options are developed for the catchments and receiving environments.
- Confirming the need for the attenuation of peak flow during storm events up to and including the 100-yr events. Attenuation forms part of the overall stormwater management toolbox and solutions are considered (both at-source and catchment wide) for each of the Study Areas.
- On-site retention (volume reduction) to ensure pre-development runoff rates and volumes are maintained within catchments and streams. Existing streams are located within the structure plan areas and it is important to maintain underlying base flows of water into the streams to avoid any effects on stream biodiversity.
- The urbanisation of the study areas presents an opportunity to provide significant ecological improvements through the protection and planting of identified streams and riparian margins. Recommendations are made to guide future Plan Change application(s) to ensure positive environmental outcomes are achieved.
- Information gaps which require further investigation and/or detailed design are identified.

The overall SMP creates a stormwater toolkit, which will guide future development of the study areas. The toolkit will promote sustainable solutions including the integration of Water Sensitive Urban Design ('WSUD') principles in future land use planning.

The following sections of the report builds upon the initial concept work done to date and addresses, as required, the Hawkes Bay Land and Water Management Strategy (Hawkes Bay Regional Council, 2011), the Regional Resource Management Plan and relevant aspects of the Regional Policy Statement which relate to freshwater.

## 2. Stormwater Reticulation

Development of the study areas will be supported by new public stormwater networks. The future public networks would be constructed by developers, will be subject to Resource Consent and Engineering Approval before being vested to Napier City Council, post construction. Where possible, the network will be designed and constructed within public roads. A summary of the likely future public networks is provided below for the two study areas.

### 2.1. Churchill Drive Extension

In support of the Churchill Drive Extension opportunity area, it is anticipated that stormwater discharge will be conveyed through the existing stormwater management facility located adjacent to Churchill Drive with discharge into the existing public network and to the open stream which flows in a north-eastern direction. The existing public stormwater infrastructure is shown below within Figure 2:



FIGURE 2: EXISTING STORMWATER NETWORK. SOURCE: NCC GIS MAPS

A new public network would provide reticulation within the study area. Public connections would be provided to each lot as required by the Napier City Council Code of Practice for Subdivision and Land Development.

The draft Stormwater Masterplan undertaken by Stantec (June 2020) on behalf of Napier City Council identifies upgrades to local reticulation and the stormwater management facility as part of the 2050 Horizon Programme to the Churchill Drive area. The likely upgrades to the Churchill Drive flood basin are expended on further within Section 4.4.1 of this Report.

### 2.2. Tironui Drive Extension

Due to topography constraints, there is no opportunity for the Tironui Drive Extension opportunity area to dispose of stormwater to existing infrastructure. As such, a new public stormwater network will need

to be constructed in support of any future development. Public lot connections would be provided to each lot as required by the Napier City Council Code of Practice for Subdivision and Land Development.

The network would include any catchment wide stormwater infrastructure as detailed in the proceeding sections of the report. The catchment falls to the south-west, away from Napier City and the downstream environment is Hastings District Council administered land. Ultimate discharge will be to the existing watercourse, which eventually flows to the Tutaekuri River.

### 2.3. Stormwater Capacity

The primary reticulated network will be sized to convey the peak discharge for rainfall events up to and including 10-year <sup>(cc)</sup> ARI to the identified point of discharge. Calculations would need to be provided to Napier City Council in support of the detailed design of the new public network at Resource Consent and Engineering Approval stages. The future networks will need to demonstrate compliance with the Napier City Council Code of Practice for Subdivision and Land Development

There is no overland flow predicted for the 10-year <sup>(cc)</sup> ARI event. During the 100-year <sup>(cc)</sup> event the stormwater runoff will be conveyed by overland flow paths within the proposed development, which will follow the road reserves (where possible) which in turn discharge into the existing watercourses and/or catchment detention solutions contained within the study areas.

## 3. Stormwater Quality

### 3.1. Statutory Context

Future stormwater discharge from the study areas is required to comply with the Regional Policy Statement and the Regional Resource Management Plan both administered by Hawkes Bay Regional Council. The relevant policy criteria is summarised below:

#### 3.1.1. Regional Policy Statement (RPS)

- *Objective 27: surface water resources and the water quality of rivers, lakes and wetlands must be maintained or enhanced, to be suitable to sustain or improve aquatic ecosystems in catchments as a whole, and for recreation where appropriate.*
- *Policy 49: stormwater diversion and discharge and its impacts on surface water resources, needs to promote and mitigate the cumulative effects of stormwater discharges on water quality, where appropriate.*

#### 3.1.2. Regional Resource Management Plan

- *Objective 40: water quality of specific rivers must be maintained to sustain existing species and natural character, while providing for resource availability for a variety of purposes, including groundwater recharge.*
- *Policy 71: environmental guidelines for managing effects of activities on the quality of water in rivers, lakes and wetlands. Surface water quality environmental guidelines apply across Hawke's Bay:*

Issue	Guideline <sup>1</sup>
<b>Temperature</b>	Water temperature should be suitable to sustain aquatic habitat
<b>Dissolved oxygen</b>	The concentration of dissolved oxygen should exceed 80% of saturation concentration
<b>Ammoniacal nitrogen</b>	The concentration of ammoniacal (N-NH <sub>4</sub> <sup>+</sup> ) should not exceed 0.1 mg/l.
<b>Soluble reactive phosphorus</b>	The concentration of soluble reactive phosphorus should not exceed 0.015 mg/l.
<b>Clarity</b>	In areas used for contact recreation, the horizontal sighting range of a 200 mm black disk should exceed 1.6 m.

- *Policy 72: environmental guidelines for surface water quality will be put into practice in the process of making decisions on resource consents, taking into account the following approach:*
  - (a) *After reasonable mixing - guidelines apply after reasonable mixing of contaminants, and disregard the effect of natural perturbations that may affect the water body.*
  - (b) *Flow - at or below median flows or levels for all guidelines except suspended solids - all environmental guidelines (except those for suspended solids) apply to flowing surface water bodies when the flow of water is at/ less than the median flow, or for non-flowing water bodies the level of water is at/ less than the median level.*
  - (c) *Flow - at all flows for suspended solids - environmental guidelines for suspended solids are:*
    - i) *At times when suspended solids concentration is less than the specified guideline for a particular water body and location, an activity should not cause, or contribute to, a breach of the specified guideline. In no case should an activity cause more than a doubling of the suspended solids concentration or turbidity of the receiving water body.*
    - ii) *At times when the suspended solids concentration is equal to/ greater than the specified guideline, an individual activity should not cause the concentration of suspended solids or the turbidity in any river or lake to increase by more than 10%, as determined on a case by case basis.*
  - (d) *Existing good water quality - where existing water quality is better than the guidelines, no more than minor degradation of water quality is allow*
  - (e) *Improvement of poor water quality - where existing water quality is poorer than the guidelines, the following approach will be adopted: Where activities that require resource consents are the main cause of poor water quality, improvements will be sought, having regard to:*
    - *the degree the activity adversely affects aquatic ecosystems and contact recreation - the extent the activity causes the poor water quality relative to other activities*
    - *for existing activities, the need to allow time to achieve required improvements.*

*Where activities regulated by resource consents are not the main cause of degraded water quality, conditions will be imposed on consents to avoid further degradation of water quality unless HBRC is satisfied that:*

- *the activity will not cause any significant adverse effects on aquatic ecosystems and contact recreation*
- *exceptional circumstances justify allowing further degradation, or - the discharge is of a temporary nature, or is associated with necessary maintenance work.*

Policy 72A gives effect to the interim provisions of the National Policy Statement for Freshwater Management 2014. The policy requires Hawkes Bay Regional Council to consider to what degree:

- a) *To which the discharge application would avoid contamination that will have an adverse effect on the life-supporting capacity of fresh water and of any associated ecosystem*

- b) It is feasible and dependable that any more than minor adverse effect on fresh water and of any associated ecosystem resulting from the discharge would be avoided
- c) The discharge would avoid contamination that will have an adverse effect on the health of people and communities as affected by their secondary contact with fresh water
- d) It is feasible and dependable that any more than minor adverse effect on the health of people and communities as affected by their secondary contact with fresh water resulting from the discharge would be avoided.

### 3.1.3. Napier City Council Code of Practice for Subdivision and Land Development

*Where permanent stormwater quality standards are set under Resource Consents, systems shall be designed to control the discharge of any contaminants. The most current versions of the following design guides (published by Auckland Council) shall be used as a basis for design:*

- *GD 01 Stormwater Management Devices*
- *GD 05 Erosion and Sediment Control Guide for Land Disturbing Activities.*

The Napier City District Plan does not specifically set quality requirements but rather the code of practice requires consideration of Auckland Council's Stormwater Management Devices in the Auckland Region (GD01) which provides detailed design considerations for stormwater devices. The ability of Auckland Council's GD01 best management practices to comply with any quality requirements and to provide enhanced treatment is summarised in Table 7 of TR2013/035.

## 3.2. Stormwater Quality - Mitigation Options Assessment

An options assessment has been undertaken to establish the best practical design criteria for the stormwater quality design in support of the study areas. These options include:

- At source stormwater quality control through the following controls:
  - Inert roofing materials for all future buildings.
  - Reduction of impervious areas through the use of permeable paving (where possible).
  - Lot development supported by approved propriety devices such as raingardens, treepits, stormwater filters etc.
- Treatment of public roads and right of ways via approved propriety devices (raingardens, swales, stormwater filters etc) as per GD01 design guidelines.
- Sub-catchment wide stormwater quality provision through detention basins and wetlands.
- Planting of riparian areas and protection of any existing bush features within the study areas.

## 3.3. Best Practical Option – Stormwater Quality

The overall preference is for stormwater to be managed as close to source as possible. This requires careful consideration of the wider use of smaller devices (such as inert materials, pervious paving, swales and rain gardens) in preference to larger devices such as wetlands. These at-source devices are most efficient at improving water quality from frequent short and medium duration events.

The best practical option to mitigate the stormwater quality risk is as follows:

- New public roads are treated to the standards required by Stormwater Management Devices in the Auckland Region (GD01). This will be provided via raingardens or swales. Future road cross-sections would need to consider and allow for such devices alongside services.
- Restrictions around building materials (via consent notices) to ensure roofing materials are non-contaminant yielding.

- Minimisation of impervious areas within the residential lots through the promotion of permeable paving and use of propriety devices prior to discharge into the public network.
- Planting of riparian margins, wetlands and detention basins. Protection of existing areas of vegetation where practical and possible.

These options would be expanded on further as part of any Plan Change application and would be administered through a comprehensive SMP and/or rules in the District Plan.

Subject to the inclusion of the above controls, all stormwater from the study areas can satisfy the requirements of the relevant statutory documents outlined above, within Section 4.4.1.

## 4. Flooding

Catchment modelling has been undertaken to provide input into the structure planning exercise. This modelling has confirmed the extent and location of flooding and overland flow within the Study Areas.

The following sections provides a summary on the flood modelling completed, investigates the known or assumed downstream constraints before outlining a high-level development framework which will enable the future development of the areas.

### 4.1. Modelling Methodology

HEC HMS version 4.5 was used for the hydrology and HEC RAS version 4.0.7 was used to model flooding. The flood modelling has been undertaken in accordance with the NCC Engineering Code of Practice. The modelling confirms the extent, location, flow, and depth of flood waters.

The below summarises the recently completed stormwater modelling undertaken to identify flood hazards and potential flood mitigation options to enable the development of the two study catchments.

### 4.2. Flooding Summary

The modelling confirms that flooding within the valleys of the two opportunity areas occurs during the 100-year flood event. Depths vary and are concentrated within the existing watercourses. Outside of the watercourses the bulk of the lower lying areas are subject to sheet flows only, with depths ranging from 100-300mm. The extent of the existing flooding is shown below within Figure 3, which is an output from the completed stormwater modelling:

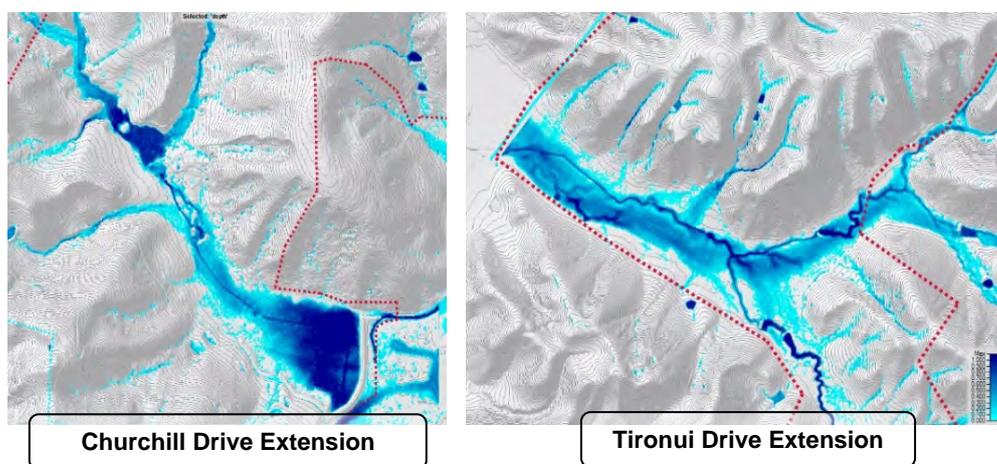


FIGURE 3: EXTRACT FROM MODELLING WHICH SHOWS EXTENT OF FLOODING WITHIN THE TWO STUDY AREAS

The modelling does indicate that within the Taradale Catchment, there are areas of existing ponding which do not reflect the catchment wide summary. The modelling confirms some flood prone areas

(where significant depth of ponding occurs) where development will need to be avoided and investigated in more detail, refer to Section 4.5. This includes the flooding which occurs behind the existing Taradale stormwater management facility. The following images provide outputs from the completed modelling and identify location of flooding and a long section, which indicates depth of flood waters through the Taradale Catchment.

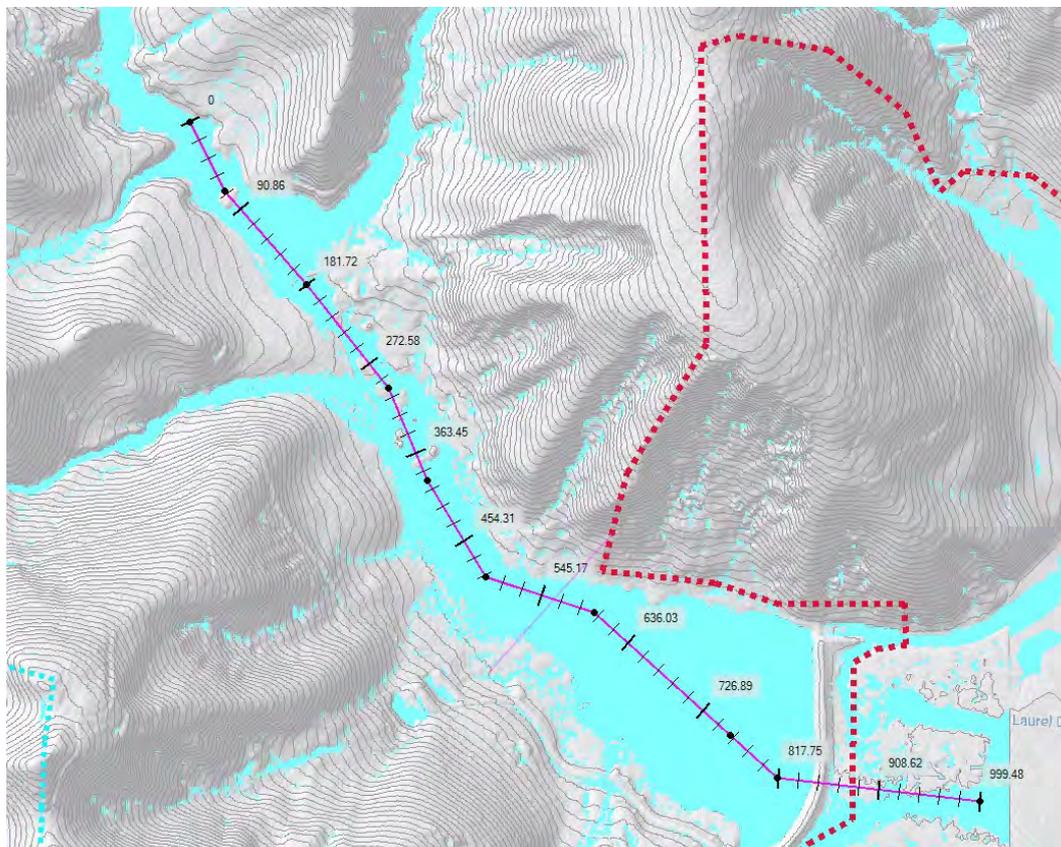


FIGURE 4: EXTRACT FROM FLOOD MODELLING SHOWING LOCATION OF FLOODING AND CHAINAGE FOR LONG SECTION.

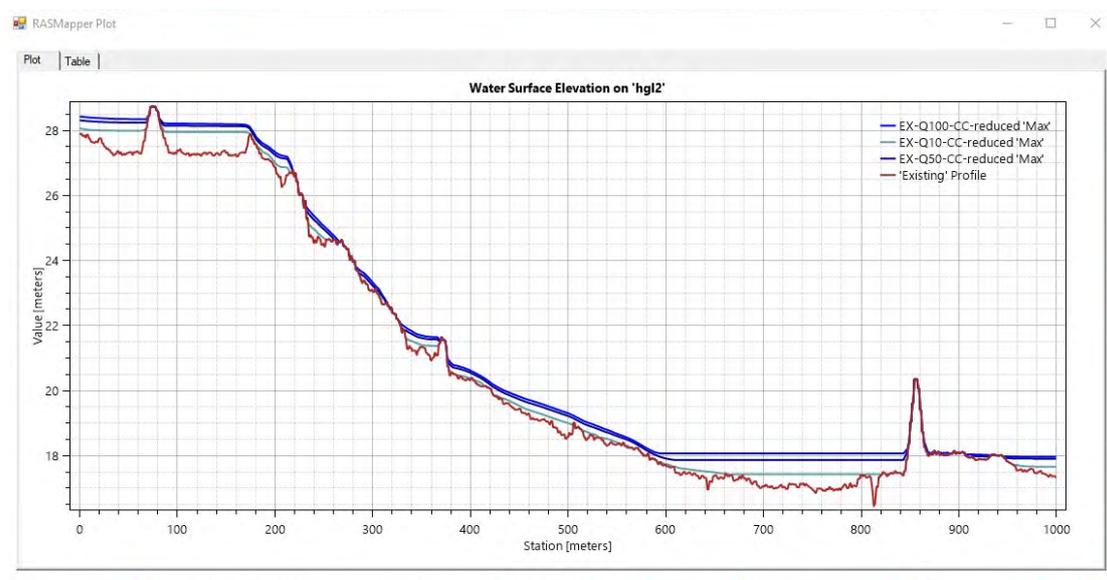


FIGURE 5: LONG SECTION INDICATING DEPTH OF FLOOD WATERS WITHIN TARADALE CATCHMENT

### 4.3. Downstream Flooding

There is known downstream flooding within the Taradale Hills study area. This is currently controlled via the existing flood detention basin constructed upstream of the existing houses accessed via Churchill Drive. Future development of this catchment must ensure that there is no increase to existing downstream flooding.

The stormwater modelling has indicated that there is widespread flooding of the downstream Tironui study area. The downstream area is located outside of the Napier City Council boundary and is located within Hastings District Council administered land. The Napier City Council and Hastings City Council boundary is shown below within Figure 6:

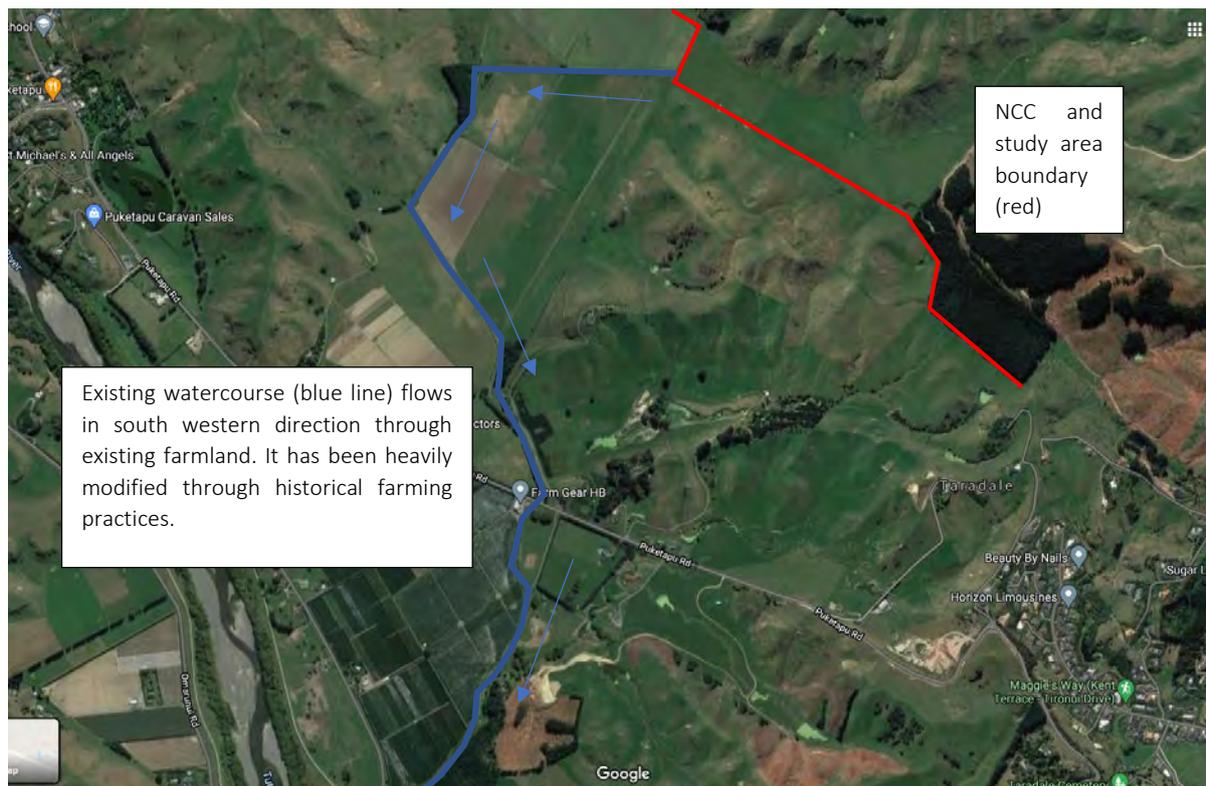


FIGURE 6: STUDY AREA AND NCC BOUNDARY WITH WATERCOURSE SHOWING FLOWING THROUGH EXISTING FARMLAND WITHIN HASTINGS CITY COUNCIL LAND. SOURCE: GOOGLE MAPS

The downstream watercourse appears heavily modified through farming practices. The watercourse flows through farmland and productive orchards. The watercourse is culverted under Puketapu and Springfield roads before eventually discharging into the Tutaekuri River. The downstream land is all relatively flat and low-lying and therefore is prone to flooding during large storm events. Any development within the Tironui study area must consider and suitably address downstream flooding impacts.

### 4.4. Downstream Flood Mitigation Solutions

To avoid any downstream flooding effects, flood mitigation will be required in support of the future development of the Study Areas. The preferred approach for each Study Area is provided below:

#### 4.4.1. Churchill Drive Extension Opportunity Area

- Avoid any downstream flooding effects by ensuring there is no increase in stormwater runoff from pre-development conditions.

- Detention needs to be provided for the 100yr<sub>cc</sub> ARI rainfall event to cater for the increased impervious area (post development). This would be administered through a combination of at-source and catchment wide solutions:
  - At-source propriety devices within residential lots. Assumed to be above ground / underground detention tanks. Emphasis would also be placed on re-use to satisfy WSUD principles. The tanks would be sized to contain the difference from pre-post for the 10-yr ARI event.
  - Catchment wide detention basin to provide peak flood storage volume (in combination with at-source detention/retention). This would require redesign / modifications to the existing stormwater management facility. Detailed design and additional geotechnical input would be required.
  - The existing flood storage will need to be maintained and considered as part of any future development of the Taradale Catchment. Please refer to Section 4.5 for additional detail below.

#### 4.4.2. Tironui Drive Extension Opportunity Area

- At-source detention provided through propriety devices within residential lots. Assumed to be above ground / underground detention tanks. Emphasis would also be placed on re-use to satisfy WSUD principles. The tanks would be sized to contain the difference from pre-post for the 10-yr ARI event.
- To ensure there is no increase to the modelled downstream flooding, two options have been developed which will enable the development of the Tironui Study Area. Both options are summarised below:
  - Downstream flood improvement works to be undertaken to reduce current flood plain and to enable greater volume of stormwater discharge from the study area. This would require consultation with Hastings District Council and downstream landowners.
  - If downstream flood works are not investigated, the Tironui study area will also need to provide peak flow attenuation for additional stormwater runoff generated. Detention will be required for the 100yr<sub>cc</sub> ARI rainfall event, once allowing for the detention provided at-source.
  - Any catchment wide detention basin would need to be constructed off-line and discharge stormwater to the existing stream which flows south west. The catchment-wide solution would also need to compensate for any loss of flood storage within the site, post development. Refer to Section 4.5 (below) for further detail and discussion.

### 4.5. Flood Mitigation within the Study Areas

The existing flood hazards will be mapped and detailed as part of any future Plan Change process. This will require future Resource Consents to be obtained for any earthworks or change of land use within the flood plain/flood prone areas. Applicants will need to demonstrate that the development allows for the existing flood plain and that there will be no adverse upstream or downstream effects.

#### 4.5.1. Minimum Floor Levels

Floor level requirements in relation to floodplains will be set through rules in the future District Plan. Minimum floor levels (freeboard) over the 100-yr flood level will be required for all habitable buildings in accordance with the recommendations provided below:

TABLE 1: MINIMUM FREEBOARD REQUIREMENTS

Freeboard	Minimum Height
Vulnerable Activities	500mm
Less Vulnerable Activities	300mm

\* *Vulnerable activities defined as residential activities*

\* *Less vulnerable activities defined as commerce, industry, and rural activities*

All future freeboard clearances shall be in accordance with the criteria stipulated above and would need to demonstrate compliance with Building Code E1 – Surface Water as required.

#### 4.5.2. Retention of Storage Volume

As both Study Areas are constrained by known downstream flooding, future development of the catchments will need to allow for and retain the existing flood storage volumes, unless downstream flood mitigation works allow for increased discharge of flood water from the Study Areas.

Downstream flood mitigation works are not considered possible for Churchill Drive Extension. Therefore, any future development above the current stormwater management facility in Churchill Drive will need to retain the existing current storage volume and flood levels. This will ultimately govern how much of the catchment will need to be set aside for detention of flood waters, post development. At-source detention and minimisation of impervious areas will assist whilst the existing detention basin can be reworked to provide additional storage capacity. Additional investigation is required in the next phase of the Plan Change process.

To enable the development envisaged within the Tironui Drive & Surrounds Study Area, it is considered that downstream flood improvement works need to occur. It is not considered viable to compensate for the loss of storage volume and attenuation of post development peak flows within the confines of the Study Area. This would result in a significant loss of yield from what has been anticipated within the Structure Plan.

#### 4.6. Flooding Summary

Subject to the future development complying with the above recommendations, there will be no adverse downstream effects from the development of the study areas. Additional investigation and detailed design is required to refine the preferred solution for each catchment as part of any future Plan Change process. Maven Associates encourages Napier City Council to progress a downstream flood improvement strategy for the Tironui Drive & Surrounds Catchment.

### 5. Overland Flowpaths

Future development of the study areas will need to consider and allow for the modelled overland flowpaths up to and for the 100-yr cc event. The Plan Change process would identify and map all existing overland flowpaths before confirming volume, flow and contributing catchment areas. This is consistent with the current approach taken within Chapter 62 (Natural Hazards) of the Napier City Plan.

#### 5.1. Overland Flowpaths – Options Assessment

An options assessment has been undertaken to establish the best practical design criteria for the overland flowpath design in support of the Study Areas. These options included:

- Retention and protection of existing overland flowpaths through the development area, ideally within green corridors where the overland flow double as watercourses.

- Maintaining the flow of OLFPs up to the 100yr cc ARI rainfall event under the maximum probable development scenario.
- Directing all internal OFLPs within the proposed roading network, where possible.
- Piping of upstream OLFPs through the development site.

## 5.2. Overland Flowpaths – Best Practical Option

The best practical option to mitigate OLFP effects is as follows:

- Retention of natural OLFPs where possible (and practical). Emphasis is provided on the OLFPs which correlate to intermittent or permeant streams within the Study Areas.
- Maintaining the flow of OLFPs up to and for the 100yr cc ARI rainfall event under the maximum probable development scenario.
- OLFPs are to be designed where possible within the roading network and discharge into the stormwater detention pond or existing watercourses (green corridors).
- Minimum freeboards for habitable buildings to be provided as per below:
  - 500mm freeboard for OLFP flow rates above 2m<sup>3</sup>/s.
  - 500mm freeboard for OLFP less than 2m<sup>3</sup>/s with average flow depths of 100mm when inundation is against the building.
  - 150mm freeboard for OLFP less than 2m<sup>3</sup>/s
- Resource Consents will require the provision of a depth-velocity assessment to indicate that the hazards associated with OLFPs within the road reserves are minor, with safe passage of vehicles and pedestrians within the road reserve in accordance with best practice guidelines.

## 6. Green Corridors

Green corridors should be provided for within the Study Areas. The green corridors would follow the primary tributaries identified within the Study Areas. The green corridors would also support the existing and/or proposed wetlands and detention basins. These green corridors would also assist in providing the required flood storage volume and conveyance of overland flows.

The green corridors would be protected from development and would be planted to provide ecological and water quality benefits. The watercourses would be mapped as part of the future Plan Change application and controls would be inserted into the District Plan that would require retention of these areas and mandate applicants to undertake riparian planting.

## 7. Additional Growth Areas

Downstream flood improvement works of the Tironui Study Area presents an opportunity to unlock the Study Area and surrounding land for additional residential development.

Whilst it is acknowledged that the downstream area is not contained within the Napier City Council boundary, a collaborative approach between the two Councils is considered necessary to suitably address and alleviate the identified downstream flooding if the density envisaged/required within the Study Area is to eventuate.

It is recommended that a downstream flood works strategy is prepared in collaboration and consultation with the downstream property owners and Hasting City Council.

## 8. Conclusions

This high-level SMP sets the framework that will enable the future development of the two Study Areas. The Plan has considered the relevant statutory documents and will ensure future stormwater discharge from the Study Areas complies with the Hawkes Bay Regional Council policies.

New public networks will need to be constructed in support of both Study Areas. The network will need to convey the 10-yr ARI event and be designed in accordance with the Napier City Council Code of Practice for Subdivision and Land Development.

Overland flowpaths will need to be mapped in any future Plan Change application. Future development of the Study Areas will need to allow for and retain existing overland Flowpaths up to the 100-yr cc ARI event.

Emphasis has been placed on providing stormwater quality treatment at-source, within both the residential lots and the public roads. Final designs will need to ensure compliance with Auckland Council's GD01 document.

At-source detention (within lots) is proposed. The detention tanks would be sized to detain the difference from pre-post runoff for the 10-yr ARI event. It is also suggested that future District Plan rules require re-use of this tank water which will help to remove dependence on public water reticulation.

To ensure there is no downstream flooding effects, stormwater neutrality is required from the pre-development conditions for and up to the 100-yr ARI event. Catchment specific solutions have been developed to enable their proposed urbanisation.

Modelled flood plains will need to be incorporated into any future Plan Change process. Future development applications located within the flood plains will need to maintain the existing storage volume and provide suitable freeboard for all habitable buildings. This will limit the extent of developable land within each catchment unless downstream flood mitigation works are achieved.

It is recommended that additional investigation work is undertaken for the Tironui Study Area. A detailed analysis of the downstream catchment would be undertaken, flood improvement options modelled alongside estimated civil costs. A collaborative approach would be needed, and the work would need to involve Hastings District Council and downstream landowners accordingly.

# Appendix 2

## Cost Estimate



COST ESTIMATE



# Napier City Council Growth in the Hills Structure Plan

CIVIL ENGINEERING ▼ SURVEYING ▼ LAND DEVELOPMENT



## PROJECT INFORMATION

CLIENT	Napier City Council
PROJECT	135022

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# 1. Introduction

## 1.1. Background

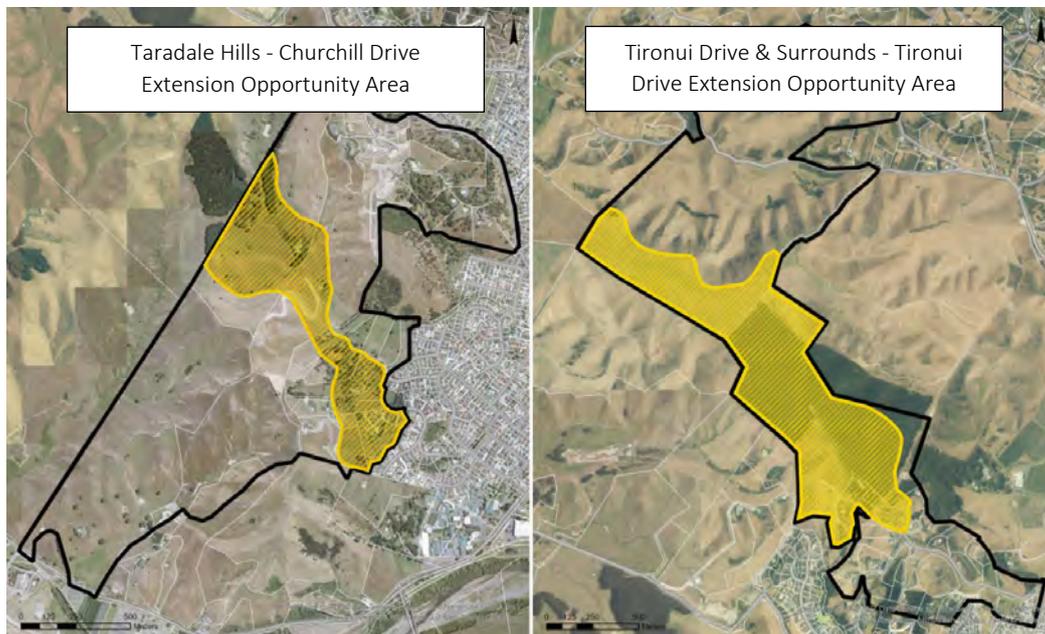
Napier City Council is undertaking a full District Plan review, providing it with the opportunity to zone land for future urban growth. One of the six key outcomes of the review is Greenfield Growth in the Hills which supports the development of urban areas to the Western Hills of Napier.

Maven Associates (Maven) and Barker & Associates (B&A) have been engaged by Napier City Council (NCC) to provide a high-level Structure Plan to further explore the feasibility of this outcome. The high-level Structure Plan is intended to provide developed planning, engineering, and financial assessments against the Growth in the Hills Study areas that NCC have identified in the Western Hills: Taradale Hills, and Tironui Drive & Surrounds.

## 1.2. Purpose of this report

The purpose of this report is to summarise the cost estimate for the development of the Study Areas identified below and to provide Napier City Council with an understanding of the likely order of costs for full development of the Study Areas at this stage of high level concept design. Operational costs and capital costs not identified within the cost estimate are excluded. The scope of the development covered by this estimate includes:

- Bulk earthworks and roading;
- Bulk three waters (water, stormwater, sewer) and services;
- Transfer Pump Station and Rising Mains; and
- Water Supply Reservoirs.



The design and layout of the structure plan areas (concept plan prepared by Barker & Associates) has been developed through on-going consultation and collaboration with NCC.

The cost estimates included in this report are a 'desktop' analysis and are preliminary in nature, offered without prejudice, and based on information available at time of issue. As design development progresses, so too will the costs, and further work will be required along with detailed design to provide a greater measure of estimating maturity.

## 2. Cost Estimate Executive Summary

Below are the summary findings of Capital cost (CAPEX) identified for each of the main Study Areas. For the purposes of this report, costs have been split into the likely funding streams typical of a development of this nature. These are as follows:

- Strategic Infrastructure – funding provided by Council required to allow development of the growth areas e.g. transport corridors, centralised wastewater treatment, centralised water supply.
- Local Infrastructure - funding provided by developers (often vested in Council) required to provide services within a development e.g. local roads, three waters reticulation and decentralised treatment.

### 2.1. Benchmark

To assist the market realities for the cost of development, we have provided a benchmark cost of CAPEX costs that Councils & developers would ordinarily expect to fund for residential developments of this nature. These are based on the following developments undertaken throughout the North Island:

- Waikato (Lockerbie Estate) - Development Cost - \$136k/lot
- Auckland (Richmond) - Development Cost - \$96k/lot
- Bay of Plenty (Harbour Ridge) - Development Cost - \$113k/lot
- Bay of Plenty (Sanctuary Point) - Development Cost - \$122k/lot
- **Avg Development Cost \$117k/lot**

### 2.2. Servicing of Taradale Hills

- Strategic Infra \$23 m - \$167k/lot
- Local Infra \$16 m - \$118k/lot
- **Total CAPEX \$40 m - \$285k/lot – (Benchmark \$117k/lot)**

Key Public Infrastructure Needs:

- 1.1km Road from Churchill Drive
- New Water Reservoir (or upgrade Churchill Reservoir) including a new booster pump station.
- Wastewater connections into Churchill Drive. May need to provide additional capacity to Churchill Drive wastewater network.
- Stormwater managed and treated within catchment. Stormwater Management Facility to Churchill Drive may require upgrading.

### 2.3. Servicing of Tironui Drive & Surrounds

- Strategic Infra \$71 m - \$109k / lot
- Local Infra \$86 m - \$132k / lot
- **Total CAPEX \$156m - \$241k / lot – (Benchmark \$117k/lot)**

Key Public Infrastructure Needs:

- 2.6km Tironui Drive Extension
- Wastewater Pump Station and Rising main to new Wastewater Treatment Plant situated near Puketapu (per the Wastewater Masterplan).
- Upgrade existing reservoirs or provide new reservoirs to reinforce water supply.
- Stormwater managed and treated within catchment e.g. by provision of detention / wetland capacity and stream protection / diversions.

### 3. Cost Estimate Summary – Taradale Hills

Section	Element	Strategic Infrastructure	Local Infrastructure	Total CAPEX
110	Preliminary and General	-	-	-
<b>100</b>	<b>Subtotal - Preliminary and General</b>	<b>-</b>	<b>-</b>	<b>-</b>
210	Site Clearance	69,930	209,770	279,700
220	Erosion and Sediment Control	52,030	156,070	208,100
230	Bulk Earthworks	1,071,820	1,071,820	2,143,640
240	Reinstatement	5,180	15,540	20,720
<b>200</b>	<b>Subtotal - Earthworks</b>	<b>1,198,960</b>	<b>1,453,200</b>	<b>2,652,160</b>
310	Subgrade Improvement - Provisional Sums	80,830	80,830	161,660
320	Road Pavement Construction	1,011,300	719,040	1,730,340
330	Concrete Pavement Construction	525,640	917,200	1,442,840
340	Marking and Signage	11,190	11,190	22,380
<b>300</b>	<b>Subtotal - Pavement and Surfacing</b>	<b>1,628,960</b>	<b>1,728,260</b>	<b>3,357,220</b>
410	Reticulation	1,222,240	698,330	1,920,570
420	Natural Systems	279,690	950,940	1,230,630
<b>400</b>	<b>Subtotal - Stormwater</b>	<b>1,501,930</b>	<b>1,649,270</b>	<b>3,151,200</b>
510	Reticulation	719,360	362,480	1,081,840
520	Pumping Stations	-	-	-
530	Treatment	-	-	-
<b>500</b>	<b>Subtotal - Wastewater</b>	<b>719,360</b>	<b>362,480</b>	<b>1,081,840</b>
610	Reticulation	288,640	240,980	529,620
620	Pumping Stations	-	2,237,500	2,237,500
630	Storage	5,593,750	-	5,593,750
<b>600</b>	<b>Subtotal - Water</b>	<b>5,882,390</b>	<b>2,478,480</b>	<b>8,360,870</b>
710	Services	56,610	135,260	191,870
<b>700</b>	<b>Subtotal - Services</b>	<b>56,610</b>	<b>135,260</b>	<b>191,870</b>
	<b>SUBTOTAL - PHYSICAL WORKS</b>	<b>10,988,210</b>	<b>7,806,950</b>	<b>18,795,160</b>
B1	On-site Overheads - 10%	1,098,820	780,700	1,879,520
B2	Off-site Overheads - 10%	1,208,700	858,760	2,067,460
B3	Staging - 10%	1,098,820	780,700	1,879,520
<b>B</b>	<b>Subtotal - Overheads</b>	<b>3,406,340</b>	<b>2,420,160</b>	<b>5,826,500</b>
	<b>SUBTOTAL - GROSS CONSTRUCTION</b>	<b>14,394,550</b>	<b>10,227,110</b>	<b>24,621,660</b>
C1	Scope Change - 5%	719,730	511,360	1,231,090
C2	Construction Delivery - 10%	1,439,450	1,022,710	2,462,160
C3	Project Contingency - 20%	2,878,900	2,045,410	4,924,310
<b>C</b>	<b>Subtotal - Construction Risk</b>	<b>5,038,080</b>	<b>3,579,480</b>	<b>8,617,560</b>
	<b>SUBTOTAL - CONSTRUCTION BUDGET</b>	<b>19,432,630</b>	<b>13,806,590</b>	<b>33,239,220</b>
D1	Professional Fees - 10%	1,943,260	1,380,660	3,323,920
D2	Consenting allowance - 5%	971,630	690,330	1,661,960
D3	Development Contributions - Excluded	-	-	-
D4	Development Overheads - Excluded	-	-	-
<b>D</b>	<b>Subtotal - Fees and Contributions</b>	<b>2,914,890</b>	<b>2,070,990</b>	<b>4,985,880</b>
E1	P95 - Risk Allowance	1,053,859	617,460	1,671,319
<b>E1</b>	<b>Subtotal - Funding Risk</b>	<b>1,053,859</b>	<b>617,460</b>	<b>1,671,319</b>
	<b>TOTAL COST ESTIMATE</b>	<b>23,401,379</b>	<b>16,495,040</b>	<b>39,896,419</b>
	<b>TOTAL COST ESTIMATE / LOT (140 Lots)</b>	<b>167,153</b>	<b>117,822</b>	<b>284,974</b>

#### 4. Cost Estimate Summary – Tironui Drive & Surrounds

Section	Element	Strategic Infrastructure	Local Infrastructure	Total CAPEX
110	Preliminary and General	-	-	-
<b>100</b>	<b>Subtotal - Preliminary and General</b>	-	-	-
210	Site Clearance	279,690	1,090,791	1,370,481
220	Erosion and Sediment Control	198,580	774,462	973,042
230	Bulk Earthworks	3,350,590	20,499,973	23,850,563
240	Reinstatement	67,300	262,444	329,744
<b>200</b>	<b>Subtotal - Earthworks</b>	<b>3,896,160</b>	<b>22,627,670</b>	<b>26,523,830</b>
310	Subgrade Improvement - Provisional Sums	238,430	309,959	548,389
320	Road Pavement Construction	2,702,490	3,112,382	5,814,872
330	Concrete Pavement Construction	1,644,570	3,955,900	5,600,470
340	Marking and Signage	61,540	80,002	141,542
<b>300</b>	<b>Subtotal - Pavement and Surfacing</b>	<b>4,647,030</b>	<b>7,458,243</b>	<b>12,105,273</b>
410	Reticulation	2,885,540	3,604,315	6,489,855
420	Natural Systems	279,690	2,327,000	2,606,690
<b>400</b>	<b>Subtotal - Stormwater</b>	<b>3,165,230</b>	<b>5,931,315</b>	<b>9,096,545</b>
510	Reticulation	1,671,980	1,715,077	3,387,057
520	Pumping Stations	12,865,630	-	12,865,630
530	Treatment	-	-	-
<b>500</b>	<b>Subtotal - Wastewater</b>	<b>14,537,610</b>	<b>1,715,077</b>	<b>16,252,687</b>
610	Reticulation	1,264,190	1,790,191	3,054,381
620	Pumping Stations	-	-	-
630	Storage	5,593,750	-	5,593,750
<b>600</b>	<b>Subtotal - Water</b>	<b>6,857,940</b>	<b>1,790,191</b>	<b>8,648,131</b>
710	Services	261,790	706,836	968,626
<b>700</b>	<b>Subtotal - Services</b>	<b>261,790</b>	<b>706,836</b>	<b>968,626</b>
	<b>SUBTOTAL - PHYSICAL WORKS</b>	<b>33,365,760</b>	<b>40,229,332</b>	<b>73,595,092</b>
B1	On-site Overheads - 10%	3,336,580	4,022,928	7,359,508
B2	Off-site Overheads - 10%	3,670,230	4,425,226	8,095,456
B3	Staging - 10%	3,336,580	4,022,928	7,359,508
<b>B</b>	<b>Subtotal - Overheads</b>	<b>10,343,390</b>	<b>12,471,082</b>	<b>22,814,472</b>
	<b>SUBTOTAL - GROSS CONSTRUCTION</b>	<b>43,709,150</b>	<b>52,700,414</b>	<b>96,409,564</b>
C1	Scope Change - 5%	2,185,460	2,635,022	4,820,482
C2	Construction Delivery - 10%	4,370,910	5,270,044	9,640,954
C3	Project Contingency - 20%	8,741,820	10,540,075	19,281,895
<b>C</b>	<b>Subtotal - Construction Risk</b>	<b>15,298,190</b>	<b>18,445,141</b>	<b>33,743,331</b>
	<b>SUBTOTAL - CONSTRUCTION BUDGET</b>	<b>59,007,340</b>	<b>71,145,555</b>	<b>130,152,895</b>
D1	Professional Fees - 10%	5,900,730	7,114,549	13,015,279
D2	Consenting allowance - 5%	2,950,370	3,557,281	6,507,651
D3	Development Contributions - Excluded	-	-	-
D4	Development Overheads - Excluded	-	-	-
<b>D</b>	<b>Subtotal - Fees and Contributions</b>	<b>8,851,100</b>	<b>10,671,830</b>	<b>19,522,930</b>
E1	P95 - Risk Allowance	2,869,186	3,834,924	6,704,110
<b>E1</b>	<b>Subtotal - Funding Risk</b>	<b>2,869,186</b>	<b>3,834,924</b>	<b>6,704,110</b>
	<b>TOTAL COST ESTIMATE</b>	<b>70,727,626</b>	<b>85,652,309</b>	<b>156,379,935</b>
	<b>TOTAL COST ESTIMATE / LOT (650 Lots)</b>	<b>108,812</b>	<b>131,773</b>	<b>240,585</b>

## 5. Basis of Estimate

### 5.1. Design Documentation

The drawings relied upon to generate this estimate is the Residential Subdivision Development – Yield Testing Plan provide by Barker and Associates for both Taradale Hills and Tironui Drive & Surrounds.

### 5.2. Procurement

Current market rates and sums based on a traditional procurement route, i.e. fully designed and competitively tendered lump sum tenders from at least three suitable selected tenderers.

### 5.3. Escalation

The estimate is based on rates and prices current as of August 2020 and no allowance has been included for increases in labour, materials, or plant beyond this date.

### 5.4. Methodology

This estimate has been prepared using high level estimating principles (e.g. cost per functional area, cost per elemental item etc.) for the key scope items identified.

The work breakdown structure for this project is as set out in the estimate attached to this report.

Elements of cost included within this estimate are based on costs from similar projects and other cost benchmarks.

### 5.5. Contingency and Risk

Contingency has been allowed to cover the cost of variation claims made by the contractor during the construction phase of the project. This contingency is integral to the estimated outturn cost and should be separately monitored during the construction phase. It is estimated based on the current project scope, exclusive of any client driven scope changes.

Client Scope Change Risk / Exceptional Risk is excluded from our estimate. We recommend the client hold a separate allowance for client driven scope change if there is the potential for such to influence outturn costs.

P95 represents a deterministic method of calculating a 95% level of confidence in the project cost outcomes; it represents a conservative position and is based on the knowledge available at the time of estimate.

### 5.6. Estimate Range

Estimate range is stated to which the final cost outcome for a given project may vary from the estimated cost. Range is expressed as a +/- percentage range around the point of estimate after the application of contingency, with a level of confidence that the actual cost outcome would fall within this range. As the level of project definition increases, the expected range of the estimate will improve resulting in a lower +/- percentage range around the point of estimate.

This estimate is based on preliminary design drawings and information. The estimate is subject to an accuracy range of **-15.0% to +30.0%**.

## 5.7. Assumptions

### General

- The presence of Asbestos and other forms of contamination and any works associated with the management of the same is expressly excluded from this estimate.
- Quantities and measurements, including where concept layout has been provided, are based on concept layouts and typical designs from similar projects.

### Client and Stakeholder

- The estimate does not include the costs associated with community engagement.
- Costs to upgrade public services adjoining the area is excluded.
- We have not allowed for disruption to Council and local services.

### Procurement

- It is assumed that all the civil work will be undertaken through a single contract for the project, though an allowance for staging is included.
- The contract will be procured in accordance with NZS 3910:2013.
- It is assumed that tendering for the project will be undertaken competitively.
- It is assumed that all works are carried out during normal daytime working hours.

### Temporary Works

- We have assumed that excavation works will be undertaken through dry weather periods to minimise dewatering.

### Demolition and Site Clearance works

- We assume no demolition is required except where allowed for general site clearing.
- We have not allowed for the physical protection of trees or associated arborist services.

### Earthworks

- We have not allowed for contouring of the sites to platform level. We have assumed that lots will be developed by others.
- We have assumed that site cut will be suitable for reuse as fill material. We have not allowed for the import of fill from off site.
- Cut to fill and cut to waste volumes are indicative only. It is assumed that a detailed design of the roading corridor will be able to achieve a net balance of cut to fill material.
- We have allowed a provisional sum for conditioning of soils.
- No allowance has been made for archaeological discoveries.
- We have not allowed for contaminated ground conditions.

### Retaining Walls

- We have not allowed for retaining walls.

### Pavement and Surfacing

- Pavement and surfacing is based on similar designs.
- Pavement design considerations are based on engineered designs to similar works.

### **Stormwater**

- Stormwater pipe sizes; catchpits; leads; laterals; etc, have been assumed with appropriate allowances made based on similar engineered designs.
- We have made a provisional allowance for stormwater bioretention devices. Expect these to be rain gardens or similar.
- We have assumed that insitu material will also be suitable for hardfill to trenches.

### **Wastewater**

- Wastewater pipe sizes; laterals; etc, have been assumed with appropriate allowances made based on similar engineered designs.
- We have allowed for one pump station to transfer raw wastewater to the west of the development to a future wastewater treatment facility for the Tironui Development only.
- We have assumed that insitu material will also be suitable for hardfill to trenches.

### **Water**

- Water design considerations are based on engineered designs to similar works.
- We have assumed that insitu material will also be suitable for hardfill to trenches.

### **Services**

- Services design considerations are based on engineered designs to similar works.
- We have assumed that insitu material will also be suitable for hardfill to trenches.

## **6. Legal Disclaimers**

This estimate is solely for our Client's use for the purpose for which it is intended in accordance with the agreed scope of work. It may not be disclosed to any person other than the Client and any use or reliance by any person contrary to the above, to which Maven has not given its prior written consent, is prohibited.

This estimate must be read in its entirety and no portion of it should be relied on without regard to the estimate, especially the assumptions, limitations and disclaimers set out.

Maven makes no assurances with respect to the accuracy of assumptions and exclusions listed within this report and some may vary significantly due to unforeseen events and circumstances.

This cost estimate has been developed for the purposes of preliminary budgeting. It should not be used for any other purpose. The scope and quality of the works has not been fully defined and therefore the estimates are not warranted or guaranteed by Maven and are provided on a without prejudice basis.

**B&A**

Urban & Environmental

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