

## 03 | physical context

**THIS PAGE IS INTENTIONALLY BLANK**

### 3.1 Physical Context Introduction

The context section of the ULDF describes the existing context of the district as it relates to the Expressway. In some instances the context description is wide scale and regional in nature and in others is more site specific.

There are eight aspects of context that are described here which are:

- landform
- hydrology
- vegetation
- ecology
- landuse and built environment
- heritage
- movement
- State Highway 1

Following these eight aspects of context the character of the landscape is described to facilitate a combined understanding of the existing environment the Expressway is to be located in.

### 3.2 Landform

The Expressway route is located within the relatively narrow coastal plain defined by the Tararua Ranges and the Tasman Sea (refer Figure 4). West of the coastline Kāpiti Island rises from the sea. The ranges, coastal plain and island are distinctive landform elements in the district.

The Tararua Ranges feature due to their relative proximity, height (350m- 540m above mean sea level [amsl]), mass and contrast to the flatness of the coastal plain. The ranges are an ever present backdrop to the area.

Kāpiti Island rises to 125m amsl and lies 5.5 km off the coast. Its height and linear form give it a distinctive outline when viewed from the mainland. The island is a contemporary and culturally significant feature in the identity of the Kāpiti Coast District.

The Tararua Ranges and foothills are comprised of old sedimentary rock - greywacke. The ranges formed by the same uplifting and faulting processes that generated the southern part of the North Island. In contrast, the coastal plains are geologically much younger having resulted from the deposition of rock eroded from the ranges. The eroded rock material from the ranges is carried to the coast by streams and rivers. This process further breaks the rock material down to smaller and smaller pieces. Ultimately as sand the material moves east and southward along the coast where it is deposited by onshore wind and wave action.

From the coastal beach the prevailing westerly winds have blown sand inland, forming an extensive network of dunes (refer Figure 6) aligned in a west-northeast to east-southeast direction (approximately parallel to the coast). The continual process of dune formation has tended to extend the land mass seaward. As each new line of dunes is formed on the coastal edge (foredunes) the overtaken dunes become more stable back-dunes.

The successive rows of interdunal hollows are damp and form wetlands that filter, collect and transport water, soil and silt, and vegetative material. Over time these areas form peat and eventually rich organic soil. Consequently, a complex system of duneland has formed along the coastal plain with roughly regular rows of stable dunes separated by low lying hollows containing, wetlands and peatlands (refer Figure 8).

Typically, the dunes are composed of sand with varying depths of top soil cover. The lower land and inter-dunal hollows consist of rich organic soils and peat up to 6.0m deep in places.

With the exception of the alluvial deposits of the Waikanae River flood plain, all of the Expressway route from MacKays

Crossing to Peka Peka is situated in sand country - much of it remnant dune landforms. The peaty soils are prevalent both beneath and between dunes, as well as where the landforms have been regraded for urban uses.

The elevation of the landform varies between 3m amsl and 20m amsl, with the highest dunes being those situated the furthest inland. The Expressway traverses the full range of elevation, from low points at watercourse crossings (eg Wharemauku Stream and the Waikanae River), to the highest dunes.

Large areas of the original dune landforms of the Kāpiti Coast have been modified to facilitate farming and urban development - much of it occurring since the 1950's. The wet areas have been drained and filled over. The remnants of these wet areas and the systems that support these are drainage channels, some recreated wetlands and low-lying flood-prone land. In the north part of the District the less urbanised areas retain some highly valued less modified wetland areas.

The little that remains of the original and unmodified dunes in the more urban part of the District is within the Expressway corridor (refer Figure 7) . The road corridor designation (applied more than 50 years ago) has 'frozen' this land and prevented its development.

As the area has been settled, movement paths through the district have followed the toe of the line of the escarpment to the east. Local roads that connect across the plain east to west to the beach areas have typically cut through the dunes and these cuttings are prevalent in places such as Raumati and Mazengarb Roads.

The east-west local roads also provide corridors from which views of the landforms of Kāpiti Island (if moving west) or the hills (if moving east) can be had.

#### Design Implications

1. Guide the design of the Expressway within the nominated corridor with the aim of minimising earthworks by:
  - > forming an alignment that runs between large dunes rather than removing them
  - > forming its vertical and horizontal extent in response to natural levels
2. Recognise that some dune loss or modification will be inevitable given the confined corridor and consider approaches to address this such as:
  - > Minimising the vertical profile of the Expressway to recognise that the coastal plain is relatively flat (even with the dune forms) - aim for an Expressway 'in' the landscape rather than 'on' the landscape.
  - > Carry out earthworks so that final landforms reflect natural shapes and patterns of the existing dunes. The prevailing alignment of the dunes runs roughly parallel to the coast therefore the design or modification of landforms should acknowledge and reflect this pattern. Leaving dune edges and expressing dune cuttings in places to reveal the dune shape as a cross-section.
3. Avoid creating and reshaping "dunes" as uniform bunds as they will appear unnatural and contrived.
4. Consider the way in which the peat material that will need to be removed in large quantities can be utilised within the District -such as mixing with other material to use for planting and to shape disturbed sand areas.
5. Utilise references to the rock and process of its breaking down in the structures and landscape of the Expressway rather than non-local materials
6. Recognise the views to the Tararua Ranges and Kāpiti Island as prominent and important landforms and features in the design of east/west local road crossings.
7. Provide for views from the Expressway to features such as the coast, Kāpiti Island and Tararuas, although this should not be at the expense of causing adverse effects on the local communities.
8. Recognise that the Waikanae River area is an alluvial flood plain and different from the dune area; it is an important and defining feature creating a physical and visual linkage between mountains and the coast.
9. Recognise that the sand will be vulnerable to wind and water erosion if not managed, and that peat ground or extracted peat will require conditioning before planting.

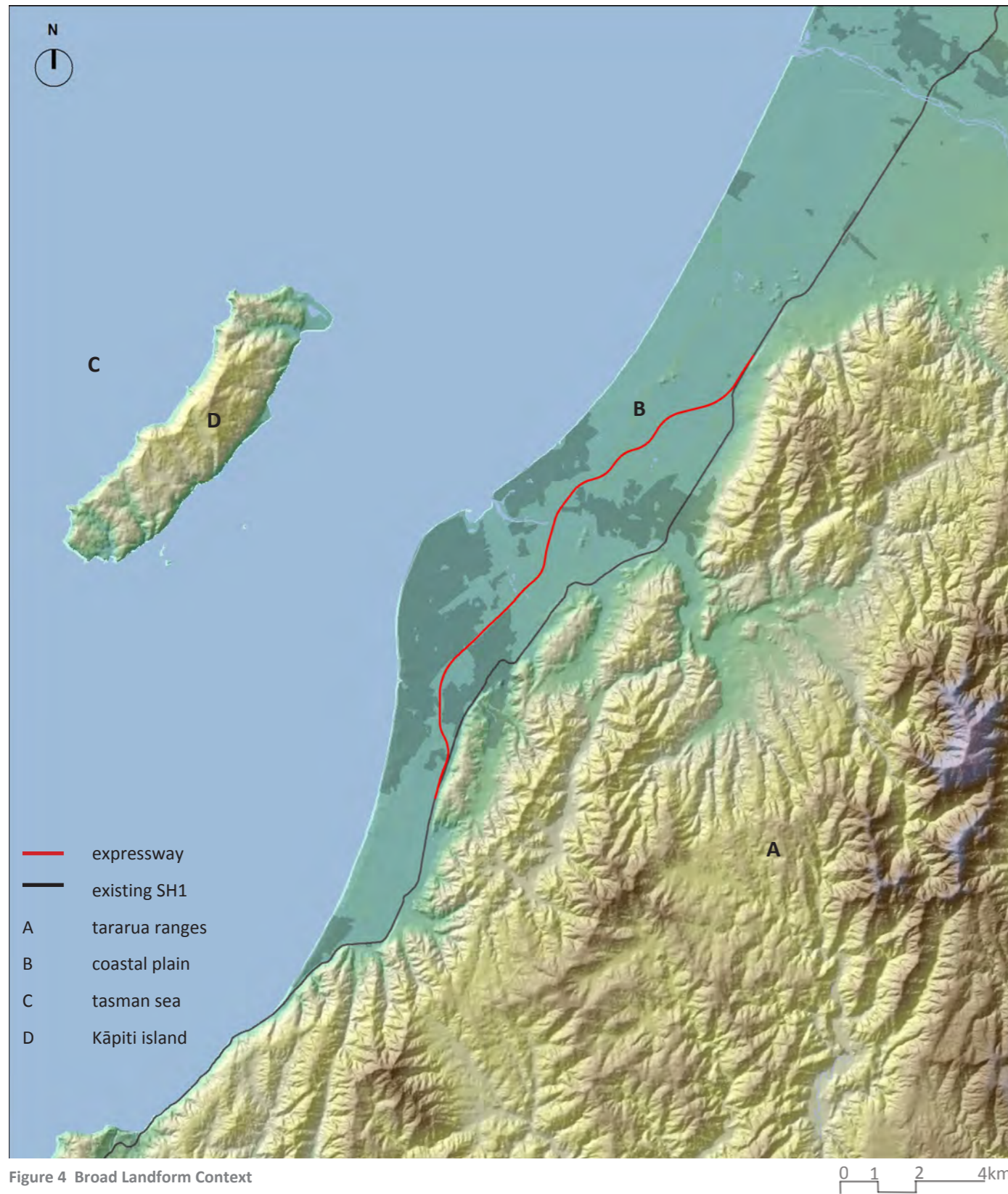


Figure 4 Broad Landform Context



c 1920-1950 looking north from Paekākāriki [ATL 1/4-019755-F ]



1972 Paraparaumu Beach looking east -the large open area in immediate foreground is the golf course [ATL 1/4-020515-F ]



1951 Waikanae looking south - the river can be seen mid ground [ATL WA -68437-F ]

**Legend**

-  - High : 1280
- Low : 0
-  Centreline (Option E6)
-  railway

- A mackays crossing
- B raumati beach
- C raumati
- D paraparaumu
- E paraparaumu beach
- F waikanae
- G waikanae beach
- H waikanae river
- I peka peka beach
- J peka peka



Figure 6 Within QE Park the dune system close to the coast is still intact. Prior to the park's establishment, the flatter areas were historically developed for farming and would have previously been extensive wetlands.



Figure 7 Remnants of the once extensive dune system remain in the Project corridor protected from development by historical road designation



Figure 8 Dunes and wetlands north of Te Moana Road



Figure 5 Landform



### 3.3 Hydrology

Prior to European settlement the Kāpiti coastal plains were a complex network of dunes, wetlands and streams. These networks sustained an ecological system inextricably linked to the natural hydrological processes.

Since the early 1900s the plains have been drained, at first to facilitate pastoral farming and then further drainage has occurred to enable urbanisation and reduce flood risk (refer Figures 9 and 10). The area remains visibly wet in places as, despite the surface hydrological modification, there is a relatively high water table which accompanies the low lying coastal plains. As noted in the landform section of this ULDF, the sub-surface hydrology maintains the conditions that continue to support saturated peat soils.

The drainage of the subject area today comprises rivers, streams (often channelised), wetlands, flood plains, ponding areas, constructed drains and high groundwater. Figure 13 describes the relatively large area identified as flood-prone or with permanent water bodies. It also describes the recognised wetland areas which are now very rare on the coast and in the region generally.

The drainage pattern of the land follows the natural east west gradient inclining from the hills toward the sea. The Expressway corridor runs north-south and consequently crosses numerous waterbodies - now variously modified as drains and rivers.

Potential for surface flooding is high throughout the district because of the relatively flat gradient across the coastal plain and the high water table. Many of the larger, low lying areas are identified as flood water storage areas (they hold water in high rainfall events before it discharges to the constrained drains) and secondary flow paths (they channel water to the coast if rivers overtop), especially in the vicinity of the Waikanae River and Wharemauku Stream.

Urban development has occurred on the higher drier land and the flooding potential of the low lying areas constrains further development on parts of the coastal plain. In some places features have been made of wetlands (refer Figure 12)

The Waikanae River (refer Figure 11) is the largest water body in the area between MacKays Crossing and Peka Peka. Its catchment is the foothills of the Tararua Ranges and it is a distinctive feature of the area. The river has recreational and natural values and is identified in the Kāpiti Coast District Plan as an Outstanding Landscape.

Alluvial material deposited by the river has created a flood plain between the hills and the sea. On the upper plain near the hills, the river cuts through alluvial gravels before flowing through the coastal dunes at Otaihanga and then to the estuary and the sea. Flooding of the river poses a significant

natural hazard in the local area. A flood control scheme including stop banks was first established in 1956-1964. However, even medium sized floods (20 year return period floods) continue to cause damage.

The Wharemauku, Mazengarb, Muaupoko and Waimeha Streams are smaller than the Waikanae River, but similarly drain local catchments at the foot of the Tararua Ranges.

#### Design Implications

1. Maintain and enhance the watercourses that remain with a view to reduced channelisation and more natural forms which can enhance the natural habitat for fish and other animals as well as improved visual amenity.
2. Integrate planning and design with GWRC and KCDC to link in the affected sections for the Expressway with the broader community watercourse network aspirations.
3. Consider the bridging of multiple stream and other watercourse crossings with long spans to keep crossing corridors wide and able to incorporate additional east west walking and cycling Expressway crossing links.
4. Integrate planning and design for flood storage associated with the Expressway in conjunction with other urban development needs and functions, such as at the Paraparaumu Town Centre where open space values can be incorporated and other places as appropriate.
5. Identify and protect the existing natural wetlands from stormwater runoff associated with the Expressway.
6. Replace any existing natural wetland area losses with new contiguous or linked wetland areas.
7. Add new wetland areas that have the dual role of flood storage and stormwater filtration required for the Expressway displacement and runoff.
8. Expand and extend the wetland network utilising the Expressway corridor to link the numerous water bodies utilising the high water table.
9. Design any new wetlands with an appropriate maintenance regime that recognises its function as either natural, or for some form of stormwater management or flood detention.
10. Recognise in the design of the bridge structure the significance of the Waikanae River corridor as a 'mountains to sea' physical, ecological, landscape and recreational link and other features of the corridor including ox-bow and Muaupoko Stream.



Figure 9 Channelised watercourses - such as the Wharemauku Stream have reduced natural values, but provide valued east-west linkages across the coastal plain.



Figure 10 Large areas of damp ground and swampland has been drained for farming



Figure 11 The Waikanae River is the largest watercourse in the Project area



Figure 12 Natural and constructed wetlands are a common feature of the area.



Figure 13 Hydrology



### 3.4 Vegetation

Prior to human occupation, the Kāpiti coastal plain was covered with a diverse mix of vegetation types. Predominant among these were the areas of lowland podocarp forest. This was interspersed with areas of swamp forest (kahikatea, pukatea, hinau, tawa, swamp maire, titoki and puka), areas of raupo reedland, flaxland, cabbage tree and coprosma, as well as sedgeland.

Most of these vegetation types and combinations have now been removed (refer Figure 19) to facilitate farming (refer Figure 14) and more latterly urbanisation (refer Figure 15). The original forests and dune wetlands now occur as isolated fragments and pasture is the dominant vegetation cover (refer Figure 16).

Several small remnants of lowland forest and scattered groups of trees persist; some of them have protection. Most remnants are located north of the Waikanae River where there is a lower intensity of urban development. Small areas of regenerating indigenous vegetation are also present, such as the prominent stand of semi-mature kanuka on the dunes at the southern end of the Expressway corridor, and groups and small of kanuka at various other locations. The lack of connectivity between the fragmented indigenous plant communities reduces the potential to prolong and enhance their overall ecological health and biodiversity.

Mature exotic trees feature in places. Typically these are grouped around rural dwellings as shelterbelts, or erosion control planting in the river corridors, or amenity planting in rural and urban areas. In places, there are individual mature amenity trees that were once part of a larger group of trees or a shelterbelt when the area was farmed but with closer subdivision the rest of the stand or shelterbelt was removed. These trees, while not significant in terms of type or stature, still contribute to the overall landscape character of the area.

At Waikanae (refer Figure 17) there has been a strong tradition of tree planting and gardening and it is well known for this today. The sandy soils on the coastal plain make the sustainability of exotic vegetation challenging. It is in the areas north of Waikanae where some of the more natural vegetation and wetland areas remain (refer Figure 18).

#### Design Implications

1. Reinforce and supplement existing forest remnants where they can be extended into the Expressway designation corridor.
2. Recognise the value of all woody vegetation in terms of integration of the Expressway into the landscape; retention of existing amenity trees and shelterbelts can assist with landscape integration and mitigation.
3. Reflect existing vegetation patterns and species mix in mitigation planting, using both exotic and native plant species, but with a predominance of native species.
4. Avoid the same vegetation treatment along all of the route and use site specific plant options and layouts that reflect the varying contexts.
5. Consider maintaining the open aspect to the rural areas and integrating the farming practice into the corridor.
6. Provide for local biodiversity through establishment of locally sourced indigenous species along much of the Expressway corridor.
7. Carefully select plant species that will be sustainable within the corridor, recognising the climatic conditions and soil types there and use types that require minimal maintenance after establishment.
8. Aim to utilise alternatives to willows along waterways in consultation with GWRC.
9. Utilise existing scrub vegetation in undisturbed areas and where practicable as a nursery for new plantings.
10. Include provision for monitoring and maintenance of new plantings, ecological and landscape treatment.



Figure 14 Rural scale vegetation typically consists of exotic species such as pine and willow.



Figure 15 The vegetation amongst the residential and rural areas in combination with wetlands provides an eclectic mix



Figure 16 Remnants of indigenous vegetation remain in places, typically on steep ground and damper areas



Figure 17 Waikanae 1947 A tradition of amenity planting contributes to its 'garden suburb' identity [ATL WA-08815-F]



Figure 18 The area north of Waikanae today where, although much of the original vegetation has been removed, natural landforms and remnants of wetland areas are most intact.





Figure 19 Vegetation

0 0.5 1 2km

### 3.5 Ecology

The Expressway is within the southern end of the Foxton Ecological District which extends along the coastal margin between Paekākāriki and Hawera in Taranaki. The Foxton Ecological District comprises one extensive land system; referred to as 'sand country'.

Most of the ecological district, including Kāpiti, has been highly modified by over a century of vegetation clearance and swamp drainage.

The Wellington region overall has lost approximately 97.5% of the wetlands that existed prior to 1840. As wetlands are now so poorly represented in this region most of those remaining, irrespective of the state of modification, are generally considered to be ecologically significant. A desktop ecological assessment identifies 39 distinct areas of identified ecological significance, almost all comprising wetlands or water bodies.

The historical nature of the Expressway corridor's wide reservation for a road purpose combined with subsequent land purchases by NZTA and KCDC has left many of these ecological features relatively unmodified.

The hydrological systems of the coast are fundamental to the sustainability of the wetlands and these will be susceptible to damage from soil compaction, filling with impervious materials, or changed drainage connections.

Many of the existing wetlands are under pressure from invasive weeds and long-term management (including hydrology), need to be taken into account in planning for any enhancement or supplementation with new wetland areas associated with the Expressway.

Water bodies such as drains, streams and rivers located along the Kāpiti Coast are recognised as providing habitat for rare or threatened freshwater fish species (refer Figure 20), including giant kokopu, brown mudfish and long-finned eel. These will be susceptible to road run-off and stormwater contaminants.

The Kāpiti coastal area is also home to a number of indigenous bird species, some of which are nationally threatened. The nature of the fragmented ecological areas along the Kāpiti Coast, combined with the presence of Kāpiti Island and the large Hemi Matenga Scenic Reserve and Taranaki Range, means that the continued east-west movement of bird species between these fragments is important to their sustainability.

In addition to providing habitat for birds, the isolated stands (Figure 21) of regenerating manuka, kanuka and mahoe along the Kāpiti Coast may provide habitat for lizards.

#### Design Implications

1. Replace any existing natural wetland area losses with new contiguous or linked wetland areas.
2. Add new wetland areas that have the dual role of flood storage and stormwater filtration required for the Expressway displacement and runoff.
3. Expand and extend the wetland network utilising the Expressway corridor to link the numerous water bodies utilising the high water table.
4. Design any new wetlands with an appropriate maintenance regime that recognises its function as either natural, or for some form of stormwater management or flood detention.
5. Utilise and enhance existing wet depressions as components in the stormwater and flood detention design.
6. Utilise east west hydrological connections as habitat corridors across the Expressway in suitable locations.
7. Develop planting and stormwater treatment wetlands to reflect existing vegetation patterns and provide additional habitat to freshwater fish and bird species.
8. Enhance the local biodiversity through establishment of locally sourced indigenous species along much of the Expressway corridor.
9. Ensure stormwater is sufficiently treated within filtration areas such as swales and wetland areas prior to entering water bodies.



Figure 20 Numerous wetlands and streams provide a range of fish and invertebrate habitat.



Figure 21 Small remnants of indigenous lowland forest in the vicinity of Ngarara provide the basis of a wildlife corridor linking the ecologies of the coast and mountains.

**Legend**

- Areas identified as having high ecological value
- Expressway
- Railway
- Local roads
- State Highway



Figure 22 Ecology

0 0.5 1 2km

### 3.6 Heritage

The Kāpiti coast has always been a highly desirable place to live - radiocarbon dating suggest people were present there in the 14th century. This long history of use over time has generated many places of cultural heritage interest. A detailed description of the history of the use and occupation of the area is provided in the Archeology and Cultural Heritage Technical Reports (Technical Reports 10 & 11 Volume 3).

Archaeology on the coast can be divided into three broad areas:

- Pre-European Māori occupation

The predominant site types on the coast are middens and ovens, with the shell middens reflecting the high reliance on the sea for subsistence. Burials also occur moderately frequently in the shifting sands.

Māori were utilising the rich resources of the sea and coast, seen in the high number of middens. They were also utilising the resources of the numerous wetlands, including flax, eels and birds. Areas of stable soils were gardened.

- Post contact Māori occupation

Post contact Māori occupation is marked by the continuation of existing subsistence activities and adoption of new ones. Grown crops included wheat and white potatoes, and steel fishhooks were utilised. Māori worked on the whaling stations that sprung up along the coast, and in new industries including flax milling.

- Early European occupation

Early European archaeology includes both commercial and residential sites. Remains of houses and farms, including the buildings themselves survive on the coast, as do remains of early churches such as Hadfield's church at Kena Kena. The railway line built in 1889 is an archaeological site in its own right.

In general there is a prevalence of known archaeological sites across the subject area (refer Figure 23), but with an emphasis on coastal locations and areas north of Waikanae River.

Specifically and in relation to the Expressway route the area around Waikanae River is important and the history of use and occupation of this area by Māori has left a legacy of physical evidence and remains, continued use and occupation (Takamore) as well as strong associations with the place.

More recent European historic heritage values coexist in this location with the Greenaway Homestead (corner of Kauri and Pururi Roads) being the most well known. There is no other recognised European historic heritage within the route area.

#### Design Implications

1. Engage with iwi in the Project design to identify how the route alignment options and the landscape of the Expressway can best be designed to provided for Māori cultural values.
2. Consider the known sites, identify the significance of these, and aim to avoid these as far as possible. However, recognise the avoidance of all sites will not be likely given the many known and still unknown sites.
3. Consider the opportunities to enhance the awareness of the heritage in the way the Expressway and associated structures, pathways and other elements are designed.



Figure 21 Urupā (burial ground) is a significant site and is in continued use



Figure 22 Maketu tree is a significant site - there is a grave within the tree



Figure 23 Aerial oblique which shows the hill with the urupā grassed area and maketu tree in the distance

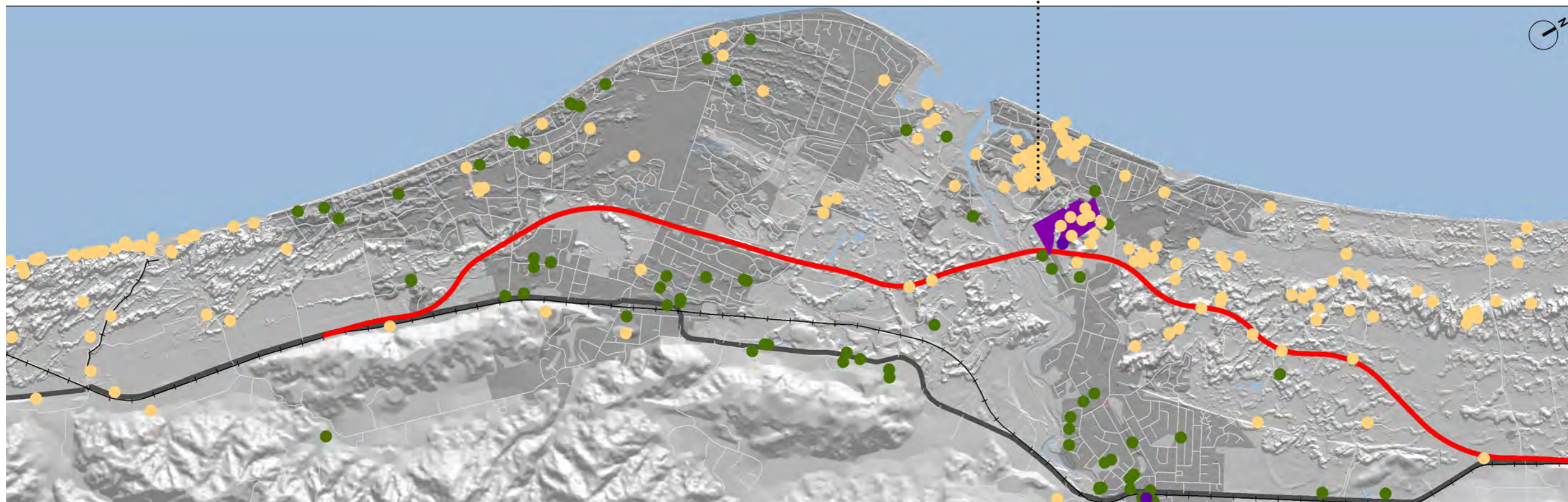


Figure 23 Known Historic Heritage Sites

### 3.7 Land Use and Built Environment

The area of the District through which the Expressway passes has a range of land uses (refer to Figures 29 and 30 Landuse Plan) and densities of use typical of a New Zealand urban area. The Kāpiti area started its urban life as a series of beach communities and the lateral connections from the existing SH1 leading to the beach places are evident (refer to Figure 24). The existing beach settlement at Peka Peka is typical of the settlement form that would have existed at Raumati, Paraparaumu and Waikanae Beaches at one time.

There are some sections where there are wide gaps between east/west links from the existing SH1. There is also a gap between north and south communities at Waikanae and Paraparaumu because of the intervening Waikanae River.

The older parts of the District's urban areas retain some of the beach settlement character. This is particularly evident at Raumati and Waikanae Beach where smaller scale buildings were constructed within the dune forms.

With improved access to transport since the 1950's the coast developed rapidly and with a more suburban character. The original designation for the "Sandhills Motorway" (MacKays to Peka Peka Expressway broadly follows) occurred at this time.

Much of the former dune landscape has been subsumed by development. Typically this more recent development has filled in around the beach settlements and spread back to and out from the main centres at Waikanae and Paraparaumu.

Notable in the District is the senior living residential land use. There are many 'retirement villages' as well as people of an older age living independently in the District. The same lifestyle has attracted people of working age with a share of local employment and commuting to larger centres for work.

The identity and naming conventions of the District's urban areas continues to follow the pattern established historically - a string of 'beach' communities (Raumati Beach, Paraparaumu Beach, Waikanae Beach, Peka Peka Beach); and the inland communities (Raumati, Paraparaumu, Otaihanga, Waikanae).

The point at which these communities become 'beach' or inland places is typically at or west of the Expressway designation. This is a function of the age of the highway designation and its width which provides a relatively wide corridor break and includes within it remnant dune landforms.

The development of the town centres at Waikanae and Paraparaumu is relatively recent. At the largest and regional centre of Paraparaumu the centre is based around a mall with civic facilities separated away. Plans for a town centre with a higher level of public amenity have been in train for some time.

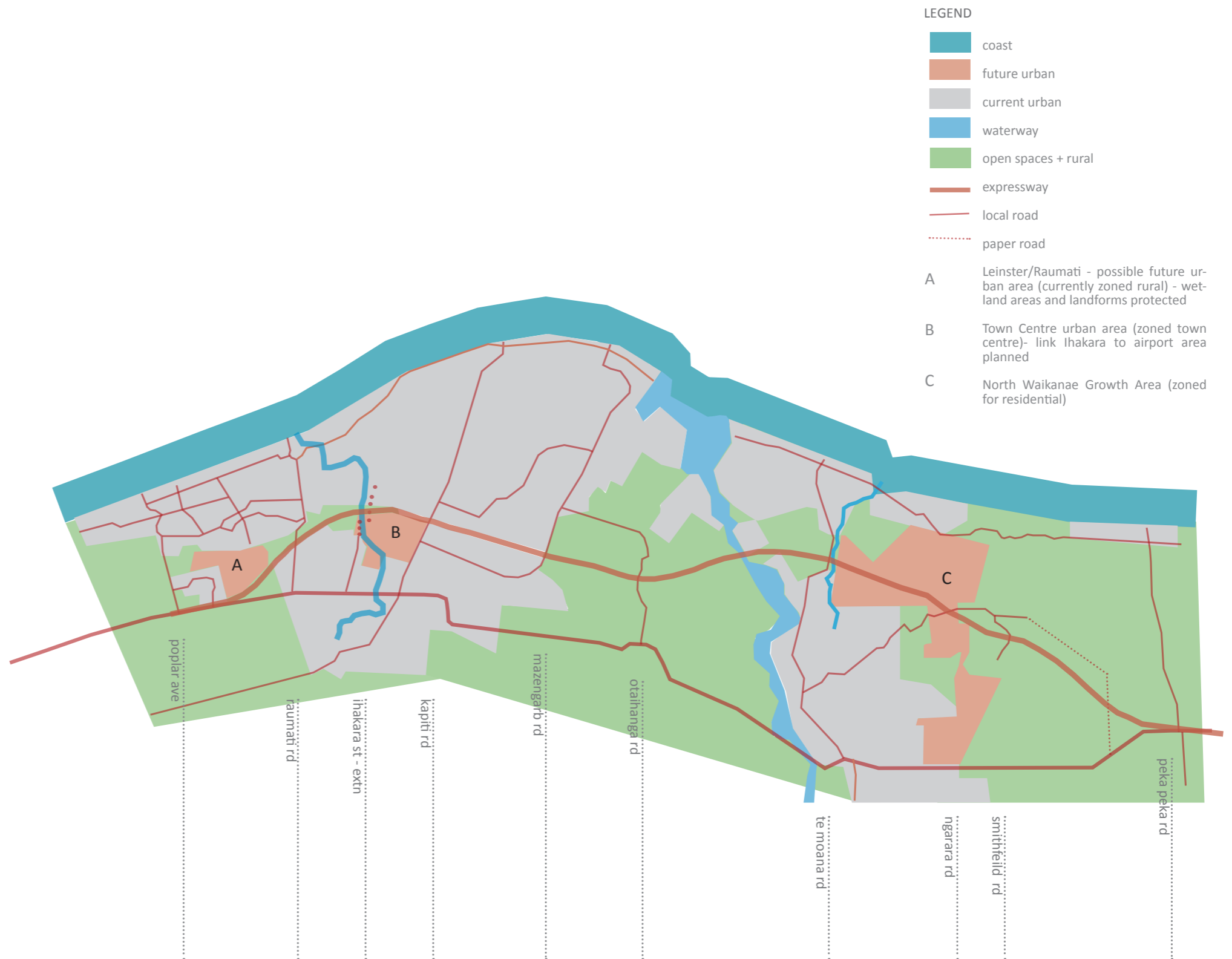


Figure 24 [diagrammatic only] Urban areas and east west connections

## Residential

Raumati South, Raumati Beach and Paraparaumu Beach are old established neighbourhoods located close to the coast. These residential areas have good access to local centres - speciality shops, schools, entertainment, community facilities and parks - within 1km to 2km for the majority of residents. The land use, street pattern and pedestrian links enable a movement between residential areas and local centres and community uses either by vehicles, pedestrians or bicycles. The older areas have a more organic and informal street character which appears to be popular for walking (refer to Movement Network section 3.9).

In the section from Poplar Avenue to Raumati Road the adjacent uses to the Expressway are residential and these tend to be suburban type (low to medium) densities and houses of a more recent age.

The exception is in the land at the rear of the Main Road properties where the sites are larger and reflect the pocket of rural zoning. There are opportunities for this area to change in due course, subject to appropriate Plan Changes, to enable residential use and protect natural values there.

Many of the properties in this section around Leinster Avenue and off Matai Road are in elevated locations reflecting the dune system here. From Raumati Road to Ihakara Street area most of the residential areas have wide separation distances from the Expressway, and much of this land is open - much of it is being leased for use as a pony club north of Raumati Road.

The residential areas between Kāpiti and Mazengarb Roads have parks, schools and community uses in the vicinity. The sub-regional centre - Paraparaumu town centre - is within 1 to 3kms from these residential areas but the street pattern, streetscape, built form and land use do not create a pedestrian and cycle friendly environment. The relationship of residential properties to the Expressway corridor is very marked, as subdivision and development has occurred up to the edge of the existing designation.

The residential areas between Mazengarb Road and Waikanae River are relatively isolated and disconnected from the other areas and main centres. They are typically rural residential in density. Access from and to these areas is mainly by car. The areas have no local centres or community amenities, streets are generally disconnected and land use is generally residential in nature.

The residential areas of Waikanae, in the vicinity of the Expressway corridor, are a mix of older and newer houses. Some of the properties are relatively large.

At Pururi Road the suburban street sits proximate to the Waikanae River - between this area and Te Moana Road the properties tend to be larger with extensive gardens or grazing space - a market garden operation utilises part of the designated land here.

Waikanae Beach and Peka Peka Beach have an informal beach character. Streets are generally low speed environments and conducive to safe walking and cycling activities. However, the predominantly residential use of this area (only a few shops and cafe) and the lack of community facilities and schools make the area dependant on driving trips to the Waikanae Town Centre area.

The residential areas close to the Waikanae Town Centre (residential areas to the east of the proposed SH1 re-alignment) are within 5km of the Town Centre. The area is well serviced with recreational activities, schools and community amenities. The street pattern is not well interconnected, which may compromise the accessibility to centres and community uses.

In general, many of the senior living areas are enclosed retirement village precincts located adjacent to industrial land and/or on areas with poor street connectivity and distant to local shops and community facilities.

The District Plan has been changed [refer to District Policy] to enable urban growth with the principal area for this being Waikanae North Low-Impact Urban Area. The north Waikanae area is currently used for rural activities but has been rezoned to allow a range of residential densities, and commercial and community uses in the future [refer to Figure 30].

The growth plan is also to retain the rural gap [Otaihanga] between Waikanae and Paraparaumu town centre and again north of Waikanae towards Peka Peka beyond the growth area described above.



Figure 25 Above: Raumati area looking south - the pony club is in the foreground - the roughly north south streets are Kiwi Road and Matai Road

Figure 26 Right: Kāpiti to Mazengarb Road section with the clearly delineated designation and relatively new houses built up to it



Figure 27 Above: Mazengarb to Otaihanga Road section - the pine forest is where the Expressway designation runs and the properties are at rural residential densities



Figure 28 Above: Te Moana Road area - a mix of larger properties and suburban densities - the ploughed paddock is where the Expressway runs. Closer to the river is where the Kauri and Puriri Road properties are located.

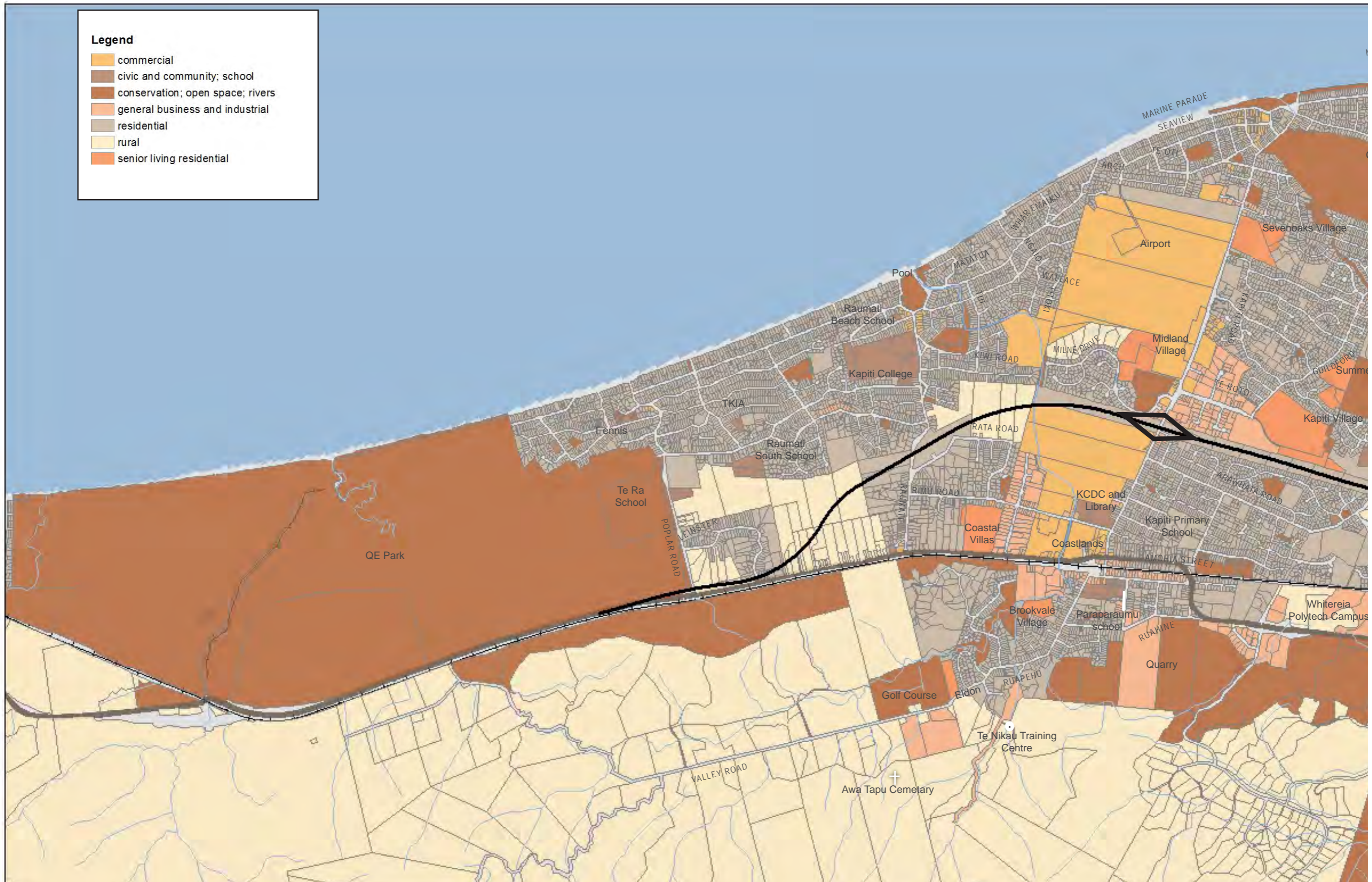


Figure 29 Landuses - south end - Note landuse generally based on District Plan zone types - some items will have an underlying zoning different than the land use



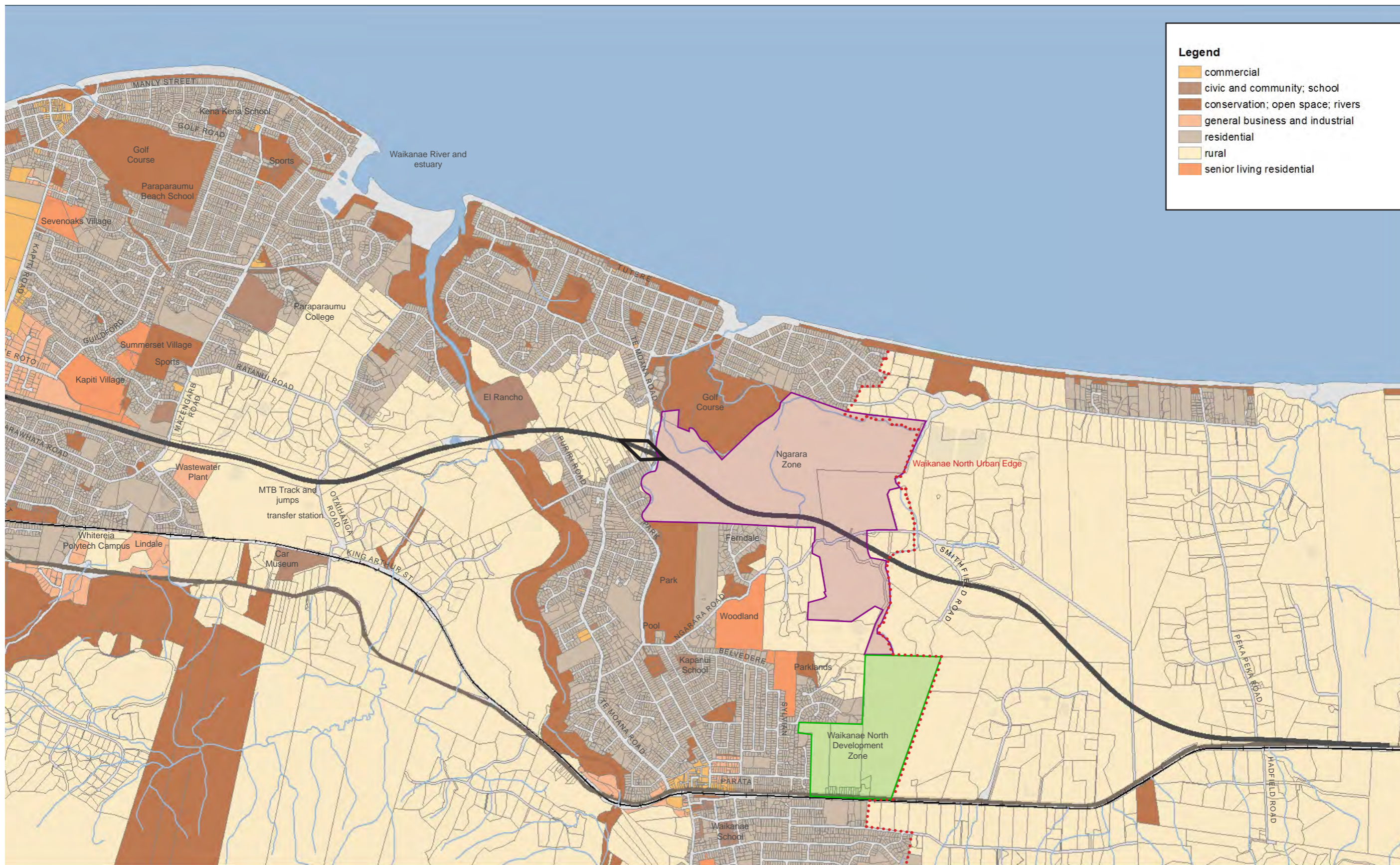


Figure 30 Landuses - north end Note landuse generally based on District Plan zone types - some items will have an underlying zoning different than the land use

## Rural

South of Raumati the Queen Elizabeth Park is rural in nature and provides an open landscape between Paekākāriki and Raumati. From Raumati north and through Paraparaumu the land is generally urban or zoned for urban uses. Because the Expressway corridor of currently designated land is relatively wide and, especially when considered in the context of large vacant areas of land, such as at Paraparaumu Town Centre, there is an impression of ruralness which belies its zone as urban.

At Otaihanga between the urban areas of Paraparaumu and Waikanae there is a large area of rural zoned land. This area provides a planned open space break between the towns. North of Waikanae the land uses are again more rural in nature, but with the areas contiguous to Waikanae's north edge being planned as urban. However, the form of this development to urban north of Waikanae has been carefully planned as linked but discrete areas of development within an open space context.

The existing SH1 traverses rural land north of Paraparaumu (Otaihanga) and this has been purposefully maintained as rural in reflection of the KCDC growth plan. There is an increased risk of pressure to urbanise this rural land should the highway 'limited access' status be uplifted. For the purposes of maintaining the KCDC growth plan, strategies to discourage urbanisation will need to be applied to the areas where urban growth is not considered desirable.

## Industry and General Business

Light industry and general business are generally located near the Paraparaumu and Waikanae Town Centres and along Kāpiti Road. This visual amenity of Kāpiti Road is poor. There are a few sites, generally located to the east of the existing SH1, which carry out primary industrial activities.

## Airport

The airport at Paraparaumu has recently undergone a change of zone to allow for commercial business development in conjunction with its upgrade as a regional airport. It is anticipated that this change will generate more options for national air travel to other major centres. It is also expected to generate increased business and employment opportunities locally and along with additional traffic (freight and private vehicles) movements on local roads - particularly Kāpiti Road and a future Ihakara Street extension.

## Local Centres - small shops / services / entertainment

The smaller beach centres range in scale and character but can be classified as local centres. These centres are easily accessible by the local residents. Buildings are predominantly single or two storey, except at Paraparaumu Beach where there are taller buildings that include residential apartments. There are no local centres on or adjacent to the Expressway route.

## Regional Centres

Paraparaumu Town Centre and commercial area is bounded by Kāpiti Road to the north, the railway line to the east, residential areas to the south and the Expressway corridor to the west. It is the main centre for Kāpiti Coast and contains a range of large format retail, light industry, general businesses and civic and community activities. Some of these are located in Industrial/Service areas across the railway line to the east.

The built form, site planning and type of activities promote a vehicle oriented environment, with high traffic volumes on the nearby roads. There is a large portion of commercial vacant land to the west of Rimu Road which is currently zoned for future "Town Centre".

The Kāpiti Road business area has a mix of light industry, general business and large format retail activities. The Expressway corridor runs to the immediate east of this business area. The built form and traffic/parking system favours vehicle movements to the detriment of visual and pedestrians use. Kāpiti Road has high traffic volumes.

There is a rail line to the east of the town centre and adjacent to the existing SH1. This station provides access to passenger transport services into Wellington as well as north to Waikanae. The line has undergone recent upgrades to provide a more reliable service.

Waikanae Town Centre has a mix of small commercial activities in the centre of the block between Te Moana Road and Ngaio Road. The small shops are planned around an internal public square. A strip of some 15 shops front the west side of the existing SH1 and sections of this have parallel parking that .

The pedestrian street and square have established planting and a number of public art works. Large format activities, general business and light industry are located at the edge of the block, and between Ngaio and Kapanui Roads.

At Waikanae the older part of the centre is to the east of the existing SH1 and is where a burial ground, parks, church, and hall are located. Waikanae also has a rail station on the main line with passenger transport services south to Paraparaumu and Wellington.

The existing SH1 has generated large traffic volumes and crossing restrictions at both of the town centres. The build up over time of the highway's traffic volumes and the fitting of this level of traffic into centres which were not planned to provide for this use has seen some poor urban conditions result.

These results include separation between the east and west parts of these centres and the residential areas on either side, as well as between rail stations and the commercial centres on the west. The highway has also generated limitations to the access across and uses that are possible along it as well as inhibiting the development options for both of these town centres.

## Schools

There are schools either near to the proposed Expressway or with a sub-regional function that need to be considered in terms of accessibility (refer to School Accessibility Plans in Movement Network section 3.9).

- **Te Ra Waldorf School** (Raumati South) is a Steiner school with a sub- regional catchment located on Poplar Avenue. It would have had to be relocated if the currently designated route was proceeded with. The proposed route allows the school to remain.
- **Raumati South School** (Matai Road) is a state primary school with a local catchment. It is adjacent to the current designation and would have been affected if that route was proceeded with.
- **Kāpiti College and Paraparaumu College** are state secondary schools that, while not physically close to the alignment, draw pupils from a regional catchment (including Waikanae).

Early Childhood Education Centres are scattered across the district. Children often attend crèche facilities based on the availability of places rather than proximity to their homes, but kindergartens and play centres tend to draw a local roll.

Whitireia Polytechnic has a campus at Lindale. Kāpiti Air Academy (run by the Kāpiti Aero Club and Whitireia Polytechnic) at Paraparaumu airport is a regional facility for professional pilot training.

## Health and Emergency Facilities

There is a concentration of medical facilities around Coastlands and Kāpiti Road. The Paraparaumu Medical Centre (92 Kāpiti Road) is directly adjacent to the existing designation on Kāpiti Road.

The Kāpiti Health Centre in Warrimoo Street in Paraparaumu is a regional facility that provides a comprehensive range of medical services, including outpatient clinics, maternity services, community health and community mental health services for the people of the Kāpiti Coast. There are maternity beds at the centre along with a birthing suite and delivery room. Multidisciplinary assessment and treatment programmes for the community's elderly are also based there. There is a health centre located on Mazengarb Road and medical centre at Waikanae. Emergency and surgical patients are treated at hospitals outside the Kāpiti District. This facility is located away from the designated route.

The Paraparaumu Police Station is on the corner of Rimu Road and Kāpiti Road, and there is a community constable based in the Waikanae town centre at Mahara Place in Waikanae. There is a volunteer fire station at Te Moana Road. The fire station in Paraparaumu is on Te Roto Drive and there is a small ambulance base at the medical centre.

## Design Implications

1. Maintaining wide corridors within the designation extent will be important to buffer the Expressway from adjacent residential uses.
2. Destination activities - eg airport, town centres and schools - will benefit from connections to the interchanges provided those connections are readily accessible from local road networks.
3. Freeing up the existing SH1 from highway traffic enables the design of the town centres to be designed to function more positively and with higher amenity, including better connections between the centres and railway stations.
4. Options for the Expressway should be designed to avoid effects on schools and to encourage the safety and directness for walking and cycling access.
5. Beach community residents and visitors will need to pass across the Expressway regularly and this movement needs to be visually, functionally and safely provided for. This includes interchange design to facilitate local road movements by pedestrians and cyclists.
6. The opportunity should be taken with the Expressway interchange design at Paraparaumu to set a positive precedent for the quality of the of whole of Kāpiti Road.
7. Design approaches should discourage urban growth at Otaihanga, Te Moana Road and Peka Peka.
8. The future development of residual areas of the Expressway designation (such as at Raumati) and at planned growth areas needs to be considered in the design especially in terms of connections, to, from and within these areas, as well as the protection of recognised features.

### 3.8 State Highway 1 Design

The 14.4 km of the existing State Highway 1 (SH1) will be handed over to KCDC by NZTA when the Expressway becomes operational.

The process of design for the Expressway has included consideration of the existing SH1 context and has identified opportunities for what its future condition may best be to serve the needs of the community and in accordance with the Project Objectives including:

*The nature and scale of the existing State Highway 1, especially at Waikanae and Paraparaumu town centres, delivers a viable and attractive roading and access system for local needs (i.e. is able to accommodate the impacts of projected passenger transport movement and growth, vehicle, pedestrian and cycle movements and enhances those town centres).*

This process has included discussions with KCDC and NZTA as well consultation in the wider community (see Consultation section 4). It is important to note that although the future for the existing SH1 is being considered, the funding of any revitalisation or changes will need to be determined by NZTA and KCDC. Much of the description of the existing environment above (and below) relates to the existing SH1 also. Specific points particular to the the existing SH1 context are provided below.

#### Land Uses

As described in Figure 31 the existing SH1 has a series of rural, suburban and urban (town centre) uses along its length. Of particular note is that Paraparaumu and Waikanae are currently bisected by the existing SH1. Over time the centres have developed with most of the retail and civic activities away from the existing SH1 - a response to limited access opportunities, parking and amenity constraints as well as to provide for retail growth (refer Figures 33 and 34) . The growth has been in a westerly direction which mirrors residential urban development.

Large sections of the highway are rural and the rail line is approximately parallel for much of the length. The two rail stops at the town centres are adjacent and east of the highway. The suburban (residential and other commercial) uses around Paraparaumu typically gain access from the existing SH1.

#### Edge Condition and Connections

From the existing SH1 most of the connections are towards the coast and the main population areas. There are only three places where significant local road connections extend east. The edges of the existing SH1 have for some time been controlled by the limited access status that applies to state highways. This has actively discouraged uses that front and gain access from it. However, historically the highway facilitated connections to the properties along its length and

through the older urban sections of the route such as south and north of Paraparaumu there are many residential and commercial property connections.

At Waikanae the west side of the highway accommodates some retail activity and parking is provided in short sections. Most of Waikanae's town centre activities occurs from access via a mall to the west with access from back streets.

#### Road Environment

The road width varies from four lanes to two operational lanes with turning lanes and flush medians at some places. Through rural areas the highway is typically two lanes with passing lanes in some sections. There are two bridge locations (Waikanae River and the Paraparaumu rail over bridge) where the highway is at two lanes. The Waikanae Bridge and Paraparaumu Bridge would require upgrading were the highway to remain and both have poor cycle/walking facility currently given their narrow width. There are many places where local road intersections exist and some of these are known safety issues.

The road carries a significant traffic load (26,900 vpd at Kāpiti Road) and is frequently congested at peak times and holidays as its carries much of the traffic in and out of the region. This volume of traffic will significantly decrease when the Expressway becomes operational.

There is some limited amenity in the form of footpaths through parts of the urban areas. The sealed road cross section varies from 11m to 28m in width. Stormwater runoff typically drains to pipe networks or to adjacent land for natural soakage.

#### Design Implications

1. Consider the future speed environment desired and the changes in the road widths, intersections and edge conditions needed to encourage that speed
2. Look to enhance the connections across the road between town centres and the rail stations opposite.
3. Consider the use of former highway seal width for walking and cycling paths
4. Consider intersections improvements using roundabouts or signals to facilitate easier use of the former highway by local traffic.
5. Look for opportunities to improve stormwater quality by filtering by swales prior to soakage or discharge to the reticulated network
6. Look to improve visual amenity by tree planting and to enhance the identity as a local arterial road

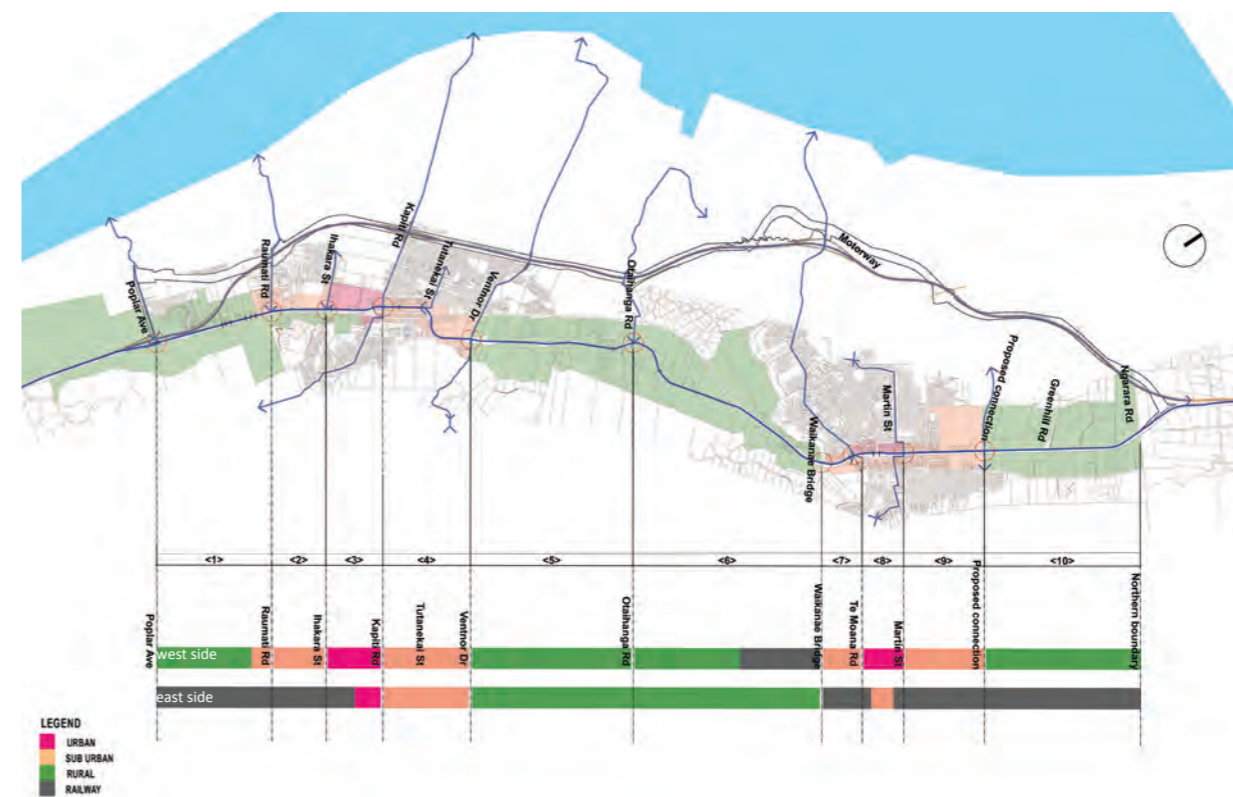


Figure 31 Land uses along SH1 (source: Kevin Brewer)



Figure 32 SH1 looking south of Paraparaumu - residential property access driveways are visible to the right



Figure 34 SH1 looking down at Paraparaumu town centre - carparking and large format retail is dominant - the rail station is on the right



Figure 33 SH1 at Waikanae - the rail station is on the left and a few shops fronting the highway are visible on the right



Figure 35 SH1 looking south towards Waikanae and Peka Peka Road in foreground -rural context

### 3.9 Movement Networks

The movement network within the Kāpiti District is provided by a combination of a hierarchy of roads and streets as well as pathways and other non-vehicular linkages. This network is used by vehicles, walkers and cyclists as well as recreational users such as horse riders. There is a public transport system in the form of a bus service as well as inter-regional trains with stops at Waikanae and Paraparaumu. There is also an airport at Paraparaumu on Kāpiti Road which began a regional service of flights in late 2011.

KCDC expresses its aspirations and supporting policy [refer to Policy section] towards developing a movement network that enables and encourages walking and cycling activities as well as horse riding. Walking and cycling is promoted as both a commuting and recreational mode of movement for people and can utilise both on road and off road facilities.

This section of the ULDF describes key attributes and functions of the movement network and concludes with key considerations for the design for the Expressway. These are in turn addressed in section 6 of the ULDF. The movement networks are of interest to urban design (as different to traffic planning which maybe more focussed on efficiency of movement) because:

- movement is also an experiential aspect of life that means the quality of that experience is influential to the quality of life. The visual sequential experience and views, ease of use, and clarity of routes are all of interest to urban design.
- movement choice is an aspect of social equity and accessibility that means alternatives to vehicular modes and making an urban area permeable to easy movement for non-vehicular modes, need recognition in the design of movement infrastructure projects such as MacKays to Peka Peka .
- connections to and within the movement network are influential on urban form and land use development and the pattern of that network can either promote or inhibit certain types and qualities of urban form.

#### Highways, Roads and Streets

State Highway 1 (SH1) is currently the busiest vehicular route and conducts traffic both within the district (i.e. between the towns and communities) as well as regionally and nationally within the North Island (see Table 2). It is identified as a National / Major District Arterial in KCDC's District Plan (refer to Movement Network Hierarchy Plan Figure 38).

The highway is a combination of two lanes and four lanes where space has allowed.

The Expressway will replace the current highway and it will revert to an arterial level road with a consequent reduction in traffic volumes. The existing SH1 presents opportunities for revitalisation as a local arterial.

The position of the existing SH1 within the district is such that it was developed along a line which follows the base of the sloping hills that runs approximately north south.

Most of the communities within the area of the proposed expressway route have developed from lateral roads extending west to the coast from the existing SH1. These roads typically have extended in relatively straight lines across the flatter coastal plain south of Paraparaumu and sometimes cut through (eg Poplar Ave, Raumati Road, Mazengarb Road) the roughly north south oriented dune system. The roads have then wound around these dune forms where they are more complex closer to the coast. They have various levels of traffic use (refer to Table 1).

Only at Paraparaumu and Waikanae have the communities been able to extend a street pattern and urban areas east of the existing SH1 to any significant extent. This has been enabled by the flatter openings in the hills generated by stream valley erosion creating flatter land in their base.

North of Paraparaumu and at Waikanae the laterals (eg Otaihanga and Te Moana Roads) are less linear - a function of dunes closer to the existing SH1 at Otaihanga and the Waikanae River shape at Waikanae.

The local roads and streets are typically one lane in each direction (Kāpiti Road is wider in its mid section). The local roads are constrained in some places by the topography and although many have footpaths, the development of on road and some off road cycle paths is a work in progress (refer to Cycling and Walking section).

It is noted also that there are residential areas where there is only one point of access which is to the current highway. At places - such as Hadfield Road - where these relate to potential expressway/existing highway interfaces these need to be integrated into the design of new Expressway intersections/interchanges. Where these areas - such as at Elizabeth Street - will continue to connect to the former highway the accessibility can be expected to improve as a result of lowering traffic volumes and opportunities to recalibrate the intersections to provide better vehicle as well as walking and cycling function.

The various communities of the district are accessed by a combination of the current highway and/or via secondary roads as follows:

- **Raumati South** is accessed by the existing SH1 via Poplar Avenue and connected to Raumati Beach via Rosetta Road and Matai Road/ Hillcrest Road / Hillcrest Road North. These three road corridors are classified as

Secondary Arterials in the District Plan. The residential enclave around Leinster Avenue is accessed directly off the existing SH1 or via Poplar Avenue.

- **Raumati Beach** is accessed off the existing SH1 via Raumati Road and connected to Paraparaumu Beach through Matatua Road / Wharemauku Road / Marine Parade. Raumati Beach is connected to Paraparaumu town centre by Rimu Road. Both these road connections are classified as Secondary Arterials in the District Plan.
- **Paraparaumu** straddles the existing SH1 and is accessed from local road connections with the highway. The main intersections are at Ihakara Street, Coastlands Parade, and Kāpiti Road which has traffic signals. Unsignalised connections are at Kāpiti Lights, Amohia Street, Hinemoa Street, Buckley Grove, Rimutaka Street and Ruahine Street. The principal connection to the east of the highway is Ruapehu Street. Some properties have direct access to and from the existing SH1. An important connection to Paraparaumu is also provided by Te Roto Drive and Arawhata Road which connect through to Otaihanga and via the existing SH1 to Waikanae to the north.
- **Paraparaumu Beach** is accessed via Kāpiti Road. The loop comprising Kāpiti Road, Manly Street, Ngapotiki Street, Te Kupe Road, Mazengarb Road and Arawhata Road provides an alternative link between the beach community and the town centre. This loop is identified as a Secondary Arterial in the District Plan. A grid of interconnected streets provides numerous connections between Kāpiti Road and Mazengarb Road.
- **Otaihanga** is accessed off the existing SH1 via Otaihanga Road and links to Paraparaumu via Ratanui Road and Mazengarb Road. Both Otaihanga Road and Ratanui Road are classified as Secondary Arterials in the District Plan. There is currently no legal road connection between Otaihanga and Paraparaumu Beach.
- **Waikanae**, like Paraparaumu, straddles the existing SH1 and is served by a number of local road connections and by direct access for those properties on the existing SH1. The location of the railway parallel to the highway limits access to the east of Waikanae to a single crossing point at Elizabeth Street. On the western side, the main intersection with the existing SH1 is Te Moana Road which has traffic signals. The only road connection between Waikanae and Paraparaumu is along SH1. There are significant levels of vehicular traffic movement between the community of Waikanae and Paraparaumu given the relative location of schools, services and retail facilities.

- **Reikorangi** is a rural residential area to the south-east of Waikanae. It is accessed off the existing SH1 via Elizabeth Street which becomes Reikorangi Road, a Secondary Arterial in the District Plan.
- **Waikanae Beach** is accessed via Te Moana Road and connects to Peka Peka via Rauparaha Street / Huiawa Street/ Field Way/William Street/Rutherford Drive / Paetawa Road. This link to Peka Peka is classified as a Secondary Arterial in the District Plan. There are no road connections between Waikanae Beach and Paraparaumu Beach or Otaihanga.
- **Peka Peka** is accessed off the existing SH1 via Peka Peka Road. As mentioned above, it is also linked to Waikanae Beach via a rural road. Hadfield Road provides access to a small rural community on the hillside to the east.
- **Waikanae North** is the area where future communities are proposed (refer to Land Use section). There are few roads in this area currently, with Ngarara Road being the main route from Te Moana Road. The proposed Expressway traverses this future growth area and it is anticipated that at such time as the urban growth occurs new roads will be required and some level of connectivity across the Expressway will be desirable to connect from this area to central Waikanae and the ultimately the beach.



Figures 36 and 37 Poplar Avenue above and Raumati Road - photos show how these roads were developed as cuts through dunes - the roads extend from the existing SH1 in straight lines to these inland dune points



**Legend**

- National / Major District Arterials
- Secondary Arterials
- Collector Road
- Local Road
- Public Transport Routes
- Expressway
- Railway

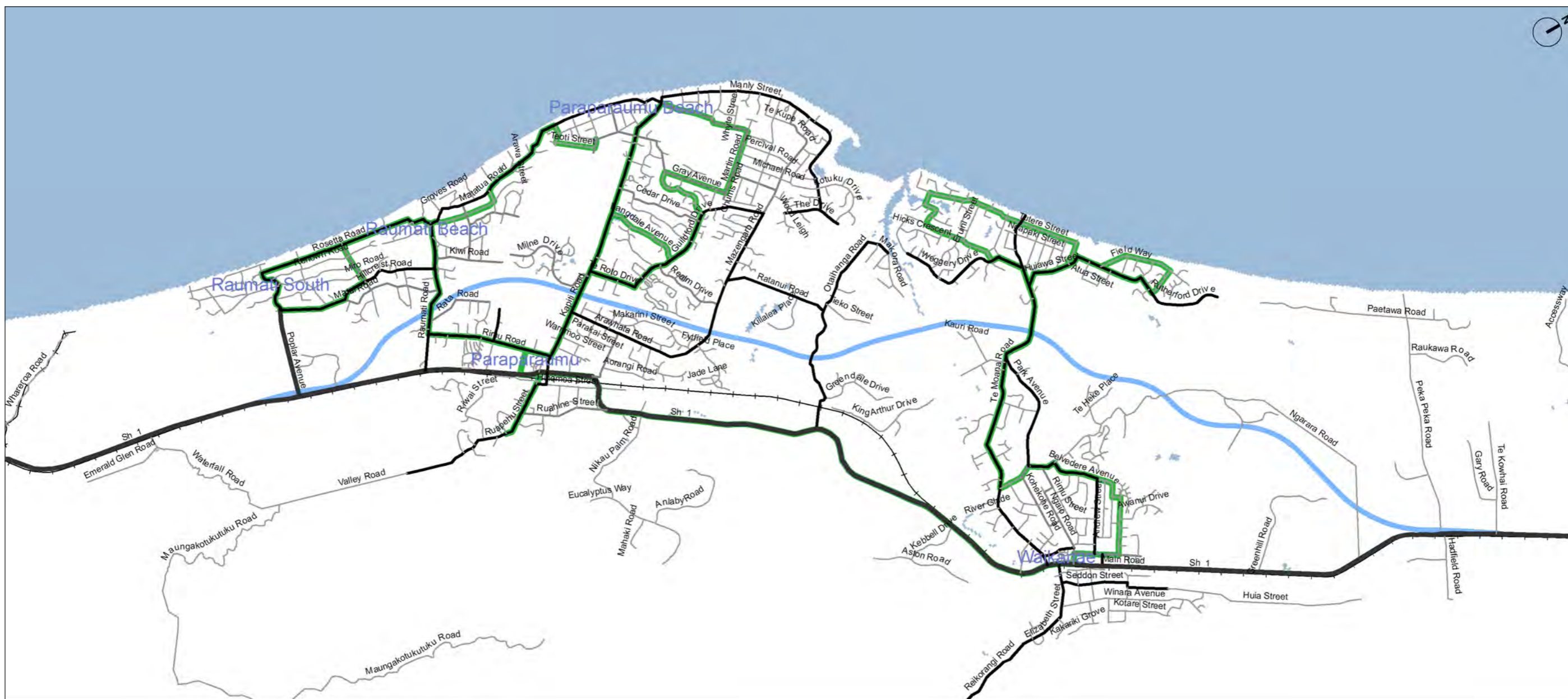


Figure 38 Rooding Hierarchy Plan - source KDC District Plan

0 0.5 1 2km

### Traffic Movement

The Assessment of Transport Effects (Technical Report 32, Volume 3) provides details of the current traffic movement figures for the roading network.

These are summarised in Tables 1 and 2 to provide a sense of the relative scale of use of the road network by vehicles and therefore the type of environment that exists currently. This information focuses on the arterial roads which are where the Expressway typically intersects or interacts.

Table 1 Local Road Vehicle Traffic Figures - 2010

location	daily flow
poplar ave - east of matai road	2,600
raumati road - west of SH1	12,900
kāpiti road - west of arawhata road	24,900
mazengarb road - east of guildford dr	5,300
otaihanga road - west of SH1	6,500
te moana road - west of SH1	10,700
peka peka road - west of SH1	1,100

The traffic movement figures for the existing SH1 are provided in Table 2 below.

Table 2 Existing SH1 Vehicle Traffic Figures - 2010

location	daily flow
south of poplar ave	22,700
south of Kāpiti road	26,900
south of otaihanga road	22,400
south of te moana road	26,900
north of peka peka road	15,900



Figure 39 Raumati Road - suburban in context and key connection between the existing SH1 and beach community at Raumati South



Figure 40 Kāpiti Road - urban in context and busy as key connection to town centre and between inland and beach communities



Figure 41 Otaihanga Road - rural in context, but key connection between the existing SH1 and Paraparaumu Beach and parts northwest

### Public Transport

The two principal public transport systems provided for in the district are rail and by buses on the local roads. As noted previously there is also an airport at Paraparaumu and it will be upgraded from a local airfield to provide regional services by Air New Zealand later in 2011.

#### Rail

The North Island Main Trunk Line roughly follows the existing SH1 through the district.

The line supports the MetLink Kāpiti passenger line providing commuter services with stations at Waikanae and Paraparaumu and frequent stations between Kāpiti and Wellington station. The line also support the Capital Connection commuter passenger train which runs between Palmerston North and Wellington on week days. The Capital Connection service stops at Waikanae and Paraparaumu and provides a non-stop service between Paraparaumu and Wellington station.

There has been consideration of the need for a train station at Raumati. This station is currently part of GWRC's *Wellington Regional Rail Plan 2010 – 2035* (July 2009). This document states that:

- "That the design of the double tracking and electrification between MacKays Crossing and Waikanae will not preclude the construction of a Raumati railway station
- That the Greater Wellington owned land at Raumati will be retained as a potential carpark and not be sold to developers for other activities
- That the future programme of work on the Kāpiti line will be reviewed once the electrification and double tracking work is complete."

#### Buses

Metlink operates a number of bus services in the study area, as follows:

- Bus route 250 "Raumati South" serves Paraparaumu train station, Coastlands, Kāpiti College, Raumati Beach and Raumati South via Rimu Road, Raumati Road and Rosetta Road. It then loops around part of Poplar Avenue, Matai Road and Menin Road.
- Bus route 260 "Raumati Beach" serves Paraparaumu train station, Coastlands, Kāpiti Village, Paraparaumu Beach and Raumati Beach via Kāpiti Road.

- Bus route 261 "Paraparaumu Beach" circulates via Paraparaumu train station, Coastlands, the airport and Paraparaumu Beach via Guildford Drive.
- Bus route 262 "Paraparaumu Beach" circulates via Paraparaumu train station, Coastlands, Arawhata Road, Mazengarb Road, Paraparaumu College, Kotuku Park, Manly Street and Paraparaumu Beach.
- Bus route 270 "Paraparaumu East" circulates via Paraparaumu train station and Ruapehu Street.
- Bus route 271 "Lindale Tourist centre" links the train station to Lindale.
- Bus route 280 "Waikanae Beach" circulates via Paraparaumu train station, Waikanae train station and town centre, the pool, the golf course and Waikanae Beach via Parata Street, Sylvian Avenue, Belvedere Avenue, part of Ngarara Road, Te Moana Road and a loop through the Waikanae Beach area.
- Bus route 290 "Otāki Beach" provides limited service (less than hourly) between Paraparaumu train station / town centre, Peka Peka, Otāki station / town centre and Otāki Beach. This route runs along the existing SH1 between Paraparaumu and Otāki.

### Walking and Cycling

In the context of movement KDCDC promotes walking and cycling as alternatives to movement by vehicle to provide choices to its residents. This is in line with Regional policy (refer to Regional and Transport Policy sections) such as represented in the RLTP. The objectives with respect to walking and cycling are also featured in the Expressway project objectives which “recognise the need to provide for modal and route choice opportunities”.

It is also noted that horse riding is considered a key part of the movements within the district - this is typically for recreational rather than commuting or destination trips.

The current provision for commuting and recreational walking, cycling and horse riding is by a mix of on road facilities - footpaths and cycle lanes as well as paths that traverse open spaces or cut through parks and between streets as alleys.

The on-road facilities are typically footpaths a marked lane or a separate path off to one side (eg at Kāpiti Road). The off-road cycle and walking paths are typically unsealed and range in width. The surface is a consolidated chip known locally as “Kāpiti Blue”.

The Local Area Movement Surveys and other data gathering methods show very strong use of the river/stream corridors as well as the many crossing points where people are walking and cycling on local roads moving east west.

### Local Commuting and Recreational Network

Due to the relatively flat topography, cycling is popular across the district for both commuter transport and recreation. A 16km Coastal Cycle route runs from Paekākāriki to Peka Peka and is sealed for almost that entire length. This is mainly promoted as a recreational route. The district advocates strongly for walking and cycling and has an aspirational network plan of new links (refer to Figure 46) for commuting and recreational use.

The local cycling advocacy group, Kāpiti Cycling Inc., in conjunction with KDCDC, has produced a local cycling map. It identifies local commuting routes as:

- Raumati/Paraparaumu
  - > Poplar Ave
  - > Matai Road
  - > Rosetta Road
  - > Raumati Road

- > Tui Road/Kiwi Road/Wharemauku Stream to town centre
- > Rata Road/Manawa Ave
- > Ihakara Street
- > Milne Road
- > Kāpiti Road
- > Arawhata Road
- > Tutanekai Street/Warrimoo Street
- > Mazengarb Road/Te Kupe Street/Ngapotiki Street
- > Te Roto Drive/Guildford Drive
- > Ratanui Road
- Waikanae/Otaihanga
  - > Otaihanga Road
  - > Weggery Drive
  - > Te Moana Road
  - > Park Avenue
  - > Huiawa Street
  - > Ngarara Road
  - > Belvedere Road/Kapanui Road/Martin Road

Twenty four cycle lockers are provided at the Paraparaumu Train Station, encouraging ‘park and ride’ cycle commuting, and six local schools have school travel plans that encourage students to cycle to school.

Figures 42 - 44 show that in some places that people are travelling by bike or walking relatively long distances between homes and school. This is especially noticeable at Waikanae where there is no school at Waikanae Beach and students cycle or walk up to Waikanae to attend the schools there. There are also some longer distance cycle movements to the two colleges at Paraparaumu by students living in Waikanae.

To understand the levels of walking, cycling and horse riding in the area traversed by the Expressway several sources of information have been used. These are shown in Figures 42-44 and Table 3.

### Regional Cycle Network

Between Paekākāriki and Waikanae, GWRC’s Regional Cycling Plan identifies both the existing SH1 and the coastal route as part of a regional cycling network. Through Waikanae and northwards, the existing SH1 provides the only regional cycle route.

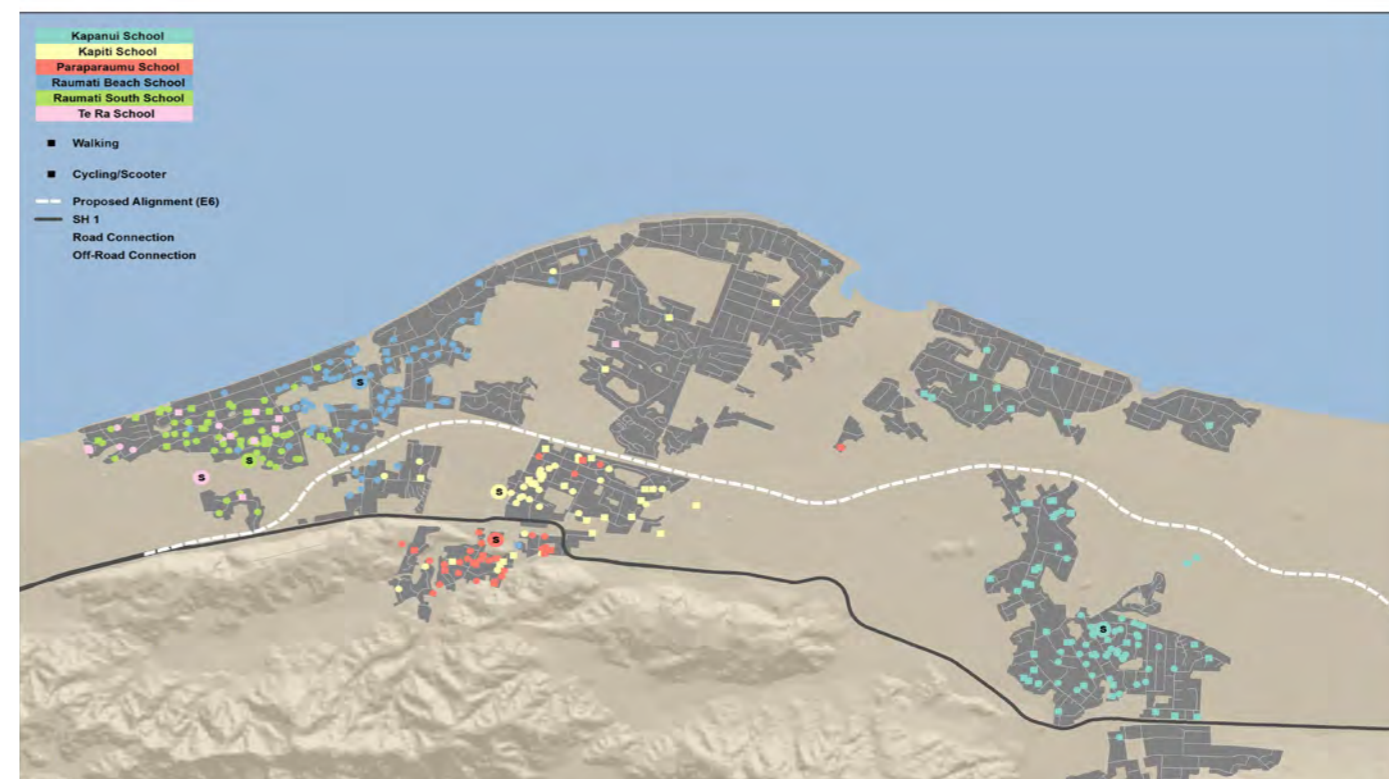


Figure 42 above shows the distribution of primary school students relative to their schools mapped from information provided by school accessibility plans

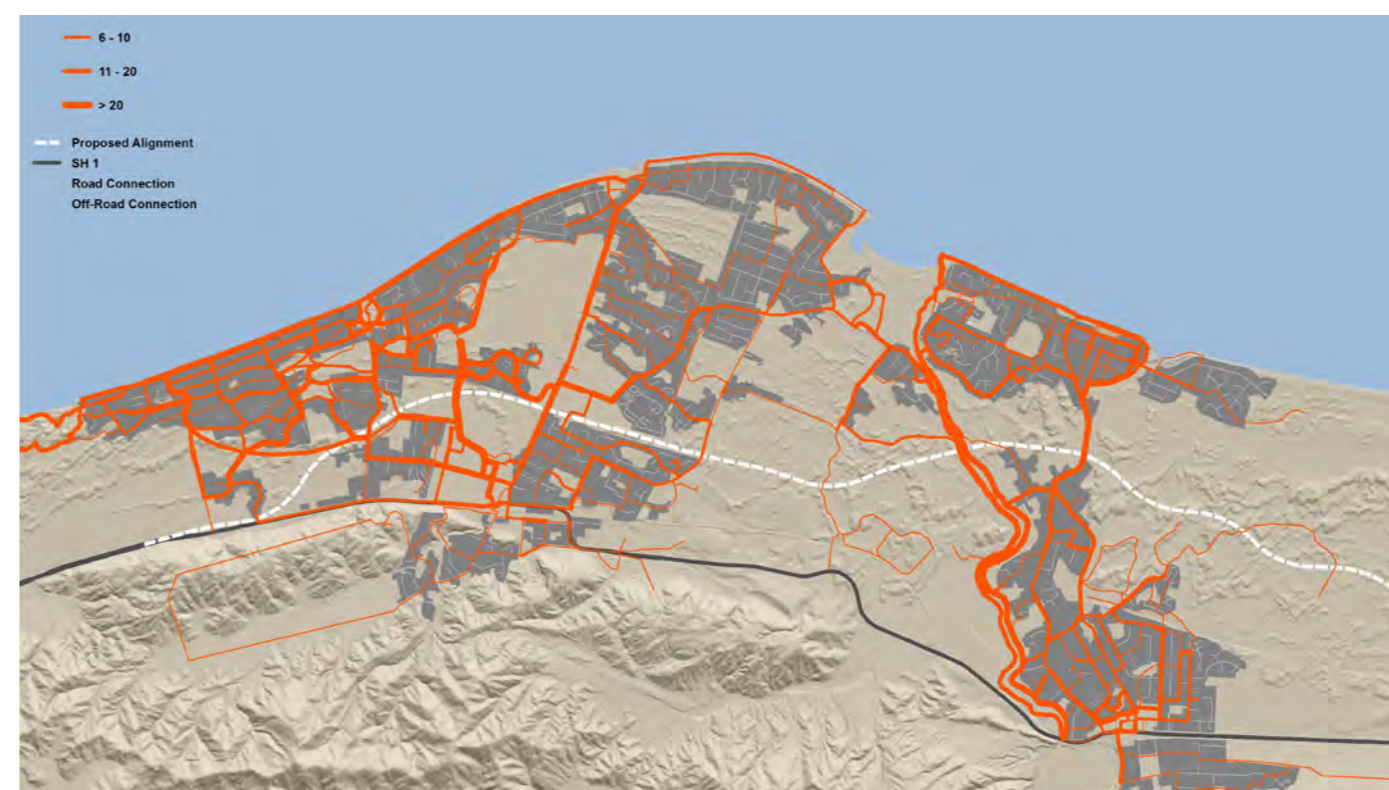


Figure 43 above shows mapped walking results from the Local Area Movement Survey (LAMS) which describes the relative frequency with which people walk along either streets or other paths. The figures are derived from the survey and show the number of respondents that used the route in a week. Notable is the heavy use of Waikanae River paths, Wharemauku path and the local streets in Raumati Beach. Also of note are movements across the Expressway route (dashed white line).



Figure 44 above shows mapped cycling results from the Local Area Movement Survey (LAMS) which describes the relative frequency with which people cycled along either streets or other paths. The figures are derived from the survey and show the number of respondents that used the route in a week. Notable (like the walking results) is the heavy use of Waikanae River paths, Wharemauku Stream path as well as the movement between Waikanae and Paraparaumu utilising the Waikanae River walking bridge. Also of note are movements across the Expressway route (dashed white line).

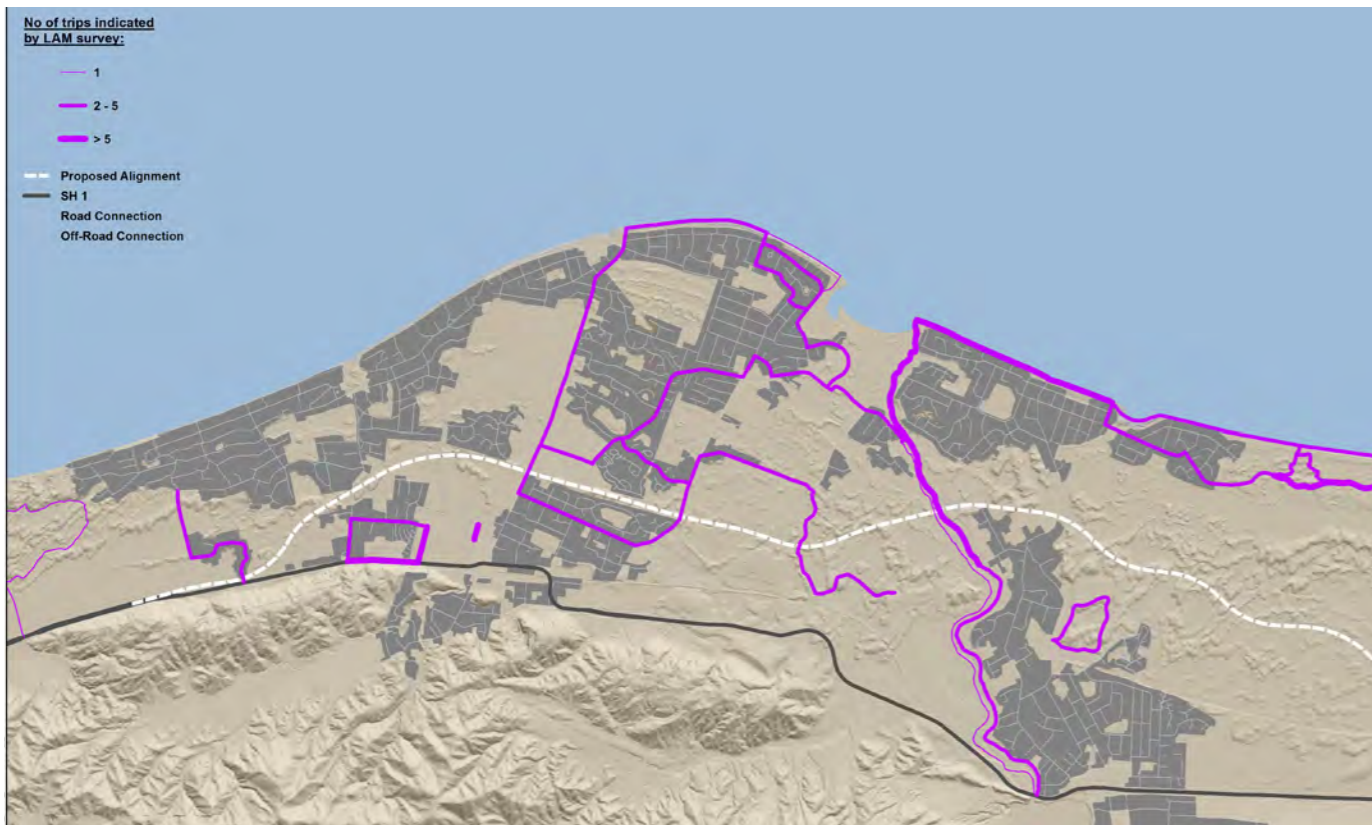


Figure 45 above shows mapped horse riding results from the Local Area Movement Survey (LAMS) which describes the relative frequency with which people rode along either streets or other paths. The figures are derived from the survey and show the number of respondents that used the route in a week. Notable (like the walking results) is the heavy use of Waikanae River paths as well as the movement between Waikanae and Paraparaumu utilising the Waikanae River walking bridge. Also of note are movements across the Expressway route (dashed white line).

Different sources of information have been used to derive an understanding of the use levels of the local road networks and off road paths. These include the Local Area Movement Surveys (LAMS) (shown graphically) and observational counts in the table below.

Table 3 Walking and Cycling Figures - Current

location	count 1 - week day all day		count 2 - weekend day part day	
	walking	cycling	walking	cycling
wharemauku stream	66	26	32	11
kāpiti road	111	44		
waikanae river (at pedestrian bridge)	80	197	152	57
te moana road	31	72		

count 1: Thursday 14 July 2011 - over period from 7.30 am to 4.30 pm - counted both east and west movements - summed

count 2: Sunday 28th November 2010 various times - Waikanae River at domain bridge from 3pm-5pm and Wharemauku Stream - Sunday 28th November 11.15am-1.15pm

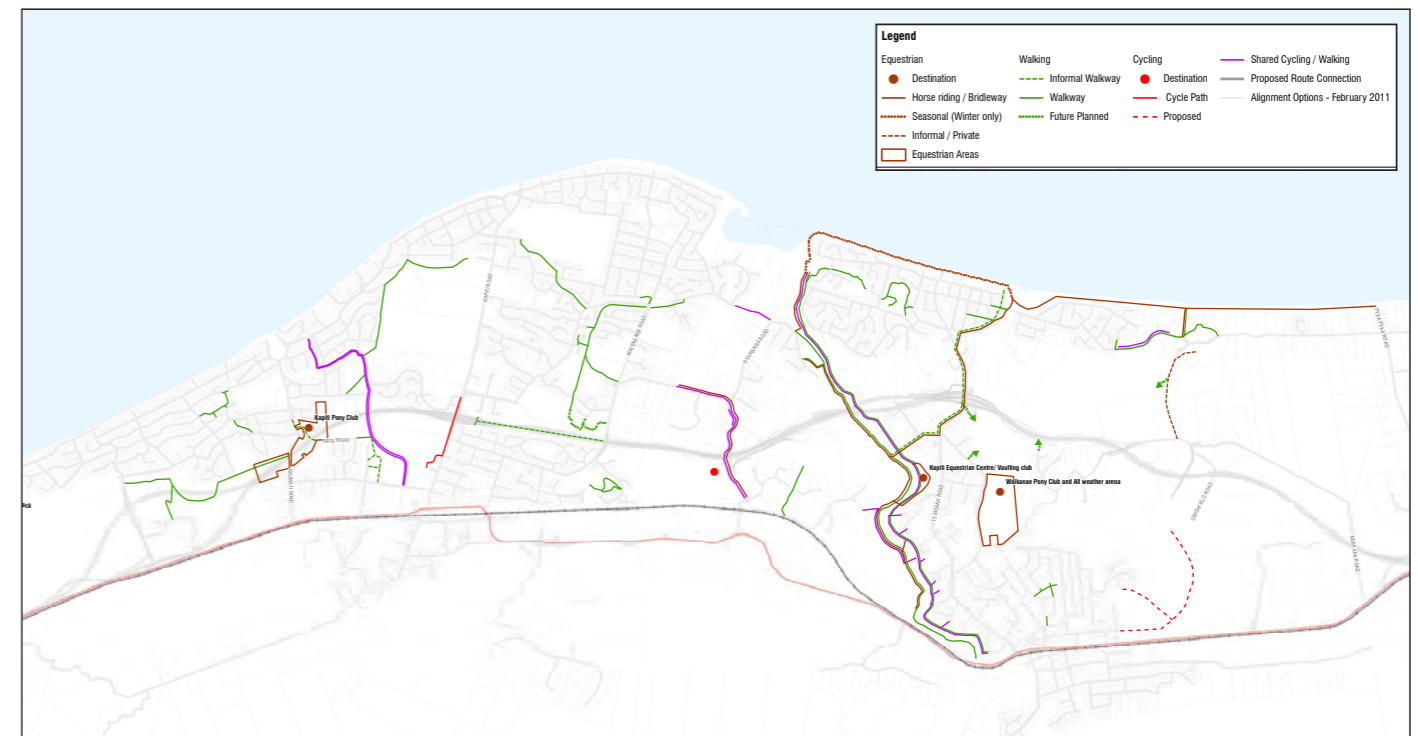


Figure 46 above shows the existing as well as aspirational walking cycling and horse path network - derived from KCDC information.



### Design Implications

1. The Expressway crosses a number of east west oriented local roads linking the beach communities on the coastal side with those inland. These connections need to be maintained to provide for the interaction between these communities. This includes through construction period.
2. The Expressway is to provide a consistent highway speed (100kmh) route through the district. The local road crossings will accordingly be grade separated and take the form of a bridge over or road under the Expressway. Walking and cycling movements will be most sensitive to the condition and quality of the crossing - be that having to move under a bridge or on an over-bridge.
3. The communities at Waikanae and Paraparaumu interact constantly for a range of economic and social reasons. The Expressway can be designed to enhance the function of the district and its economic performance and social condition by providing connectivity to the Expressway at Waikanae and Paraparaumu.
4. The Waikanae River and Wharemauku Streams provide highly used corridors for recreation and commuting movements. They also have other amenity values. The sensitivity with which the Expressway crosses these waterways will be important to the continuance of the movements and enjoyment of these places.
5. The existing SH1 is part of the regional cycle network. Consideration needs to be given to its relationship to a new cycle route along the Expressway, as well as how they connect at either end to the wider network. In either case, the safety, convenience and amenity of cycling must be a primary consideration to satisfy transport policy and project objectives.
6. The Expressway enables the existing SH1 to take on a new character including revitalised town centres at Waikanae and Paraparaumu. The design for the condition of the existing SH1 is of interest to KCDC and the community generally, given that it will pass to KCDC once the Expressway is operational as the new SH1. Of interest will be:
  - > the ability to enhance connections across the former highway to railway stations and bus interchanges from the town centres
  - > the potential to reduce the width of asphalt to improve visual amenity by the planting of trees for example
- > the potential for a lower speed environment that may encourage a quieter and more comfortable route option for some drivers
- > the utilisation of some of the current width for walking and cycling facilities
- > the ability to introduce traffic controls at some local road connections to make the turning to and from these to the former highway easier and safer
- > the relative extent to which any changes to the existing SH1 are to be prioritised as well as funded.
7. There will be an interaction between the existing SH1 and Expressway at the points where interchanges are provided for. The implications for the design of the local roads that connect the two need to be considered in terms of impacts on existing land uses and the quality of the road as a walking and cycling route.
8. At interchanges the effect on the safety and comfort with which pedestrians and cyclists (as well as horse riders) can cross through the interchange will require careful design.
9. The location of interchanges and the level of connectivity these provide will influence the use of land around them. Where there is good connectivity to the local network there is likely to be pressure for land development by urban land uses. Although this connectivity can be positive, KCDC's objectives are to limit urban growth outside of the existing towns and nominated growth areas.
10. The interaction between the existing SH1 and future land uses along its length will need to be considered to ensure that KCDC's urban growth objectives are not put at risk as a result of the change from the current limited access status.
11. The need for future connections across the Expressway in the north Waikanae area should be considered.
12. There is the possibility of a future Raumati railway station - the Expressway design should not preclude this possibility.
13. Raumati Road, Kāpiti Road, Guildford Drive, Mazengarb Road and Te Moana Road form the backbone of the bus network. Good pedestrian access to bus stops on these routes in the vicinity of the Expressway should be provided for.

### 3.10 Landscape Character

The Expressway passes through areas with different landscape characters and these are identified and described below. It is noted that the landscape character includes all the attributes of the character including the built environment. The intention of this description is to enable key characteristics to be highlighted for the Expressway landscape treatment to respond to.

- A QE Park
- B Raumati South
- C Raumati Road
- D Wharemauku Basin
- E Kāpiti-Mazengarb
- F Otaihanga South
- G Otaihanga North
- H Waikanae River
- I Te Moana
- J Ngarara
- K Peka Peka South
- L Peka Peka



Figure 47 Landscape Character Areas



Figure 48 Raumatī Straight looking south



Figure 49 QE Park aerial plan

### QE Park

Queen Elizabeth Park occupies the full extent of the coastal plain and thus forms an open space link between the coast and the foothills of the Tararua Range.

The Park is enclosed to the east by the Raumatī Escarpment, part of which is included in the Raumatī Escarpment Reserve. The existing SH1 and the rail line run in a narrow transport corridor along the toe of the escarpment. The eastern part of the Park is relatively flat, low lying and traversed by several drains.

There are also remnants of low dunes which have been gradually modified by grazing stock and cultivation over many decades. A line of high, relatively intact dunes extends down the centre of the flat land and form the southern extension of the intact dunes north of Poplar Avenue.

To the west, a complex field of intact dunes extend westwards to the coast. An operating clean fill site is located at the northern end of the Park with access off Poplar Avenue.

Within the Park apart from exotic shelterbelts adjacent to the existing SH1 and scattered macrocarpa trees, there is little significant woody vegetation. Pasture is the dominant land cover with large patches of gorse at the northern end. A strip of native planting, dominated by kanuka, extends along the edge of the existing SH1 and the Park.

### Key Characteristics

- Open expansive rural/coastal landscape
- Little substantial vegetation, secondary native forest on the Raumatī Escarpment
- No urban development

**Raumati South**

This character area has two distinct rows of dunes, some of which are over 20m high. Several areas of low-lying damp ground and areas of open water are present amongst the dunes, with a major drain running north-south through the area.

There is a distinctive large area of open space enclosed by residential housing on the existing SH1 with Leinster Road to the east and Matai Road to the west. The Leinster Road residential area is located on a third area of dunes. Overall the area has a relatively low density of settlement.

The open space area includes part of the existing designated corridor and provides the adjacent communities and two schools with an informal parkland, albeit that much of it is unmanaged. The area supports a combination of horse grazing land, gorse and broom, scattered groups of mature exotic trees (especially pines) and large stands of tall kanuka at the southern end.

**Key Characteristics**

- Relatively large area of ‘wild-land’ open space.
- Combination of medium density residential development and lower density residential on large sites.
- Relatively unmodified dune landforms.
- Significant existing vegetation, particularly kanuka, and groups of pines.



Figure 50 Raumati looking south



Figure 51 Raumati South aerial plan



Figure 52 Raunati looking south



Figure 53 Raunati Road aerial plan

### Raumati Road

This area is characterised by the undeveloped corridor of land created by the WLR which has retained a corridor of open space, with residential (or industrial) development on either side.

The height of the dunes varies between 10 and 20m and they are reasonably intact. The open space area is mainly leased for grazing horses. Small scattered groups of mature pine trees are present and small areas of native vegetation occur in places.

The adjoining residential housing is well established with a typical suburban density settlement pattern that has provided space for mature trees within many of the allotments. Consequently, there is a strong vegetation framework comprising mature exotic and native trees and shrubs. The housing areas to the east are typically on flat land north of Raumati Road and on the undulating dunes to the south.

Raumati Road cuts through the dunes in the designation corridor forming a distinctive threshold along the route between the existing SH1 inland and the residential communities to the west on the coast.

### Key Characteristics

- Significant existing vegetation; pine, macrocarpa, eucalyptus, kanuka.
- Relatively wide corridor and separation distances to the nearest housing.

**Wharemauku Basin**

This area is characterised by the large expanse of open undeveloped land in the heart of Paraparumu due to the Town Centre Zone and the existing designation. The large flat basin is fringed by undeveloped dunes and residential development on the west. Midlands subdivision, established adjacent to the designation boundary is the most recent area of residential housing and occupies in part, elevated duneland. The more established residential area of Kiwi Road occupies lower land to the west. Paraparumu town centre encloses this character area to the east.

Dunes between 10m and 20m are located near the middle of the basin and also on the northern fringe adjacent to Milne Drive and Kāpiti Road.

The Wharemauku Stream, now channelised, drains the basin. A walkway adjacent to the stream is an important pedestrian and cycle link between the town centre and the suburban areas to the west. An area of wetland, often with open water but which fluctuates during the summer, is situated close to the walkway.

There are shelterbelts and streamside plantings of moisture tolerant deciduous trees such as willow, a eucalypt woodlot,

large areas of gorse, patches of native grasses, and riparian species on damper ground.

While the middle part of the area is currently open and undeveloped, the underlying Town Centre Zone means that in the medium to long term this area will be subject to urban development.

**Key Characteristics**

- Proximity to existing town centre (and future expansion of the town centre)
- Large flat basin fringed by dunes to the west
- Wharemauku Stream and walking and cycle links
- Significant existing vegetation with exotic trees such as willow, poplar, eucalypt, and also native riparian species.



Figure 54 Wharemauku looking west



Figure 55 Wharemauku aerial plan



Figure 56 Wharemauku looking south



Figure 57 Mazengarb Road looking south

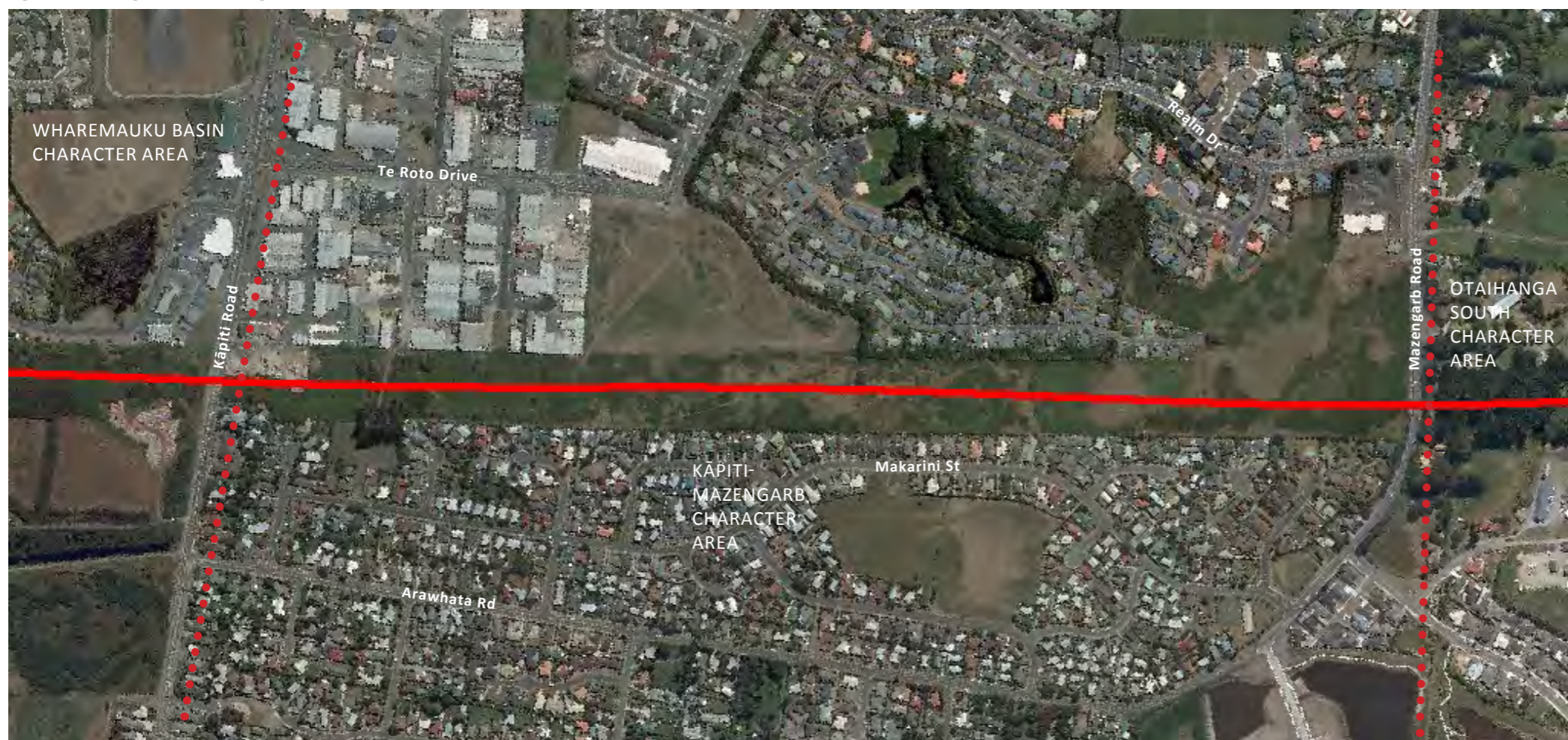


Figure 58 Kāpiti Mazengarb aerial plan

### Kāpiti-Mazengarb

This character area is characterised by residential and industrial development tightly defining the existing WLR designation. This part of the corridor is highly developed with little of the natural landforms or vegetation remaining.

A remnant of the original dune topography of the area remains within the WLR designation; the surrounding dune land having been flattened as part of its development for residential housing. To the west of the designation corridor, there is established industrial development, industrial zoned land, retirement housing and medium density residential development located on relatively flat land. Residential development is also located to the east and to the south end this is relatively flat, but to the northern end is sitting up on higher dune land.

Given the size and scale of the allotments most of the vegetation within this area comprises low stature exotic amenity species.

There is evidence of informal walking tracks across this corridor which assist to overcome the relatively long block length and lack of connectivity from east to west between Kāpiti to Mazengarb Roads.

Within this urban area, there are small pockets of native vegetation associated with natural and also constructed water bodies, and remnant dune landforms.

### Key Characteristics

- Suburban and residential development defining the corridor edge.
- Generally flat areas for urban development, but with some housing on rising ground to the north.
- Informal crossing links for walking east to west.
- Absence of any significant vegetation.

**Otaihanga South**

Extending from Mazengarb Road to Otaihanga Road this landscape character area comprises predominantly rural land with pine plantations, rural residential lots and infrastructure facilities, including the former landfill and waste water treatment plant.

The area occupies a series of medium height intact dunes, and interdunal hollows. Pine plantations along the existing designation obscure the topography of the intact dunes.

Mazengarb Stream and several drains connect with the network of waterbodies in the Killalea enclave, and several wetlands remain in the interdunal hollows amongst the pine plantation

The Killalea Place rural residential enclave (bounded by Mazengarb, Ratanui and Otaihanga Roads), has substantial plantings of exotic and native trees, which provide a relatively strong vegetation framework, and there are also several natural and constructed waterbodies, with generally well vegetated margins.

**Key Characteristics**

- Peri-urban west of designation, mixed use infrastructure facilities to the east.
- Intact dune landforms with wetlands in the interdunal hollows
- Pine forest, eucalyptus, manuka, lowland native pioneer species.
- Substantial established tree structure.



Figure 59 Pine plantations occupy the WLR designation, with the Killalea rural residential area on right

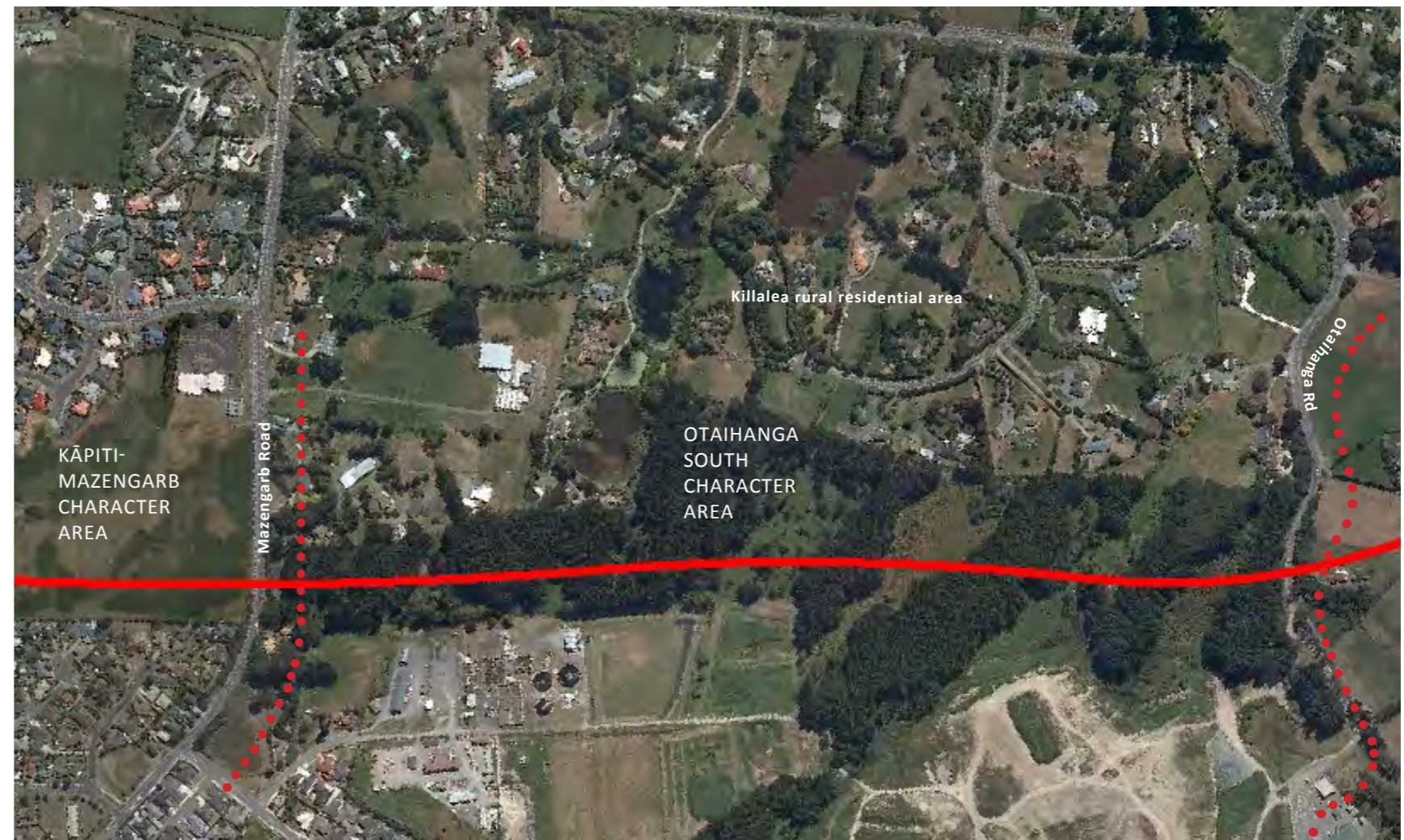


Figure 60 Otaihanga aerial plan





Figure 61 Pasture covered dunes in the northern part of the character area.



Figure 62 Otaihanga aerial plan

### Otaihanga North

Extending from Otaihanga Road to the Waikanae River corridor the character of this area is distinctly rural, with Otaihanga residential area on the western periphery.

The rural residential area accessed from Greendale Drive adjoins the western designation boundary near Otaihanga Road. Small and medium sized rural blocks, with grazed pasture, small wood lots and shelter belts occupy most of the area.

Well established trees are found throughout the area, comprising pine shelter belts and woodlots, willow and poplar streamside plantings, and amenity plantings associated with dwellings and farm settlements. Some recent removal of pine trees has opened up the area around the old landfill.

This character area comprises a series of high intact dunes with small areas of permanent and ephemeral wetlands and water bodies in the interdunal hollows. The high dunes are a visually distinctive feature of the locality due to the open nature of the grazed farmland.

Muaupoko Stream at the northern end of the character area drains into the Waikanae River.

### Key Characteristics

- Open rural character with some rural residential development.
- Intact dune landforms, and damp interdunal hollows.
- Grazed pasture dominant.
- Tree structure of exotic shelter belts and woodlots and amenity plantings.

**Waikanae River**

The Waikanae River corridor includes the River, its margins and the floodway. The corridor provides an important lineal area of open space linking the coast and foothills of the Tararua Range. The Waikanae River corridor is identified as an outstanding natural landscape in the KCDC District Plan.

The corridor, including the river, its margins, public recreation areas, and walkways/cycleways, is popular and well used for recreational activities and also for commuting locally.

The river is shallow at normal flow, and its gravel bottom combines to make it a safe and inviting place for a wide range of water activities. Mown grass areas at El Rancho and reserve areas along the riverside flood plain areas provide recreational space adjacent to the river.

The vegetation in this part of the river corridor is dominated by willow and poplar trees planted for flood erosion control. However, local residents have over many years been removing and controlling the widespread areas of blackberry, montbretia, wandering willy, and convolvulus along the river margins, and planting and managing a wide range of native riparian species. There are now long continuous stretches of the bank where native species are very well established and significantly influence landscape character .

From many locations on the walkway/cycleway, residential dwellings and other buildings and structures and roads are visible. However, the river corridor overall has a secluded and peaceful character, with high amenity values. The natural character of the river and its margins is moderate/high.

**Key Characteristics**

- ‘Natural’ and peaceful river environment
- Willow and poplar trees line the riverbanks
- Intact dune landforms adjoin river corridor
- Areas of well established native riparian species



Figure 64 Waikanae River Character Area

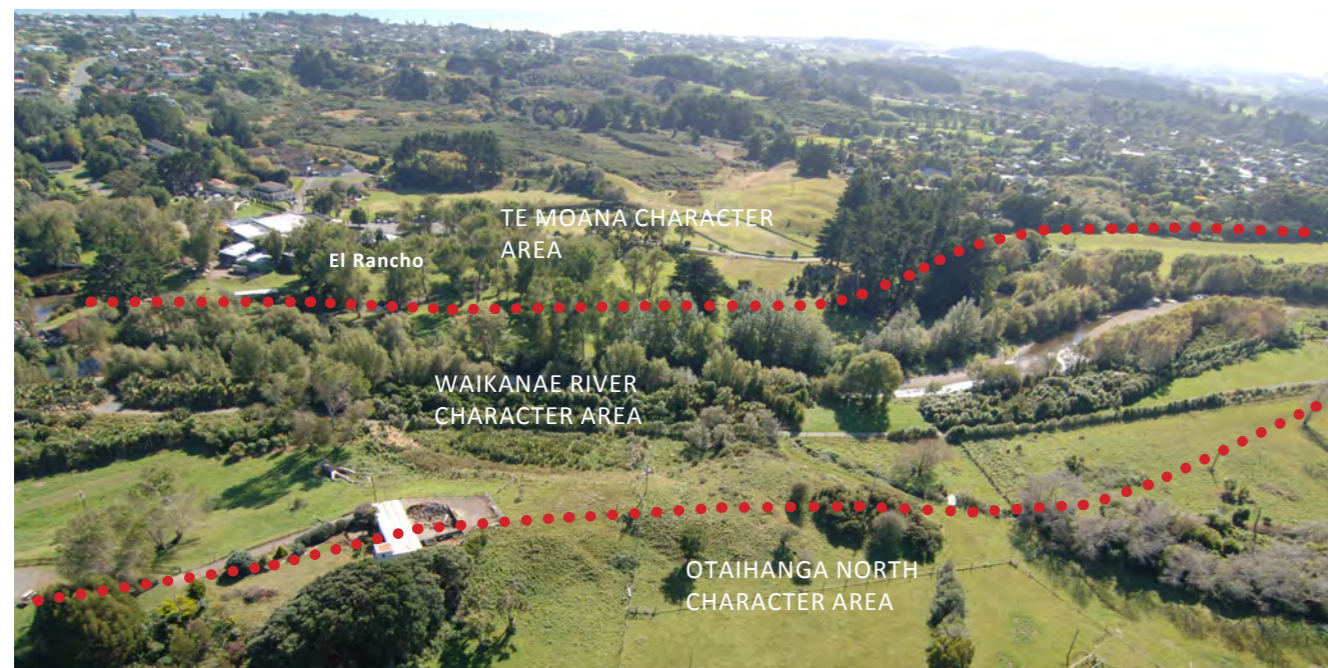


Figure 63 Waikanae River Character Area

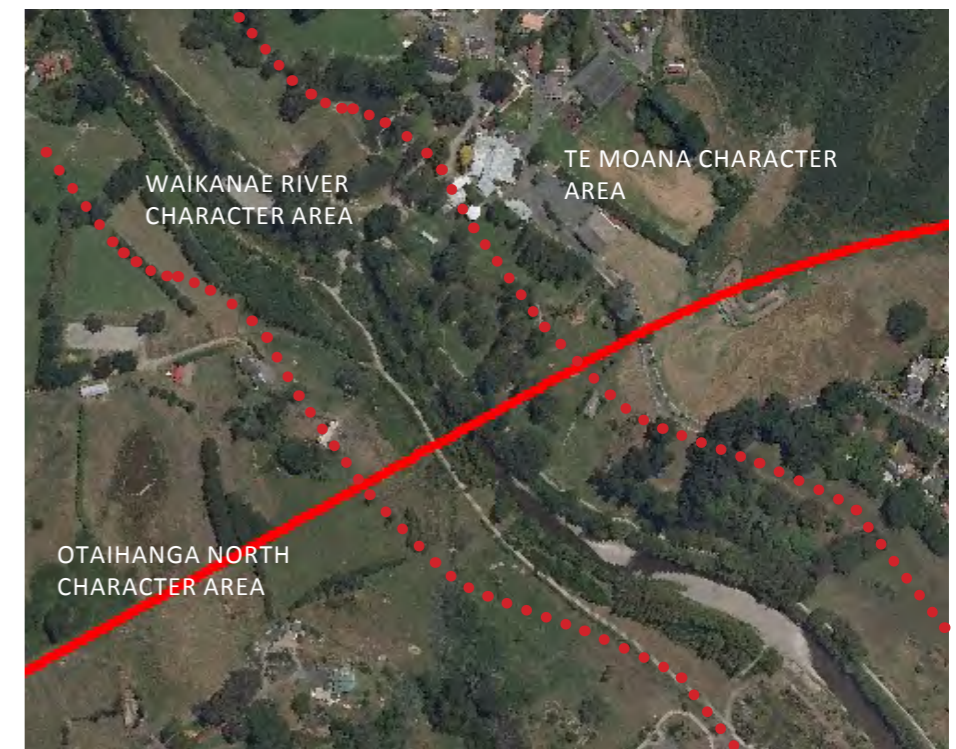


Figure 65 Waikanae River Character Area



Figure 66 Te Moana Character Area (above)



Figure 67 Te Moana Character Area

**Te Moana**

North of the Waikanae River, a band of rural land separates the suburban areas of Waikanae and Waikanae Beach. The topography varies with an intact series of dunes, up to 25m asl, to the west and a large low-lying basin to the east at Te Moana Road.

The eastern side of the character area includes the residential areas on the western fringe of Waikanae (Te Moana, Pururi, Kauri, and Greenaway Roads). The rural land on the east comprises rural residential properties, small rural holdings and horticultural production. The Pururi and Kauri Roads provide access to 'fingers' of residential uses. These areas are relatively flat.

The western side of the character area is less intensively developed, comprising intact duneland, occupied by rural residential lots, Waikanae Golf Course, Takamore Trust land and El Rancho Christian Holiday Camp. Large areas of regenerating native vegetation, and several wetland areas with high ecological values, are prominent features of the dunes. The rural and residential areas on the east also have a strong framework of mature native and exotic trees.

**Key Characteristics**

- Mix of peri-urban rural and residential settlement
- Intact dune landforms with regenerating native vegetation
- Substantial established tree structure — pine, willow, poplar, eucalyptus, manuka, exotic amenity trees



Figure 68 Te Moana Character Area

**Ngarara**

Extending from Te Moana Road to Smithfield Road this character area includes the most intact and complex dune lands of the Expressway route with dune sequences up to 30m amsl or 20m higher than the surrounding ground in places.

Land use is primarily pastoral farmland with some smaller rural residential and lifestyle blocks, and the yet to be occupied Ferndale residential subdivision. The Ngarara area (generally west of the Expressway route) is also planned as a new residential development location to provide for much of the future growth of the district.

In places, there are tracts of native vegetation, including coastal/lowland forest remnants, regenerating scrub, and large wetland areas to the west. There are also pine plantations and woodlots present throughout the area.

Some of the remnant and regenerating indigenous vegetation have been identified as significant ecological sites and are protected (e.g. by way of QEII National Trust open space covenants, Nga Manu Reserve) . This area has been identified by KCDC as part of an ecological corridor linking the coast and the mountains.

The relatively complex topography and substantial tree structure creates an enclosed landscape that moving through it, gradually unfolds.



Figure 69 Ngarara Character Area

**Key Characteristics**

- Numerous small areas of indigenous vegetation.
- Intact landforms including large dunes, and wetlands.
- Remnant lowland native forest, semi mature manuka/kanuka, wetlands, pine/macrocarpa shelterbelts woodlots and individual trees.



Figure 70 Ngarara Character Area



Figure 71 Ngarara Character Area



Figure 72 Peka Peka South Character Area



Figure 73 Peka Peka South Character Area

### Peka Peka South

Extending from Smithfield Road to just south of Peka Peka, this character area is very uniform comprising relatively flat open rural land located between the high dunes to the west and the foothills of the Tararua Ranges. Pastoral farming is the predominant landuse and low-lying land has been drained with a series of open drains. There are areas of rural residential development along both Greenhills and Smithfield Roads.

Small patches of remnant native forest remain in the area such as at the end of Smithfield Road. Mature pine and macrocarpa trees scattered throughout the open flats are dominant vertical elements in an otherwise flat and homogenous landscape. A double row of 220KV pylons are a prominent feature.

### Key Characteristics

- Open flat landscape with Tararua Ranges a significant feature
- Rural character dominated by grazed farmland
- Mature pine and macrocarpa trees

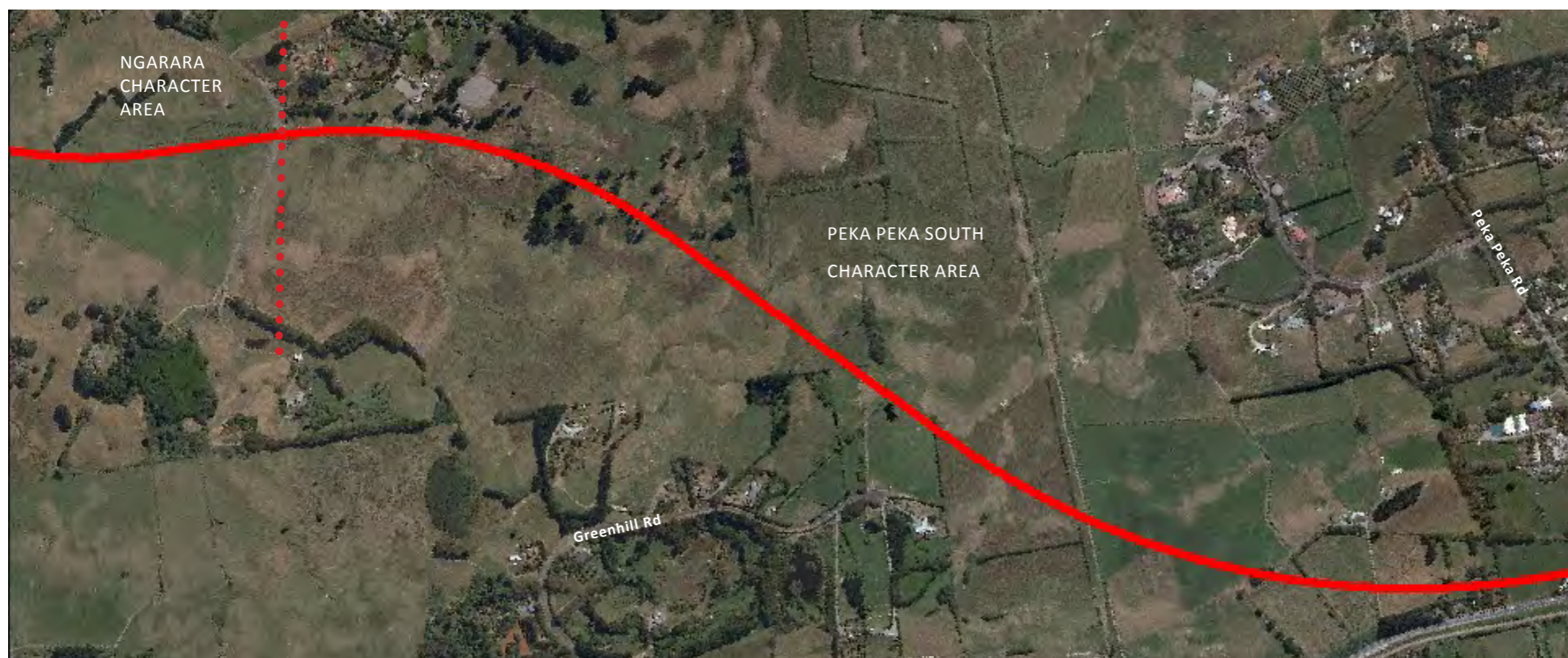


Figure 74 Peka Peka South Character Area

## Peka Peka

This character area encompasses the area in the vicinity of the junctions of Peka Peka Road, Hadfield Road, the existing SH1, and the main trunk rail line at the toe of the Tararua foothills. The Tararua foothills are dominant, providing significant physical and visual enclosure to the east. The existing SH1 and the railway line are located at the base of a small but distinctive coastal escarpment north of Hadfield Road.

Overall, the character is of a working rural landscape with small rural land holdings. Dwellings are located on the higher ground amongst the dunes and on the slopes of the foothills, with the lower damper ground being utilised as grazing land. Harrison's Garden Centre is located on Peka Peka Road.

The area has substantial numbers of mature exotic trees, established as shelterbelts, woodlots and amenity planting, on the rural lots, including pine, poplar, eucalyptus, willow. This creates a strong vegetation framework. Patches of remnant native forest occur throughout the area, particularly on the foothills east of the existing SH1.

### Key Characteristics

- The existing SH1 and Rail corridor
- Mature exotic trees
- Remnants of native lowland forest
- Relatively open rural landscape

Figure 75 Peka Peka Character Area



Figure 76 Peka Peka Character Area





**THIS PAGE IS INTENTIONALLY BLANK**