Technical Report 7

Assessment of Landscape and Visual Effects

NZ TRANSPORT AGENCY
WAKA KOTAHI

1 MacKays to Peka Peka Expressway

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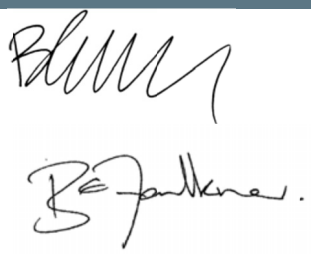
Prepared by	Boyden Evans & Bronwyn Faulkner		21/12/2011
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Executive summary

Introduction

This report addresses the landscape and visual effects of the proposed 16km MacKays to Peka Peka Expressway (Expressway).

In addition, the supporting technical document to this assessment is *the Urban and Landscape Design Framework* (ULDF – Technical Report Appendices, Report 5, Volume 5).

The proposed Expressway route passes through a range of landscape types including, rural, rural lifestyle, suburban, industrial, open space and river environments. Twelve distinct landscape character areas have been identified and described along the route and an assessment of effects undertaken for each character area.

Since the 1950s there has been a proposal for a 'Sandhills Motorway' along this corridor, which has influenced in part, the pattern of residential and other development on the Kāpiti Coast. The proposed MacKays to Peka Peka Expressway generally follows the existing Western Link Road designation (existing WLR designation) but in places the proposed Alignment departs from this. The designation has resulted in the corridor of land acting as de facto open space providing separation and buffer between residential areas in some places. However, in places, this resulted in residential subdivision right up the edge of the designation, such as the section between Kāpiti and Mazengarb Roads.

Project design and mitigation

The landscape and visual team as part of the MacKays to Peka Peka Expressway Project team[1] have provided advice and input throughout the design process to avoid adverse landscape and visual effects as far as possible through good design, rather than simply relying on landscape mitigation. Mitigation measures involving shaping of earthworks to integrate them with the surrounding topography, and planting, are fundamental aspects of the Expressway proposal. Importantly, for the purpose of this assessent the proposed mitigation measures have been considered as part of the overall proposed Expressway design, rather than 'add-on' mitigation measures.

[1] This Technical Report refers to the Project team as carrying out works on behalf of and as contracted by the NZTA. The NZTA is the requiring authority and the consent holder.

Assessment of Landscape and Visual Effects

The potential landscape and visual effects of the Expressway proposal as they relate to the RMA are:

i. Effects on the natural character of the coastal environment, wetlands and rivers and their margins Section 6(a);

ii. Effects on outstanding natural features and landscapes Section 6(b);

iii. Effects on amenity values (visual amenity) Section7(c); and

iv. Effects on the quality of the environment (biophysical aspects of the landscape) (Section7(f).

This assessment considers the landscape and visual effects of the Expressway proposal on three interrelated components - biophysical, visual amenity and landscape character. The magnitude of the effects on each of the twelve landscape character areas has been based on a seven point scale ranging from extreme to negligible.

A summary of landscape and visual effects by character area is set out in the table below. The assessment in relation to the Wharemauku Basin landscape Character Area is an exception given that Kāpiti Coast District Council's proposed Paraparaumu town centre development is likely to significantly change the existing landscape. Consequently, the assessment was carried out in two ways – the effects of the proposed Expressway on the existing landscape character with and without the town centre development.

Summary of landscape and visual effects by character area

Character Area	Biophysical	Visual Amenity	Landscape Character
QE Park	low	low	low
Raumati South	moderate	high	high
Raumati Road	high	high	high
Wharemauku Basin	high	very high	high*
			very high**
Kāpiti Mazengarb	high	high	high
Otaihanga South	very high	low	high
Otaihanga North	high	moderate	high
Waikanae River	moderate	extreme***	very high
		very high****	
Te Moana	high	very high	very high
Ngarara	high	moderate	high
Peka Peka South	moderate	moderate	high
Peka Peka North	moderate	high	high

* Considered in the context of a future built environment with the development of the town centre the effects on landscape character would be high.

** Considered in relation the existing open space environment the effects on landscape character would be very high.

*** In close proximity to the bridge

**** At greater distances where the bridge is visible

In the following sections the three interrelated factors used in the assessment are summarised in relation to the landscape character areas.

Biophysical effects

The proposed Expressway traverses 16 km of an undulating dune and peatland landscape. The scale of the proposed Expressway footprint and required geometric design parameters mean that substantial changes to the landforms, vegetation and waterbodies is unavoidable in places. The Alignment and design has, wherever possible, avoided areas of intact dunes, indigenous vegetation and wetland areas. In particular, the Alignment of the proposed Expressway through the Raumati

South character area, which has deviated from the existing WLR designation, has avoided a series of large intact dunes with stands of semi-mature manuka, as well as a natural wetland.

Physical change to the dune landforms, floodplain areas and wetlands cause the greatest level of adverse biophysical effects, as these are permanent changes to natural landforms. Due to the large scale of the physical changes proposed, little effective mitigation is possible, beyond integrating the earthworks into the natural landforms as far as is practicable.

In places, intact dunes within the proposed Expressway footprint will be totally removed and in other places they will be modified by cuts or the addition of fill to form bunds. Many of the dunes within the existing WLR designation remain today only because of the de facto 'protection' that the designation has provided over the previous decades. This is particularly evident between Kāpiti and Mazengarb Road, where land beyond the existing WLR designation has been flattened to facilitate residential and industrial development.

The construction of elevated ramps at interchanges and bridges also requires significant change to the existing landforms, especially where ramps are required in flat or low lying areas such as the Poplar Avenue, Wharemauku Basin, Te Moana Road, Smithfield Road and the Peka Peka interchange overbridge. Conversely, in places, the existing elevation of the dunes are utilised to ramp the proposed Expressway or local road over the intersecting road, such as at the Raumati, Mazengarb, Otaihanga, Ngarara Road crossings. While in these situations the dunes may largely remain intact, the integrity of their natural form would still be significantly modified.

Loss and fragmentation of indigenous vegetation and habitats, while undesirable, can to some extent be effectively mitigated, through replanting, rehabilitation and offset mitigation measures. However, the benefits of such measures will be effective only if they are properly managed and maintained; in some instances this will mean that maintenance will need to be ongoing and continue long term.

The proposed Expressway Alignment has avoided all but four wetland areas, three of which lie within the Otaihanga South character area and will be fragmented and reduced in size. An area of new wetland proposed in the same character area will go some way to offset this loss. The large crescent-shaped dune with advanced regenerating indigenous vegetation near Puriri Street, north of the Takamore urupa, will be substantially altered by large cuts and the loss of an area of advanced secondary native vegetation. However, this Alignment avoids the need to remove more dwellings in the Te Moana character area.

The proposed riparian mitigation planting on the sections of streams affected by the proposed Expressway will in time improve the indigenous biodiversity and habitat of those parts of the streams.

Visual amenity effects

The magnitude of visual effects is dependent on several factors, including the size of the viewing audience, the sensitivity of that audience, the duration of view and the degree of the visual change. The assessment has assigned a magnitude of the visual amenity effects to each character area which reflects the prevalent effect across the character area, but recognises there will be locations where the effects are likely to be greater or less.

The proposed Expressway will be an unavoidably visible component in the landscape. It's large scale with elevated structures make it difficult to screen from view. The dynamic aspect of traffic movement visible on the proposed Expressway accentuates the visual impact, and causes the greatest effect. However, for large sections of the proposed Expressway, excepting interchanges and local road crossings, the proposed earth bunds, noise fences walls and planting will screen views of the moving traffic.

The effects on visual amenity are rated as very high in three character areas and high in four. The greatest visual effects are where the proposed footprint is large and where there are large structural and elevated components (ramps bridges, embankments and noise walls). The magnitude of these effects increases where they are visible to both resident and transient viewing audiences, and when the visual change detracts from existing views and outlooks.

The effects on the visual amenity of the Waikanae River corridor will be very high, extreme when viewed at close quarters. The River corridor's high natural and recreational values and its status as an Outstanding Natural Landscape (ONL) make this area sensitive to change. That is, the presence of a large bridge across the river corridor will be a dominant feature that detracts from the otherwise 'natural' and 'wild' amenity enjoyed by the community. While the visual effects would be severe from close proximities of the bridge (i.e. within about 200m), they diminish with distance. Also, it is only part of the river corridor ONL area that would be affected.

Similarly, the bridge and embankments crossing Wharemauku Stream introduce large elevated structures into a relatively flat, undeveloped and well used landscape, reducing the openness of the area and restricting views to Kāpiti Island from some locations. At Kāpiti Road and Te Moana Road interchanges there are large elevated structures crossing busy local roads and in residential areas which impact on the visual amenity of large viewing audiences, in particular transient road users.

From most locations the visual changes resulting from the proposed Expressway will not necessarily adversely affect visual amenity but will simply be a different view (e.g. along Makarini Street). For the majority of viewers, (resident and transient) once the bunds are formed and vegetation established on them and therefore proposed Expressway traffic not visible, the visual effects of the proposed Expressway would be minimal. At some locations, the effects on visual amenity for residents immediately adjacent to the proposed Expressway will be severe, particularly

for residents who lose views of open space and traffic becomes a prominent element of their foreground view (e.g Chilton Drive). However assessments have not been carried out from individual private properties.

The largest viewing audience will experience the proposed Expressway as a transient event when passing under or over it on local roads, through interchanges, and along the Waikanae River and Wharemaku Stream corridors. In time, the new structures and road layouts will become familiar elements along the transport network. Effects on landscape character

The landscape character varies along the proposed 16km route; there are areas with distinct rural, rural lifestyle, residential, urban, industrial, and highway characters. As a large piece of infrastructure, the proposed Expressway will introduce a new type of activity and character into these areas.

The proposed Expressway will bisect the landscape, interrupting the natural topography and waterbodies as well as man-made patterns such as settlements, plantations, shelterbelts, roads and accessways.

The degree of change to the existing landscape relates to the scale of the proposed Expressway footprint and the size of the various structures. The change to landscape character will generally be the greatest in the immediate vicinity of the footprint; however, with increasing distance from the proposed Expressway these effects will lessen and then virtually diminish

The least effect on the existing landscape character occurs where the proposed Expressway is close to the existing SH1/NIMT rail corridor, which is already is a busy transport environment. While the proposed Expressway will contribute to this character in these areas, in other places it will be an unfamiliar element, despite that much of the route lies in a corridor that has long been identified for a major road.

For most of the route, the changes to landscape character are rated high. Three character areas the changes will be very high – Wharemauku Basin, Waikanae River and Te Moana. In these locations, the scale of the proposed Expressway structures and the activity that the proposed Expressway will introduce will significantly change the existing landscape character.

Notwithstanding,, landscape character evolves over time. As reflected in the Kāpiti Coast District Plan, several provisions provide for development and expansion of urban and residential areas, which make landscape change in this part of the Kāpiti Coast inevitable. For example, the development of Paraparumu Airport and accompanying business park, and the proposed Kāpiti town centre, and district plan changes- Waikanae North Development Zone, Waikanae North Urban Edge, and Ngarara, The 16 km Expressway, proposed to be built over 4-5 years, will bring relatively rapid landscape change to parts of several communities. However, in the longer term, the

landscape character adjoining the proposed Expressway will evolve and, the proposed Expressway will be assimilated to some extent into the landscape.. Summary against the RMA provisions

Section 6(a) Natural Character of the Coastal Environment, rivers, wetlands and their margins

The proposed Expressway corridor is not considered to lie within the Coastal Environment (as defined in Policy 1 of the New Zealand Coastal Policy Statement).

The proposed Expressway crosses approximately 11 streams, most of which currently have low level of natural character, (due to being channelised, with poor riparian vegetation and low in-stream ecological value). However, the Waikanae River has a high level of natural character.

The imposition of the large scale of the proposed Expressway where it crosses these streams will have an adverse effect on the natural character in term of perceived naturalness. It will also affect the natural character in an ecological sense because of the loss of habitat in the long culverts. However, the proposed riparian restoration/enhancement of sections of the streams will improve the ecological value and natural character of these particular stream sections.

Parts of some of the larger wetlands will be lost, which will adversely affect their natural character. In addition, three small and high value wetlands will be either lost or seriously compromised by construction of the proposed Expressway, which will have serious or very high adverse effects on their respective natural characters.

The loss of natural character in the immediate vicinity of the proposed Waikanae River Bridge would be very high with the realigned Muaupoko Stream and the main river channel confined by riprap and with the bridge overhead. However, in the context of the river over its entire length, the effect on natural character would be low.

Section 6(b) Outstanding Landscapes

Short sections of the proposed Expressway are in close proximity to the former coastal escarpment, and also the Outstanding Natural Landscapes (ONLs) at Raumati and Peka Peka, and where the proposed Expressway crosses the Waikanae River ONL.

The proposed Expressway would not have any effects on the two escarpment ONLs. However in relation to the Waikanae River ONL the effects of the proposed Expressway bridge crossing would be moderate when considered in terms of the ONL overall but in the immediate vicinity of the river crossing, the effects on the natural and landscape values would be severe.

Section 7(c) Amenity Values

This assessment has focused on the landscape and visual components of amenity.

Overall, the proposed Expressway will have will have very high adverse effects on the amenity in relation to its immediate surroundings. The large scale and physical nature of the proposed Expressway and also traffic movement, will unavoidably affect the amenity and open space values of the rural, and residential communities through which it passes.

While the proposed mitigation will assist to integrate the earthworks into the local environment and to screen views of the road and traffic, the physical presence and resultant ambient noise will impact on the existing amenity of adjoining areas.

Section 7(f) Quality of the Environment

The physical changes to the dunes and other landforms, features and waterbodies will adversely affect the quality of the environment along the proposed Expressway route. However, the large areas of the proposed Expressway corridor to be planted with predominantly locally eco-sourced indigenous vegetation will improve the biodiversity of the environments along the route.

Conclusions

The proposed MacKays to Peka Peka Expressway is a large piece of infrastructure that will result in changes to the landscape. The scale of the footprint, the earthworks, scale and elevation of the various associated structures - bridges, retaining walls, noise structures that comprise the proposed Expressway will have adverse landscape and visual effects in places which are unavoidable, even with the substantial mitigation that is proposed as part of the design. .

The benefits of the proposed Expressway extend beyond the Kāpiti District and while some adverse landscape and visual effects are unavoidable, given the nature of the landscape, the pattern of existing development and the scale of the development, the proposal does provide opportunities to improve some aspects of the landscape in places.

Areas of wetland will be lost and others affected by the construction of the proposed Expressway but planting of indigenous vegetation around existing wetlands, formation and planting of new wetlands areas, together with planting throughout the corridor are all positive outcomes. These outcomes will not only improve the biodiversity and provide habitat but they will help to strengthen the framework of vegetation throughout the district and help to achieve some of KCDCs sustainability/environmental objectives.

The creation of a combined cycleway / walkway along the entire route with connections into the local network will also improve the living and recreational environment for residents and also visitors.

Landscape and visual concerns have been comprehensively addressed from the outset of the proposed Expressway Project and have helped shape the Alignment and the details at these initial

stages. The key will be transferring landscape and visual matters and outcomes into subsequent stages of design and implementation.

1. Introduction

This report has been prepared for the NZ Transport Agency to address the landscape and visual effects of the proposed MacKays to Peka Peka Expressway Project. The proposed Expressway is a 16km greenfields route that passes through the Raumati, Paraparaumu, Waikanae and Peka Peka communities. Much of the route is along the former existing WLR designation, an arterial road proposed by Kāpiti Coast District Council; however, the proposed Expressway deviates quite markedly from this designation in places.

A Sandhills Motorway along this corridor has been proposed since the 1950s when Raumati, Paraparaumu and Waikanae were small beachside settlements and when the sand dune system was a dominant landscape feature along this coast. Consequently, there was an expectation amongst successive Councils and many in the community, that a motorway would be one day constructed along this corridor. However, widespread residential development, together with rural lifestyle and coastal subdivision, farming and horticulture, has resulted in a transformation of the Kāpiti coastal landscape. This trend is set to continue with further development proposed in the area. As a result of development, the once continuous dune systems have been flattened, inter-dunal wetlands drained and native vegetation cleared.

In places along the proposed Expressway route, residential subdivision has been developed right up to the existing WLR designation, whereas in other places, especially in the northern section, large tracts of farmland remain, together with relatively recently developed pockets of rural lifestyle holdings.

The proposed MacKays to Peka Peka Expressway is one of seven Roads of National Significance (RoNS) projects underway in the lower North Island between Wellington Airport and Levin. The proposed Expressway is one of three linked RoNS projects that traverse the sand dune country between Paekakariki and Levin.

The landscape and visual team has collaborated with other specialists working as part of the proposed MacKays to Peka Peka Expressway Project team; this collaboration started in the initial stages in the design process, through to the review of options, refinement of the proposed Expressway Alignment and development of detailed solutions. The overall aim of the landscape and visual team has been to provide appropriate input to help integrate the proposed Expressway into the landscape and avoid, remedy or mitigate adverse landscape and visual effects.

1.1. Purpose and scope

The purpose of the landscape and visual assessment is to gain a thorough understanding of the existing landscape and how the proposed Expressway will potentially affect that landscape, its character and also the visual amenity of local communities. In addition, it also considers the proposed Expressway users in relation to landscape and visual matters (eg driver experience, views from the proposed Expressway, etc). In relation to the analysis of the existing environment, it should be noted that an overall landscape character assessment of the whole Kāpiti District was not carried out.

Specifically, this landscape and visual assessment report considers the effects of the proposed Expressway on three groups of effects; biophysical, visual amenity and landscape character.

The design process has sought to avoid and reduce effects, and the proposed planting mitigation is an integral part of the design in order to achieve this. Consequently, there is a significant degree of mitigation 'built-in' to the design. This assessment therefore, includes the mitigation planting as part of the proposal, rather than as an aspect to be considered separately.

This report forms part of the overall Assessment of Environmental Effects (AEE), which will form part of the application documents for the Board of Inquiry process.

1.1.1. Landscape and visual effects

The RMA provisions relevant to this assessment are listed below. This assessment considers the landscape and visual effects in terms of three interrelated assessment categories; biophysical, visual amenity and landscape character, (explained further in Section 5 of this report). The table below shows the relationship between the relevant RMA provisions the assessment categories used in this report;

RMA Provision	Landscape and Visual assessment category
s 6(a);Effects on the natural character of the coastal environment, wetlands and rivers and their margins	Biophysical Landscape Character
s 6(b) Effects on outstanding natural features and landscapes	Biophysical Landscape Character Visual Amenity
s 7(c) Effects on amenity values; and	Visual amenity
s 7(f) Effects on the quality of the environment (biophysical aspects of the landscape).	Biophysical

1.1.2. Overlaps with other disciplines

There is an inevitable overlap between landscape and visual aspects, and some of the other specialist disciplines involved in the Project. Consequently, the assessment of landscape and visual effects has relied on information contained in other specialist reports, particularly in relation to ecology, stormwater management and flood attenuation, urban design, noise, lighting and earthworks (see Technical Reports, Volume 3).

A noise assessment for the Expressway proposal has been undertaken by the Project team noise consultants and their findings are contained in Technical Report 15, Volume 3. While technical noise standards may be met, Expressway traffic will introduce new ambient noise to areas in the vicinity of the proposed Expressway. This noise is likely to affect the overall amenity of areas close to the proposed Expressway. Consequently, ambient noise from the proposed Expressway has been considered as part of this assessment, in so far as its likely effects on the existing amenity of an area.

This landscape and visual assessment also draws on the Assessment of Lighting Effects (Technical Report 8, Volume 3) prepared for this proposal, and is discussed in later sections.

The landscape and visual team also contributed to the Urban and Landscape Design Framework (ULDF) report (Technical Report Appendices, Report 5, Volume 5), which also forms part of the MacKays to Peka Peka Expressway application (see 2.4).

One aspect that should be noted is that some environmental effects that would often be included as part of a landscape and visual assessment, such as urban design matters, and effects on cultural landscape values, have been addressed by other specialists in these areas.

1.1.3. Definitions

For clarity, several terms used throughout this landscape and visual assessment are defined below:

Expressway: is considered to include all the permanent works and structures that form part of the new road, including the earthworks, bridges, noise bunds, noise walls, road surface, cycleway / walkway, safety structures, signage, lighting, and mitigation planting.

Road users: includes people who use the local roads - pedestrians, cyclists, and vehicles.

Expressway users: comprise the drivers who will use the proposed Expressway.

Zone of highest sensitivity is the area that potentially is the most sensitive in terms of the visual effects of the proposed Expressway. It includes all of the area within 100m of the edge of the proposed Expressway, and also elevated areas between 100m-200m that due primarily to their elevation, would potentially have views of the proposed Expressway.

1.1.4. Urban and landscape design framework (UDLF)

The ULDF (Technical Report Appendices, Report 5, Volume 5) focuses primarily on design aspects of the proposed Expressway, as opposed to an assessment of specific environmental effects. It includes an analysis of the landscape, and the consequential implications of this analysis on the design of the proposed Expressway.

A series of design principles were developed as part of the Framework and these were taken into account in the selection of route options, refinement of the Alignment and the development of design details. The ULDF report (Technical Report Appendices, Report 5, Volume 5) documents the existing environment and the design rationale that is relevant to, and that has informed this assessment.

1.1.5. Landscape input into design process

The landscape and visual team, as part of the MacKays to Peka Peka Expressway Project team, have provided input into the following aspects:

- Design philosophy
- Scoping report
- Option assessment workshops
- Alternative route assessment
- Scheme assessment report
- Multi Criteria Assessment (MCA) workshops
- Value Improvement Process (VIP) workshops
- Preparation of visualisations, animations, cross sections and other graphic material for various workshops, the two public Expos, and meetings with various agencies and organisations, and meetings with members of the public
- Refinement of the earthworks design
- Development and refinement of bridge abutment details, bunding, and noise walls
- Development and refinement of landscape and visual mitigation measures
- Costings for landscape mitigation works.

2. Project description

A full description of the Project is detailed in a separate document, within Part D, Chapters 7 and 8, Volume 2 of the AEE. A brief summary to describe the scale and nature of the Project follows.

The proposed 16 km, 4-lane, Expressway loops to the west of SH1 and passes through the Raumati South, Paraparaumu, Waikanae and Peka Peka communities. The southern end of the

Project corridor, at Raumati South, begins approximately 500m south of Poplar Avenue. The northern end extends approximately 500m north of Peka Peka Road.

Key features of the proposed Expressway are:

- Partial interchanges at Poplar Avenue; and Peka Peka Road;
- Full interchange at Kāpiti Road (Paraparaumu) and Te Moana Road Waikanae);
- Four lane bridge over the Waikanae River;
- Grade separated overbridges and underbridges to cross local roads, watercourses and the Expressway;
- Expressway crosses nine local roads, the Waikanae River and 11 streams;
- Stormwater treatment and flood attenuation measures;
- Provision of a shared cycleway/walkway and bridleway separated from the shoulder of the Expressway;
- Noise mitigation through construction of noise bunds and noise walls and fences; and
- Mitigation planting as an integral part of the design.

2.1. Road design

The proposed Expressway has been designed to the following general specifications:

- 4x3.5 m wide traffic lanes with an overall pavement width of 25m-27m (including shoulders and median strips)
- A 4.0m wide median (not planted) at the southern end of the Expressway, extending from Raumati Straight through to south of Raumati Road and from north of Mazengarb Road through to Peka Peka;
- A 6.0m wide median, which will be planted from south of Raumati Road through to north of Mazengarb Road;
- A TL-4 wire rope median barrier generally, with concrete median barriers at some bridges over local roads;
- 9.0m wide trafficable clear zone, no steeper than 1V:4H at cut areas and low embankments;
- Noise bunds and noise walls/fences. Noise walls/fences vary in height from 1.0-3.0 m; and
- Earthworks are a significant part of the Project and include elevated ramps and embankments, (particularly at interchanges) as well cuts through sand dunes.

2.2. Planting design

The inclusion of planting along the proposed Expressway corridor, and its design, was an integral part of the Project design process from the outset. While the establishment of vegetation along the

route is effectively 'mitigation'. For the purposes of this assessment, it is considered a fundamental component of the proposed Expressway design.

Details about the planting can be found elsewhere; in the ULDF and in Figures 2-6 in Appendix 7.A, Technical Report Appendices, Report 7, Volume 5.

2.3. Lighting

The key features of the proposed lighting design are summarised below and based on the *Assessment of Lighting Effects* (Technical Report 8, Volume 3). In general, only relatively short sections of the proposed Expressway at the interchanges will be lit. The middle section of the cycleway / walkway will be lit.

Key features:

- Overhead Expressway lighting at intersections on 10.0m-12.5m high poles
- Approximate lengths of Expressway at intersections to be lit;
  - Poplar Avenue 500m
  - Kāpiti Road 1100m
  - Te Moana Road 1150m
  - Peka Peka Road 350m
- Lighting under Expressway bridges (under-bridge lights and inground up-lights) at – Poplar Avenue, Raumati Road, Kāpiti Road, Mazengarb Road, Te Moana Road, Peka Peka SH1 over-bridge.
- No lighting where Expressway crosses Otaihanga Road, Waikanae River, or at Ngarara Road and Smithfield Road overbridges.
- cycleway / walkway lighting between Raumati Road and Mazengarb Roads on 7.0 m high poles.
- To reduce glare and light spill all overhead lighting lamps will have semi or full cut-off characteristics.

2.4. Noise Mitigation Structures

Key features:

- Earth bunds- typically integrated with other earthworks, the cycleway / walkway and
- Timber noise fences on the boundaries of some private properties (2.0m high)
- Noise walls of various heights on the edge of the proposed Expressway shoulder (1.1, 2. to, 3.0m high), built of concrete and/or welded gabion baskets. Earth will be ramped up against the external face of the walls to assist with their physical and visual integration into the landform

See Section 8.1.2 for more detail

3. Statutory context

A detailed analysis of the statutory provisions relevant to the assessment of the landscape and visual effects of the Expressway proposal can be found in Attachment 1. The content of the statutory analysis is summarised below.

There are four relevant sections in Part 2 of the RMA; these sections are given effect to in the objectives and policies of the Wellington Regional Policy Statement and Kāpiti Coast District Plan.

The four sections are:

> *Section 6. Matters of national importance*
>
> *6(a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:*
>
> *6(b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development*
>
> *Section 7. Other matters*
>
> *7 (c) the maintenance and enhancement of amenity values*
>
> *7(f) maintenance and enhancement of the quality of the environment*

These sections of the RMA have also guided the structure of the landscape and visual assessment, which has considered the potential effects in three interrelated categories of biophysical, landscape character and visual amenity (see section 2.1.1).

The statutory analysis in Attachment 1 has considered the following documents.

Resource Management Act 1991

New Zealand Coastal Policy Statement 2010 (NZCPS)

Wellington Regional Policy Statement Operative (1995) and proposed (2009)

- Chapter 10 Landscape and Heritage
- Regional Freshwater Plan
  - Natural Character of water bodies
  - Amenity and Recreational Values
  - Use of beds of rivers and lakes
  - Structures
  - Planting

- Regional Soil Plan
- Soils and vegetation disturbance

3.1. Kāpiti Coast District Plan

Key KCDP landscape, open space and visual amenity objectives and in the chapters relating to:

- Residential Zone
- Strategic Growth - North Waikanae
- Ferndale Area
- The Ngarara Zone and Precinct:
- Rural Zone
- Outstanding Landscapes
- Earthworks
- Town Centre Zone
- Open Space Zone
- River Corridor Zone
- Transport

3.2. Non RMA Documents

- Wellington Conservation Management Strategy, 1996
- The Greater Wellington Parks Network Plan, 2010
- 'Choosing Futures'- The Community's Vision for the Kāpiti Coast District Community Outcomes 2009

4. Methodology

The methodology adopted by the landscape and visual assessment team follows what is recognised as professional best practice; it comprised the following steps and tasks:

- Site familiarisation;
- Review of documents, plans and other material;
- Analysis and appraisal of existing landscape and viewing audience, which involved fieldwork and reconnaissance, interrogation of GIS data, and analysis of maps and aerial photography;
- Ongoing development of planting design and input to the proposed Expressway design process and the subsequent value Engineering (VE) process;
- Assessment of landscape and visual effects including the preparation and review of cross sections, ground-based and aerial oblique visual simulations; and

- Peer review.

These steps are described below.

4.1. Site familiarisation

Familiarisation with the 16km proposed Expressway ranged from site visits in the early stages of the Project to gain an overview, some of which were undertaken with various other team members, through to subsequent more detailed field work and investigation of specific areas or issues.

In addition, an aerial reconnaissance of the route by helicopter and aerial oblique photography was completed, which also helped with the overview. Recent vertical aerial photography, Google Earth, and detailed LiDAR[2] contour information, together with a wide range of GIS information was also used to help gain an understanding of the existing environment and issues in a wider context.

4.2. Review of documents

A considerable amount of work had been carried out previously for the existing WLR designation investigations[3], and this provided a useful starting point. In addition, numerous other documents, studies and reports that cover the corridor and also the adjoining and wider landscape had been completed by KCDC, GWRC and other agencies (eg District Plan, Regional Policy Statement, Parks Network Plan). A review of these helped provide an understanding of both broad and specific landscape and visual matters.

A review of some of the reports and investigations prepared by other specialist team members in the Project team was also completed, together with a review of various NZTA documents.

4.3. Analysis of existing landscape and viewing audience

Gaining a thorough understanding of the existing landscape and viewing audience involved several discrete pieces of work:

- Landscape Character Assessment- This involved drawing on the work already completed for the ULDF, together with field work, photography, analysis of contour information, vertical and oblique aerial photography, preparation of a 3D terrain model and interrogation of GIS data. This analysis of the existing landscape provided an understanding of landscape character and the

[2] LiDAR aerial photography is an abbreviation of light detection and ranging, which is an alternative to ground surveying, achieving accuracies far superior to conventional photogrammetric mapping.

[3] Some of these investigations involved Boffa Miskell team members, now working on the proposed MacKays to Peka Peka Expressway.

intrinsic landscape and visual values of the corridor in the context of the surrounding environment. Twelve landscape character areas were identified.

- A visibility analysis was completed to define the extent of visual catchment using a computer-generated Zone of Theoretical Visibility (ZTV), based on 'first response' LiDAR survey data[4]. In support of the ZTV, an analysis of typical viewing distances and consequential magnitude of visual effects was also undertaken to define the approximate zone of visual influence within which a proposal of this scale could be visually significant.
- Analysis of the viewing audience determined the size and nature of the local community that would be most sensitive to visual changes (i.e residents in close proximity, users of local roads, and Expressway travellers).

4.4. Assessment of landscape and visual effects

This phase of work involved several interrelated aspects. The assessment focuses on effects in relation to three interrelated aspects – biophysical change, visual amenity, and landscape character. The landscape and visual effects of the Expressway proposal in relation to each of the landscape character areas was assessed and consideration given to these three factors. The magnitude of the effects on each of these categories was assessed on a seven point scale:

Magnitude of effects terminology

# Rank	NZILA Best Practice Note terminology[5]
1	Extreme
2	Very high
3	High
4	Moderate
5	Low
6	Very low
7	Negligible

In addition, the analysis of the visual simulations prepared for 16 representative ground-based viewpoints and 22 cross sections also informed the assessment of effects.

[4] First response LiDAR survey data records vegetation height as well as the ground below.

[5] *NZILA, Best practice Note, Landscape Assessment and Sustainable Management 10.1.2011*

4.4.1. Biophysical effects

This considers the extent and significance of modifications to landform, waterways and vegetation. As part of this work, a detailed analysis of the 3D terrain model and elevation plans was carried out, together with an analysis of cross sections at 20.0m intervals generated by the civil engineering team. In addition, reference was made to the investigations carried out by the ecologists, stormwater specialists and geotechnical specialists. The scale of biophysical change used is set out in the table below.

Magnitude of Biophysical Change

Degree of Magnitude	Indicative Examples
Extreme	Loss of most key features/attributes
Very high	Fundamental alteration to most key features/attributes
High	Alteration to several key features/attributes-considerably changed
Moderate	Alteration to one key feature/attribute –partially changed
Low	Minor change to a key feature/attribute–similar to before
Very low	Very slight change/change barely distinguishable
Negligible	No discernable change

4.4.2. Effects on visual amenity

Visual amenity is a component the overall amenity and therefore contributes to peoples' appreciation of the pleasantness and aesthetic coherence of a place. This aspect considered the effects of the visual change that the proposed Expressway would bring to the outlook and views of the viewing audience.

Several factors can affect the magnitude of visual effects, generally, one or more of these factors contribute to the overall magnitude of effects from any one viewpoint. The table below summarises how factors contribute to the relative magnitude of effect.

Magnitude of Visual effects

Contributing Factors	Higher	Lower
Size of viewing audience	Higher density populations and well used public space (ie residential areas, roads, and public recreational areas).	Lower density areas such as rural and rural lifestyle areas
Proximity to Expressway	Within 100m	Beyond 100m
Duration of view	Residents	Recreation, road users

Relative elevation of Expressway to viewpoint	Difference in elevation	Similar elevation
Visibility of traffic on Expressway	Traffic visible	Traffic not visible
Outlook/desirable views from viewpoint	Loss of key view/visual focus/open outlook	Partial or no loss of key view/visual focus/open outlook
Primary/peripheral views	Expressway central to primary view	Expressway part of the secondary/peripheral view

The scale of changes used to determine the magnitude of change to visual amenity is set out in the table below.

Magnitude of Change to Visual Amenity

Degree of Magnitude	Indicative Examples
Extreme	Proposal dominates/ obscures views for most of the viewing audience.
Very high	Proposal is prominent and significantly restricts views, for viewing audience within 100m
High	Proposal is a major element of mid-ground view from within 200m
Moderate	Proposal forms a visible and recognizable new element within the overall scene/readily noticed
Low	Proposal may constitute a limited component of wider scene/ may be missed by casual observer
Very low	Proposal only occupies very limited part of view often at distance/ may be scarcely discernable
Negligible	Proposal will not be seen within this view

4.4.3. Landscape character effects

Landscape character is derived from a combination of landform, land cover and land use that makes one area different from another. The effects on landscape character relate to changes in landuse, (new or different activities), changes to existing patterns and elements in the landscape, such as vegetation, waterbodies, landform, and settlement patterns.

The introduction of the proposed Expressway into the Kāpiti coast landscape, including the various associated earthworks, structures, planting and traffic, combine to potentially affect landscape character.

Magnitude of Change to Landscape Character

Degree of Magnitude	Indicative Examples
Extreme	Significant change to overall landscape character
Very high	Fundamental alteration to key features/ attributes, composition largely changed
High	Alteration to several key elements or features/ attributes, major change to composition.
Moderate	Alteration to one key element or feature / attribute, composition partially changed
Low	Minor change to underlying composition, similar to before
Very low	Very slight change to landscape character, change barely distinguishable
Negligible	No discernable change

4.4.4. Visual simulations

Using the ZTV, field work was carried out to identify representative publicly accessible viewpoints[6] along the proposed Expressway route (eg from local roads, parks and recreation areas, public and semi-public areas and facilities, and shopping and commercial areas). This work also assisted to understand in detail, the potential effects on visual amenity.

Given that the proposed Expressway traverses through existing well established communities, selection of the simulation viewpoints was based on the following:

- Local roads crossing the proposed Expressway;
- Areas highly used by the public, such as the walkway from the end of Ihakara Street adjacent to Wharemauku Stream, and the Waikanae River walkway;
- Key semi-public locations, such as El Rancho Christian Camp and the Takamore urupa;
- Key public locations, especially those in close proximity to the proposed Expressway corridor or in elevated locations which may be some distance from the proposed Expressway but from which there are clear and unobstructed views of it.

In identifying representative viewpoints, consideration was also given to the potential location of the various elements associated with the proposed Expressway, such as noise bunds, noise walls, light poles and road signs, etc.

[6] Viewpoints on private land have not been identified at this stage. It is anticipated that the submission process will require assessments to be undertaken from some private properties.

Computer-generated visual simulations were produced for the selected viewpoints, most of which are from representative publicly accessible locations, with two from community locations - El Rancho and the Takamore urupa.

Visual simulations are a well recognised and helpful tool to better understand the extent and nature of visual effects. They do not however, claim to reproduce what is perceived by the human eye. The preparation of the visual simulations followed professional best practice as set out in the guidelines adopted by the New Zealand Institute of Landscape Architects[7].

For each of the visual simulation viewpoints, three images have been produced to show the:

- Existing situation;
- The proposed Expressway immediately following construction without any mitigation planting; and
- Proposed Expressway with mitigation planting after approximately 10 years.

4.5. Peer review

A peer review carried out by an experienced landscape practitioner who has worked on roading and other large scale infrastructure projects of a similar scale as the Expressway Project, was nominated at the outset of the Project. John Goodwin, a senior landscape architect and Director of Boffa Miskell based in Auckland, conducted the peer review.

It involved a desktop exercise initially where John reviewed a range of background material on the Project prior to him making a day-long site visit. He then completed a formal review of the completed draft landscape and visual assessment report.

In addition, the visual simulations prepared by the Boffa Miskell visualisation specialist team members in Wellington were peer reviewed by Michael Bain, a visualisation specialist based in the Boffa Miskell Auckland office.

5. Existing environment

5.1. Landscape context

The proposed Expressway is located on the relatively narrow coastal plain between the Tararua Ranges and the Tasman Sea. The Tararua Ranges, coastal escarpments and Kāpiti Island are

[7] *Best Practice Guide, Visual Simulations BPG 10.2*, New Zealand Institute of Landscape Architects, November 2010 .

distinctive and defining landforms, which are well recognised and visible from many locations throughout the Kāpiti district.

The Kāpiti coastal plain is located at the southern end of an extensive coastal sand country[8] land system; that extends from Paekakariki to Hawera. With the exception of the alluvial deposits on the Waikanae River floodplain, all of the proposed Expressway is situated on the sand country; a complex of old sand dunes, interdunal hollows, sand plains, peatlands and drained swamplands.

The sand country land system has been significantly modified through drainage and vegetation clearance, originally for farming but subsequently parts of it have been developed for residential, rural lifestyle and coastal settlement, and horticulture.

When considered at a regional level, the proposed Expressway traverses relatively flat topography. However, at a local scale, the remaining dunelands and waterbodies are a significant feature of the local landscape.

In a local context the proposed Expressway passes through a variety of smaller landscapes - residential areas, open farmland, vegetated dunelands, and rural lifestyle areas - each with a different and distinctive landscape character. To recognise the different landscapes, 12 landscape character areas were defined, based on the difference in landform, land cover and land use of areas along the route. The landscape and visual assessment in Section 10 has been prepared in relation to these character areas. A description of the existing environment for each of the character areas can also be found in Section 10.

For consistency with the Expressway AEE documentation, the landscape character areas have been assigned to the four Project sectors. The summary below defines the relationship between the four Sectors and the 12 Landscape Character areas.

5.2. Landscape character areas as they relate to the four Project Sectors:

Sector 1 - Raumati South

Two landscape character areas;

- Queen Elizabeth Park
- Raumati South

Sector 2 - Raumati/Paraparaumu

Three landscape character areas:

[8] Ravine, D.A. 1992. *Foxton Ecological District: Survey Report for the Protected Natural Areas Programme*. Report prepared for the Department of Conservation.

- Raumati Road
- Wharemauku Basin
- Kāpiti-Mazengarb

Sector 3 - Otaihanga /Waikanae

Four landscape character areas:

- Otaihanga South
- Otaihanga North
- Waikanae River
- Te Moana

Sector 4 - Waikanae North

Three landscape character areas:

- Ngarara
- Peka Peka South
- Peka Peka

5.3. Existing amenity

Amenity values is defined in the RMA as, *"those natural or physical qualities and characteristics of an area that contribute to peoples' appreciation of its pleasantness, aesthetic coherence, and cultural and recreational attributes".*

This assessment specifically considers visual amenity. Visual amenity is a component of the overall amenity of a place. Amenity includes a combination of many factors, such as, visual amenity, ambient noise, air quality, and recreational and cultural attributes.

The effects of noise per se are not part of a landscape and visual assessment of effects. However, noise is an inextricable component of amenity. For example, relative quietness and the sounds typical of rural environments are often very different to the sounds associated with urban and highway dominant environments. The environment along the proposed Expressway route can be catergorised into four amenity types, – Rural/open space amenity, Urban/industrial amenity, Suburban amenity, and Highway/Road amenity.

The effects assessment in Section 10 considers the existing environment and as part of that, the existing amenity of each character area. To avoid repetition, the amenity type descriptions below should be referred to when reading Section 10 'The Assessment of Landscape and Visual Effects'.

- **Rural /Open space amenity**, (including rural farmland, rural lifestyle areas, and open spaces).

- Sense of spaciousness
- Productive farmland and associated elements and patterns, fences, shelterbelts grazed pasture.
- Privacy, relative quietness and minor traffic and bustle, rural noises such as machinery and stock may be present.
- Environment relatively uncluttered by structures, buildings and artificial features.
- Clean environment, characterised by fresh air, clean water, and lack of pollutants.
- Natural landforms, waterbodies, trees and vegetation are dominant.

- **Suburban amenity**
  - Relatively small spaces enclosed by buildings, fences and vegetation.
  - Background neighbourhood sounds and smells, activity on streets, in parks and within residential sections, differing levels of noise and activity occur at various times (weekends, week days, evenings, night time).
  - Visually dominated with buildings, structures and domestic vegetation.
  - Hard surfaces dominant in street environment, natural landforms/waterbodies less prominent.
- **Urban /Industrial amenity**
  - Buildings and structures are dominant, with relatively large bulk and often with tall and broad facades close to the street boundary.
  - Exterior spaces enclosed by buildings and fences.
  - Relatively high traffic activity, and busy road environment.
  - Hard surfaces dominate, natural features and vegetation a minor element.
- **Highway/Road amenity**
  - Linear space, often enclosed by residential/industrial development/vegetation.
  - Traffic activity and noise are dominant features, also dust and exhaust fumes on busy roads.
  - Linearity of road provides strong directional axis of view, can be visually cluttered in built up areas, including signage, lighting, parked and moving vehicles.
  - Hard/artificial surfaces dominate.
  - Physical personal safety a perceived and actual issue.

6. Landscape design principles

The ULDF provides a detailed rationale and explanation of the landscape input into the design process and the landscape mitigation measures proposed. The key principles that have guided the landscape input to the proposed Expressway design process are listed below.

- Avoid, where possible, disturbance of intact natural landforms, water bodies and areas of indigenous vegetation. Where avoidance is not possible, minimise the extent of modification.
- Recognise the diverse local character of the landscape along the route and reflect that character through landscape design and plant species selection.
- Seek to achieve a design where the proposed Expressway integrates into the landscape as far as is possible.
- Recognise the importance of retaining existing vegetation (exotic and indigenous), to provide a basis on which to develop a vegetation framework.
- Seek to include environmental benefits where possible, for example biodiversity.
- Recognise that the visual and amenity effects on the receiving communities' has precedence over Expressway user experience.
- Ensure proposed plantings are sustainable in the long term through use of appropriate planting medium, appropriate species, locally eco-sourced species and effective maintenance regimes.

7. Mitigation

Measures to avoid, remedy or mitigate the landscape and visual effects are summarised in Attachment 3.

Throughout the design process the aim has been to avoid adverse effects. However, consideration of landscape and visual effects are just one of many potential effects that were addressed in the design process. Given the large scale of the proposed works, complete avoidance of adverse effects is not always possible. Where avoidance of effects has not been possible, various mitigation measures have been proposed and included in the Alignment and design of the proposed Expressway.

In relation to landscape and visual effects, earth bunding and associated planting are the primary mitigation measures proposed.

Mitigation measures proposed for ecological and noise related purposes have also been taken into account and these often assist with landscape and visual mitigation. For example, the visual effects of noise walls on the proposed Expressway or areas adjacent to it, need to be mitigated. This has involved ensuring the design of noise walls, including their materials and colour, are appropriate to the receiving environment. It may also mean contouring earth around noise walls to form bunds and/or planting to screen and integrate the noise walls in to the surrounding landscape.

The extent and type of planting proposed as mitigation along the proposed Expressway is shown in Figures 2-6, Appendix 7.A, Technical Report Appendices, Report 7, Volume 5.

The proposed landscape mitigation has been taken into account when determining its effectiveness in maintaining and/or enhancing the existing landscape character and visual amenity. The key to successful landscape mitigation for the proposed Expressway along its 16km length is dependent upon:

- Avoiding a standard approach to mitigation treatment along the entire route and instead ensuring that the measures proposed are appropriate to the particular location and landscape character; and
- Ensuring wherever possible that the treatment of landform as a mitigation measure especially the finishing details, are incorporated as an integral part of the bulk earthworks. How the existing landforms are modified and the shape and design of new landforms are key to successful integration. Planting should not be seen as a convenient way of screening or masking the appearance of poorly considered earthworks.

The landscape mitigation measures proposed in particular seek to address two aspects:

- Effects on biophysical factors: by retaining existing trees and vegetation where desirable and practicable, earth bunding and contouring of earthworks, and planting to integrate the proposed Expressway into the fabric of the surrounding landscape.
- Effects on the visual amenity from beyond the corridor: by including measures that can as far as practicable, screen views of the proposed Expressway, associated structures, and traffic movement, particularly for nearby residents. The measures include earth bunding and planting.

7.1. Contouring of earthworks

While the land along much of the route is flat, sand dunes of various heights and inter-dunal hollows are landforms that significantly contribute to landscape character. They also provide considerable scope to assist with integrating the proposed Expressway into the landscape. Construction of the proposed Expressway will significantly modify the landscape and in places, totally alter and transform the dunes, which in some areas are restricted to narrow, isolated bands.

Given the level of disturbance that will occur to the dunes, it will be important to ensure that the cut faces and batter slopes are ‘tied in’, both physically and visually, with the adjoining, undisturbed dunes. Sometimes, this will entail re-shaping a much larger area than that simply required to construct the road itself in order that all the ‘faces’ of a modified landform are effectively integrated. The ULDF report (Technical Report Appendices, Report 5, Volume 5) describes and illustrates these points, see also Figure 7 of Appendix 7.A, Technical Report Appendices, Report 7, Volume 5.

The civil engineering design depicts cut and fill batter slopes as very uniform in their shape whereas natural landforms, such as dunes, have subtlety and variation with small humps and hollows and irregularities.

A uniform shape form and gradient is certainly appropriate for grassed areas that will be regularly mown but generally not so when dealing with natural landforms, which will be mostly be planted in woody vegetation. While earthwork contour plans and drawings can illustrate the overall form to be achieved, obtaining a 'natural' looking result is generally reliant on the skill of the contractors, especially machine operators. At the detailed design stage, minor adjustments to the final contour plans may be needed to ensure the earthworks fully integrate with the existing landforms at a site specific level.

7.1.1. Noise bunds

Noise bunds and bunds to provide visual screening adjoin dunes in many places but in others are located on flat land. The shape of bunds are important in that they need to relate to their context and ideally, have a 'natural' appearance. The way these tie in with existing and new landforms will require careful attention at the detailed design stage. Once again, while drawings can illustrate the forms of these in a general sense, their successful integration will rely on the interpretation and execution by the contractors.

7.1.2. Noise walls and fences

Noise walls have been designed in relation to their context. In those places where 1.1m noise walls along the proposed Expressway ramps and bridges are required, these will be extensions of the concrete bridge barriers as opposed to being totally separate structures.

Other noise walls along the route will be either i) concrete walls of varying heights depending on the specific location, or, ii) welded mesh stone filled gabion baskets along the edge of the proposed Expressway with earth ramped up on the outer face and mass planting (see ULDF report, Section 5.9 – Technical Report Appendices, Report 5, Volume 5). It is intended that earth will be ramped some way up the external faces of the concrete noise walls to, in effect, part 'bury' them on one side. The earth ramps will also be planted, further integrating the walls into the landscape and largely screening them from view from beyond the proposed Expressway corridor.

Timber noise fences along rear boundaries of some residential properties are also proposed. These will be 2.0m high, closed board fences. Timber fences such as these are familiar elements in the urban environment but where timber fences are proposed they will need to be designed to relate to adjacent properties.

Generally there will be planting along the 'Expressway side' of fences, as part of overall landscape mitigation; planting may also be required within private properties to minimise the effects of high fences.

7.2. Vegetation

7.2.1. Retention of existing vegetation

While there is not a lot, there are patches of existing vegetation that are proposed to be retained; in some places there are just individual trees (see Figures 3-6) Technical Report Appendices, Report 7, Volume 5. Retention of existing vegetation is a key mitigation measure, which can assist with integrating the proposed Expressway into the landscape in several ways:

- It has intrinsic values which should be acknowledged instead of clearing all vegetation at the outset regardless of its ecological and landscape worth or value;
- It provides a starting point for planting further vegetation;
- Providing shelter and protection for new plantings; and
- It can reduce overall planting requirements and therefore reduce costs.

There are however, issues in retaining existing vegetation that also need to be considered:

- It may restrict activities and movement on site, especially in relation to use of machinery and access;
- It needs to be protected during construction, often requiring fencing to prevent access and/or accidental damage.

In several areas where the retention of existing vegetation is proposed, the planting of adjoining areas is based on this existing vegetation being present. If for some reason the existing vegetation were to be removed then this could affect habitat, landscape character, and the success in establishing the proposed new planting. Given that screening of the proposed Expressway and associated structures is part of the mitigation strategy, retaining existing vegetation is an important consideration.

7.2.2. Planting

Planting as a landscape mitigation measure is equally as important as re-contouring of dunes and earth bunding. Planting is also key in terms of ecological mitigation.

In landscape terms planting will:

- Enhance local landscape character;
- Integrate earthworks with adjoining topography / vegetation;
- Enhance local biodiversity;
- Reinforce or complement existing vegetation to be retained;
- Screen views of the Expressway, associated structures and traffic on the Expressway;
- Screen views of noise walls;

- Maintain visual amenity for residents; and
- Enhance cycleway/walkway amenity.

Mitigation vegetation and wetland areas will be planted as the earthworks of each stage of the Project is completed, at a time when environmental conditions are appropriate. A maintenance period of two years for the areas planted in terrestrial vegetation and four years for planting in the wetlands, following completion of landscape works will apply to successive areas in relation to the Project staging.

Nine planting types are proposed along the proposed Expressway route, see Figure in 2 Appendix 7.A, Technical Report Appendices, Report 7, Volume 5 for more detail :

Mass planting – trees and shrubs, typically native species, selected from a palette of proven species eco-sourced from the Foxton Ecological District. This planting will be the dominant type for most areas along the route, including the 'wet' swales and in the median. The width of the proposed Expressway median is either 4.0m or 6.0m; only the 6.0m wide median will be planted. The northern and southern parts of the route (ie Sectors 1 and 4). Will have a 4.0m wide median, which will be sealed.

Mass planting with tree enrichment – similar to the above type but with the addition of eco-sourced canopy tree species. The mass planting will provide shelter and a better growing environment for the canopy tree species which will be planted one or two years after the initial mass planting.

Specimen trees underplanted with groundcover species – this planting type is mostly confined to the Kāpiti Road and Te Moana Road interchanges and comprises large grade native or exotic tree species with small grade native or exotic groundcover species.

Trees with grass – this is proposed in the open rural areas with the aim of re-establishing pasture close to the road with shelterbelts or groups of rural type tree species in places.

Riparian planting – where the proposed Expressway crosses streams and waterways, riparian planting using native species will be planted 10.0m on both sides of the waterway extending approximately 50m upstream and downstream of the proposed Expressway. This planting will comprise closely-spaced, eco-sourced species from the Foxton Ecological District with the aim of creating a dense band of planting that will overhang the stream to provide shade and habitat.

Wetland planting – forming the edges of wetlands and then planting these areas with a range of proven species will be challenging both in terms of plant establishment and ongoing maintenance. Aggressive exotic pest plants are well established and a problem in many of the existing wetlands on the Kāpiti Coast, including those along the proposed Expressway route. Plant establishment will rely on ensuring that the overall form and design of wetland areas can provide suitable habitat for plant establishment, that good site preparation prior to planting is carried out, and then timely maintenance is undertaken to ensure pest plants and animals are controlled.

Two types of wetland areas are proposed – ecological wetlands and stormwater treatment wetlands. There are several existing wetlands along the route and most of these have been avoided and will be retained as key ecological features. However, control of pest plants will be required and also some additional planting. The margins of existing wetlands that are disturbed will be rehabilitated. In addition, there is one new ecological wetland area proposed near Otaihanga Road.

Stormwater treatment wetlands- these areas will in many instances have a similar appearance to ecological wetlands but their function will be quite different as they will receive and treat stormwater from the proposed Expressway. They will require a totally different kind of maintenance to the ecological wetlands with machinery access required for periodic cleaning to remove of silt and contaminated material from proposed Expressway runoff. A similar range of eco-sourced native plants will be used in both types of wetlands.

Flood storage areas –are extensive in several places along the route. Generally, these areas once formed, will be re-grassed and grazing continued wherever possible. Some will intermittently/seasonally have areas of standing water whereas other flood storage areas will generally remain damp and periodically they will become inundated with flood waters. In some locations, where flood storage areas are adjacent to stormwater treatment or ecological wetlands, they will be planted with appropriate local native species. These areas are annotated on the Mitigation Planting Plans (Figures 3-6, Technical Report Appendices, Report 7, Volume 5).

Mown Grass- is proposed along immediate the edge of the proposed Expressway and in the dry swales.

7.2.3. Lizard habitat

The Herpetofauna Report (Technical Report 28, Volume 3) recommends that suitable lizard habitat be included in the planting.

Terrestrial lizards prefer open environments with abundant refuges, and the edges of plantings are conducive to these characteristics because they are naturally open and promote the growth of a thick ground tier. We recommend designating and managing such edges as lizard habitat, and planting appropriate ground tier species such as toe toe (Austroderia toetoe, A. fulvida), meadow rice grass (Microlaena stipoides), blueberry grass (Dianella nigra) and flax (Phormium tenax). Optimal arboreal lizard habitat consists of native shrubs and trees, and particularly kanuka (Kunzea ericoides). Landscape plans should also incorporate these species.

Lizard habitat can be provided along the edge of the cycleway / walkway and wetland areas with the inclusion of the species listed above. This will be incorporated at the detailed planting plan stage.

7.2.4. Pest plants

Pest plants will be a major issue in relation to the landscape and ecological rehabilitation of areas of existing vegetation to be retained and also in areas of new planting – both terrestrial and wetland vegetation. In particular, blackberry and convolvulus will be an issue as both species are well established and already a problem on the Kāpiti Coast; they are aggressive and fast-growing species and readily colonise disturbed sites.

Blackberry and convolvulus and other pest plant species have proven to be a problem in various places where relatively large scale rehabilitation plantings of eco-sourced native terrestrial and wetland species are planted regularly such as Queen Elizabeth Park and Whareroa Farm.

Given that material used in the construction of the proposed Expressway will be transported to and from different parts of the route, as well as being brought in from places from further afield, there is considerable risk of pest plants being spread to areas where they are currently not present or where they have only a minor presence.

Removing and controlling pest plants requires vigilance and a sustained effort both at the outset of construction and ongoing maintenance; regular and careful monitoring will need to be established in the construction phase and continue through the defects liability period and in the long term management of these plantings.

7.2.5. Eco-sourcing

Although very little original indigenous vegetation remains on the Kāpiti coastal sand plain, the development of the landscape and ecological mitigation planting along the proposed Expressway provides an opportunity to use a range of native plant species that occur in the Foxton Ecological District, which extends from Paekakariki to Wanganui. The Department of Conservation, regional councils and many city and district councils exclusively use plants raised from eco-sourced seed and often consent conditions require many development projects to do the same.

Much of the native planting carried out by KCDC uses plants raised from eco-sourced seed and the Council has developed expertise in this area. In 2009 KCDC received a grant from the Ministry for the Environment's Sustainable Management Fund to employ an Environmental Restoration Officer to establish a seed bank to improve the supply of eco-soured plants for use in environmental restoration projects.[9]

Eco-sourcing seed from local populations of native plants and then propagating these for use in environmental projects requires a long lead time, generally 1-2 years in advance of when the plants are required and consequently good planning is necessary.

[9] Pers comm. Rob Cross, Biodiversity Advisor, KCDC, 29 June 2011

Use of eco-sourced plants has been factored into the planting along the proposed Expressway, however there are exceptions. Given the time frames for construction of the proposed Expressway obtaining the quantities of certain species of large grade specimen trees for planting in areas such as the Kāpiti Road and Te Moana Road interchanges is unlikely. The planting proposed for these areas is more for amenity purposes rather than one of trying to approximate natural plant assemblages.

Eco-sourcing plants generally does not increase costs but adds significant environmental benefits. While using eco-sourced plants is widely adopted, it does come with challenges, such as insufficient seed of the range of species required, poor germination, die-back, unthrifty plants.

7.2.6. Planting: terrestrial

As part of refining the planting design and species composition along the route, a planting substrate and plant trial is being established on an area of NZTA land in Greenhill Road, on the same site where geotechnical trials are being carried out. Given that a large volume of peat will be extracted as part of construction of the proposed Expressway, the intention is to use a significant proportion of this peat in combination with other material such as biosolids produced in KCDC's sewerage plant, topsoil and compost to provide suitable growing medium for areas to be planted.

The substrate and planting trials are proposed to commence in the first half of 2012 and continue for at least two years. The trials will identify the recommended methodology for composition, handling, mixing and placement of planting substrate and to the best planting methods to establish vegetation using a range of eco-sourced native species and in some places exotic species as well. The trials will be designed, monitored and documented to ensure the findings are accurate and can be easily implemented at the much larger scale of the proposed Expressway construction.

As part of the trial, different species proposed along the route will be planted and their survival and success monitored. The construction methodology involves peat that is removed being stockpiled along the route to dry out, a proportion of which will be used in landscape mitigation works.

Planting will involve the following:

- All areas disturbed by earthworks will be hydroseeded on completion to provide stability and to control silt runoff. For the areas being returned to grazing, pasture grasses will be used as this will be the final vegetation cover.
- Areas to be planted in woody vegetation will be either blanket sprayed or spot sprayed depending on the type of planting being carried out. All areas planted in woody vegetation will be mulched. Depending on the particular situation, mulch will be mechanically applied, blown on to areas or applied by hand. Various areas of woody vegetation along the route will be cleared and mulched (except those species that may become future pest plants). and used around new planting,

- All plants will be 'hardened off' either in a nursery where they are propagated or in a suitable nursery holding area for at least two months prior to being planted.
- Controlling pest plant and animals will be a key to plant survival and establishment. Where pest plants or animals are likely to be a threat then a removal/control programme will be initiated in advance of planting.
- A two year maintenance period is proposed for planting on embankments, batter slopes, bunds, wet and dry swales and for riparian planting. A four year maintenance period is proposed for the ecological and stormwater treatment wetlands.

7.2.7. Planting - wetlands

Establishing and maintaining planting in the existing and new wetlands will pose several challenges, notably pest plants and the level and period of maintenance required. Given the level of pest plants present in most of the existing natural wetlands on the Kāpiti Coast, any additional planting in these areas will face competition. There are numerous man-made 'wetlands' on the Kāpiti Coast; often these are steep-sided stormwater ponds servicing a group of houses with a fringe of planting. Many of these have little or no ecological value and limited landscape value.

A good example of what can be achieved in terms of wetland planting is the Pharazyn Reserve, KCDC's former sewerage ponds. The edge of these man-made rectangular-shaped ponds, has been reconfigured and extensively planted with local native species. Reshaping and planting started about four years ago along the southern boundary of one of the ponds and a wide band of native wetland species is now well established.

Over the past couple of years material excavated from the double tracking of the NIMT rail line was used in reshaping the western edge of the pond and then this area planted. Plant survival and establishment has been good and pest plants have not been a problem.

8. Landscape and visual assessment- introduction

8.1. Identification of the assessment area

The first step of the assessment was to determine the extent of the area within which the effects would be assessed. The extent of this area was required to be of a sufficient size to encompass the potential significant effects of the three assessment aspects (biophysical, visual amenity, landscape character).

Obviously the greatest effects will generally occur close to the proposed Expressway and diminish at more distant locations. There is no definitive distance from the proposed Expressway at which the effects may cease being significant, and each type of potential effect will have a different zone of influence. That is, biophysical effects will occur under and immediately adjacent to the proposed

Expressway while visual effects and effects on amenity and landscape character can occur on a continuum from immediately adjacent to the proposed Expressway, extending out into the wider environment. The Following discussions about visibility relate to day time viewing, the effects of lights at night are considered separately.

8.1.1. Visibility

Visibility is generally a key determinant of the extent of a study area as it may generate effects across all three assessment aspects - biophysical, visual amenity, landscape character. A tool often used for determining the extent of visibility is a ZTV (zone of theoretical visibility) analysis. While ZTV analyses are very useful, they need to be interpreted with caution and considered as an indicative tool to identify features visible from any given point. It is important to understand the parameters and data used to generate a ZTV[10].

Two ZTV analyses were carried out, one broad scale (3km extent) and the other at a more local level (300m extent). Both scales of analysis involved assessing the potential visibility of the proposed Expressway along the 16km route by generating ZTV maps based on detailed LiDAR contour data. The 3D model of the proposed Expressway, including the proposed earth bunding and associated structures such as noise walls and light poles, was integrated into the terrain model for the ZTV mapping.

The ZTV analyses considered from where beyond the proposed Expressway a series of target points on the edge of the proposed Expressway could be seen/not seen. The target points, at 10m intervals along both sides of the carriageway were located 3.0m above the road surface. This height was used to capture the potential visibility of commercial traffic such as trucks and buses[11].

The ZTV maps indicate locations from where the points 3.0m above the edge of the carriageway would be visible or not. However, it does not indicate whether any other part of the proposed Expressway such as earth bunds beside the carriageway can be seen.

The broad scale analysis considered a viewing radius of 3km and used the terrain model only; that is, it took no account of vegetation or buildings that may screen views of the proposed Expressway (Figure 8, Technical Report Appendices, Report 7, Volume 5).

[10] Attachment 1 provides detail of the ZTV methodology.

[11] If the target points were located at road level, any low obstruction beside the road, such as 1.1m high concrete barrier would result in a reading that indicated that the proposed Expressway would not be visible beyond it. Consequently, the 3.0m high target point position overstates what is visible and conversely understates what is not visible

The second more detailed ZTV analysis was limited to a 300m radius from the proposed Expressway and includes both the terrain and the first response LiDAR data (ie features that occur above the terrain such as vegetation and buildings) that may obscure line of sight to and from the proposed Expressway (Figures 11, 24, 36, 50, Technical Report Appendices, Report 7, Volume 5)

Note: The ZTV mapping was carried out on the basis of the proposed Expressway at completion of construction; that is, without any mitigation planting on the earth bunds or within the Designation.

8.1.2. Broad Scale ZTV - 3km extent

Figure 8 (Technical Report Appendices, Report 7, Volume 5) shows that theoretically, the proposed Expressway would be visible from most locations within the 3km radius. The analysis shows that the relatively flat topography of the Kāpiti Coast area potentially offers distant views across the landscape. However, in reality, the proposed Expressway with its low profile, combined with intervening vegetation and landforms would generally not be discernible from a 3km distance, unless the viewpoint was elevated, (such as positions on the Tararua foothills).

The enclaves of residential development located on the slopes above SH1 have expansive views over the Kāpiti sand plain, the coast and to Kāpiti Island. While these residential areas are up to 2km away from the proposed Expressway it will still be visible given its scale and its north-south linearity extending across the middle-ground of the views from these areas.

8.1.3. Detailed ZTV - 300m extent

The maps showing these ZTVs are included within their appropriate Sectors in Appendix 7.A, Technical Report Appendices, Report 7, Volume 5 (Figures 11, 24, 36, 50). This ZTV identifies where the proposed Expressway is potentially visible/not visible from within a 600m wide corridor (300m either side) where, because of landform and other obstructions, such as vegetation, buildings and other structures the proposed Expressway cannot be seen.

In broad terms, the proposed Expressway along much of its length will be potentially visible from many residential areas on both the eastern and western sides of the Alignment that located close to the proposed Designation. This is especially so at the southern and middle stretches of the route but less so at the northern end beyond Te Moana Road, where the sand dunes are higher and more extensive and thus would obscure the proposed Expressway from many inter-dunal areas.

At the locations either side of where bridges cross local roads where the road ramps up, the proposed Expressway will be more visible. Conversely, where earth bunds are proposed, locations adjacent to the proposed Expressway will not have views of the road or traffic.

Throughout Raumati South, Paraparaumu and Waikanae, the dunes have been significantly modified (mostly flattened), as part of residential subdivision. However, in some subdivisions, dunes

or parts of them have been retained and allotments created to take advantage of views to Kāpiti Island, the coast and eastern escarpment.

In the areas of rural lifestyle development, dwellings are almost invariably sited on dune crests to obtain views and sun and also so that they are above low lying and damp ground. The properties on these elevated sites, even if they are 100m, 200m or even further away from the proposed Expressway, will potentially still have views of it.

On the flat and gently rolling land which occurs along several stretches, the proposed Expressway will be built on an embankment varying from 2.0m-4.0m above existing ground. In these places, the proposed Expressway will often be visible from areas close by, and from more distant locations because of the elevation and absence of vegetation to screen views.

8.1.4. Identifying the extent of the zone of influence

A field-based analysis[12] to consider the nature and magnitude of effects created by a road of similar scale to that proposed was undertaken to determine the approximate zone of influence of the visual and landscape effects of the road and also traffic. This analysis was carried out at the SH1 MacKays crossing overpass near the Queen Elizabeth Park entrance. The investigation considered the experiential effects of the road from a similar elevation over a range of distances from SH1 (at 50m intervals from 50m to 500m). The results from this investigation were extrapolated and applied to the wider proposed Expressway environment.

The following general observations were made. The primary effects were:

- Static visual effects –the physical structures (elevated carriageway, bridge, barriers, ramps and embankments) - physical presence of the features, and the built nature of the structures, and contrasting colours and materials.
- Dynamic visual effects- the movement of traffic- the dynamic nature of moving traffic accentuates the visual effects compared to a static scene.
- Effects of the traffic noise on the general amenity of the area.
- The combined effect of the visual effects and traffic noise on the amenity and otherwise rural character of the location. The effect of being able to see and hear the traffic was greater than if the traffic could just be heard, or just seen.

Considering the magnitude of these effects from a range of distances when viewed from a similar elevation it was determined that:

[12] Qualitative field analysis based on the professional judgement of two senior landscape architects. The observations and findings reviewed by a third senior landscape architect, Dr Frank Boffa.

- Within 100m the effects listed above are likely to be significant because from this distance the proposed Expressway often constitutes a large proportion of the view. Even if traffic on the road is not visible, the combination of the static visual effects and traffic noise is significant.
- Within 200m the effects listed above are likely to be significant, however the further away from the road the more likely it is that intervening structures or vegetation will partially screen views of the road and reduce the extent of road visible, therefore reducing the visual effects.
- Beyond 200m the effects are less significant, but still potentially high if there is a clear line of sight to the proposed Expressway and traffic is visible. If moving traffic is not visible the visual effects are much reduced.

For the purposes of this assessment, the 100m and 200m distances have been considered to be the most sensitive part of the receiving environment where people or places will potentially be the most affected by the proposed Expressway. (This considers daytime effects not night time lighting effects) Consequently, areas within 200m of the proposed Expressway were deemed the primary study area and the focus of the assessment of landscape and visual effects.

8.2. Receiving population and sensitivity

In order to understand who will be affected by the proposed Expressway, an analysis of the potential viewing population was undertaken. The viewing audience falls into two broad groups:

i. Resident population: those residents located close to the proposed Expressway who will have views from their dwelling or immediate outdoor living area of the proposed Expressway, and associated landforms, structures, and various mitigation measures such as planting. There will be several subsets to the residents' population group, such as those who live close by, those that live some distance away but on elevated sites and those who live a considerable distance away, such as on the slopes below Hemi Matenga Reserve, from where the proposed Expressway will still be visible.

ii. Transient population: people using the roads, footpaths, public spaces, and public facilities from where views of the proposed Expressway and landforms, structures, plantings may occur, albeit for short periods of time.

8.2.1. Size of residential population with 200m of proposed Expressway

This assessment considers that the residential population within 200m of the proposed Expressway would potentially be the most affected. A count of dwellings within this zone was carried out to quantify the size of the audience.

The count was based on aerial photography flown in July 2010, minus the dwellings proposed to be removed as part of this Project. In addition to the dwellings, there are also various non-residential buildings along the route, especially farm buildings at the northern end; these have not been

counted. The Sector maps (Figures 10, 23, 35, 49, Technical Report Appendices, Report 7, Volume 5) show the 200m buffer where the assessment was carried out).

Many of the dwellings within 200m of the proposed Expressway are in subdivisions that have been developed since the existing WLR designation was put in place.

The table below sets out, by character area, the numbers of dwellings within 100m and 200m of the proposed Expressway, divided into dwellings east and west of the proposed Expressway.

8.2.2. Number of dwellings within 200m of the edge of the proposed Expressway

Character Area	East of Expressway			West of Expressway			East and west		
	0m-100m	100 - 200m	0m-200m	0m-100m	100 - 200m	0m-200m	0m-100m	100m-200m	0m-200m
QE Park	0	0	0	0	0	0	0	0	0
Raumati South	1	6	7	20	25	45	21	31	52
Raumati Road	8	34	42	29	66	95	37	100	137
Wharemauku	2	16	18	42	87	129	44	103	147
Kāpiti Mazengarb	123	166	289	57	75	132	180	241	421
Otaihanga South	0	3	3	8	8	16	8	11	19
Otaihanga North	2	7	9	2	2	4	4	9	13
Waikanae River	0	0	0	0	0	0	0	0	0
Te Moana	12	44	56	0	2	2	12	46	58
Ngarara*	0 (5)	2 (24)	2 (29)	0	2	2	0	4	4 (31)
Peka Peka South	0	1	1	2	1	3	2	2	4
Peka Peka North	0	2	2	0	6	6	0	8	8
Total	148	281	429	160	274	434	308	555	863

These numbers do not include the yet to be built dwellings in the Ferndale subdivision where there are 5 lots between 0-100m, 22 between 100m-200m (i.e. potentially an additional 27 dwellings within 200m of the proposed Expressway).

8.2.3. Total Dwellings Within 200m

There are approximately 865 dwellings within 200m of the edge of the proposed Expressway with almost equal numbers on the east and west. The Kāpiti /Mazengarb character area contains over 48% of the total dwellings within 200m, with Raumati Road 16% and Wharemauku Basin 17%. Together, these three Paraparaumu character areas account for 81% of the dwellings within 200m of the proposed Expressway.

While dwellings within 200m may potentially be close enough to see parts of the proposed Expressway, most will not have direct views due to intervening vegetation, landforms and buildings. It is anticipated that most locations within 200m of the proposed Expressway will experience some level of traffic noise.

8.2.4. Between 100m and 200m

64% (557) of the total dwellings lie between 100m and 200m with 85% of these in the Paraparaumu/Raumati area.

8.2.5. Within 100m

Approximately 308 dwellings (or 36% of those within the 200 metre total) are located within 100m of the proposed Expressway; the numbers of dwellings on the east and the west are similar. 58% (180) of these dwellings lie within the Kāpiti-Mazengarb character area, of which 68% (123) are on the east and 32% (57) on the west.

The residences within 100m are potentially the most affected. The close proximity means that, if visible, the effects are likely to be more significant than at greater distances, particularly if traffic is visible. It is likely that traffic noise will also be audible to some degree from this distance.

While these numbers provide a useful understanding of the numbers of dwellings in close proximity of the proposed Expressway they do not identify which dwellings would actually be able to see the proposed Expressway. Site visits and assessments from individual private properties have not been carried out. In many cases vegetation, structures or landforms may obscure or interrupt views to the proposed Expressway from dwellings and the only way to determine this is through field work and assessment from each individual property.

The 'above ground ZTV'[13] prepared for each Sector (Figures 11, 24, 36, 50, Technical Report Appendices, Report 7, Volume 5) provides an indication of the locations from where the proposed Expressway is not likely to be visible. Many of the dwellings within 200m of the proposed Expressway would not have a direct line of sight, and many within 100m may be able to see parts of the proposed Expressway such as the earth bunding but not traffic.

8.2.6. Zone of highest sensitivity

The baseline 100m and 200m distance concept was further refined to define the area in which the potential effects of the proposed Expressway are likely to be the greatest (i.e. zone of highest sensitivity). As well as proximity, the topography, and presence of dwellings (i.e. areas of existing or zoned for residential) along the proposed Expressway corridor were considered.

[13] Vegetation and buildings are taken into account.

The zone of highest sensitivity is shown on Figures 11, 24, 36, 50 (Technical Report Appendices, Report 7, Volume 5) and was based on the 100m buffer with adjustments to account for:

- Where there are dwellings between 100m and 200m that are likely to have views to the proposed Expressway because they are on elevated ground;
- The elevated parts of Ferndale residential area, which is consented with roading and infrastructure in place, but where very few buildings have yet been constructed. Many of the allotments in the subdivision however, would potentially have views to the proposed Expressway;
- ZTV analysis (300m) locations beyond 100m distance with visibility of the proposed Expressway, and where there are several dwellings.
- Locations within 200m of the proposed Expressway, but beyond the zone of highest sensitivity may still have a high level of sensitivity to change.

8.2.7. Transient population

The ULDF provides an analysis of the local movement networks (Section 3.9 ULDF), including SH1 and the local roads where cycling, walking, recreational and commuter movement has been taken into account. The largest component of the transient population is the users of the local roads that will cross the proposed Expressway or where people live in close proximity to it. The table below from the ULDF, shows the vehicle counts for the local roads.

Location	Local Road Vehicle Traffic Figures 2010 daily flow
Poplar Avenue - 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 Drive	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

In addition to vehicles, cyclists and pedestrians also use these roads. Pedestrians and cyclists move at a slower pace than vehicles and consequently would experience the proposed Expressway in a more intimate fashion and for longer periods. The experience of a pedestrian or cyclist is also more immediate than for those in the confines of a car. Pedestrians and cyclists are therefore more sensitive to the visual, noise, dust, and general amenity effects, than people in vehicles.

The effects from local roads that cross the proposed Expressway will generally be greater than for other local roads in the surrounding area, given the proposed Expressway is orientated across the direction of travel and therefore in the direct line of view. The visual effects would be further accentuated where the proposed Expressway is elevated on a bridge or on embankments.

Beyond the road network, the transient population is made up of people using open spaces and pathways for recreation and local commuting. In particular, the Waikanae River corridor is a well used public space valued for its remote, 'wild', 'natural' and recreational values.

8.3. Lighting

This landscape and visual assessment draws on the Assessment of Lighting Effects prepared for the Expressway proposal (Technical Report 8, Volume 3). The lighting effects assessment considers the relevant lighting standards and statutory plan provisions and concludes that these standards *"can be easily met for residential properties and that the majority of lighting will be in areas where there are no immediately adjacent residences". And, "overall the effects of the proposed lighting to the immediate environs the effects would be 'minor' ".*

The effects of traffic headlights have not been addressed in the *Assessment of Lighting Effects* (Technical Report 8, Volume 3). However, it is anticipated that effects from headlights are most likely to affect residents when headlights are directed toward a dwelling; requiring the following combination of circumstances to occur:

- the Expressway is elevated, with no planting mitigation taller than the pavement height;
- where the Expressway curves resulting in headlights being directed off the Alignment of the road; and
- where residences are close to the Expressway.

Given this, it is not anticipated that light from headlights will be a significant issue for residents along the route. The visual screening provided by earth bunding and the proposed vegetation will obscure or screen light from headlights beyond the proposed Expressway corridor. Light from headlights may be visible or partially so in places along the proposed Expressway but is unlikely to be visually intrusive.

Where headlights are visible from 'side on' (i.e. passing traffic with headlights oriented at right angles to the view), the effects would be less than if headlights were directed toward the viewpoint/dwelling.

8.4. Natural character

The assessment of natural character applies to the natural character of the coastal environment, wetlands, rivers, streams and their margins that would be affected by the Expressway proposal (as per Section 6(a) RMA).

8.4.1. Coastal environment

The proposed Expressway corridor (in the opinion of the authors) is not considered to lie within the coastal environment (as defined in Policy 1 of the NZCPS). While it is acknowledged that the sand country between the foothills of the Tararua Range and the coastline results from coastal processes, the active coastal processes and dynamic influences of the coast do not continue to shape the inland area where the Expressway is proposed. That is, coastal processes, influences and qualities are not considered to be significant in any part of the proposed Expressway corridor.

Where the proposed Expressway crosses the Waikanae River, approximately 2.0km from the coast, there may be minor coastal influence in the river (due to migration of some marine fish species), but the water in the river is not saline, the vegetation does not comprise coastal species, coastal process are not evident, and overall the area has no perceptible coastal characteristics.[14]

8.4.2. Rivers, streams, wetlands and their margins

The natural character of the rivers streams and wetlands potentially affected by the proposal has been based on the ecological assessment[15] and field observation. Assessment of the natural character of the waterbodies refers to just the part of the waterbody potentially affected by the proposal; assessments of the whole waterbody has not been undertaken.

The existing natural character of the streams and wetlands has been assessed in Section 10.0 of this report in each of the relevant character area descriptions. In general, the streams have relatively low natural character but potential for significant improvement. In contrast, the Waikanae River has high natural character.

A brief assessment of the existing natural character of the streams, rivers and wetlands is included in the description and assessment of each landscape character area Section 10.

Summary from *Freshwater Habitat and Species – Description and Values* ecology report (Technical Report 30, Volume 3):

[14] KCDC are currently preparing a study of the Coastal Environment

[15] 'Freshwater Habitat and Species – Description and Values' – Technical Report 30, Volume 3

"In summary, with the exception of the Waikanae River, the streams potentially affected by this Project are typically:

1. *Highly modified*
2. *Lack riparian margins, or where present are dominated by exotic species.*
3. *Are deeply incised*
4. *Have low fish diversity dominated by species tolerant of water quality issues*
5. *Have aquatic macro-invertebrate communities dominated by species that are robust and tolerant, and lack EPT species that are sensitive to water quality issues and indicators of healthy streams.*
6. *Have low to very low MCI and QMCI scores*
7. *Have low to very low SEV and PHA values*
8. *Have contaminant including elevated levels of heavy metals, nutrients, E.Coli and sediments that in a number of cases exceed guideline trigger levels.*
9. *Typically have low Dissolved Oxygen, levels of pH that are highly acidic, and poor clarity.*

Of these streams three have some slightly higher habitat values. They are the Wharemauku stream and Whareroa tributary and to a lesser extent the Muaupoko Stream.

Despite these low values, each stream has the potential for significant improvement, and will be performing ecological functions that are important to some species. Without management and in some cases mitigation, the MacKays to Peka Peka Project could have a range of effects on riparian and aquatic habitat and on freshwater fauna."

9. Landscape and visual effects assessment - by character area

The landscape and visual assessment has been undertaken in relation to the 12 Landscape Character Areas. While the focus of the assessment has been on the Zone of Highest Sensitivity and the areas within 200m of the proposed Expressway, effects on the wider area have also been considered.

The figures in Appendix 7.A and 7.B of this report (in Technical Report Appendices, Report 7, Volume 5) should be referred to while reading this section. The appropriate figures are referenced in a table at the beginning of each chapter.

10. Sector 1

10.1. Queen Elizabeth Park Character Area

Refer to the following graphics:

Sector 1 plan	Figure 10	Appendix 7.A (Technical Report Appendices, Report 7, Volume 5)
Sector 1 300m ZTV	Figure 11	
Annotated Aerial Oblique Photograph(s)	Figure 12-14	
Landscape Character Description	Figure15	
Cross Section(s)	Figures 16, 17	
Visual Simulation(s)	Figure VS1	Appendix 7.B (Technical Report Appendices, Report 7, Volume 5)

10.1.1. Landscape character description

The southern end of the route is located at the toe of the Raumati Escarpment, on the eastern edge of Queen Elizabeth Park (QE Park). QE Park, a GWRC regional park, occupies the full width of the coastal plain and dunelands and is an important open space link comprising an area of continuous and mostly unmodified dunes between the coast and the foothills of the Tararua Range.

A line of high, relatively intact dunes extends down the centre of the Park and they form the southern extension of the dune sequences north of Poplar Avenue. To the west, a complex of intact dunes, which are grazed, extends towards the coast. This part of the Park is dominated by grazed pasture with large patches of gorse, and apart from a few scattered mature macrocarpa, pine shelter belts and small native forest remnant, has very few other mature trees. An operational clean fill site with access off Poplar Avenue.is located at the northern end of the Park

A strip of native planting, dominated by kanuka, extends along the edge of SH1 and the Park. The land is low-lying with large areas of young peat and with a high watertable, approximately 1.0m below the surface. The flatter area is drained by a series of open drains and ephemeral wetlands occupy some of the inter-dunal hollows.

The Raumati Escarpment provides a strongly defined eastern edge to the sand plain with its steep, semi-vegetated slopes contrasting with the flat openness of the coastal plain. The Escarpment is protected as a reserve and is identified as an Outstanding Natural Landscape in the KCDC District Plan. Large areas of remnant and regenerating native forest cover much of the escarpment, interspersed with un-grazed grassland.

QE Park has a distinctive rural character, with the exception of the SH1/NIMT rail corridor situated at the toe of the escarpment; this narrow corridor is modified and introduces a high level of activity to the edge of the Park.

Key characteristics

- Open, 'flat' rural/coastal landscape
- Little substantial vegetation, secondary native forest on the Raumati Escarpment
- SH1/NIMT rail corridor
- Intact and relatively continuous sand dunes
- The Raumati Escarpment is an Outstanding Natural Landscape
- Overall amenity of area-existing road/rail environment dominant, with rural/open space fringe.

10.1.2. Key landscape change resulting from the proposal

- Expressway footprint extending approximately 20m into QE Park at the southern end and up to 120m at the northern end by Poplar Avenue.
- Removal of dense, 5.0m wide buffer of indigenous vegetation between SH1 and QE Park at southern end.
- New stormwater swale planted with wetland species between SH1 and QE Park
- Interchange at Poplar Avenue including Expressway embankments (up to 7.0m high) and over bridge, on/off ramps and two round-a-bouts.
- Overhead lighting on ramps and at Poplar Avenue. Under bridge lighting on Expressway overbridge.
- Temporary Project yard (Bridge Yard) on clean fill site adjacent to Poplar Avenue.

10.1.3. Proposed landscape mitigation

- Establish dense buffer (10.0m wide) of indigenous vegetation between the Expressway and QE Park at southern end and upto 20.0m wide at Poplar Avenue.

- Mass planting of indigenous vegetation at Poplar Avenue interchange, between ramps, Expressway and cycleway / walkway.
- 320m of riparian planning along realigned drain (20m wide).

Assessment of Effects

10.1.4. Biophysical effects

The proposed Expressway involves widening of SH1, which will require encroaching into the edge of the northeastern corner of Queen Elizabeth Park (approximately 2.8 Ha). The encroachment is on flat low-lying land underlain by deep, relatively young peat. The interchange occupies the north-eastern corner of the Park and involves the construction of on/off ramps, bridge embankments, an overbridge, roundabouts and reconfiguration of Polar Avenue. Construction of the proposed Expressway will not involve modification of sand dunes, removal of any remnant or significant native vegetation or modification of any natural waterways

A stormwater swale will be constructed between the proposed Expressway and QE Park to deal with the stormwater from the steep escarpment above the NIMT rail line, which will be channelled into culverts under the proposed Expressway; the swale will also deal with the runoff from the proposed Expressway itself.

The dense band of existing vegetation between SH1 and the Park will need to be removed to enable construction but will be replanted as part of the mitigation proposal. In addition, there will be a large area of indigenous vegetation associated with the interchange. The establishment of indigenous vegetation on what is now bare land will improve local biodiversity.

Currently this part of the Park is not used for recreational activities but long term, this will undoubtedly change as the Park is developed. In the Greater Wellington Parks Network Plan the 'Projected Future Changes' plan 'for QE Park shows an ecological link along the eastern edge; however, at this point GWRC is unable to confirm what form this ecological link might take. The planting proposed along the Raumati Straight section of the proposed Expressway, together with the planting associated with the interchange, could form the basis of this ecological link[16]. In addition, GWRC have confirmed that a sustainable land use plan is currently being developed for the farmed area of the Park[17], which could incorporate how this end of the Park is developed, especially the interface between the Park and the proposed Expressway.

[16] Meeting with GWRC 26 January 2011

[17] Correspondence GWRC to Alliance Project Manager, 4 February 2011

The changes the proposed Expressway will bring to the biophysical aspects of the Park overall, will be low, given the proposed Expressway's relatively small footprint and the already modified nature of this corner of the Park.

10.1.5. Visual amenity

The open undeveloped landscape of the Park contrasts with the highly developed nature of the adjoining narrow transport corridor. Large numbers of people travel through the corridor daily and there are no dwellings in close proximity to the proposed Expressway. As noted, there is currently no recreational use of this corner of the Park and the mitigation planting proposed will provide screening of the proposed Expressway in a similar fashion to what currently exists.

There is a walkway along the top of the Raumati Escarpment from where there are expansive views across the sand plain to the sea and Kāpiti Island beyond. SH1 and the Poplar Avenue, tucked into the toe of the escarpment are difficult to see from the walkway.

The raised ramps and bridge of the interchange will be most visible from Poplar Avenue. The visual effects are discussed below in relation to the visual simulation. The southern extension of the proposed Expressway will be seen as an extension to the existing SH1 infrastructure. However, the changes will not impact on the integrity of the Raumati Escarpment (ONL).

Night Lighting

The on and off-ramps will be lit as will the eastern end of Poplar Avenue and the proposed roundabouts. However, the elevated part of the proposed Expressway and bridge will not be lit.

The off-ramp extends approximately 100m into QE Park at its Poplar Avenue end. Overhead lights from the off-ramp and Poplar Avenue will introduce light into this localised corner of the Park, but given the limited extent of this lighting it will not affect the natural darkness of the Park overall. In-ground and under bridge lights would illuminate the Poplar Avenue underpass and bridge piers, providing a safe night time environment; however, this localised lighting would not affect areas beyond.

10.1.6. Landscape Character

The busy transport corridor (2600 vehicles/day) is located at the junction of two distinctly different landscape types – the steep Raumati escarpment and the flat grazed duneland/ peatland of QE Park. The Park is an open and expansive landscape and while over time, there will be an increase in native and other vegetation with restoration of wetlands as outlined in the Parks Network Plan, the overall landscape character will remain much the same with the development of the proposed Expressway.

According to GWRC, this part of the Park will continue to be farmed albeit in a more sustainable manner. The transport corridor will also remain but it will be wider; there have been recent changes

in this corridor with the double tracking of the NIMT rail line and this had negligible adverse affect on landscape character.

Given the proposed reinstatement of the buffer planting between the proposed Expressway and the Park, the magnitude of landscape change will be low when considered in the relation to the wider area. The proposed Expressway and interchange will not adversely affect the character of the Raumati Escarpment nor impact on the ONL values.

Visual Simulation- Poplar Avenue - Figure VS1

The interchange, by reason of the size of its footprint and elevation (parts of it being elevated up to 8.5m above the existing land), will create a new element in this landscape. For people travelling east or west on Poplar Road, as well as on the proposed Expressway itself, the interchange will be prominent with elevated ramps, embankments, signs, and lights. When viewed east along Poplar Avenue, the proposed Expressway will be seen against the steep escarpment, which will provide a backdrop and also help to reduce the overall scale of the proposed Expressway.

The proposed massed tree and shrub planting on the ramp embankments and in the areas between the ramps and the proposed Expressway will help to mitigate visual effects but traffic on the proposed Expressway itself and on the ramps will be visible, especially in the short to medium term until the planting becomes well established.

10.1.7. Assessment summary

The Expressway proposal widens the existing SHI/NIMT rail corridor and replaces the buffer vegetation that will be lost. The encroachment and effects on QE Park are limited given the scale of the proposed Expressway footprint and position in relation to the Park and the SH1/NIMT corridor.

The viewing audience is primarily transient and visual effects for those viewers would be negligible. The Poplar Avenue interchange, located immediately adjacent to the existing transport corridor and separated from nearby residential area, will not significantly change the character of the area.

Effect	Magnitude	
Biophysical	Low	Minor change to a key feature/attribute–similar to before – in context of QE Park
Visual Amenity	Low	Proposal may constitute a small component of wider scene/ extends existing transport corridor
Landscape Character	Low	Generally, very slight change to landscape character, change barely distinguishable – in context of wider area.

RMA Provision	Existing Environment	Effects of Proposal
s 6(a); Natural character	N/A	
s 6(b) Outstanding natural feature/landscape	N/A Adjacent to coastal escarpment ONL	Proposal does not impact on the values of the ONL any more than the existing SH1/NIMT rail corridor does already.
s 7(c) Amenity values, (visual amenity)	Existing amenity-rural/openspace/SH1/rail way line	Elevated Expressway at interchange traffic movement, ambient noise. Effects on visual amenity low.
s 7(f) Quality of the environment (Biophysical)	Modified rural landscape	Reduced quality of physical environment, embankments for overbridge in flat topography, but with escarpment backdrop. Mitigation planting will improve localised biodiversity.

10.2. Raumati South character area

Refer to the following graphics:

Sector 1 plan	Figure 10	Appendix 7.A (Technical Report Appendices, Report 7, Volume 5)
Sector 1 300m ZTV	Figure 11	
Annotated Aerial Oblique Photograph(s)	Figure 13	
Landscape Character Description	Figure 18	
Cross Section(s)	Figures 19	
Visual Simulation(s)	No simulation	

10.2.1. Landscape character description

This character area incorporates intact dunelands and swampy ground at the toe of the Raumati escarpment. A line of dunes to the west; over 20m above sea level (asl), are 10m-15m higher than the surrounding area. Several areas of low-lying damp ground and a manuka dominant wetland are present between the dunes, with a major drain (Drain 7) running north-south through the area.

A large area of open space, which includes part of the existing WLR designation, provides the adjacent communities and two schools with an informal area of open space, albeit that much of it is unmanaged. The open space is enclosed by the adjoining residential areas on SH1, Leinster Ave, Matai Road and Raumati Road.

Leinster Ave is an enclave of residential properties located on the dunes and elevated above the surrounding area adjacent to SH1 (up to 30m asl, or approximately 20m higher than the surrounding area). The open space supports a combination of horse grazing land, rank grass, gorse and broom, scattered groups of mature exotic trees, especially pines, and large stands of tall kanuka at the southern end. One permanent wetland in the area supports a mix of manuka, sphagnum and carex species.

Overall, the area has a relatively low density of residential settlement with established residential areas on the fringe of the open space.

Key Characteristics

- Relatively large area of ‘wild’ undeveloped land acting as informal open space and enclosed by residential development.
- Relatively unmodified dune landforms.
- Manuka dominant wetland
- Significant existing vegetation, particularly kanuka, manuka; groups of pines also present.

- General amenity of area- open space semi enclosed by suburban development.

10.2.2. Key landscape change resulting from the proposal

- Approximately 500m Expressway footprint through Leinster Avenue residential properties adjacent to SH1.
- Approximately 1km of 'greenfields' Expressway through small rural properties and undeveloped land currently in the existing WLR designation (low dunes and drained wetland) supporting gorse, rank grass, and exotic trees.
- Expressway on elevated 2.0m high embankment across the low lying ground and cuts into the dunes at the northern end with 5.0m-6.0m high cuts.
- Removal of semi- mature kanuka and loss of small area of wetland
- New 500m long right-of- way to provide access to residential properties whose access is severed by the Expressway.
- 2.0m high earth noise bund between right-of-way and Expressway with shared 3.0m wide cycleway / walkway on top.
- Pedestrian bridge across Expressway between chainage 3000 and 3300, Position and design not finalised
- Formation of stormwater treatment wetlands and flood storage areas planted with eco-sourced indigenous wetland and other species adjoining Expressway.
- No Expressway lighting.

10.2.3. Proposed landscape mitigation

- Mass planting of indigenous vegetation both sides of Expressway, and wetland to west.
- Retain existing vegetation- semi-mature kanuka and mature exotic trees (pine, macrocarpa)
- Retain area of manuka-dominated wetland with spaghnum and carex.
- Planting of 6.0m wide median begins near Upper Drain 7 crossing

Assessment of Effects

10.2.4. Biophysical Effects

From existing SH1, the proposed Expressway traverses an area of dunes adjacent to the Leinster Avenue residential area then across low-lying drained swampland on a low, 2.0-3.0m high embankment before climbing on to the dunes that lie in the existing WLR designation. The proposed Expressway Alignment has avoided the highest dunes, to the south, most of which have well established kanuka growing on them and it also avoids all but a tiny portion the significant wetland areas.

The proposed Expressway will cut through the smaller dunes, where some regenerating native vegetation interspersed with gorse will be removed. Stands of amenity trees growing on the slightly

higher land at the rear of the long narrow properties fronting existing SH1 and extending back into the drained peatland will also be removed, together with trees and other vegetation growing on several of the residential properties that are proposed to be purchased as part of the proposed Expressway Project.

In addition to retention of a large manuka- dominant wetland, eco-sourced buffer planting is proposed on the higher land around the edge of the wetland and this planting will extend around the stormwater treatment wetland and the flood storage basin.

While construction of the proposed Expressway will modify the dunes along the eastern edge of this character area, the retention of the larger intact dunes and vegetation, creation of stormwater treatment wetlands, together with the planting proposed, will improve the overall ecological values of the area. It will require appropriate and careful long term management to retain and enhance these values.

10.2.5. Visual amenity

For residents in Leinster Avenue and also for those in Raumati South whose properties back on to the existing WLR designation, the proposed Expressway will adversely affect the visual amenity of the area. The open 'wild' area of informal open space will be lost but in part it will be replaced by a landscape with a different type of visual amenity – a large piece of infrastructure set within an area of open space. Given its context, the proposed Expressway, which for much of this landscape character area will sit on a low embankment slightly above existing ground, and so will be well integrated into its surroundings, with the assistance of the proposed mitigation planting.

There are 21 residential dwellings located within 100m of the proposed Expressway and another 31 dwellings situated between 100-200m away; most of these are to the west of the proposed Expressway. From some of these properties, the views will be looking down on the proposed Expressway, with it forming a major element in mid-ground views. People using the Raumati Escarpment walkway will also have a distant view of the proposed Expressway.

Given the low position of the proposed Expressway, drivers travelling north will not have views of the wider landscape; however, south-bound drivers will have views toward the steep eastern escarpment as they descend from the low dunes into the low-lying basin.

10.2.6. Landscape character

This area has quite a diverse character ranging from the enclave of residential properties on Leinster Avenue, the transport corridor, the small rurally-zoned lots north of Leinster Avenue, and the undeveloped low-lying land west of these properties rising up to the vegetated dunes beyond. The existing WLR designation extends along these dunes.

The undeveloped part of the area is used informally as an area of 'wild' open space and there are numerous tracks criss-crossing between Leinster Avenue and the residential properties of Raumati South and Raumati South School that back on to the existing WLR designation.

Construction of the proposed Expressway will affect the landscape character with the loss of residential dwellings, loss of informal open space, loss of the 'wild' or rural amenity associated with the northern part of this character area. The addition of stormwater treatment wetlands and extensive planting of native vegetation, replacing the tracts of gorse with local native vegetation, will assist in mitigating the change through screening and improved indigenous biodiversity.

The cycleway/walkway will run along the western side of the proposed Expressway and this will continue to provide public access to this area, albeit of a more formal nature.

10.2.7. Assessment summary

The proposed Expressway will bisect the semi-rural/suburban area, affecting the nearby resident population and recreational users. While the biophysical change is moderate, the adverse effects on the landscape character and general amenity will be high, with the proposed Expressway and traffic adding new visual elements to the character area. Where the proposed Expressway is adjacent or close to SH1, the degree of change will be less, given the existing road activity that exists there.

The ambient traffic noise from the proposed Expressway will adversely affect the existing suburban and rural amenity.

Effect	Magnitude	
Biophysical	Moderate	Alteration to one key feature/attribute –partially changed
Visual Amenity	High	Proposal is a major element of mid-ground view from within 200m
Landscape Character	High	Alteration to several key elements or features/ attributes, composition changed

RMA Provision	Existing Environment	Effects of Proposal
s 6(a); Natural character	Manuka dominant wetland –moderate ecological value moderate natural character Upper Drain 7 - Channelised with low ecological values/low natural character	Reduced natural character. Loss of very small finger (0.35 ha) of wetland (but most retained) and large area of margin planted with native vegetation (replacing gorse-dominated scrub). Expressway will reduce natural character of area; mitigation planting and stormwater wetlands may improve localised ecological values. Upper Drain 7- loss of habitat in culvert
s 6(b) Outstanding natural feature/landscape	N/A	
s 7(c) Amenity values, (visual amenity)	Existing amenity - Open space/rural amenity fringed with suburban residential properties.	Reduced amenity values –large scale of Expressway, traffic movement, reduced visual amenity, loss of informal open space, increase in ambient noise.
s 7(f) Quality of the environment (Biophysical)	Drained peatlands, unmodified dunes, residential development, exotic vegetation dominates.	Reduced quality of physical environment (see above) mitigation planting and stormwater wetlands may improve localised ecological values. Alignment avoids large series of dunes and stands of semi-mature manuka.

10.3. Raumati Road landscape character area

Refer to the following graphics:

Sector 1 plan	Figure 10	Appendix 7.A (Technical Report Appendices, Report 7, Volume 5)
Sector 1 300m ZTV	Figure 11	
Annotated Aerial Oblique Photograph(s)	Figure 14	
Landscape Character Description	Figure 20	
Cross Section(s)	Figures 21,22	
Visual Simulation(s)	Figure VS 2	Appendix 7.B (Technical Report Appendices, Report 7, Volume 5)

10.3.1. Landscape character description

This small character area is typified by the undeveloped existing WLR designation corridor (70m-100m wide), which stretches along the top of the dunes; generally 10m-15m higher than the adjoining flat land.

Residential development located on the dunes and also on the surrounding low, flatter land has been established up to the boundaries of the existing WLR designation, leaving a corridor of open space. This open space area is used mainly for grazing, and as walking access.

Groups of mature pine and eucalypt trees adjacent to Raumati Road are significant landscape elements in the area. Native vegetation, particularly kanuka, occurs on some of the dune faces and also on the low-lying areas. The dunes north of Raumati Road are open and grazed by horses owned by members of the Kāpiti Pony Club that lease the NZTA owned flat land on the west of the proposed Expressway.

The residential housing adjoining the proposed Expressway is well established with a medium density settlement pattern that has provided space for mature trees to be established within many of the properties. Consequently, there is a strong vegetation framework comprising mature exotic and native trees and shrubs.

At the existing WLR designation, Raumati Road cuts obliquely through the dunes, which form a distinctive threshold between SH1 and the residential communities to the west.

Key Characteristics

- High grassed dunes
- Significant tall trees (pine, macrocarpa, eucalyptus) and semi-mature kanuka

- Narrow corridor of open space
- General amenity of area- suburban.

10.3.2. Key landscape change resulting from the proposal

- Expressway footprint including swales, requires significant modification of (cutting into) dune landforms.
- Expressway elevated above some of the surrounding residential properties.
- Expressway overbridge elevated approximately 5.0m above Raumati Road.
- Shared cycleway / walkway located on western side of Expressway, and crosses Raumati Road on Expressway bridge.
- 2.0m high concrete noise walls; on the eastern side of the Expressway (chainage 4100-4450) and western side between 4550-4800.
- Lighting under the Expressway bridge and in-ground uplighting of piers.
- Lighting on cycleway / walkway begins here and continues north to Mazengarb Road.

10.3.3. Proposed landscape mitigation

- Retain as many of the existing groups and individual mature exotic trees as is practicable.
- Planting additional trees to strengthen groups of existing trees that are retained.
- Mass planting of indigenous vegetation, including some species enrichment to enhance long term biodiversity.

Assessment of Effects

10.3.4. Biophysical effects

The proposed Expressway will cut into dunes that are 10-15m higher than the surrounding flat land. The proposed Expressway will follow the existing WLR designation; the land is currently leased by NZTA and is grazed. There are large patches of gorse, clumps of semi-mature kanuka and in places mature exotic trees. The dune crests and sides north of Raumati Road are more open than those to the south and are grazed by horses.

The proposed Expressway will modify the dunes but it will not remove them completely; they will still be distinguishable as dune landforms from various locations. The proposed embankments once revegetated, will appear as a continuation of the dune landforms. Most of the semi-mature kanuka and other 'desirable;' woody vegetation will be removed to enable construction but in places individual trees or small clumps of woody vegetation may be able to be retained.

The extent of ground improvements for the Raumati Road bridge embankment on both the northern and southern sides of Raumati Road will result in the existing dunes being modified and the kanuka and other woody vegetation in this area being removed. The new embankments, together with the

associated indigenous planting that is proposed, have been designed to tie in with the surrounding landform and vegetation.

10.3.5. Visual amenity

There are 37 dwellings located within 100m of the proposed Expressway and 100 dwellings between 100 and 200m. While the proposed Expressway is elevated above the surrounding residential properties through most of this character area, it is cut into the crests of the high dunes in several places and thus obscured from view. A few dwellings in Conifer Court are located close to the proposed Expressway, but are unlikely to have direct views of the road or traffic, but the earth bunds and noise walls will be visible.

Mass planting on the dune flanks is proposed, which will change the outlook for residents from open grazed land but this planting will be effective in providing screening and a substantial greenbelt of vegetation along this section of the proposed Expressway.

The bridge over Raumati Road will be the most significant element that will be seen by both local road users and by residents. The alignment of Raumati Road means that for people travelling east, the bridge will be visible from about 80m away due to the bend in the road. West-bound travellers will have a direct view of the bridge along the length of Raumati Road.

For north-bound and south-bound proposed Expressway users, the views will be contained to the east and west given that the road is mostly cut into the dunes through this area.

Due to the scale of the changes associated with the proposed Expressway (ie the overbridge, embankments and the changes to the outlook), there will be adverse visual amenity effects for the residents on the east and the west, and also for walkway users and for people using Raumati Road, due to the change from a rural corridor to a four lane Expressway.

Lighting effects

Lighting will be confined to under the proposed Expressway bridge to create a safe night time environment. Street lights already exist on Raumati Road. Nearby dwellings are too far away to be affected by localised under-bridge lighting.

Lighting of the cycleway / walkway begins just north of Raumati Road. Given that it runs through rural land itis highly unlikely to impact on residential areas.

Visual Simulation – Raumati Road- Figure VS2

Raumati Road cuts through high dunes. The proposed Expressway overbridge will add a significant new element spanning between the cut embankments; traffic will also be visible. The proposed Expressway embankment will replace the dune landform. Earth at the top of the embankment will be extended up the outer edge of the noise wall, concealing it from view. The embankment will be

planted with native vegetation and once this is established the bridge will be the only Expressway element that is prominent when viewed from this general location.

10.3.6. Landscape character

The dunes, because of their height and absence of residential housing are a dominant landscape element. They provide a tract of highly legible open space separating the residential housing located on both the eastern and western sides of the existing WLR designation.

The houses and residential properties in this area are well established. Some of the properties in Matai Road, west of the proposed Expressway, and those in Gavin Road and Fincham Road are located on the same dunes as in the existing WLR designation and will be at a similar elevation to the proposed Expressway. For most of these houses there is a wide separation between them and the proposed Expressway. However, a few properties just south of Raumati Road are within 50m of the proposed Expressway and while they may not be able to see the proposed Expressway, its presence and the traffic on it will significantly change the character of the existing WLR designation corridor area (see cross section 4). The cycleway/walkway is to be aligned through this area and this too will contribute to the change in character.

Currently, a sign-posted KCDC walkway runs along the top of the dunes both north and south of Raumati Road. By default, the existing WLR designation provides an important open space separation within this residential community and the horse grazing and presence of the Pony Club impart a rural character. The proposed Expressway will bisect this community. While provision is being made to formalise pedestrian access through the development of the cycleway/walkway, the scale of the proposed Expressway, including the bridge over Raumati Road, will fundamentally change the landscape character.

10.3.7. Assessment summary

The physical effects on the dunes are high, with the dune crests being cut and modified. While there is a relatively large residential population nearby, only a small number of dwellings are situated close to the proposed Expressway. For other residents, existing vegetation, intervening landforms and/or the elevation of the proposed Expressway in relation to their homes screens direct views of the road itself and the traffic on it.

The bridge over Raumati Road will add a prominent new built element and Expressway traffic will be visible from Raumati Road. Given the narrowness of the existing WLR designation with residential development either side, the addition of the proposed Expressway will have a high and adverse effect on the landscape character for local residents, particularly for those within 100m (notwithstanding, a road has been anticipated in the existing WLR designation for many decades).

The ambient traffic noise from the proposed Expressway will adversely affect the existing suburban amenity for nearby residents.

Effect	Magnitude	
Biophysical	High	Alteration to several key features/attributes – still able to read dunes landforms, loss of indigenous vegetation
Visual Amenity	High	Proposal is a major element of mid-ground view (from within 200m) – Expressway cut into dune ridges,
Landscape Character	High	Alteration to several key elements or features/ attributes, composition changed

RMA Provision	Existing Environment	Effects of Proposal
s 6(a); Natural character	N/A	
s 6(b) Outstanding natural feature/landscape	N/A	
s 7(c) Amenity values, (visual amenity)	Overall suburban amenity and corridor of open space (WLRD)	Reduced amenity values –large scale of Expressway, traffic movement, reduced visual amenity, loss of informal open space, increase in ambient noise close to residential areas.
s 7(f) Quality of the environment (Biophysical)	Intact dunes, patches of exotic vegetation and some stands of native vegetation	Reduced quality of physical environment, significant modification of dunes, mitigation planting will improve localised biodiversity.

Sector 2

10.4. Wharemauku Basin landscape character area

Refer to the following graphics:

Sector 2 plan	Figure 23	Appendix 7.A (Technical Report Appendices, Report 7, Volume 5)
Sector 2 300m ZTV	Figure 24	
Annotated Aerial Oblique Photograph(s)	Figure 25,26,27	
Landscape Character Description	Figure 28	
Cross Section(s)	Figures 29,30	
Visual Simulation(s)	Figure VS3,VS4, VS5, VS6	Appendix 7.B (Technical Report Appendices, Report 7, Volume 5)

10.4.1. Landscape character description

This area is characterised by the large expanse of open, undeveloped land in the heart of Paraparaumu. It remains undeveloped because of a combination of its Town Centre zoning, the existing WLR designation and constraints of potential flooding. The large, flat, low-lying basin is fringed by undeveloped dunes and residential development on the west.

Midlands subdivision, established on the western side of the existing WLR designation, is the most recent area of residential housing in the vicinity and it is partly located on dunes. The more established residential area of Kiwi Road occupies lower–lying land to the south. Paraparaumu town centre encloses this character area to the east.

While the middle portion 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 intensive development. The surrounding environment includes the existing commercial town centre, Kāpiti Road, which is a very busy arterial road, and industrial developments (Kāpiti Road, Te Roto Drive and the Airport zone).

A row of dunes up to 20m asl, which are 15m above surrounding ground level, are located near the middle of the basin and lower dunes also fringe the northern side of the basin adjacent to Milne Drive and Kāpiti Road.

The Wharemauku Stream, now channelised, drains the basin, and is also used for stormwater discharge from Paraparaumu town centre. The significantly modified stream is characterised by steep banks, lack of riparian vegetation, and a straight Alignment. A walkway along the south of 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 the level of which fluctuates greatly during the summer, is situated close to the walkway to the south.

There are shelterbelts and streamside plantings of deciduous trees such as willow, together with a eucalypt woodlot, large areas of gorse, and patches of native grasses and riparian species on damper ground. A stand of semi- mature eucalyptus trees adjacent to Kāpiti Road are a significant landscape element.

This area has an urban character despite its undeveloped nature, because of its context.

Key Characteristics

- Proximity to existing town centre (and future expansion of the town centre)
- Large flat basin fringed by dunes to the west
- Line of intact dunes in centre of basin
- Wharemauku Stream, modified but still an important waterway and landscape element
- Willow, poplar, eucalypt, and also native riparian species
- Wetland with open water
- General amenity- rural enclosed by urban/suburban context.

10.4.2. Key landscape change resulting from the proposal

- Expressway embankments elevated up to 8.0m above low lying ground – at Wharemauku Stream and on top of the dunes at Kāpiti Road.
- Expressway bridge across Wharemauku Stream and walkway- 89m long and approximately 5.0m above ground (to underside of bridge).
- Full interchange at Kāpiti Road, including on/off ramps, retaining walls, split overbridge.
- Two large flood storage areas on the south side of Wharemauku Stream. One planted with native vegetation and the other grassed with groups of trees.
- Stormwater treatment wetland adjacent toKāpiti Road interchange.
- Shared cycleway / walkway on top of earth bunds –located on western side of Expressway.
- An earth noise bund will be constructed between the dunes, at chainage 5670, to provide mitigation of the Expressway for Quadrant Height dwellings.
- Three, 2.0m high timber noise fences along four property boundaries west of Expressway (Quadrant Heights, Observation Place, Milne Drive)
- Concrete noise walls adjacent to the west side of Expressway and northbound off-ramp (3.0m) and Kāpiti Road bridge approach (2.0m). North of Kāpiti Road concrete noise walls (1.1m) on east side of Expressway and south bound off ramp. Overhead lighting of Expressway and on/off-

ramps at Kāpiti Road interchange, for approximately 1300m. Under-bridge lighting and inground uplighting of bridge piers.

- No lighting at Wharemauku Stream bridge.
- Lighting on cycleway / walkway.

10.4.3. Proposed landscape mitigation

- Retain lengths of mature shelterbelts of exotic trees where possible
- Add to shelterbelt planting in places to strengthen visual connections to wider landscape
- Large area of mass planting of indigenous vegetation in the flood storage area south of Wharemauku Stream; planting to comprise species that can tolerate occasional inundation.
- Mass planted indigenous vegetation either side of the proposed Expressway and cycleway / walkway extends to the beginning of the Kāpiti Road interchange.
- Mass planting of indigenous vegetation north of Wharemauku stream to also include enrichment planting of canopy tree species to enhance the long term biodiversity of the local area.
- Restoration of the riparian margins of 160m length of Wharemauku Stream.
- Specimen trees with massed underplanting at Kāpiti interchange to recognise proximity to Paraparaumu Town Centre zone.

Assessment of Effects

10.4.4. Biophysical effects

Most of this character area is open and low-lying but at the northern end there are dunes up to 15m higher than the surrounding land. Wharemauku Stream which drains the basin, has been channelised and has low ecological values. Peat underlies this area and therefore much of it is wet; the vegetation cover reflects the high water table.

Vegetation is a mix of grazed pasture, large tracts of blackberry in the damp areas, gorse, shelterbelts, groups of exotic trees, including a eucalypt woodlot on the southern side of Kāpiti Road.

Much of the open undeveloped land on the eastern side of the proposed Expressway is earmarked for the Paraparaumu Town Centre development, and an extension to Ihakara Street is also proposed. Therefore, the area will undergo significant changes; this will involve having to deal with similar construction issues as the proposed Expressway development, such as removal of peat, drainage and flood storage.

Through the flat, low lying area at the southern end of the character area, a 600m length of proposed Expressway embankment rises from 2.0m to 9.0m where it crosses the Wharemauku Stream and extends to the dunes north of the stream. This new and substantial landform will reduce the size and also the legibility of the basin. The proposed Expressway then cuts into dunes

immediately east of the Quadrant Heights residential subdivision and then crosses over Kāpiti Road. The dunes east of the Alignment remain intact.

The substantial area of proposed mitigation planting will enhance the indigenous biodiversity of this character area. The proposed flood storage area adjacent to Wharemauku Stream occupying approximately 5.5ha, will replace damp pasture land with indigenous vegetation tolerant of occasional inundation.

An existing low value wetland will be utilised as a stormwater treatment wetland (2000m2) which will be planted with indigenous wetland species. A 160m long section of Wharemauku Stream margin will be restored and indigenous riparian species established. Massed planting of indigenous species is also proposed either side of the proposed Expressway and cycleway / walkway through this character area.

10.4.5. Visual amenity

The proposed Expressway will be a major element of the foreground or mid-ground view for a substantial number of people living in the adjoining residential areas; 44 properties are located within 100m of the proposed Expressway and a further 103 between 100 and 200m. While the proposed Expressway cuts into the dunes in places thus obviating the need for earth bunding, noise mitigation concrete noise walls and timber noise fences are required in some places. Noise walls (2.0m and 3.0 high) are proposed along the western edge of the proposed Expressway carriageway and on the Kāpiti Road off ramps.; Timber noise fences are also required along the rear boundaries of four properties on Quadrant Heights, Observation Place and Milne Drive. While 2.0m high timber noise fences are a standard (and permitted fence height in urban areas, they may however affect the outlook from some of these dwellings, if they do not already have a boundary fence of a similar height. The concrete noise walls on the edge of the carriageway have been designed as an integral part of the proposed Expressway embankment with earth ramped up on the outer edges (i.e. sides facing residential properties) of the walls and then planted. Consequently, the walls will not be visible as discrete structures when viewed from outside the proposed Expressway (See Technical Report Appendices, Report 5, Volume 5). However, the walls are likely to restrict views to the west for proposed Expressway users.

The two bridges, one at Kāpiti Road and the other where the proposed Expressway crosses the Wharemauku Stream and walkway, will be highly visible and prominent structures. Given the landscape condition, there will also be a loss of openness and sense of ‘remoteness’.

The design of the bridges has been carefully considered, especially in terms of how they will be experienced by pedestrians and cyclists passing under them. Attention has also been given to the design, position and number of bridge piers, the design and detailing of the bridge abutments, the surfacing of the footpaths, planting on the embankments and the lighting on and under the bridges.

The overbridge, which is elevated above Kāpiti Road (6.0m clearance), will be visible when travelling east or west along Kāpiti Road. Looking west it partly obscures the view to Kāpiti Island and travelling east it is seen against a backdrop of the eastern hill slopes and the undeveloped skyline.

The ramps on either side of the overbridge, which will in part be supported by vertical concrete retaining walls, will also be visible. The walls and associated sloping abutments have been positioned and designed to accommodate tall trees and massed under planting to soften the appearance of these walls and also to integrate the interchange with the existing and future surrounding environment. In addition to the proposed Expressway's effect on views for some residents and other users, traffic movement on the proposed Expressway will also create an effect in terms of visual amenity, as will the various associated proposed Expressway elements such as light poles and road signs.

Road users on the proposed Expressway will have long views towards the coast and Kāpiti Island from some of the elevated sections, and the view east will look over the stormwater wetland and flood storage area and eventually the new Kāpiti Town Centre.

There are opportunities in the way the design of the new Paraparaumu town centre is handled to further integrate the Kāpiti interchange into the wider context through the structure and layout of the town centre itself and also in the 'hard and soft' landscape elements used in the design. Currently, the view along Kāpiti Road eastwards is fairly busy and cluttered and this could be improved by the way in which future development along the road is designed and also by the landscape treatment within the road reserve.

Lighting Effects

A 1300m section of the proposed Expressway, adjoining the Kāpiti Road interchange, would be lit at night. The cycleway / walkway to the west of the proposed Expressway is also proposed to be lit along its full extent extent in this section,, apart from at the northern end,where it passes through open space andis located well away from dwellings.

The cycleway / walkway runs immediately adjacent to several residential properties just south of Kāpiti Road, west of the proposed Expressway, (Midlands Subdivision). The *Assessment of Lighting Effects* (Technical Report 8, Volume 3) notes that for these dwellings, the combined effects of the proposed Expressway and cycleway / walkway lighting could intrude into residential properties and be a source of irritation. The report suggests several mitigation methods which should be considered during detailed design, including the installation of a 1.8m high fence along property boundaries. This appears to coincide with the need for a 2.0m high noise wall in the same location.

Street lighting already exists in the urban/residential area and along Kāpiti Road, However, the proposed lighting would be of a higher level of illumination and of greater extent than the existing lights. The lighting effects assessment notes that it is only the residential properties to the north-west corner (land east of the proposed Expressway and Kāpiti Road) that may be affected by the increased lighting.

10.4.6. Landscape character

The landscape character of this whole area will change. The proposed Expressway will change what is currently an open and partly rural undeveloped landscape, which is grazed or covered in blackberry and gorse. Assuming that it proceeds as planned, the new town centre will help transform the area into a suburban/town centre dominated environment.

Stormwater treatment wetlands and flood storage areas will ensure a reasonable degree of openness is maintained. The proposed Expressway will help to define the edge of the town centre and also provide a strong separation between the commercial centre of Paraparaumu and the residential areas to the west. As part of this, the proposed stormwater treatment wetland and the flood storage area will provide further separation and a 'soft' planted boundary to the town centre.

Some residential properties in the Midlands and Quadrant Heights residential subdivisions northwest of the proposed Expressway will be affected by the change of character because the proposed Expressway will be quite close. In contrast, well established residential areas on Kiwi Road and Rata Road will have a substantial buffer of open space between them and the proposed Expressway. Consequently, for them, the changes to the overall landscape character will be less evident, especially given that the proposed Expressway embankments will be densely planted.

For users of the walkway alongside Wharemauku Stream, the change in landscape character and sense of 'remoteness' will be significant with the proposed Expressway bisecting the area and the bridge with traffic crossing 4.9m above the walkway and Wharemauku Stream.

The Kāpiti Road interchange will be a major piece of infrastructure in a busy road environment. While the proposed Expressway will significantly reduce the number of vehicles per day on Kāpiti Road, it will continue to be a busy arterial road. The interchange will be prominent given its elevation (top of bridge 7.7m above Kāpiti Road), but the character of Kāpiti Road itself will undergo relatively limited change. The split overbridge has been designed and detailed so that it appears as simple in form with the various components well integrated. The split bridges will also provide a more pedestrian-friendly environment underneath.

Visual simulation - Wharemauku Stream - Figure VS3

From this location the proposed Expressway will enclose the view toward the west, with the embankments and overbridge creating a visual barrier. While the skyline of Kāpiti Island will remain visible, the skyline comprising the natural shape of the dunes and distant trees will be replaced by the more uniform profile of the proposed Expressway. The proposed Expressway will introduce a significant new landform and bridge structure into this flat and open landscape.

Initially, before vegetation is established on the embankments, traffic on the proposed Expressway will be visible; however, once the planting is established Expressway traffic will be visible only on the bridge.

Visual Simulation- Kāpiti Road- looking west - Figure VS4

The proposed Expressway embankment and bridge will introduce a significant new element across the view down Kāpiti Road and toward Kāpiti Island. From this location, views of the Island's profile will be retained, but this will vary at other points along the road. Currently, the Kāpiti Road environment is dominated by traffic and the proposed Expressway will reinforce this character

While tree and shrub planting associated with the proposed Expressway areas have been maximised, the scale of the interchange and the space around it is relatively limited. The planting will help to mitigate the landscape and visual effects, however additional tree planting along Kāpiti Road and as part of the proposed town centre redevelopment could also make a significant contribution to the overall mitigation.

Visual simulation Kāpiti Road – looking east - Figure VS5

From here, only the proposed Expressway overbridge will be visible with the embankments and ramps obscured behind large buildings. The industrial character of this part of Kāpiti Road will visually absorb the proposed Expressway bridge to a large degree. As with the view west, a limited amount of additional visual mitigation could be achieved with increased tree planting in the road reserve.

10.4.7. Assessment summary

The elevated proposed Expressway and bridge running through the low-lying Wharemauku basin will reduce the openness of the basin, forming a physical and visual barrier across the east-west axis. The proposed Expressway and its traffic will add a bustle of activity that currently does not exist in this presently undeveloped area.

When considered in the context of the planned development of the Paraparaumu Town Centre, the effects of the proposed Expressway activity would be less than if considered in the context of the existing open space environment.

The residents in the Midlands subdivision in close proximity of the proposed Expressway will experience the greatest change. While the road itself may not be visible beyond the landforms, noise walls and vegetation, the loss of open space (albeit the existing WLR designation) will change the existing suburban amenity. Many of the Midlands dwellings are orientated away from the proposed Expressway but several in Quadrant Drive face east toward the proposed Expressway, and consequently their outlook will be affected by earth bunding and associated planting. For the residential lots with 3.0m high timber noise walls on their boundaries the adverse visual effects are likely to be high.

The proposed Expressway ramps, embankments and overbridge at the Kāpiti Road interchange will introduce a substantial new landform and structure, creating a definite 'threshold' for travellers along Kāpiti Road. However, given the existing nature and scale of Kāpiti Road itself, together with the industrial development located on Kāpiti Road, the interchange will not be out of context in this highly developed urban landscape. Views to Kāpiti Island will be affected for those travelling west on Kāpiti Road, but these will be brief and over a short stretch of the road.

The background traffic noise from the proposed Expressway will adversely affect the current suburban amenity for nearby residents.

Effect	Magnitude	
Biophysical Effects	High	Alteration to several key features/attributes
Visual Amenity	Very High	Proposal is prominent, restricts views to the west, for viewing audience within 100m and beyond.
Landscape Character	High*	Alteration to several key elements or features/ attributes, composition changed – assuming town centre development proceeds

** Considered in the context of a future built environment with the development of the town centre the effects on landscape character would be high. However, if considered in relation the existing open space environment, the effects on landscape character would be very high.*

RMA Provision	Existing Environment	Effects of Proposal
s 6(a); Natural character	Wharemauku Stream and Lower Drain 7 '- Channelised with low ecological values/low natural character	s 6(a); Natural character Enhanced riparian planting of short section of Wharemauku Stream- slight improvement of natural character in localised area. Loss of freshwater habitat under culvert in lower Drain 7
s 6(b) Outstanding	N/A	

natural feature/landscape		
s 7(c) Amenity values, (visual amenity)	Existing amenity-Open space enclosed by urban/suburban amenity	Reduced amenity values –large scale of Expressway, traffic movement, loss of informal open space, increase in ambient noise close to residential areas. Adverse effects on visual amenity very high.
s 7(f) Quality of the environment (Biophysical)	Exotic vegetation dominant	Reduced quality of physical environment, significant modification of dunes, embankment across flat basin. Large areas of indigenous mitigation planting will improve local biodiversity.

10.5. Kāpiti – Mazengarb

Refer to the following graphics:

Sector 2 plan	Figure 23	Appendix 7.A (Technical Report Appendices, Report 7, Volume 5)
Sector 2 300m ZTV	Figure 24	
Annotated Aerial Oblique Photograph(s)	Figure 26,27	
Landscape Plan Kāpiti Road Interchange	Figure 26A	
Landscape Character Description	Figure 31	
Cross Section(s)	Figures 32, 33, 34	
Visual Simulation(s)	Figure VS6, VS7, VS8	Appendix 7.B (Technical Report Appendices, Report 7, Volume 5)

10.5.1. Landscape character description

This area is characterised by suburban and industrial development tightly enclosing the 130m wide corridor of undeveloped land in the existing WLR designation. A remnant of the once more extensive dune topography remains within the corridor, while the surrounding dunes have been flattened as part of development for residential housing and industrial activities. Consequently, the remaining dunes are generally elevated 10-13m above the adjacent flat land outside the designation. The exception is a small area around Chilton Drive, where the dunes have been only partly modified. Mazengarb Road has been cut through the dunes.

This corridor of undeveloped and largely unmodified land currently functions as de facto open space for the community with numerous informal walking and mountain bike tracks throughout.

To the west of the existing WLR designation, there are a mix of land uses - industrial development, industrial zoned land as yet undeveloped, a Council reserve, retirement village housing, and residential housing. In contrast, single storey residential housing on regularly sized 500m^2 -600m^2 lots encloses the corridor to the east

Largely because of the size and density of the allotments and that the housing is relatively recent, there is no substantive tree framework within these residential lots; instead, tree planting on these properties generally consists of small exotic trees and shrubs. However, in the residential area to the west, there are small pockets of native vegetation associated with natural and also constructed water bodies. In the undeveloped existing WLR designation corridor itself there is a mix of rank grass, blackberry, lupin, gorse with a few small pockets of manuka.

While the corridor has a distinct 'wild' feel, the adjoining residential and industrial activities have the greatest influence on the overall landscape character of the area.

Key Characteristics

- Residential and industrial context
- A marked difference in landscape character between the east and west of the existing WLR designation corridor
- Absence of significant vegetation
- Remnants of the dune landform remain in existing WLR designation corridor
- General amenity of area- suburban

Key landscape change resulting from the proposal

- Substantial modification of remnant 10-13m dune landforms.
- Expressway cut down into dune remnants and with construction of noise bunds between the low points in the dunes, a continuous 3.0m-7.0m high bund will be created either side of the Expressway providing visual screening and noise mitigation to the adjoining residential areas.
- Expressway elevated either side of Mazengarb and Kāpiti Road bridges.
- Concrete noise walls north of Kāpiti Road (1.1m) on east side of Expressway and south bound off ramp.
- Concrete noise wall (2.0m) east side on top of bund chainage 7700-7900 just south of Mazengarb Road adjacent to St James Court & Chilton Drive dwellings, and between 7800 and Mazengarb Road.
- Earth noise bund on west side, adjacent to Metlife Retirement Village (chainage 7150-7450) and 2.5m concrete noise wall on west side adjacent to Expressway near Metlife Retirement Village (chainage 7150-7680).
- Overbridge across Mazengarb Road bridge (not split).
- 4.5m-5.0m high retaining walls either side of Mazengarb Road, east of the Expressway.
- Shared cycleway / walkway on western side of Expressway.
- Cycleway / walkway bridge across Expressway (location yet to be determined)
- Stormwater swales either side of Expressway.
- Stormwater treatment wetland near Mazengarb Road.
- No significant vegetation to be removed.
- Expressway, and on/off ramps at Kāpiti Road lit with overhead lighting,
- Underbridge lighting and inground uplights at Kāpiti Road and at Mazengarb Road.
- Cycleway / walkway lit (lighting ends at Mazengarb Road).

10.5.2. Proposed landscape mitigation

- Utilise dune remnants and noise bunding for visual and noise mitigation. Mass planting of indigenous vegetation either side of the Expressway and cycleway / walkway.
- Mass planting on bunds and interchange embankments to screen noise walls, traffic and roadway. (eg from Makarini Street Reserve, St James Court, Chilton Place)

Assessment of Effects

10.5.3. Biophysical effects

The existing WLR designation separates the continuous band of residential subdivision between Kāpiti Road and Mazengarb Road. The designation has meant that the original 10-13m high sand dunes have remained largely undisturbed and have had de facto protection.

The proposed Expressway will cut through this narrow band of remnant dunes; they will be significantly modified but they will not be removed completely as has occurred with development of the adjoining residential subdivisions. The proposed Expressway earthworks will reshape the dunes to ensure that they retain their basic overall profile and although the dunes will be reduced in size and scale as shown on Figure VS 7 (Technical Report Appendices, Report 7, Volume 5), they will still provide a physical barrier between the eastern and western residential areas (Makarini Street/Spackman Crescent and Te Roto Drive/Realm Drive).

There are low points between the dunes but earth bunds will be constructed in these areas as part of noise mitigation; some of these bunds will also have noise walls on top of them. There is currently little woody vegetation on the dunes, mostly blackberry, rank grass, exotic scrub and a few small patches of manuka. Consequently, no significant vegetation will be lost. Massed tree and shrub planting of indigenous species on the dunes and bunds on both sides of the proposed Expressway covering the full width of the designation is proposed as part of landscape mitigation. Once established, the planting will enhance the local indigenous biodiversity.

Given that it crosses over Kāpiti and Mazengarb Roads, the proposed Expressway is elevated at both ends of this character area. In addition, a cycleway / walkway bridge over the proposed Expressway will link the residential areas, (actual location unconfirmed); informal tracks across the designation already exist and the construction of a bridge as part of the proposed Expressway development will formalise this important community link.

10.5.4. Visual amenity

Of the 865 dwellings located within 200m of the proposed Expressway over the entire length of the route, 48% or 420 dwellings, are situated in this particular landscape character area. Approximately 180 dwellings are located within 100m of the proposed Expressway.

From many residential properties located on the eastern side of the designation, the dunes block views to the west. However, there are exceptions in places where the dunes are low, and from

several properties in these locations there are views to the west. The earth noise bunds proposed to be constructed in these low points will effectively link the dunes and so will block views to the west from some of the properties that currently have views.

A group of properties in the vicinity of Chilton Drive and St James Court, immediately south of Mazengarb Road, most of which have two storey dwellings on them, are slightly elevated on a dune remnant and are likely to currently have views to Kāpiti Island, (see Figure 34 Cross Section 10 Appendix 7.A, Technical Report Appendices, Report 7, Volume 5). The proposed Expressway at this location is elevated in order to cross over Mazengarb Road and earth bunds with noise walls on top are proposed in this area. It is likely that these dwellings will lose distant views to the west due to the proposed noise bund, 2.0m high noise wall and planting.

At the southern end, dwellings adjacent to the elevated proposed Expressway and off ramps will lose their open outlook to the west (Figure 32 Appendix 7.A, Technical Report Appendices, Report 7, Volume 5) which will result in an increased sense of enclosure. From these dwellings, the noise walls and traffic would be visible until the proposed vegetation grows to sufficient heights to screen it.

Metlife Retirement Village which is accessed off Guilford Drive, is a dense enclave of dwellings separated from the existing WLR designation by tall tree planting. There are a significant number of these dwellings within the 200m of the proposed Expressway but given the orientation of these, together with the existing vegetation, proposed noise bunds and the tree planting proposed, the proposed Expressway will not be visible. There is also a concentration of residential development north of the retirement village and east of Realm Drive but only a few houses in this area are within 200m of the proposed Expressway and consequently the visual effects for these dwellings is unlikely to be an issue.

The proposed Expressway and the movement of traffic on it will introduce a new large scale infrastructural element in what is predominantly a small scale suburban environment. In terms of overall visual amenity, the construction of the proposed Expressway, including the proposed mitigation, will change the outlook depending on the particular property. From some properties the outlook may be enhanced by reduction in the height of dunes (Figure 33 cross section 9 Appendix 7.A, Technical Report Appendices, Report 7, Volume 5) and the addition of tree and shrub planting. Whereas, from other properties, a view will be lost or the outlook reduced because of the elevated sections and ramps of the proposed Expressway and/or the addition of noise bunds and fences (Figures 32 and 34-cross sections 8 and 10 Appendix 7.A, Technical Report Appendices, Report 7, Volume 5).

While there is large potential viewing audience, few will have views of the proposed Expressway itself or the traffic, but will be able to see the earth bunds; this would be a minor visual change. At

the Kāpiti and Mazengarb Road crossings, the visual effects for a small number of dwellings immediately adjacent to the proposed Expressway would be adverse and very high.

Effects of Lighting

Overhead lighting on the proposed Expressway and the off-ramp will potentially be visible from residences east of the proposed Expressway and north of Kāpiti Road. However, headlights from passing traffic will not be visible beyond the noise walls and mitigation planting. Street lighting already exists at the Mazengarb Road crossing point and the additional underbridge lighting will not affect nearby dwellings.

The cycleway / walkway is lit through this character area.At the northern end just south of Mazengarb Road the cycleway / walkway is located immediately adjacent to several dwellings in the Metlife Retirement Village. The Lighting Assessment report notes that the lighting will result in unacceptable glare for some residences, but mitigation measures to be considered as part of the detailed design phase, can address these effects, In particular changingf luminare types and using backshields to deflect glare.

10.5.5. Landscape character

The landscape character is a combination of residential/suburban, higher density 'senior living' and industrial. On the eastern side of the existing WLR designation there is residential housing but on the western side about 40% of the land adjacent to the proposed Expressway is zoned industrial, of which about two thirds is already developed. The Metlife Retirement Village is also located on the western side and at the northern end a stormwater treatment wetland is proposed in an area of vacant land.

The proposed Expressway will alter the landscape character of this area changing it from a predominantly quiet suburban enclave to one bisected by a piece of major infrastructure. Partial retention of the dune landforms, the addition of earth bunds, and substantial tree and shrub planting will provide effective visual mitigation from most locations.

Visual Simulation - Makarini Street Reserve - Figure VS6

From this location just north of Kāpiti Road, the elevated proposed Expressway and ramps are a new large scale and visually dominant feature. Distant views to Kāpiti Island would be obscured so the reserve would have a more enclosed feel. The concrete noise wall on the south bound off-ramp and on the main carriageway are 1.1m high . The upper portion of vehicles on the off-ramp and the proposed Expressway will be visible beyond the wall However, once the planting is established, the on the off-ramp embankment it will obscure views of the noise wall.

The visual change from this location will be significant, due to the loss of outlook, and this, combined with the background traffic noise, will have a major impact on the amenity of the reserve and surrounding residential area.

Visual Simulation - Makarini Street/Pohutukawa Park - Figure VS7

The dunes in this section are currently higher than the single storey houses, and would restrict the westerly outlook from these dwellings. The design of the proposed Expressway requires lowering the higher dunes and filling the low areas between the dunes; resulting in a more or less continuous bund, varying in height between 3.0m -7.0m. Revegetation of the flanks with indigenous vegetation would replace the current rank grass and weedy cover and would create a continuous 4.0+m high backdrop to these properties.

Visual Simulation - Mazengarb Road - Figure VS8

The proposed Expressway bridge, abutments and retaining walls are large and visually dominant structures. The proposed Expressway, with the long length of embankment visible from this location, will significantly change the existing view. Only the tops of the dwellings visible on the dune (to the right of the road) are visible in the simulations; views from these dwellings will be restricted by the proposed Expressway and noise bunds (Cross section 10, Figure 34 Appendix 7.A, Technical Report Appendices, Report 7, Volume 5)

10.5.6. Assessment summary

Notwithstanding that the remnant dunes in the existing WLR designation have thus far been 'protected' from alteration by the designation, the natural dune profiles that are a feature of this area will be removed by construction of the proposed Expressway. Consequently, the adverse biophysical effects on the remnant dunes is high.

The large residential population in close proximity to the proposed Expressway will potentially have views of the earth bunds either side of the proposed Expressway rather than views of the proposed Expressway itself and the traffic on it (with the exception of residences close to Kāpiti and Mazengarb Roads where the proposed Expressway crosses on bridges). The change to the visual amenity for residents living Chilton Drive, St James Court (south of Mazengarb Road) and just to the north of Kāpiti Road will be adverse. The landscape character in relation to these residents will be similarly affected.

The background traffic noise from the proposed Expressway will adversely affect the current suburban amenity for nearby residents.

Effect	Magnitude	
Biophysical	High	Alteration to several key features/attributes (remnant dunes and adjacent land has been significantly modified 'flattened')
Visual Amenity	High	Proposal is a major element of mid-ground view from within 200m – Large potential viewing audience- small number with very high adverse effects
Landscape Character	High	Alteration to several key elements or features/ attributes, composition changed

RMA Provision	Existing Environment	Effects of Proposal
s 6(a); Natural character	N/A	
s 6(b) Outstanding natural feature/landscape	N/A	
s 7(c) Amenity values, (visual amenity)	Suburban/ Industrial narrow corridor of open space (existing WLR designation)	Reduced amenity values –large scale physical infrastructure of Expressway, traffic movement, loss of informal open space, increased ambient noise close to residential areas. Effects on visual amenity high.
s 7(f) Quality of the environment (Biophysical)	Remnant dunes remain but modified either side. Rank grass and exotic vegetation dominates	Reduced quality of physical environment, significant modification of remnant dunes (albeit the dunes either side have been significantly modified), mitigation planting will improve local biodiversity.

Sector 3

10.6. Otaihanga South landscape character area

Refer to the following graphics:

Sector 3 plan	Figure 35	Appendix 7.A (Technical Report Appendices, Report 7, Volume 5)
Sector 3 300m ZTV	Figure 36	
Annotated Aerial Oblique Photograph(s)	Figure 37	
Landscape Character Description	Figure 40	
Cross Section(s)	Figures 41	
Visual Simulation(s)	Figure no simulation	Appendix 7.B (Technical Report Appendices, Report 7, Volume 5)

10.6.1. Landscape character description

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 KCDC landfill and waste water treatment plant. The Killalea Place rural residential enclave (bounded by Mazengarb, Ratanui and Otaihanga Roads), has substantial plantings of exotic and native trees, which provide a strong vegetation framework. There are a series of medium height dunes and interdunal hollows and also several natural and constructed waterbodies; three reasonably intact wetlands generally with well vegetated margins and high ecological values are present. Mazengarb Stream and several drains connect with the network of waterbodies in the Killalea Place.

The large pine plantation within the existing WLR designation masks the dune topography; recently a block of these trees fronting on to Otaihanga Road were removed because of the hazard they posed to overhead power lines. Trees have also previously been removed in other parts of the plantation or have been wind-blown.

Key Characteristics;

- Rural lifestyle west of existing WLR designation, mixed use infrastructure facilities to the east.
- Intact dune landforms
- Intact wetlands with high ecological values

- Predominant vegetation a mix of pine forest, eucalyptus, manuka, lowland native pioneer species
- Substantial and well established vegetative framework
- General amenity of area - rural

10.6.2. Key landscape change resulting from the proposal

- Expressway cuts through dunes (up to 10.0m -12.0m cuts).
- Loss of high value wetland areas
- New stormwater wetlands and flood storage areas.
- Expressway bridge over Otaihanga Road (alignment of Otaihanga Road left as is).
- Removal of some of the mature pine plantation in existing WLR designation –leaving parts of the stand adjacent to Killalea Place rural lifestyle area.
- Shared cycleway / walkway on western side of Expressway crosses to east side at Otaihanga Road and continues on the eastern side north of Otaihanga Road.
- Concrete noise wall (2.0m) on western side at southern end, (chainage 8000-8400), and shorter 2.0m high wall on eastern side near Mazengarb Road. A 1.1m high concrete noise wall at the northern end on the western side immediately south of Otaihanga Road.

10.6.3. Proposed landscape mitigation

- Retain mature pine trees between Expressway and properties to the west.
- Retain as much of the Carex dominated wetlands and regenerating kanuka as possible.
- Restore and enhance wetland areas and riparian margin of Mazengarb drain.
- Mass planting of native species in Expressway corridor.
- Off-set ecological mitigation- new wetland area near Mazengarb Road to offset loss of wetlands.

Assessment of effects

10.6.4. Biophysical effects

In contrast to the Kāpiti-Mazengarb character area to the south, in this area much of the dune landforms remain intact; there are nine bands of dunes running east-west with inter-dunal peat-filled hollows and wetlands.

While the former landfill and the sewage treatment ponds are major features, which have modified the area, several important natural features remain, including Mazengarb Stream, and several inter-dunal wetlands. Three intact wetlands with high ecological values will be significantly reduced in size and fragmented (two manuka sphagnam wetlands and a sedge/rush wetland.

A mature pine plantation extends across most of the dunes, and construction of the proposed Expressway would require removal of at least half of these trees. Removal of the ‘core’ of the

plantation is however likely to destabilise the stand and lead to wind-throw of some of the remaining trees and so this will need to be taken into account when deciding the extent of the pines to be removed. An allowance for hazard buffer zone will be required to avoid the risk of trees falling on the proposed Expressway or the cycleway / walkway.

The proposed Expressway will cut through the dunes with cuts up to 10-12m high in places. Stormwater treatment wetlands will be constructed and also flood storage areas. In addition to the removal of most of the existing vegetation, Mazengarb Stream will be affected and several of the wetland areas will be lost or fragmented. Consequently, the construction of the proposed Expressway will create a fundamental alteration to the biophysical nature and ecological functioning of this area.

Landscape and ecological mitigation works will be carried out, including buffer planting around remaining Carex-dominated wetlands, riparian planting along Mazengarb Stream and extensive planting of eco-sourced native vegetation through the proposed Expressway corridor on the cut faces and embankments.

10.6.5. Visual amenity

There are 8 dwellings located within 100m of the proposed Expressway; all of these are located in Killalea Place. There are a further 11 dwellings within 200m and of these only three are located on the eastern side of the proposed Expressway near Mazengarb Road.

Retention of the part of the pine plantation adjacent to the Killalea Place properties will provide screening to the proposed Expressway and therefore the visual change for these residents will be limited.

For road users, there will be views to the surrounding countryside from the two elevated bridges at Mazengarb and Otaihanga Roads but in between these areas, views will be largely contained as the proposed Expressway is cut into the dunes. However, in places, there will be glimpses to the surrounding countryside where the proposed Expressway passes through a low point in the dunes

10.6.6. Landscape character

Loss of the wetland areas and construction of the proposed Expressway through the dunes will significantly change the natural patterns that exist through this area.

The few dwellings that are immediately adjacent to the proposed Expressway are on rural lifestyle properties in Killalea Place to the west. The pine plantation provides a tall backdrop to these properties and this essentially will not change, despite that much of the ‘core’ of the stand will be removed to enable the proposed Expressway to be built. Removal of some of the pines will alter the landscape character from what it is currently but in time indigenous vegetation that will replace the pines will create a different character.

Otaihanga Road at the northern end of this character area is a low- key, winding, rural road with relatively high traffic flows. While it will not be physically altered by construction of the proposed Expressway, the bridge over Otaihanga Road will affect landscape character.

A popular mountain bike park, which operates as a temporary use in the pine plantation, would be displaced by construction of the proposed Expressway. The proposed cycleway/walkway is located on the western side of the proposed Expressway but it is well separated from the Killalea Place properties. The adjacent 47ha, former landfill site will be used as the main construction base for the proposed Expressway and so there will be significant activity in this area during the five year construction period.

10.6.7. Assessment summary

Removal of part of the pine plantation which covers a large part of this area will initially affect the existing, biophysical, visual amenity and landscape character of the area. However, once the area is revegetated these effects will lessen.

Construction of the proposed Expressway will result in substantial modification of the dune landforms and the loss of wetland areas. New areas of wetland for ecological benefit will be created to mitigate the loss of these.

The area is relatively secluded from view with a small viewing audience in the rural lifestyle enclave at Killalea Place, where most dwellings are orientated away from the proposed Expressway. Retention of part of the plantation will provide physical and visual separation between these properties and the proposed Expressway.

Ambient traffic noise from the proposed Expressway will increase, which is likely to affect the currently quiet rural amenity of the area.

Effect	Magnitude	
Biophysical	Very High	Fundamental alteration to most key features/attributes Modification of dunes, loss of wetlands and indigenous vegetation/habitat
Visual Amenity	Low	Proposal may constitute a limited component of wider scene/ may be missed by casual observer
Landscape Character	High	Alteration to several key elements or features/ attributes, composition changed

RMA Provision	Existing Environment	Effects of Proposal
s 6(a); Natural character, rivers, streams,	Mazengarb Stream, Mazengarb (WWTS) Drain, Landfill Drain all channelised. Low ecological values/ low natural character. Three intact interdunal wetlands affected -2xNorthern wetlands- manuka/sphagnum, total 1.0ha - Southern wetland- sedge /rush 1.39ha) with moderate ecological values/moderate natural character.	Reduced natural character overall. Riparian enhancement of sections of both streams- slight improvement of natural character in localised area. Loss of freshwater habitat in culverts- three streams Loss of wetlands, north 0.53ha (50%) south 0.55ha (39%) Creation of 'offset wetland'
s 6(b) Outstanding natural feature/landscape	N/A	
s 7(c) Amenity values, (visual amenity)	Existing amenity; Rural/open space amenity	Reduced amenity values –large scale of Expressway, traffic movement, loss of informal open space, increased ambient noise. Effects on visual amenity low.
s 7(f) Quality of the environment (Biophysical)	Intact dunes and inter-dunal wetlands; predominantly exotic forest cover	Reduced quality of physical environment, significant modification of dunes, mitigation planting will improve local biodiversity.

10.7. Otaihanga North landscape character area

Refer to the following graphics:

Sector 3 plan	Figure 35	Appendix 7.A (Technical Report Appendices, Report 7, Volume 5)
Sector 3 300m ZTV	Figure 36	
Annotated Aerial Oblique Photograph(s)	Figure 38	
Landscape Character Description	Figure 42	
Cross Section(s)	Figures 43	
Visual Simulation(s)	Figure VS9	Appendix 7.B (Technical Report Appendices, Report 7, Volume 5)

10.7.1. Landscape character description

Extending from Otaihanga Road to the Waikanae River corridor, the character of this area is distinctly rural lifestyle, with Otaihanga residential area on the western periphery. The rural lifestyle enclave with access from Greendale Drive adjoins the existing WLR designation boundary near Otaihanga Road. Small and medium sized rural blocks, with grazed pasture, small woodlots and shelterbelts occupy most of the area.

Substantial tree planting that creates a distinctive vegetation framework exists throughout the area, comprising pine shelterbelts and woodlots, willow and poplar streamside plantings, and amenity plantings associated with dwellings and farm settlements.

A series of high intact dunes with small areas of permanent and ephemeral wetlands and water bodies in the inter-dunal hollows are dominant landscape elements of this area. Due to large tracts open grazed farmland, the high dunes are visually distinctive. A series of high dunes in the southern part of the character area vary in height from 20m to 27m asl or approximately 6.0-9.0m higher than the surrounding land.

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

Key Characteristics

- Open rural character with rural residential development
- Intact dune landforms, and damp inter-dunal hollows
- Grazed pasture dominant
- Tree framework of exotic shelterbelts and woodlots and amenity plantings
- General amenity of area- rural lifestyle

10.7.2. Key landscape change resulting from the proposal

- Expressway cut into dunes (up to 15.0m cuts)
- 700m of new right-of-way on east side to link existing right-of-way to Otaihanga Road
- New stormwater wetlands and flood storage areas
- Shared cycle/ walkway on eastern side of Expressway
- 1.1m high noise wallon the western side just north of the Otaihanga Road overbridge (chainage 9200-9420)

10.7.3. Proposed landscape mitigation

- Retain several stands of mature trees within the existing WLR designation
- Pasture and rural scale tree plantings proposed to retain the existing open character of the area. It is intended that grazed pasture (or mown grass) will extend as close as possible to Expressway. If visual screening is required from particular locations (such as dwellings) 'shelter belts' or strategically placed groups of trees could be planted.

Assessment of Effects

10.7.4. Biophysical effects

In contrast to the character south of Otaihanga Road, to the north, the area is farmed with rolling dunes mostly in grazed pasture with shelterbelts and amenity tree planting. The Muaupoko Stream runs through this area and there is low-lying damp, peaty ground between the dunes and, in places, ephemeral wetlands.

Some of the area has been subdivided into rural lifestyle properties and many of the dwellings on these properties are located on dune crests. However, the dunes have remained largely intact, apart from driveways and minor earthworks associated with house sites.

Construction of the proposed Expressway will significantly modify the dunes, requiring cuts up to 15m high. In places the proposed Expressway will be on a 2.0m-3.0m high embankment. A new 700m long right-of-way off Otaihanga Road will be formed on the eastern side of the proposed Expressway to service several properties. New stormwater treatment wetlands and flood storage areas will be built and the cycleway/walkway will continue along the eastern side of the proposed Expressway.

Given the open rural landscape, it is proposed to restore pasture close to the proposed Expressway wherever possible with limited tree planting either as shelterbelts or for amenity purposes. Planting using eco-sourced native species associated with the stormwater treatment wetlands is also proposed.

10.7.5. Visual amenity

There is a small resident population, which is widely dispersed. There are 13 dwellings located within 200m of the proposed Expressway, of which, four are located within 100m. The proposed Expressway will be potentially more visible from properties on the east because they are elevated on dune crests; however, it appears that trees surrounding many of the dwellings would screen views to the proposed Expressway.

While tree planting for mitigation using rural scale tree species will help to integrate the proposed Expressway into its rural setting, this planting will not totally screen it from adjoining properties and dwellings. For some landowners there will be intermittent views looking down on to the proposed Expressway.

For proposed Expressway users, the views to the surrounding countryside will be intermittent, depending on the height of the cuts through dunes; in places views will be restricted and instead channelled along the road corridor.

10.7.6. Landscape character

The rolling dunes and rural scale tree planting create an intimately-scaled landscape with a relatively remote feel. The informal nature of Otaihanga Road influences the overall character of this area.

The proposed Expressway will introduce a large scale piece of infrastructure to the rural landscape resulting in changes to the landscape character. Most rural residential landowners have carried out extensive tree and other planting along their boundaries and elsewhere on their properties, which has been instrumental in creating or reinforcing the character of this area.

Because most of the dwellings are located on dune crests to provide an outlook, the proposed Expressway will be visible and will result in a fundamental alteration of this relatively tranquil rural landscape. However, through this section of the Alignment, the proposed Expressway follows the existing WLR designation and this has probably influenced where dwellings have been sited and where trees have been planted on these properties.

Visual Simulation- Otaihanga Road- Figure VS9

From Otaihanga Road, the views are generally quite short and narrow because of the alignment of the road and the nature of the surrounding landscape – topography and vegetation. There are 6500 vehicle movements per day on Otaihanga Road.

The bend in Otaihanga Road will partially obscure the bridge from view and prevent distant views of the bridge for road users. The proposed Expressway embankment will be slightly higher than the dune with a 2.0m high noise wall visible from this location. Expressway traffic would also be visible.

The proposed planting in this farming area is designed to reflect the rural planting pattern but the widely spaced groups of trees proposed would allow the traffic on the proposed Expressway to be seen.

10.7.7. Assessment summary

The proposed Expressway will significantly modify a series of large and intact dunes, through several large cuts and the raised embankment for the southern ramp of the Waikanae River bridge. The presence of the proposed Expressway with its quiet and semi-remote rural character will have a major effect on both landscape character and overall amenity. While the steep profile of the dunes will reduce the extent of the proposed Expressway that may be visible from any one location, both the extent of landform modification and the scale of the proposal itself will mean that the proposed Expressway is a dominant feature.

The Otaihanga Road overbridge will span the gap across the existing road cut through the dunes, however, the scale of the bridge will be inconsistent with the scale and rural character of Otaihanga Road.

Effect	Magnitude	
Biophysical Effects	High	Alteration to several key features/attributes–change to the currently intact and unmodified dunes, no significant vegetation or water bodies affected
Visual Amenity	Moderate	Visible and recognisable new element within the overall scene- readily noticed.
Landscape Character	High	Alteration to several key elements or features/ attributes, composition changed. Intact dunes modified, addition of major infrastructure to rural area.

RMA Provision	Existing Environment	Effects of Proposal
s 6(a); Natural character	N/A	
s 6(b) Outstanding natural feature/landscape	N/A	
s 7(c) Amenity values, (visual amenity)	Existing amenity values- rural/rural lifestyle	Reduced amenity values –large scale of Expressway, traffic movement, increased ambient noise. Effects on visual amenity moderate.

s 7(f) Quality of the environment (Biophysical)	Intact dunes, working open rural landscape	Reduced quality of physical environment, significant modification of dunes.

10.8. Waikanae River landscape character area

Refer to the following graphics:

Sector 3 plan	Figure 35	Appendix 7.A (Technical Report Appendices, Report 7, Volume 5)
Sector 3 300m ZTV	Figure 36	
Annotated Aerial Oblique Photograph(s)	Figure 38	
Landscape Plan Waikanae River Bridge	Figure 38A	
Landscape Character Description	Figure 44	
Cross Section(s)	Figures 45	
Visual Simulation(s)	Figure VS10, VS11	Appendix 7.B (Technical Report Appendices, Report 7, Volume 5)

10.8.1. Landscape character description

The Waikanae River corridor includes the River, its margins and the floodway. The corridor provides an important open space link between the coast and foothills of the Tararua Range. The Waikanae River corridor is identified as an Outstanding Natural Landscape (ONL) 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; it is also used as a commuter route. The river is shallow at normal flow, and with 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, the stopbank and adjoining areas provide recreational opportunities along the river.

The vegetation in this stretch of the river corridor is dominated by willow and poplar trees planted for flood control. However, local residents over many years have been removing and controlling 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 have significantly influence landscape character.

From many locations on the river trail, 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
- Recognised as an Outstanding Natural Landscape
- Intact dune landforms adjoin river corridor
- Areas of well established native riparian species along river banks
- General amenity of area- rural/open space

10.8.2. Key landscape change resulting from the proposal

- 182m long bridge over river corridor 7.0m above the ground
- Eight bridge piers in river corridor, four immediately adjacent to the river channel (two either side)
- Riprap reinforcement of river on both sides of the channel and 30m wide strip of riprap extending across the floodplains to the bridge abutments, (100m north bank, 38m south bank covering approximately 4000m^2)
- Realignment of approximately 200m of river channel
- Riprap in river channel to protect bridge piers
- Realignment of Muaupoko Stream at its confluence with the Waikanae River, including, reinforcement with riprap.
- Works in the river will require removal of riparian vegetation (both willow and native vegetation plantings) for approximately 200m up/down stream. Willow/poplar to be replanted to stabilise river channel banks.
- Mixture of poplar and native species will be planted either side of the walkways to assist with visual mitigation.
- Minor relocation of walkway on north bank to allow for bridge pier.
- Shared cycleway / walkway crosses river on Expressway bridge and access to the river also provided on both sides of the river to connect with paths that run along the river.
- Access road to El Rancho passes under bridge adjacent to the abutment on the north bank.
- Concrete noise wall (1.1m) on west at El Rancho (chainage 10750-11000) and continues into next character area.

10.8.3. Proposed landscape mitigation

- Planting of native vegetation along Muaupoko Stream and Waikanae River to replace the existing vegetation in the river corridor that will be removed.
- Replanting of willows for flood protection along realigned river edge.
- Floodplain on northern bank needs to allow for flood flows and cannot be densely planted. However, a strip of poplar and native species will be planted eitherside of the walkway in the

vicinity of the bridge to assist with visual mitigation of the bridge structure. A concept design along these lines has been approved by GWRC and hydrological modeller.

Replanting of existing vegetation on the south bank will allow for a future walkway that is parallel to but separate from the existing vehicle access track.

Assessment of Effects

10.8.4. Biophysical effects

While the river has been modified through straightening, construction of stopbanks and extensive willow planting for bank stabilisation, the river corridor retains many of its original features and is an important landscape element and habitat area in the district. The river has played a significant role in shaping the landscape and this is particularly evident in the immediate environs– terraces, gravels, riparian vegetation and former meanders (the latter have been cut off as part of the GWRC's floodplain management plan).

The Muaupoko Stream enters the Waikanae River immediately east of where the proposed Expressway bridge will cross the Waikanae River. The stream will be realigned and the new channel reinforced with riprap to protect it and the bridge abutment located close by. In addition, the Waikanae River itself is to be realigned approximately 50m upstream and 180m downstream of the bridge.

The bridge will be 182m long and approximately 7.0m above the river; eight bridge piers will be located in the river corridor but not in the actual river channel. Riprap reinforcement of the banks will be required on the edge of the river channel to protect the bridge piers.

Ground improvements to facilitate construction of the bridge abutments and piers, together with river realignment, realignment of Muaupoko Stream, and the removal of native riparian vegetation, willows and mature exotic trees, will result in significant changes in the short and medium term.

While GWRC will require reinstatement of willow planting for bank stabilisation as part of mitigation, mass planting of indigenous species is also proposed and will involve reinstatement of the native riparian planting on both banks in association with the required willow planting, and also riparian planting along the east bank of the realigned Muaupoko Stream (riprap on west bank).

The walkways on both sides of the river will also be affected by bridge construction; these will also be reinstated and the northern walkway slightly realigned. In addition, a new access road to El Rancho will be built taking it from its present alignment on the top of the river terrace down on to the lower terrace and under the bridge close to the abutment. It will then join the existing entrance road back on the top of the terrace. Many of the mature pines and other exotic trees on the lower terrace located within the bridge alignment and either side of it will be removed to facilitate bridge construction.

While the short term effects may be significant, in the long term, the proposed rehabilitation of the water bodies and revegetation of the riparian areas the biophysical changes will be moderate.

10.8.5. Visual amenity

The bridge will be a dominant structure in this part of the river corridor and will severely reduce the visual amenity of the locality. The presence of the bridge and traffic movement will significantly affect the sense of remoteness and naturalness that is currently experienced in the river corridor and which is highly valued by the community.

The proposed Expressway, including the embankments, abutments and the bridge, will be dominant physical and visible structures from the El Rancho access road and will also be visible from various parts of the El Rancho site.

At close proximity, the bridge and its piers will dominate the view but from greater distances (beyond about 200m) because of the alignment of the river and the tracks and also the existing and proposed tree planting, the visibility and effects on visual amenity will be considerably lessened.

For northbound proposed Expressway users the road Alignment will channel views to the Tararua Ranges and for southbound users, Kāpiti Island will be visible as well as fleeting oblique glimpses up and down the river when crossing the bridge.

10.8.6. Landscape character

The River corridor is an important part of the district's open space framework and is a heavily used recreational and commuter route. On the true left bank, well upstream of where the proposed Expressway will cross, there are many well established and well treed residential properties that back on to the river. West of Greenaway Road, where GWRC carried out extensive flood control works, the landscape is more open with large tracts of mown grass and groups of trees and other vegetation (i.e the floodway).

Despite the modification that has occurred, the river corridor has a high level of natural character and high scenic and amenity values. The river itself is not very wide and the overall corridor is enclosed and intimate.

While landscape and ecological mitigation works are proposed, it will take some years before this area approximates the current landscape condition. The proposed Expressway, especially the presence of the bridge and riprap, will permanently affect the landscape character of the immediate area.

El Rancho is a popular and well used facility hosting people from outside the district; its riverbank location and the discreet access road are important in creating its distinctive character, despite it being very close to a well established residential area. The proposed Expressway will affect how El

Rancho is perceived in terms of its 'remote' location but realignment of the access road and mitigation planting will partly offset this.

10.8.7. Effects on natural character of the Waikanae River and Muaupoko Stream

The river corridor has a high level of natural character. Construction of the proposed Expressway will introduce a large piece of built infrastructure into the river environment. The bridge abutments, piers, riprap and associated ground improvement and engineering works, the bridge itself, and realignment of the river channel will considerably reduce the natural character of the river corridor in the immediate vicinity of the bridge.

The dry and relatively shaded conditions under the proposed bridge combined with the rock riprap areas will make it difficult to establish any substantial vegetation and these areas are likely to support only low stature, sparse vegetation. The willows and indigenous vegetation that will be established along the realigned river channel will essentially replicate what is currently there. The establishment of indigenous vegetation will, over time, enhance the local biodiversity of the area.

The realignment of the Muaupoko Stream involves a 50m section being aligned through the rock rip rap. However, vegetation will be able to be established on the stream margins.

The adverse effects of the proposal on the natural character of the waterbodies in the area immediate to the bridge will be very high, however in the overall context of the river the effects would be moderate.

10.8.8. Effects on the outstanding natural landscape (ONL)

The specific landscape values attributed to the Waikanae River corridor's ONL status are not set out in the District Plan. However, it is assumed that ecological and natural values of the river and corridor, the recreational and open space values and the link that the corridor provides between the coast and the Tararua Range have collectively contributed to this status.

Construction of the proposed Expressway, bridge and associated structures will considerably alter the landscape values of the area in close proximity to the bridge. Not only will it introduce a large physical structure into the river corridor, it will also introduce traffic noise into the quiet, recreational open space environment.

In close proximity to the bridge the effects on the landscape values of the river corridor will be very high. However, when these changes are considered in relation to the overall river corridor the effects on landscape values will be much reduced and the effects on the ONL status would be moderate.

Visual Simulation- Waikanae River - Figure VS10

With the exception of fences and erosion protection groynes in the river, the river corridor is free of substantial structures. The absence of structures is one of the main contributors to the river corridor's moderate/high level of natural character that is valued by the community.

The proposed Expressway bridge is a large scale structure that will span the full width of the river corridor, at right angles to the line of travel up and down the river. Its elevation exacerbates its prominence and dominates the view. From this location the bridge will have a significant physical and visual presence for recreational users in the area.

Traffic on the bridge will be visible and this together with the traffic noise will have an adverse permanent effect on the visual and recreational amenity of the river corridor. From viewpoints further away, the visual intrusion of the bridge will decrease as the structure becomes a smaller part of the view and existing trees and proposed planting obscure it.

The proposed planting either side of the walkway in the vicinity of the bridge will, once established, provide some visual screening of the bridge for walkway users as they approach the bridge. The proposed planting would consist of a mix of fast growing poplar (to provide screening quickly) and native species which in the longer term will replace the poplar.

Visual Simulation- El Rancho - Figure VS11

The northern ramp of the Waikanae River bridge, which is approximately 5.6m high, is located on the flat land between the viewpoint and the dunes. A view of the new embankment and noise wall 40m away replaces the view of the dunes 120m away. The Expressway traffic will be visible on the ramp and this movement will further add to the significant visual change.

Notwithstanding the existing El Rancho buildings and other infrastructure in this locality, the proposed Expressway structures, the traffic movement and associated noise will together adversely affect the current tranquillity and remoteness of the area to a significant extent.

10.8.9. Assessment summary

The Waikanae River corridor is a well used public area and is particularly sensitive to change. The river and its margins are highly valued by the community for their recreational opportunities, as a local commuter route, and for its 'wild' and 'natural' amenity values.

The proposed Expressway bridge, piers, abutments, and riprap will introduce new and large scale structures into the relatively small scale river corridor. The bridge will be visually obtrusive at close proximity, due to its elevation, length and bulk. In addition to the physical presence and visual effects of the bridge and associated abutments, traffic movement will accentuate the adverse effects on the river corridor landscape and its recreational users.

The effects on the visual amenity of this section of the river corridor will be extreme, especially from close quarters. The magnitude of these effects will decrease with distance, but the elevation of the bridge will result in significant impacts being experienced beyond just the immediate area. The effects on the natural character of the river and Maupoko Stream will be very high.

The traffic noise from the proposed Expressway bridge will adversely affect the currently peaceful amenity of the river corridor.

Effect	Magnitude	
Biophysical Effects	High	Alteration to several key features/attributes-considerably changed.
Visual Amenity	Extreme (at close proximity) Very high at greater distances when bridge is visible in-part	Proposal is prominent structural feature in the river corridor and significantly impacts on the visual amenity.
Landscape Character	Very High	Fundamental alteration to key features/attributes, major change to composition

RMA Provision	Existing Environment	Effects of Proposal
s 6(a); Natural character	Waikanae River and margins – high ecological values/ high natural character. Muaupoko Stream and margins moderate ecological values/moderate natural character.	Bridge, rock riprap controlling river channel, willow planting realignment of Muaupoko Stream – very high adverse effects on natural character of river in immediate proximity to bridge. Low in wider context of river and over the long term. Muaupoko Stream, realigned, riparian margin reinstated and enhanced.
s 6(b) Outstanding natural feature/landscape	Waikanae River identified as ONL in District Plan. Valued by the community	Very high effects on a short section of the river corridor ONL in close proximity to the bridge. Impact on 'natural and wild' values,

	for its ‘natural’ and recreational values	scenic qualities, remoteness. Moderate effects at a distance.
s 7(c) Amenity values (visual amenity)	Existing amenity- open space (‘natural’)	Reduced amenity values –large scale of Expressway, loss of ‘naturalness, increased ambient noise, physical bulk of bridge. Effects on visual amenity very high.
s 7(f) Quality of the environment (Biophysical)	Slightly modified water course, groynes upstream, exotic vegetation (willow)	Reduced quality of physical environment, rock riprap, bridge piers, willows, control of river channel, realignment of modification of dunes, mitigation planting will improve local biodiversity.

10.9. Te Moana landscape character area

Refer to the following graphics:

Sector 3 plan	Figure 35	Appendix 7.A (Technical Report Appendices, Report 7, Volume 5)
Sector 3 300m ZTV	Figure 36	
Landscape Plan, Te Moana Road	Figure 39A	
Annotated Aerial Oblique Photograph(s)	Figure 39	
Landscape Character Description	Figure 46	
Cross Section(s)	Figures 47,48	
Visual Simulation(s)	Figure VS12, VS13	Appendix 7.B (Technical Report Appendices, Report 7, Volume 5)

10.9.1. Landscape character description

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. Waimeha Stream runs westward adjacent to Te Moana Road and the Waikanae Golf Club.

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 a market garden.

The western side of the character area is less intensively developed, comprising intact duneland, occupied by rural residential lots, Waikanae Golf Course, and Takamore Trust land. 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.
- General amenity of area – rural lifestyle enclosed by suburban.

10.9.2. Key landscape change resulting from the proposal

- Expressway is on raised embankments through this character area (7.5m high at El Rancho, and 9.0m high ramps at Te Moana) and cuts the side off a high dune with a 13m cut just south of Te Moana interchange.
- 215m long, 4.0m-5.0m high earth noise bund near Pururi Road (chainage 11100-11300)
- 1.1m high concrete noise wall on the embankment just north of the Waikanae River bridge, adjacent to El Rancho (chainage 10720-11000) continued from Waikanae River character area.
- Full interchange at Te Moana Road including on/off ramps, embankments, Expressway bridges over Te Moana Road and Waimeha Stream, two roundabouts and large areas of open space between the paved road areas for residual overland flood flow path.
- New stormwater treatment wetlands near Pururi Road and overland flow path east of Te Moana Road.
- Cycle/walkway on eastern side of Expressway which diverges from the Expressway Alignment along Kauri Road.
- New access road to Takemore Urupa - off Te Moana Road west of Expressway.
- 1300m length of Expressway lit at Te Moana interchange;
- Expressway and on/off ramps lit as well as both roundabouts and underbridge lighting and in-ground up-lighting under the Expressway

10.9.3. Proposed landscape mitigation

- Restoration of indigenous riparian margin of a 320m length of the Waimeha Stream
- Retain areas of existing vegetation, wetlands, regenerating broadleaf scrub and areas of mature exotic trees.
- Mass planting of indigenous species throughout the interchange, provides some visual screening and will enhance the local biodiversity.

Assessment of Effects

10.9.4. Biophysical effects

Significant wetlands on the El Rancho property, together with regenerating native vegetation on El Rancho and the adjoining Takamore land, large unmodified dunes, and the Waimeha Stream are important biophysical landscape features that will be affected by the proposed Expressway. Some of these will be directly affected whereas others will be indirectly affected.

The proposed Expressway has been aligned to avoid the culturally significant Maketu tree and associated burial area; much of the low dune on which it is situated will be unaffected as will most of the wetland area at the toe of the dune below the urupa. An earth bund will be constructed from the northern end of the dune on which the Maketu tree is situated. This bund will provide separation

and a buffer for several of the Puriri Road properties and together with the proposed planting on the flanks of the bund will screen the proposed Expressway.

The high crescent-shaped dune immediately north of the urupa, with advanced regenerating native forest, will be significantly modified with a 13m-14m high 3:1 cut. The 3:1 slope will be planted with similar vegetation to what is currently growing there.

There are extensive deposits of peat on the Takamore land and also south of Te Moana Road, which will be excavated to enable construction of the proposed Expressway; this work will have a bearing on the existing wetland areas that will be disturbed but retained, and also on the design and construction of the stormwater treatment wetlands. The existing essentially man-made wetlands on the Tocker property immediately north of Puriri Road, will be significantly altered and replaced by a large stormwater treatment wetland. This wetland will be extensively planted and the shared cycleway/walkway will cross over it on a boardwalk.

There is a residual flood flow path from the Waikanae River across low-lying land to the north with flood waters eventually emptying into Waimeha Stream. A new 1.0m to 1.5m high stopbank, 350 m long to protect an enclave of residential properties on Te Moana Road will be constructed; Within the floodway, planting will comprise widely-spaced specimen trees with grass underneath so as not to unduly impede flood flows. Tree planting will be based on some of the species that are thriving in the gardens of many of the adjacent residential properties. Along the proposed Expressway margins and throughout the interchange, beyond the floodway, the planting will consist of massed indigenous species which will collectively enhance the indigenous biodiversity of the area.

The proposed Expressway will cross Waimeha Stream north of Te Moana Road. A 320m length of the riparian margin of Waimeha Stream will be restored with indigenous riparian planting.

10.9.5. Visual amenity

Construction of the proposed Expressway will change the visual amenity for a wide range of residents and road users. For residents, the effects will be permanent and for the many road users travelling to and from Waikanae Beach (10,700 vpd), the effects on visual amenity will be transient.

In addition to the removal of 18 houses in Puriri Road and Te Moana Road, approximately 58 houses will be located within 200m of the proposed Expressway and 12 of these within 100m. Given that two thirds of the proposed Expressway is elevated through this character area the proposed Expressway will be potentially visible to a large number of people.

Te Moana Road provides the main access to Waikanae Beach for locals and for visitors; however, because of the alignment of Te Moana Road, users travelling west will have a relatively short range view (350m) of the elevated interchange but in terms of its overall scale it will be dominant.

Extensive tall tree planting around the edge of the interchange and between the ramps will however mitigate some of the visual effects

The visual amenity will be affected for some Puriri Road residents although the earth bunds and associated planting will mitigate these effects to some degree. The visual amenity and overall ambience will be affected for users of El Rancho, especially in relation to the heavily used flat land located immediately west of the proposed Expressway.

Given that that much of this section of the proposed Expressway is elevated, for proposed Expressway users, whether travelling north or south, there will be views across the countryside.

10.9.6. Effects of lighting

The overhead lighting of the interchange at Te Moana Road will introduce a significant new light source into an area that, currently, is relatively dark. However, only a small number of residences would be potentially affected as most of the interchange area is rural land.

The lighting assessment states that the effects from the illumination will be “minor on the surrounding environs” and that “no residential properties will receive light spill from the proposed road lighting.”

The areas along Te Moana Road to the east and west of the proposed interchange are residential and have existing street lighting. While the lighting at the interchange will light a currently unlit area, the area it is bounded either side by lit residential areas.

10.9.7. Landscape character

In the Te Moana landscape character area there is a variety of land uses, from the El Rancho Christian Holiday Camp in the south, to residential development along Puriri Road and also at Te Moana Road, the Takamore wāhi tapu and urupa, the market gardens and the Waikanae Golf Course north of Te Moana Road. The area is suburban fringe, essentially a tract of rural land between two residential areas. While the landscape is relatively enclosed at the southern end of this landscape character area, at the north it opens into the flat Te Moana basin with its deep alluvial soils.

Only part of the proposed Expressway is located in the existing WLR designation; the Alignment has been significantly altered where it passes through the Takamore land and in relation to the adjoining Puriri Road properties. The large cut through the high crescent-shaped dune north of the wāhi tapu area is a significant alteration, (to avoid residential properties and to maintain the road geometrics), as is the creation of the large stormwater treatment wetland.

The cut dune face will be reshaped to tie in with the surrounding area and it will be revegetated with a similar mix of local native species. However, given the scale of the cut it will take many years before the planting is effective.

North of this dune, the proposed Expressway will remain elevated on an embankment to enable it to cross with a 6.0m clearance above Te Moana Road, and together with the on and off ramps and two new roundabouts, the Te Moana Interchange will occupy a large footprint. While the interchange will not extend over the entire market garden area, it will substantially alter the character, changing it from an open semi- rural environment to a busy road environment.

The large extent of planting proposed around the interchange will however help to reinforce the separation that exists between the residential areas to the east with those further to the west along Te Moana Road and the beach beyond.

Visual Simulation-Takamore Urupa- Figure VS 12

This viewpoint, is about 100m away from the proposed Expressway, taken from the Takamore urupa. The mid-ground part of the view will be substantially different to what it is now. Planting associated with the stormwater treatment wetland and revegetation of other areas will mean that once the planting is well established, much of the proposed Expressway will be screened, at least in part, when viewed from the urupa. Traffic movement will be visible from this location, and this combined with the background noise from the proposed Expressway will affect the currently tranquil amenity of the area.

Visual Simulation-Te Moana Road- Figure VS 13

The proposed Expressway bridge, embankment and on/off ramps are large scale and are substantial structures, that will enclose the mid-ground area and obscure distant views of the Tararuas. While the bridge allows views beyond, its scale dominates what was formerly an open and semi rural landscape.

Traffic on the bridge and also on the on/off ramps will be visible and will contribute to the overall significant landscape change. While the proposed planting will assist to break and soften the view of the bridge and embankments, the scale of visual change will still be very evident.

10.9.8. Assessment summary

The biophysical effects that will occur in this area are high because of the large cut through a high, forested, crescent-shaped dune, loss of part of a wetland on Takamore Trust land, and the large footprint, elevated proposed Expressway and ramps of the interchange on the flat inter-dunal land at Te Moana Road. Large bunds are also proposed as mitigation of visual and noise effects. There will be ecological benefits in the proposed rehabilitation of the margins of Waimeha Stream.

The Takamore wāhi tapu, urupa, and Maketu tree are important cultural features located close together and construction of the proposed Expressway will affect the amenity.

A relatively large residential population within 200m of the proposed Expressway makes this an area sensitive to changes in visual amenity and also in terms of landscape character. The existing tall and dense vegetation will obscure the proposed Expressway or screen it to some degree from many dwellings in the area. However, in the vicinity of Te Moana Road, which is flat and more open, the proposed Expressway is elevated and so the effects on visual amenity from private properties and Te Moana Road will be high. The effects on landscape character of the quiet suburban/ rural area as a result of the landform modification, interchange structures and the activity on the proposed Expressway will also be very high.

The background traffic noise from the proposed Expressway will adversely affect the existing amenity for nearby residents.

Effect	Magnitude	
Biophysical Effects	High	Alteration to several key features/attributes
Visual Amenity	Very High	Proposal is prominent and significantly restricts views for viewing audience within 100m
Landscape Character	Very High	Fundamental alteration to key features/attributes, major change to composition – interchange large and dominant

RMA Provision	Existing Environment	Effects of Proposal
s 6(a); Natural character	Waimeha Stream channelised, Low ecological values/ low natural character. El Rancho manuka wetland (KCDC K170) 8.8 ha- moderate ecological values/ moderate natural character.	Reduced natural character. Enhancement of riparian margin to sector of stream slight improvement of natural character in localised area Loss of small area of El Rancho wetland 0.38ha (0.04%) small reduction in natural character.
s 6(b) Outstanding natural feature/landscape	N/A	
s 7(c) Amenity values,	Existing amenity Rural	Reduced amenity values –large scale of

(visual amenity)	lifestyle and urban	Expressway, traffic movement, increased ambient noise close to residential area and El Rancho. Effects on visual amenity very high.
s 7(f) Quality of the environment (Biophysical)	Intact dunes, regenerating native vegetation, suburban development	Reduced quality of physical environment, significant modification of dunes, raised embankments and interchange in flat topography, loss of regenerating and advanced regenerating indigenous vegetation. Mitigation planting will improve local biodiversity.

Sector 4

10.10. Ngarara landscape character area

Refer to the following graphics:

Sector 4 plan	Figure 49	Appendix 7.A (Technical Report Appendices, Report 7, Volume 5)
Sector 4 300m ZTV	Figure 50	
Annotated Aerial Oblique Photograph(s)	Figure 51,52	
Landscape Character Description	Figure 54	
Cross Section(s)	Figures 55, 56, 57	
Visual Simulation(s)	Figure VS14	Appendix 7.B (Technical Report Appendices, Report 7, Volume 5)

10.10.1. Landscape character

Extending from Te Moana Road to Smithfield Road, this character area includes the most intact and complex dunelands along the Alignment with dune sequences up to 30m asl or 20m higher than the surrounding ground. Land use is primarily pastoral farmland with some smaller rural residential and lifestyle blocks. In places, there are tracts of native vegetation, including coastal/lowland forest remnants, regenerating scrub, and large wetland areas to the west. Kakariki Stream and Ngarara Creek flow through the area.

There are also pine plantations and woodlots present throughout the area.

Some of the remnant and regenerating indigenous vegetation has been identified as significant ecological sites and are protected (by way of QEII National Trust open space covenants for example, Te Harakeke/Kawakahia wetland, Nga Manu Reserve). This area has been identified as part of an ecological corridor linking the coast to the mountains.

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

Key Characteristics

- East-west ecological corridor
- Numerous small areas of indigenous vegetation
- Intact landforms including large dunes, and wetlands (eg Te Harakeke/Kawakahia Wetland)
- Kakariki Stream and Ngarara Creek.

- Remnant lowland native forest, semi mature manuka/kanuka, wetlands, pine/macrocarpa shelterbelts woodlots and individual amenity trees
- General amenity of area- rural

10.10.2. Key landscape change resulting from the proposal

- Substantial earthworks required through series of large dunes between Te Moana and Ngarara Roads with the Expressway being cut down into the dunes resulting in many large cuts ranging from 13m-16m high.
- Removal of small areas of regenerating broadleaf forest.
- Inter-dunal areas modified and native vegetation removed.
- Rural landscape and farming operation split by Expressway.
- Shared cycle/ walkway on eastern side of Expressway south of Ngarara Road, crosses to west north of Ngarara Road.
- Ngarara Road bridged over the Expressway near Nga Manu access road, including 16m high cuts into dunes.
- Smithfield Road realigned partly along Nga Manu access road, 1.2km of new road including approximately 500m on raised embankments to cross Expressway (up to 9.0m high embankments).
- Construction of large stormwater treatment/storage wetlands, most to be planted with indigenous vegetation.
- Restoration of drain to more naturalised stream and riparian planting.
- Riparain planting along 520m of Kakariki Stream.

10.10.3. Proposed Landscape Mitigation

- Retain existing native and exotic vegetation/trees wherever possible and strengthen with additional plantings.
- Construction design avoids heritage tree (pohutukawa near Smithfield Road, see Figure 49, Technical Report Appendices, Report 7, Volume 5).
- Mass planting of native vegetation including canopy species to contribute to key east-west ecological corridor.
- Reshaping of cut faces to high dunes along this part of the route to integrate Expressway into the landscape.
- Large area (approximately 9ha) of indigenous planting associated with the stormwater wetlands, flood storage riparian restoration of drain (‘Smithfield Stream diversion’) and riparian enhancement of Kakariki Stream will enhance the local biodiversity and enrich the ecological corridor.

Assessment of Effects

10.10.4. Biophysical effects

Modification of the dunes and removal of native vegetation will occur throughout this character area. There will also be effects on local streams. Kakariki Stream and Ngarara Creek run through this area and drain into the large, regionally significant, Te Harakeke/Kawakahia Wetland, which is also protected by an open space covenant. In places, peat in some of the low-lying inter-dunal areas will be removed and replaced with sand and/or granular material to provide a suitable base for road construction.

Until relatively recently, pine plantations covered large areas of dunes; since being milled many of these areas have reverted into exotic scrub and rank grassland. Some pine woodlots still remain, together with stands and groups of mature exotic trees. Pest plants, such as blackberry and Convolvulus, are well established and, in places, dominate many of the wetlands in the inter-dunal hollows.

While the Alignment of the proposed Expressway has avoided most of the significant ecological areas, it will dissect the dunes with large cuts in several places. While the impact of the proposed Expressway will be severe in terms of modifying the high dunes, there will be positive benefits in terms of the riparian planting along Kakariki Stream and Ngarara Creek and also enhancement of the local biodiversity with the large area of indigenous vegetation proposed near Smithfield Road. Large stormwater treatment wetlands and flood storage areas will be constructed, near Smithfield Road.

The key ecological and landscape aim in this section of the proposed Expressway is to maintain, and wherever possible, strengthen the east-west habitat linkages between Te Harakeke/ Kawakahia Wetland, Nga Manu Reserve, and the Hemi Matenga Reserve on the eastern hills; this was also a key objective of the 2009 Ngarara Farm Plan Change. An integral part of the Plan Change, the dune system, wetlands, waterways and remnant and regenerating vegetation are required to be protected and enhanced.

The recently developed Ferndale subdivision located on the eastern boundary of the proposed Expressway has also set aside wetlands and inter-dunal hollows as reserves and has carried out extensive native planting in these areas.

Ngarara Road will also be realigned and will cross over the proposed Expressway near the Nga Manu access road with cuts up to 16.0m high. 1.2 km of Smithfield Road will be realigned along the access road to Nga Manu Reserve with approximately 500m on raised embankments in order to take it over the proposed Expressway. The embankments will be up to 9.0m high and planted.

10.10.5. Visual amenity

The visual amenity will be affected from many locations within this character area. Currently, there are few dwellings and none within 100m of the proposed Expressway. While the size of the existing resident viewing audience is currently very low, it is anticipated that with the adoption of a revised[18] layout for the Ngarara Farm Plan Change development[19], together with more houses being built at Ferndale, this will change. There will potentially be 27 houses established in the Ferndale subdivision within 200m of the proposed Expressway (5 within 100m and 22 between 100m and 200m).

At Ferndale, most of the allotments are located on the dune crests and many will have views of the proposed Expressway. From these allotments there are open views across the recently milled dunes toward the coast, with partial views of the Kāpiti Island skyline possible from some locations. While the development envisaged by the Ngarara Farm Plan Change would potentially affect the outlook from Ferndale, it would be of a different scale and character when compared to the effect of an Expressway. For many of the Ferndale properties, the proposed Expressway will be a major element of the mid-ground view within 200m.

The scale of the cuts through the dunes through this area exacerbate the effects on visual amenity because the number and height of these cuts will require comprehensive re-shaping in order to integrate them with the surrounding landform; in addition, extensive mitigation planting will be necessary and it will be some years before this planting is established and effective in screening views. The aggressive pest plants present will pose challenges to the survival and establishment of native vegetation.

The realignment and elevation of Smithfield Road over the proposed Expressway will exacerbate the effects on visual amenity for the local community, due to the 500m length of the raised embankments and the elevated bridge. The Ngarara Road bridge crosses over the proposed Expressway, which will be cut down to pass under the local road. The crossing is visually concealed by the surrounding dune topography and vegetation. (Figure 57 Cross Section 18, Technical Report Appendices, Report 7, Volume 5)

The extensive mitigation planting proposed along this part of the route, which is a key to maintaining and enhancing the east-west habitat linkages, will also provide effective visual mitigation. In time,

[18] It is anticipated that the Ngarara Farm development layout will be revised to take account of the proposed Expressway Alignment.

[19] Although the Ngarara Farm Plan Change is operative, development is subject to resource consent as a discretionary activity.

this planting will screen the proposed Expressway from adjoining properties at both Ferndale and ideally from a revised layout of the Ngarara Farm development.

In locations where the proposed Expressway will not be contained by landform there will be vistas across farmland towards the coast for road users, travelling in either a northerly or southerly direction.

10.10.6. Landscape character

While farming is the dominant land use in this character area, there is the Ferndale residential subdivision, Nga Manu Reserve, and two rows of pylons carrying the 220kV transmission lines, and areas of woodlots. In addition, there is the development envisaged by the Ngarara Farm Plan Change, comprising residential subdivision, quite high density in places, grouped in hamlets within an overall open space and ecological framework. While the Ngarara Farm development as envisaged by the plan change would transform the area from what it is now, the proposed Expressway is not consistent with the aspirations of the plan change and the effects it will have on landscape character.

In addition to the proposed Expressway, Ngarara and Smithfield Roads will be realigned and will cross over the proposed Expressway on bridges. Ngarara Road will cross the proposed Expressway where the high dunes end. The proposed Expressway, together with the two realigned and elevated local roads, will introduce a piece of large scale infrastructure into what is a quiet, rural environment characterised by natural elements, including extensive high dunes, wetlands and native vegetation.

The dunes will be affected the most by substantial earthworks, with many cuts ranging from 13-17m (Figure 56 Cross Section 17 Appendix 7.A, Technical Report Appendices, Report 7, Volume 5). In addition, inter-dunal areas will be modified and native vegetation removed and this will significantly alter the landscape character. This will be partly offset by the proposed mitigation, especially the extensive planting, new and rehabilitated wetlands, and the Alignment of the shared cycleway/walkway. This will be located on the eastern side of the proposed Expressway, south of Ngarara Road crossing to the west, north of Ngarara Road.

Groups and single mature trees, which are small but important elements that contribute to the rural character, will be retained within the Designation footprint and these will help to integrate the proposed Expressway into the landscape.

Visual Simulation-Ferndale Subdivision- Figure VS14

Views toward the west from this location are dominated by the dunes where a pine plantation has been recently milled. The proposed Expressway will be located behind the dunes in places and cut through the side of other dunes, making it and the cycle/walkway visible from this point. Expressway

traffic on an 80m section of the road will be visible from this viewpoint, which is 220m away. The proposed planting of native vegetation will assist to screen views of the traffic, and in time, this part of the proposed Expressway would be obscured.

10.10.7. Assessment summary

Most of the length of the proposed Expressway through this area cuts through intact dunefields. The combined adverse biophysical effects of the dune modification and the realigned Smithfield Road with ramps and overbridge across the proposed Expressway will be high.

Large stormwater wetland treatment and floodstorage areas are proposed, (replacing grazed pasture with indigenous vegetation), and these will enhance the local biodiversity of the area. The dune landforms obscure views to the proposed Expressway, or at least limit the extent of proposed Expressway visible from any one viewpoint. This will assist with the effectiveness that planting will have to mitigate visual effects. Currently, there is a small resident population but is anticipated to become much larger, with the Ferndale subdivision and Ngarara Plan Change areas yet to be developed. The presence of the proposed Expressway and associated visual effects will have an adverse impact on the landscape character of this quiet, relatively remote rural area.

The background traffic noise from the proposed Expressway will adversely affect the existing rural amenity of the Ferndale subdivision and other nearby residents.

Effect	Magnitude	
Biophysical	High	Alteration to several key features/attributes – severe in relation to dunes, but positive re streams and wetlands and local biodiversity although these would be protected and enhanced as part of implementation of Ngarara Farm Plan Change
Visual Amenity	Moderate	Proposal forms a visible and recognizable new element within the overall scene/readily noticed, currently there is a very small viewing audience potentially 27 dwellings within 200m
Landscape Character	High	Alteration to several key elements or features/ attributes, composition changed

RMA Provision	Existing Environment	Effects of Proposal
s 6(a); Natural character, rivers, streams, coastal environment.	Kakariki Stream and Ngarara Creek and margins. Low ecological values/ low natural character. Kakariki Stream does retain some of its natural meander.	Loss of freshwater habitat in Ngarara Creek culvert, also under Kakariki Stream bridge. Enhancement of riparian margin to approximately 520m section of Kakariki Stream - slight improvement of natural character in local area. Restore approximately 500m length of drain to stream with riparian enhancement ('Smithfield Stream diversion'). slight improvement of natural character in local area.
s 6(b) Outstanding natural feature/landscape	N/A	
s 7(c) Amenity values, (visual amenity)	Existing amenity-rural/open space	Reduced amenity values –large scale of Expressway, traffic movement, increased ambient noise, loss of rural amenity. Effects on visual amenity moderate.
s 7(f) Quality of the environment (Biophysical)	Large intact dunes, areas of regenerating indigenous vegetation	Reduced quality of physical environment, significant modification of large intact dunes, Smithfield Road bridge. Mitigation planting (including large areas of native vegetation replacing pasture, and stormwater wetland planting) will improve local biodiversity.

10.11. Peka Peka south landscape character area

Refer to the following graphics:

Sector 4 plan	Figure 49	Appendix 7.A (Technical Report Appendices, Report 7, Volume 5)
Sector 4 300m ZTV	Figure 50	
Annotated Aerial Oblique Photograph(s)	Figure 52	
Landscape Character Description	Figure 58	
Cross Section(s)	Figures 59,60	
Visual Simulation(s)	Figure VS15	Appendix 7.B (Technical Report Appendices, Report 7, Volume 5)

10.11.1. Landscape character description

Extending from Smithfield Road to just south of Peka Peka, this character area is very homogeneous, comprising open rural land located between high dunes to the west and the foothills of the Tararua Ranges to the east. Low dunes throughout the area, varying in height from 3.0m to 8.0m are interspersed with flat low-lying land. Pastoral farming is the predominant land use with most of the low lying land drained by a series of open drains. There are areas of rural residential development along both Greenhill 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 landscape with low dunes and flat damp land
- Foothills of Tararua Ranges a significant local feature
- Rural character dominated by grazed farmland
- Mature pine and macrocarpa trees
- General amenity of area- rural

10.11.2. Key landscape change resulting from the proposal

- Expressway marginally higher than the existing ground level, embankments 2.0-3.0m high
- Shared cycle/walkway on western side of Expressway
- Partial interchange at Peka Peka Road has an elongated footprint covering approximately 18ha. and extends into this character area at the northern end.

- One roundabout, one bridge over the Expressway with embankments up to 9.0m and new local road
- Construction of large flood storage area

10.11.3. Proposed landscape mitigation

- Riparian planting 10m wide along 200m of Paetawa Drain
- Planting along either side of the Expressway and cycleway / walkway will reflect the current open/gazed pasture character with grazed pasture extending as close as possible to Expressway. Rural scale trees, in groups/as shelterbelts will be included in the grassed areas and can be strategically located to provide visual screening, if required.

Assessment of Effects

10.11.4. Biophysical effects

While the proposed Expressway will cut through the low dunes, much of it will be on a low embankment 2.0-4.0m high. The aim is to re-establish pasture and graze the embankments wherever possible, together with new shelterbelts and also groups of rural amenity tree species in places.

In the low-lying areas, deep deposits of peat will be excavated and replaced with sand and/or granular material to provide a suitable base for road construction. A section of the Paetawa Drain will be realigned and planted with native riparian vegetation as part of the ecological and landscape mitigation to create a more natural waterway.

In addition to construction of stormwater treatment wetlands, provision of flood storage is a key issue in this area. The ground will be lowered to provide sufficient storage capacity and in some of these areas will be planted in local native wetland species with other native species on the higher land adjoining. Other flood storage areas will be re-grassed and will continue to be grazed.

10.11.5. Visual amenity

There is a very small resident viewing audience; only four dwellings are located within 200m of the proposed Expressway, of which two lie within 100m. The Greenhill Road and Kensington Drive dwellings are sited on or near dune crests and will therefore have oblique views across adjacent farmland to the proposed Expressway. The proposed Expressway will also be visible from the properties in Octavius Road on the hill slopes east of SH1.

Generally, all of these rural residential properties have established shelter and amenity planting along boundaries and around dwellings, which will screen views of the proposed Expressway or partly so. Also, the size of these properties provides scope for additional strategically located tree planting to control and manipulate views.

For both north and south bound proposed Expressway users, given the elevation of the road, the views will be long and largely unobstructed over the relatively open landscape, apart from where trees are close to the edge of the Designation. There will be views to the Tararuas to the east and for travellers heading north, the elevated sections of the Peka Peka interchange will be visible.

10.11.6. Landscape character

Pastoral farming is the dominant land use but there is an enclave of rural residential subdivision in Greenhill Road and also in Kensington Drive (off Peka Peka Road) at the northern end of this character area. The dwellings on these properties are sited on dune crests with views primarily towards the north and west. The 220kV transmission lines and pylons traverse through this area and the SH1/NIMT transport corridor also contributes to the landscape character at the northern end.

The character is one of open farmland and despite areas of dunes, the landscape is relatively flat with the shelterbelts and groups of mature trees subdividing and enclosing the landscape. The proposed Expressway, much of it on a low 2.0-3.0m high embankment, will dissect the landscape.

The landscape mitigation treatment is based on maintaining the open rural character with grazing close to the road, and in places, establishment of new lengths of shelterbelts and groups of rural amenity trees to reflect the existing character and provide visual screening from some locations.

The overall composition and character of the landscape will change as a result of the presence of the proposed Expressway. The open and relatively flat nature of the landscape has limited ability to absorb development of the scale of the proposed Expressway. Shelterbelts and amenity planting will assist with mitigation in places but with little intervening elevated land it will potentially be possible to view large segments of the proposed Expressway from nearby, as well as more distant locations. In addition, traffic, both in terms of movement and noise will introduce effects that are not currently present. While this is true for much of this character area, at the northern end, SH1 and the adjacent rail corridor already impact on rural character in this area.

Large shallow flood storage areas are proposed adjacent to the proposed Expressway; once these areas have been excavated to the required levels they will be re-grassed and continue to be grazed where practicable. Consequently, the land will essentially remain the same, albeit much damper in places and perhaps with areas of standing water for much of the year. With the high water table, in time, native and exotic reed and rush species will colonise where suitable environmental conditions prevail and pasture grasses are unable to re-establish.

Visual Simulation- Greenhill Road- Figure VS15

From the end of Greenhill Road, which is about 150m from the proposed Expressway, there is a broad outlook over what is essentially a flat landscape. Shelterbelts and groups of amenity trees

often block views. The proposed Expressway will be visible from here being slightly elevated on embankments.

With the establishment of shelterbelts and other trees in the middle-ground, together with additional trees providing a backdrop and additional mitigation planting in places, the proposed Expressway will be well integrated with the surrounding landscape. Expressway traffic will be visible on a 320m section of the road from this location; this will be a significant feature of the view, and very different from the existing rural outlook.

10.11.7. Assessment summary

The physical change to the topography in this section of the proposed Expressway through this open and relatively flat rural land is minor, with the exception of the local road overbridge which is part of the Peka Peka interchange. The openness of the area means that long sections of the proposed Expressway are potentially visible from a number of viewpoints, particularly the elevated overbridge.

The local resident population is small, but most surrounding dwellings are located on the crests of low dunes, which provide opportunities for more distant and wider views over the low-lying land. Trees associated with many of the dwellings appear to provide some degree of visual screening. Travellers on SH1 will have clear views of the overbridge, albeit in the context of the busy road/rail corridor.

The proposed Expressway and associated visual and aural effects will have a major impact on the existing landscape character of much of the area, which has a quiet and relatively remote rural character. However, in the northern part of the area the rural character is already compromised by the presence of SH1 and rail corridor.

Effect	Magnitude	
Biophysical	Moderate	Alteration to one key feature/attribute –partially obscured
Visual Amenity	Moderate	Proposal forms a visible and recognisable new element within the overall scene/readily noticed
Landscape Character	High	Alteration to several key elements or features/ attributes, composition changed

RMA Provision	Existing Environment	Effects of Proposal
s 6(a); Natural character	Paetawa Drain-Low ecological values/ low natural character.	Loss of freshwater habitat under Paetawa Drain bridge. Enhancement of riparian margin to sector of drain- slight improvement of natural character in localised area.
s 6(b) Outstanding natural feature/landscape	N/A	
s 7(c) Amenity values, (visual amenity)	Existing amenity- working rural landscape	Reduced amenity values –large scale physical infrastructure of Expressway, traffic movement, increased ambient noise, loss of rural amenity. Effects on visual amenity moderate.
s 7(f) Quality of the environment (Biophysical)	Low dunes, cultivated land has modified dunes, drains, isolated patches of vegetation	Reduced quality of physical environment, although minimal earthworks required; mitigation planting aims to integrate with working rural landscape rather than ecological plantings.

10.12. Peka Peka landscape character area

Refer to the following graphics:

Sector 4 plan	Figure 49	Appendix 7.A (Technical Report Appendices, Report 7, Volume 5)
Sector 4 300m ZTV	Figure 50	
Annotated Aerial Oblique Photograph(s)	Figure 53	
Landscape Character Description	Figure 61	
Cross Section(s)	Figures 62, 63	
Visual Simulation(s)	Figure VS 16	Appendix 7.B (Technical Report Appendices, Report 7, Volume 5)

10.12.1. Landscape character description

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

Overall, the character is of a working rural landscape - small rural land holdings and dwellings located on the higher ground and on the foothills and 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 and willow, and these creates a strong vegetation framework. Patches and small scattered groups of remnant native forest occur throughout the area, especially on the foothills east of SH1.

Key Characteristics

- SH1 and NIMT rail corridor
- Mature exotic trees create an enclosed character
- Remnants of native lowland forest
- General amenity of area – rural

10.12.2. Key landscape change resulting from the proposal

- Partial interchange has an elongated footprint covering a total of approximately 18 Ha.
- One roundabout, new local road and Expressway on/off ramp.

- Lighting of Peka Peka Road roundabout and Expressway on/off ramps.

10.12.3. Proposed landscape mitigation

- Massed indigenous tree and shrub planting on exterior of interchange with open grassed area and groups of trees in the internal spaces between roads.

Assessment of effects

10.12.4. Biophysical effects

The SH1/NIMT transport corridor is a key element at the northern end of the Project area. Rural residential holdings are located on both sides of SH1, with an enclave of well established properties on the flat and gently undulating land in and around Peka Peka Road to the west and on Hadfield /Octavius Roads and environs on the hill slopes to the east. Along the upper hill slopes there are extensive tracts of remnant and regenerating native forest on the foothills of the Tararuas.

The land around Peka Peka Road comprises low dunes, inter-dunal hollows with tracts of low-lying, imperfectly drained flat land, which is grazed. Most of the dwellings in Peka Peka Road are sited on dune crests. Landowners have planted shelterbelts along boundaries and groups of amenity trees around houses and elsewhere on their properties. Hadfield Drain/ Kowhai Stream, both take water from the eastern hill slopes and the low-lying flat land.

The proposed Expressway avoids the low dunes and is built on a low embankment with the local road off the present SH1 that provides access to Peka Peka Road crossing over the proposed Expressway. The Peka Peka interchange footprint covers approximately 18ha and its construction will require removal of several shelterbelts and also groups of mature trees. The areas between the proposed Expressway, SH1 and the access road will handle runoff in stormwater treatment ponds, which will be planted, together with mass planting on the embankments.

10.12.5. Visual amenity

While there are few residents within 200m or even 100m of the interchange, the overall scale of the interchange means that for residents moving about on local roads, residents on the eastern hill slopes, and for proposed Expressway users, the level of visibility and the visual effects will be high. SH1 and the NIMT railway line are low-key elements and occupy a relatively small area. With the addition of the proposed Expressway with its elevated ramps and overbridge, the size of the overall infrastructure footprint in this flat landscape will increase and adversely affect the visual amenity of the local area.

For residents above SH1, the rural outlook to the west will change with the interchange forming a major part of their view in the middle ground. However, unlike along other sections of the proposed Expressway, which will be built in greenfield locations, the proposed Expressway and the interchange will be an expansion of the existing transport corridor, albeit a sizable expansion.

Effects of Lighting

Lighting is limited to just the roundabout and interchange on/off ramps. While the current Peka Peka Road intersection is lit the proposed lighting will extend further north along the SH1 corridor. There are no residences nearby that will be directly affected by the additional lighting.

10.12.6. Landscape character

While the overall character of this area is essentially rural, there is a mix of land uses – the road-rail transport corridor, grazed pasture, rural lifestyle subdivision, horticulture on the hill slopes above SH1, and the Harrisons Garden Centre on Peka Peka Road. Although this area is zoned rural, there is pressure for additional rural lifestyle subdivision.

The close proximity to the hills, together with the shelterbelts and stands of mature amenity trees and rural residential subdivision have created a more enclosed landscape compared to the much more open landscape of the Peka Peka South character area. It is a combination of a working rural landscape, with busy and bustling activity on SH1 and retail activity associated with the Garden Centre.

The interchange will affect landscape character, increasing the current 50m wide transport corridor to 200m wide to accommodate the large interchange footprint. This will result in removal of key features and a fundamental increase in overall scale of roading structures and traffic activity

While the extensive planting will help to mitigate some of the landscape effects, it will not be adequate to offset the changes due to the size of the interchange footprint, the elevation of the ramped access road over the proposed Expressway, the extent of built elements and the overall increase in traffic movement in this rural landscape.

Visual Simulation SH1 Peka Peka Figure Vs16

From this location the existing view westward of SH1 comprises open rural farmland with a distant glimpse of Kāpiti Island. From this location the proposed Expressway bridge and ramps will be significant features and will obscure distant views across the farmland. The busy SH1 corridor forms part of the landscape context of this viewpoint.

The proposed planting will assist to integrate the new landform into the landscape and also screen views of the traffic on the ramp. While the rural outlook has been affected the proposed Expressway adds to the existing road/traffic environment, as opposed to introducing new, unfamiliar elements thus making the visual change less significant.

10.12.7. Assessment summary

The elongated Peka Peka interchange footprint occupies the length of this small character area. The proposal will effectively widen the existing SH1/rail corridor from 50m up to 200m wide,

together with an increase in traffic activity. While the change to the landscape character is consistent with that of the existing SH1/rail corridor environment, the new roads, roundabout and increased traffic movement contrasts with the rural/rural lifestyle landscape context.

	Scale	Magnitude
Biophysical Effects	Moderate	Alteration to one key feature/attribute –partially changed
Visual Amenity	High	Proposal is a major element of mid ground view within 200m.
Landscape Character	High	Alteration to several key elements or features/ attributes, composition changed

RMA Provision	Existing Environment	Effects of Proposal
s 6(a); Natural character	Kowhai Stream/Hadfield Drain-channelised- Low ecological values/ low natural character, already culverted under SH1 and NIMT railway.	Additional culverts will reduce natural character, but restoration of riparian margins proposed. Neutral effects in the long term.
s 6(b) Outstanding natural feature/landscape	N/A Nearby coastal escarpment	Proposal does not impact on the values of the ONL any more than the existing SH1/rail corridor does already.
s 7(c) Amenity values, (visual amenity)	Existing amenity- rural, SH1/ NIMT railway line	Reduced amenity values –large scale of Expressway, overbridge and interchange, traffic movement, increased ambient noise. Effects on visual amenity high.
s 7(f) Quality of the environment (Biophysical)	Modified rural landscape	Reduced quality of physical environment, embankments for overbridge in flat topography. Mitigation planting will improve local biodiversity.

10.13. Visual Effects of Noise Mitigation Structures

Noise attenuation structures are concentrated along the more densely populated parts of the route (Raumati, Paraparaumu, Waikanae). There are no noise structures proposed north of Te Moana Road. Three types of noise mitigation structures are proposed;

- Earth bunds of various heights,
- Timber acoustic fences on residential property boundaries up to 2.0m high
- Concrete walls i) low barriers-1.1m high barrier on bridges and in places extending beyond the bridge. ii) Higher barriers on edge of Expressway shoulder (2.0m, 2.5m and 3.0m, some constructed as gabions or with gabion style facing). The concrete walls will, wherever possible, have earth ramped-up and planted along their 'external faces' (i.e. side facing exterior of the Expressway corridor, private property) to integrate them as far as practicable.

The location and extent of these structures are shown on Figures 10, 23, 35, 49 in Appendix 7.A, Technical Report Appendices, Report 7, Volume 5. They are also described in the ULDF report (Technical Report Appendices, Report 5, Volume 5).

The vertical nature of these structures have the potential to obscure or reduce outlooks from locations nearby. The bunds, walls or fences will also screen views to the proposed Expressway, which would be a beneficial effect for most. However, as well as screening views of the proposed Expressway, other more distant views such as the Tararua Ranges or Kāpiti Island may also be obscured totally or in part. A wall or fence in close proximity t a dwelling may also result in a loss of perceived openness because the new structure may increase the sense of enclosure to a property.

Earth bunds will be planted with native vegetation, which will generally approximate the appearance of a planted dune. Bunds have been used in preference to walls or fences, wherever space has allowed.

Timber acoustic fences are proposed for locations on property boundaries, in preference to concrete walls, as these are more in keeping in terms off a 'residential' appearance and scale. The timber fences are proposed to be 2.0m high, which is similar to many typical residential boundary fences.

Generally, the planting proposed as part of landscape mitigation will obscure the concrete noise walls from view, from locations outside the proposed Expressway corridor. The taller concrete walls (2.5 and, 3.0m) are located adjacent to the proposed Expressway away from property boundaries. Therefore, the greatest visual effects of these particular noise walls will occur from within the proposed Expressway corridor.

An assessment of the potential visual effects of noise structures from individual properties or locations beyond the proposed Expressway has not been carried out. The table below indicates the locations from where noise mitigation structures are most likely create effects on views or introduce a sense of enclosure from beyond the proposed Expressway. A noise structure, simply by being visible does not necessarily create an adverse visual effect,. Importantly, in most cases, the noise mitigation structures will assist in screening views of the proposed Expressway.

Character Area	Noise Mitigation Structure	Locations with Potential Visual effects	See Figure #
QE Park	nil		10
Raumati South	Earth bund (2.0m) chainage 3100-3500	Residential properties in Leinster Ave are nearby, planted bund may screen views to Expressway	10 19
Raumati Road	Concrete noise wall (2.0m) east chainage 4100-4400 Concrete noise wall (2.0m) west chainage 4500-4800	Residential properties in Conifer Court close but unlikely to be affected.	23 22
Wharemauku Basin	Earth bund chainage 5700 Timber fences (2.0m) Concrete walls (3.0m & 2.0m) west side Expressway and off-ramp chainage 58300-63000	Two properties in Quadrant Heights may have restricted views to east. Fences on four residential property boundaries; Quadrant Heights, Observation Place Milne Drive. Views from Expressway to east restricted, Very low/negligible effects for Residential properties	23 30
Kāpiti Mazengarb	Concrete wall east side Expressway and off-ramp chainage 6380-6580 Earth bunds to infill low points in existing dunes on east side, to create continuous bund,chainage 6850-7900	Residential properties west end Greenwood Place and Makarini Street reserve unlikely to be affected, planting will screen walls and traffic. Residential properties north end/side of Elder Grove, Cypress Grove, Spackman Cresent, Makarini Street, Palmer Court, St James Court, Chilton Drive, new bunds and planting may restrict views to Expressway and further west where low points in dunes currently exist. Residential properties west end of	23 32 34

	Concrete wall (2.0m) east side on top of bund chainage 7700-7900, and chainage 7800-7920 adjacent to Expressway. Earth bund on west side chainage 7150-7680 Concrete noise wall on west side adjacent to Expressway chainage 7150-7680	St James Court & Chilton Drive may have restricted views to west. Very low/negligible effects for Metlife residences Very low/negligible effects for Metlife residences not affected.	
Otaihanga South	Concrete noise wall west (2.0m) chainage 7950-8420, Concrete wall on west (1.1m) chainage 8900-9180. Concrete noise wall on east (2.0m) chainage 7950-8080	Very low/negligible effects for rural lifestyle properties Very low/negligible effects for rural lifestyle properties	35
Otaihanga North	Concrete wall on west (1.1m) chainage 9200-9420	Very low/negligible effects for Rural residential properties	35
Waikanae River	Concrete noise wall (1.1m) on west-El Rancho chainage 10750-11000	Very low/negligible effects	35 45
Te Moana	Concrete noise wall (1.1m) on west-El Rancho chainage 10750-11000 Earth bund on east chainage 11100-11320	Very low/negligible effects Residences at west end of Puriri Street may have restricted views to the west.	35 45 47
Ngarara	nil		49
Peka Peka South	nil		49
Peka Peka	nil		49

10.14. Temporary Effects

For the purposes of this assessment, temporary effects are regarded as those effects created by the construction process; over and above the effects of the earthworks and changes to the landform and vegetation already considered in this report.

During construction of the proposed Expressway there will be temporary landscape and visual effects. However, given that construction of the proposed Expressway will not start at one end and progress to the other, many of these temporary effects will occur at different times along different parts of the route during the overall construction period. The activities involved in construction of the proposed Expressway in relation to potential landscape and visual effects fall into four broad categories:

- Earthworks
- Structures
- Temporary fencing
- Temporary buildings and yards.

While earthworks will occur along the entire route, structures such as erection of bridges and retaining walls, and the location of temporary buildings and yards will occur at specific locations. Consequently, the potential landscape and visual effects of these will be limited and a lot more area/site specific. The nature of the potential landscape and visual effects in each of these is described below.

10.14.1. Earthworks

The extent of earthworks will be confined to the area within the construction Designation boundary. (shown on Figures 10, 23, 35, 49, Technical Report Appendices, Report 7, Volume 5). Final heights of the proposed Expressway carriageway and the associated structures and bunds are shown on the various civil engineering plans and drawings and are also illustrated also on the visual simulations. However, given that the proposed Expressway passes through large areas of peatland at various places along the route requires specific ground improvement measures to be undertaken.

Pre Loading

Pre-loading of the actual carriageway is a key ground improvement measure; this involves building up the earthworks in the peat areas with fill material to levels higher than the final road levels in order to surcharge the peat and compact it to provide a firm base for road construction. The preload material is removed once the road surface has settled to its final level.

The heights of the pre-loading will vary from 2.0m to 3.9m above the finished road level. The finished road level compared to the existing ground level varies along the route. In places it may be

at a similar height to the existing ground level but at interchange areas it would be up to 7.0m above existing ground. The pre-loading will need to remain in place for 6-24 months depending on the location. For short-term pre-load areas (ie less than 6 months), a top layer of clean granular material, sub base course or mulch (straw, hay or wood) will be applied over sand to minimise wind disturbance of the surface and to minimise dust. For the pre-load areas that will remain in place longer than 6 months, a layer of topsoil will be applied and then grassed.

Surcharging the peat by pre-loading will mean that from some properties, especially those in immediate proximity to the proposed Expressway, the earthworks may be more visible for the duration of the pre-loading period but this will change when construction has been completed. The greatest effects will occur where the over height of the earthworks are greatest; that is where thickest pre-load depths occur on elevated parts of the proposed Expressway, (such as interchange ramps. Figure 64 (Technical Report Appendices, Report 7, Volume 5) shows the areas where pre-loading will occur and the approximate depths of the pre-load material relative to the final level of the proposed Expressway.

The specific details of the pre-loading are described in the Assessment of Ground Settlement Effects report (Technical Report 35, Volume 3).

Assessments of the visual effects of pre-loading from individual properties has not been carried out. However, the locations that potentially would be the most affected are those places immediately adjacent to the proposed works, which is where the pre-load depths are greatest. The pre-loaded areas generally occur in predominantly rural or low population areas, Poplar Avenue, Raumati South, Wharemaku Basin, Otaihanga and Peka Peka, which are well away from residential areas. The residential areas immediately adjacent to the proposed preloading sections of the proposed Expressway, and potentially the most affected are;

- Eastern end of Leinster Avenue,
- Conifer Court - Raumati Road/Rata Road area
- Observation Place and Milne Drive in the Midlands subdivision

In other parts of the route where it traverses particularly deep areas of peat, the peat will be excavated and replaced with imported fill material in order to provide a suitable base for road construction. This peat will be excavated and stockpiled along either side of the route to enable it to dry out sufficiently. Some of the peat will be mixed with other material and used as growing medium for the extensive planting that will be done as an integral part of the Project.

Once again, the temporary stockpiling of the peat along the edges will mean that for a period during the construction, the height of the earthworks will be greater than the final earthworks levels.

Once the earthworks have been finally shaped they will be bare until planted/hydroseeded. Progressively, upon completion, the earthworks will be hydroseeded to minimise soil erosion and

scouring; in places artificial materials such coconut or brush may be required to replace or to complement the hydroseeding.

Tree and shrub planting of the earthworks will be carried out in optimal environmental conditions to maximise plant survival and establishment. The hydroseeded areas will be spot or blanket sprayed prior to planting and all planted areas will be mulched.

Exposed, recently earthworked areas will be visible but this will change as the hydroseeded grasses germinate and become established. The visibility of earthworks will change once the final planting is completed and as the plants grow the landscape and visual effects will progressively lessen.

10.14.2. Structures

There will be a lot of activity around the places where the bridges and retaining walls and other structures are being built, especially so at the interchanges. Given that many of the bridge and other structural components will be precast off site and transported to the various sites it will reduce the amount of time and activity at the actual locations where these structures are being built. This will have positive outcomes in terms of construction times and it will also ensure better quality finishes of concrete components such as beams and columns. The precast elements will need to lifted into position and consequently large cranes will be located at these constructions sites.

Contractors working on construction bridges will need to use floodlights, either portable or temporary but these will be mounted so that they do not cause glare towards any residential properties or towards roads and also ensuring the correct selection of the type of luminaire.

All of the activities within the construction Designation will be fenced and the defined areas where bridges, retaining walls and other structures are being built will be within the 11 construction yards proposed along the route.

10.14.3. Temporary fencing

At the outset of the construction the area where earthworks and other construction activities will occur will be securely fenced. This will secure the construction site in terms of health and safety perspective and will also ensure that areas of vegetation within the construction Designation but outside of the fenced area, which have been identified to be retained as part of landscape mitigation, are not inadvertently damaged or disturbed.

The fencing will be 5-wire stockproof farm fencing for much of the route. However, in the areas where there is public access 2.0m high mesh fencing will be erected.

For the most part the temporary fencing will be familiar to most people, especially in the rural and rural lifestyle character areas. The nine sites selected for the establishment of the construction

yards are relatively discrete and separated from residential properties. While the 2.0m high mesh fencing around the yards will be visible from public roads and residential areas, it is unlikely to be intrusive or result in any adverse landscape or visual effects.

10.14.4. Temporary buildings and yards

Due to the lineal nature of the proposed Expressway, 11 areas along the route will be established to accommodate and service the works at various stages during the construction programme. The extent of these will vary according to their purpose – Project Yard, Bridge Yard or Intersection Yard. All yards will be fully fenced and made secure. Site establishment will include site clearance, ground preparation, and establishment of erosion control measures prior to any construction activities occurring. Upon completion of the works, the construction yards will be disestablished and the areas reinstated.

The Expressway Project Office and Yard will be established at the Otaihanga landfill and waste transfer site on Otaihanga Road, which is about at the mid point of the proposed Expressway route and within 1km of SH1. It will be the central hub for all construction work and comprise relocatable buildings housing administration offices, equipment, materials and plant storage. There will also be an adjoining prefabrication yard for pre-casting the concrete bridge units and preparation of stormwater drainage and sediment control. Part of the yard area will be used as a disposal site for excess peat excavated along the route.

The Project Office and Yard will cover 20,000m2 and comprise one Project office building and one workshop covering approximately 10,500m2 and the pre-cast yard approximately 12,000m2. The site was selected because of its location, good access off Otaihanga Road and that it is well segregated from adjoining residential and other areas. The site will be fenced with 2.0m high mesh and it will be lit at night to provide security.

At each bridge construction and intersection sites, a small construction yard will be established for material and plant storage together with facilities for staff. Bridge Yards will be located at Raumati Road, Wharemauku Stream, Mazengarb Road, Waikanae River, Ngarara Road and Smithfield Road. Intersection Yards will be established at Poplar Avenue, Kāpiti Road, Te Moana Road and Peka Peka Road. Each yard will be fenced with a 2.0m high mesh security fence. Intersection Yards will be lit at night but not Bridge Yards. However, during night time bridge construction operations Bridge Yards will be lit.

Construction yard lighting has not yet been designed. All design and installation of construction yard would be carried out using best practice to minimise adverse or stray lighting effects. In addition, the lighting of construction yards will need to be fully compliant with the relevant lighting standards of the Kāpiti Coast District Plan and relevant clauses of the Australian Standard (AS 4282)

A 10.0m buffer zone between any equipment requiring light and a residential boundary and lighting layout and design for the construction yards will be reviewed and approved by an accredited illumination engineer to ensure avoid adverse environmental effects from lighting prior to it being installed. Details on temporary and construction lighting are addressed in the Assessment of Lighting Effects report (Technical Report 8, Volume 3).

Temporary road access will be formed from the end of Ihakara Street to the Wharemauku Bridge site.

One advantage of the greenfield lineal nature of the proposed Expressway is that during construction the proposed Expressway corridor will provide the haul route for delivery of materials and construction thus minimising both the volume of traffic on local roads and the area of disturbance within the Designation. Each section of the route will be constructed consecutively and progressively away from the Otaihanga Project Office and Yard.

The sites for the temporary buildings and yards have been carefully considered in terms of efficiency during construction and also in terms of adjoining land uses, especially residential areas and local roads. All will be located within the construction Designation with layouts and access to avoid adverse effects on residents and local road users and in places appropriate measures will be adopted to mitigate potential landscape and visual effects.

10.14.5. Summary

The construction effects are relatively short term in relation to the life of the Project and regarded here as temporary effects, albeit a 3-4 year construction programme. The visual effects of earthworks are the most significant temporary effects.

The construction process will have landscape and visual effects for nearby residents and others in the vicinity of the proposed Expressway corridor. In particular, the removal of vegetation and earthworks will be the most significant, and will affect the visual amenity of the locality. During and post construction the bare earth or hydroseeded surfaces, especially on the elevated embankments, will be most visible and from some locations visually prominent. Until the proposed planting is established the visible earthworks will have a ‘bare’ or ‘new’ appearance, contrasting strongly with the established view which it has replaced.

In locations where preloading is required un-vegetated earthworks, 2.0-3.9m higher than the finished road height may be visible for periods of 6-24 months. Consequently, the visual effects of preloading earthworks are likely to be greater than the final effects of the established proposed Expressway, as the finished Expressway road level will be lower and the embankments planted. Given most of the preloading sections are located in areas of low population the number of residents affected will be small.

11.Summary of Assessment of Effects

Summary of effects by Character Area

Character Area	Biophysical	Visual Amenity	Landscape Character
QE Park	low	low	low
Raumati South	moderate	high	high
Raumati Road	high	high	high
Wharemauku Basin	high	very high	high*
			very high**
Kāpiti Mazengarb	high	high	high
Otaihanga South	very high	low	high
Otaihanga North	high	moderate	high
Waikanae River	moderate	extreme***	very high
		very high****	
Te Moana	high	very high	very high
Ngarara	high	moderate	high
Peka Peka South	moderate	moderate	high
Peka Peka North	moderate	high	high

* Considered in the context of a future built environment with the development of the town centre the effects on landscape character would be high.

** Considered in relation the existing open space environment the effects on landscape character would be very high.

*** In close proximity to the bridge

**** At greater distances where the bridge is visible

Magnitude of Effects – Seven Point Scale

Extreme	1
Very High	2
High	3
Moderate	4
Low	5
Very low	6
Negligible	7

11.1. Biophysical effects

The proposed Expressway route traverses 16 km of an undulating dune and peatland landscape. The scale of the proposed Expressway footprint and required geometric design parameters mean that substantial changes to the landforms, vegetation and waterbodies is unavoidable in places. The Alignment and design has, wherever possible, avoided areas of intact dunes, indigenous vegetation and several wetland areas. In particular, the Alignment of the proposed Expressway through the Raumati South character area, which has deviated from the existing WLR designation, has avoided a series of large intact dunes with stands of semi-mature manuka, as well as a natural wetland.

Physical change to the dune landforms, floodplain areas and wetlands cause the greatest adverse biophysical effects, as these are permanent changes to natural landforms which reduce the integrity of the natural components of the landscape. Due to the large scale of the physical changes proposed, little effective mitigation is possible, beyond integrating the earthworks into the natural landforms as far as is practicable.

In places, intact dunes within the proposed Expressway footprint will be totally removed and in other places they will be modified by cuts or the addition of fill to form bunds. Much of the dunes within the existing WLR designation remain today only because of the de facto 'protection' that the designation has provided over the previous decades. This is particularly evident between Kāpiti and Mazengarb Road, where land beyond the existing WLR designation has been flattened to facilitate residential and industrial development.

The construction of elevated ramps at interchanges and bridges also requires significant change to the existing landforms particularly where ramps are required in flat or low lying areas such as the Poplar Avenue, Wharemauku Basin, Te Moana Road, Smithfield Road and the Peka Peka interchange overbridge. Conversely, in places the existing elevation of the dunes are utilised to

ramp the proposed Expressway or local road over the intersecting road, such as at the Raumati, Mazengarb, Otaihanga, Ngarara Road crossings. While in these cases the dunes may largely remain intact, the integrity of their natural form would still be significantly modified.

Loss and fragmentation of indigenous vegetation and habitats, while undesirable, can to some extent be mitigated, through replanting, rehabilitation and offset mitigation measures (eg riparian planting, wetland planting, and use of locally eco-sourced indigenous vegetation throughout the corridor).

The proposed Expressway Alignment has avoided all but four wetland areas, three of which lie within the Otaihanga South character area and will be fragmented and reduced in size. An area of new wetland proposed in the same character area will go some way to offset this loss. The large crescent-shaped dune with advanced regenerating indigenous vegetation near Puriri Street, north of the Takamore urupa, will be substantially altered by large cuts and the loss of an area of advanced secondary native vegetation. However, this Alignment avoids the need to remove more dwellings in the Te Moana character area.

The proposed riparian mitigation planting on the sections of streams affected by the proposed Expressway will in time improve the indigenous biodiversity and habitat of those parts of the streams.

The scale of the footprint and earthworks required to construct 16km of Expressway is necessarily large and adverse biophysical effects are unavoidable (even with mitigation). The magnitude of the biophysical effects range from low to very high with the majority of character areas rated as moderate or high.

11.2. Visual amenity

The magnitude of visual effects is dependent on several factors, including the size of the viewing audience, the sensitivity of that audience, and the degree of the visual change. Obviously, visual effects are specific to a particular viewpoint from where the proposed Expressway is viewed. Consequently, within any given character area, the effects on visual amenity may range across the whole seven point spectrum (from extreme to low) depending on the location of the viewpoint. This assessment has assigned a magnitude of the visual amenity effects to each character area which reflects the prevalent effect across the character area, but recognises there will be locations where the effects are likely to be greater or less.

The proposed Expressway will be an unavoidably visible component in the landscape. Its large scale with elevated structures make it difficult to screen from view. The dynamic aspect of traffic movement visible on the proposed Expressway accentuates the visual impact. However, for large sections of the proposed Expressway the proposed earth bunds, noise walls and planting will screen views of the moving traffic.

From many locations, the proposed Expressway will appear as elevated embankments, many of which will be planted with indigenous vegetation. Over-bridges and interchanges will be highly visible, especially to large number of travellers on local roads.

The effects on visual amenity are rated as very high in three character areas and high in four. The greatest visual effects where the proposed footprint is large and where there are large structural and elevated components (ramps bridges, embankments and noise walls). The magnitude of these effects increase where they are visible to both resident and transient viewing audiences, and when the visual change detracts from existing views and outlooks.

The effects on the visual amenity of the Waikanae River corridor will be very high. The River corridor's high natural and recreational values and its status as an Outstanding Natural Landscape (ONL) make this area sensitive to change. That is, the presence of a large bridge across the river corridor will be a dominant feature that detracts from the otherwise 'natural' and 'wild' amenity enjoyed by the community. While the visual effects would be severe from close proximities of the bridge (i.e. within about 200m), they diminish with distance. Also, it is only part of the river corridor ONL area that would be affected.

Similarly, the bridge and embankments crossing Wharemauku Stream introduce large elevated structures into a relatively flat and undeveloped landscape, reducing the openness of the area and restricting views to Kāpiti Island from some locations. At Kāpiti Road and Te Moana Road interchanges there are large elevated structures crossing busy local roads and in residential areas which impact on the visual amenity of large viewing audiences.

In places, the changes the proposed Expressway will produce in relation to altered landforms or mitigation planting will not necessarily adversely affect visual amenity but will simply be different (e.g. along Makarini Street). For a large section of the proposed Expressway between Kāpiti and Mazengarb Roads, the residents on the east currently have views of the remnant dunes in the existing WLR designation. Some of these dunes will be reduced in height and in places earth bunds will be constructed so traffic on the proposed Expressway will not be visible. Planting proposed on these new landforms will, in time, replace the scrub with a treed backdrop.

At some locations, the effects on visual amenity for residents immediately adjacent to the proposed Expressway will be severe, particularly for residents who lose views of open space and traffic becomes a prominent element of their foreground view (e.g Chilton Drive). However, it appears that there will not be a large number of residents affected in this way, although assessments have not been carried out from individual private properties.

11.3. Landscape character

The landscape character varies along the proposed 16km route; there are areas with distinct rural, rural lifestyle, residential, urban, industrial, and highway characters. As a large piece of

infrastructure, the proposed Expressway will introduce a new type of activity and character through these areas.

The linear nature of the proposed Expressway will bisect the landscape, interrupting the natural topography and waterbodies as well as man-made patterns such as settlements, plantations, shelterbelts, roads and accessways.

The degree of change to the existing landscape relates to the scale of the proposed Expressway footprint and the size of the various structures. The change to landscape character will generally be the greatest in the immediate vicinity of the footprint; however, with increasing distance from the proposed Expressway these effects will mostly diminish

The least effect on the existing landscape character occurs where the proposed Expressway is close to the existing SH1/NIMT rail corridor, which is already is a busy transport environment. While the proposed Expressway will contribute to this character in these areas, in other places it will be an unfamiliar element, despite that much of the route lies in a corridor that has long been identified for a major road.

For most of the route, the changes to landscape character are rated high. Three character areas the changes will be very high – Wharemauku Basin, Waikanae River and Te Moana. In these locations, the scale of the proposed Expressway structures and the activity the proposed Expressway will introduce will significantly change the existing landscape character.

11.4. Summary against the RMA provisions

11.4.1. Section 6(a) Natural Character of the Coastal Environment, rivers, wetlands and their margins

The proposed Expressway corridor is not considered to lie within the Coastal Environment (as defined in Policy 1 of the New Zealand Coastal policy Statement (NZCPS)[20].

The proposed Expressway crosses approximately 11 streams, most of which currently have low level of natural character, (due to being channelised, with poor riparian vegetation and low in-stream ecological value). However, the Waikanae River has a high level of natural character.

The imposition of the large scale of the proposed Expressway where it crosses these streams will have an adverse effect on the natural character in terms of perceived naturalness. It will also affect the natural character in an ecological sense because of the loss of habitat in the long culverts. However, the proposed riparian restoration/enhancement of sections of the streams will improve the ecological value and natural character of these particular stream sections).

[20] Professional opinion of report authors (see section 9.4)

Small parts of some of the larger wetlands will be lost, which will adversely affect their natural character. In addition, three small and high valuebut modified wetlands in the Otaihanga character area, will be either lost or seriously compromised by construction of the proposed Expressway, This will in turn have serious or very high adverse effects on their respective natural characters. However, the new off-set wetland proposed in this character area, once established, will go some way to compensate for the decreased natural character of the existing wetlands. The loss of natural character in the immediate vicinity of the proposed Waikanae River bridge would be very high with the realigned Muaupoko Stream and the main river channel confined by riprap and with the bridge overhead. However, in the context of the river over its entire length, the effect on natural character would be low.

11.4.2. Section 6(b) outstanding landscapes

Short sections of the proposed Expressway are in close proximity to the former coastal escarpment, and also the Outstanding Natural Landscapes (ONLs) at Raumati and Peka Peka, and where the proposed Expressway crosses the Waikanae River ONL.

The proposed Expressway would not have any effects on the two escarpment ONLs. However in relation to the Waikanae River ONL the effects of the proposed Expressway bridge crossing would be moderate when considered in terms of the ONL overall but in the immediate vicinity of the river crossing, the effects on the natural and landscape values would be severe.

(KCD are currently undertaking a review of the existing ONLs, and have a draft report prepared by Isthmus)

11.4.3. Section 7(c) amenity values

This assessment has focused on the landscape and visual components of amenity.

Overall, the proposed Expressway will have very high adverse effects on the amenity in relation to its immediate surroundings. The large scale and physical nature of the proposed Expressway and also traffic movement, will unavoidably affect the amenity and open space values of the rural, and residential communities through which it passes. The effects on amenity will however, be reduced at greater distances from the proposed Expressway.

11.4.4. Section 7(f) quality of the environment

The physical changes to the dunes and other landforms, features and waterbodies will adversely affect the quality of the environment along the proposed Expressway route. However, the large areas of the proposed Expressway corridor to be planted with predominantly locally eco-sourced indigenous vegetation will improve the biodiversity of the environments along the route.

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Attachment 7.1- Statutory Planning Context

Resource Management Act 1991

Part II of the Resource Management Act 1991 (RMA) sets out the purpose and principle of the Act and in relation to character and visual AEE, the following principles are relevant and set out below:

Section 6: Matters of national importance

> *In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for the following matters of national importance:*
>
> > *(a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:*
> >
> > *(b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development*

Section 7: Other Matters

> *In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall have particular regard to—*
>
> > (c) the maintenance and enhancement of amenity values
> >
> > (f) maintenance and enhancement of the quality of the environment

New Zealand Coastal Policy Statement 2010 (NZCPS)

The proposed Expressway corridor is not considered[21] to lie within the coastal environment (as defined in Policy 1 of the NZCPS). Coastal processes, influences and qualities are not significant in any other part of the proposed Expressway corridor. Where the proposed Expressway crosses the Waikanae River, 2.0 km from the coast, there may be minor coastal influence in the river (due to tidal movement downstream, and migration of some fish species) but the water there is not saline and the area has no perceptible coastal characteristics.

Greater Wellington Regional Council

[21] Professional judgement of the authors. It is understood that KCDC have commissioned an assessment of the natural character of the coastal environment

Greater Wellington Regional Council has a series of statutory RMA documents. The Operative Regional Policy Statement (RPS), 1995, sets the scene by identifying the region's significant resource management issues and providing a regional policy direction to manage natural and physical resources in accordance with the purpose and principles of the RMA. GWRC's second generation RPS has since been prepared (2009) and has made significant progress through the Schedule 1 process of the RMA. The Council decisions on the proposed RPS were released (May 2010) and therefore significant weight can be given to this document.

The GWRC regional plans provide further policy direction and methods (regulation and others) to managing air, soil, water, the coastal marine area, discharges to land or water, and activities on, over and within the beds of rivers and lakes. Of the regional plans, the Freshwater and Soil plans are considered to be relevant to the landscape and visual assessment.

The Operative Regional Policy Statement (1995)

Chapter 10 Landscape and Heritage

The RPS devotes a Chapter to landscape matters, responding to section 6 (b) of the RMA, where Councils shall recognise and provide for the following matters of national importance: (b) *the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:*

This RMA principle is translated into the objectives and policies of the RPS, whereby Objective 1 and 2 state:

- *Objective 1 Nationally and regionally outstanding geological features, landforms, soil sites and other natural features of the Region are protected from inappropriate subdivision, use and development.*
- *Objective 2 Adverse effects of human activities on the Region's natural and physical resources are avoided, remedied or mitigated so that the quality of any regionally outstanding landscapes which those resources contribute to is maintained.*

Policies 1 – 3 give effect to Objectives 1 and 2 by directing the use, development and protection in relation to outstanding natural features and landscapes:

- *Policy 1: To manage the use, development and protection of natural and physical resources in ways which recognise and respect their contribution as elements of regionally outstanding landscapes.*
- *Policy 2 To avoid, remedy, or mitigate the adverse effects of subdivision, use, and development on regionally outstanding landscapes, and nationally and regionally outstanding landforms, geological features, soil sites, and other natural features.*

- *Policy 3 To manage the use, development and protection of outstanding landscapes of significance to the tangata whenua.*

Policy 4 and 8 promote the protection, maintenance and enhancement of broader values (amenity and recreation) which are associated with outstanding landscapes.

Policy 4 To promote the maintenance and enhancement of the amenity and intrinsic values of regionally outstanding landscapes, and of nationally and regionally outstanding landforms, geological features, soil sites, and other natural features.

Policy 8 To promote, on behalf of future generations, the protection of the potential for recreation of open space, indigenous and exotic vegetation, water bodies, the coast, and regionally outstanding landscapes, and any other regionally or nationally outstanding natural features.

Other Chapters

Objective 3 in Chapter 5: Freshwater states:

- *Freshwater resources of significance or of high value for cultural, spiritual, scenic, ecosystem, natural, recreational, or other amenity reasons are protected or enhanced.*

There is a hierarchical approach to managing landscape, visual and amenity values of freshwater environments. Policies 10 and 11 signal that while waterbodies with regionally significant landscape values are important and the water resource must be protected, all other water bodies have values or intrinsic qualities that require some protection, but these values may not be as significant as those listed in Policy 10 and so may not deserve the same level of protection.

The proposed Expressway route does not include any of the regionally significant waterbodies[22] as identified in Policy 10. Therefore Policy 11 applies and avoiding, remedying, or mitigating effects (depending on their severity) will be the most appropriate management response to ensure this.

Policy 12 states:

- *To avoid, remedy, or mitigate any adverse effects of any new or existing use and development where these effects impact on the natural character of wetlands, lakes, rivers, and other water bodies, and their margins.*

This policy gives effect to the requirements of section 6(a) of the RMA, to recognise and provide for the preservation of the natural character of water bodies and their margins, and is relevant to the

[22] The Regional Plan for Freshwater does list the Waikanae River as a regionally significant river for recreational values (refer to Section XX).

proposed Expressway because of the wetlands and streams present within and along the Designation.

Proposed Regional Policy Statement (2009)

Outstanding Natural Features and Landscapes and Significant Amenity Landscapes

The proposed RPS creates a two tiered framework to manage landscape values. This framework is to be adopted by both regional plans and district plans for implementation. The first tier of the framework is the identification of 'outstanding natural features and landscapes' and the protection of these identified areas from inappropriate subdivision, use and development.

The second tier of landscape is the identification of 'significant amenity landscapes' and the management of these areas. This framework is set out in Objectives 17 and 17a, and Policies 24, 25, 26 and 27 and implemented through regional plans and district plans.

This is relevant background for the proposed Expressway landscape and visual assessment, particularly given the relationship with the outstanding landscapes identified in the KCDP.

Significant Values of Rivers and Lakes

The proposed RPS provides a framework to support a range of values associated with waterbodies (Objective 13). Policy 17 seeks to protect significant values of rivers and lakes by directing regional plans and district plans to (a) Maintain or enhance the significant amenity and recreational values of associated with the rivers and lakes, including those values listed in Table 15 of Appendix 1.

Of relevance to the proposed Expressway is the Waikanae River, which is identified in Appendix 1 for having significant recreational values and therefore a consideration for the landscape, visual and open space values assessment.

Assessment Policies

The proposed RPS nominates policies that are of particular relevance in the consideration for resource consents, notices of requirements and plan changes/variations. Both Policy 49 and 52 are relevant for the assessment of the landscape, visual and open space values of the proposed Expressway Project.

Policy 49: Managing effects on outstanding natural features and landscapes, and significant amenity landscapes is relevant and seeks a determination as to whether:

- an activity may affect an outstanding natural feature and/or landscape, or significant amenity landscape; and/or
- an activity is inappropriate, having particular regard to the following:

(a) the degree to which the natural feature or landscape values will be modified, damaged or destroyed including:

(i) the duration and frequency of any effect, and/or

(ii) the magnitude or scale of any effect;

(b) the irreversibility of adverse effects on landscape values;

(c) the resilience of the natural feature, place or area to change;

(d) the opportunities to remedy or mitigate previous damage to natural feature or landscape values; and

(e) whether the activity will lead to cumulative adverse effects on the natural feature or landscape values.

Policy 52: Public access to and along the coastal marine area, lakes and rivers - consideration

Particular regard shall be given to enhancing public access to, and along:

(a) areas of the coastal marine area, and lakes and rivers with:

...(iii) outstanding natural features and landscapes identified in accordance with policy 24;

(iv) significant amenity landscapes identified in accordance with policy 26; and

…(vi) the rivers and lakes identified in table 15 of Appendix 1;

These 'assessment policies' are particularly relevant to the proposed Expressway Landscape and Visual Assessment because of the outstanding landscapes identified in the KCDC district plan, and because the Waikanae River is identified in Table 15 referred to in Policy 52.

Regional Freshwater Plan

The GWRC Regional Freshwater Plan (the Freshwater Plan) gives effect to the resource management framework for freshwater values and their management set out in the RPSs. The Freshwater Plan has objectives and policies on the use of water (both quality and quantity) in streams, rivers and wetlands, and activities occurring in, on, over or under the beds of rivers and streams. Activities associated with the proposed Expressway Alignment include river crossings and structures in the bed of rivers and streams (bridges, erosion control structures and culverts), diversion and realignment of waterways and wetlands, and the discharge of sediment. There are limited policies that are directly relevant to landscape and visual assessment matters. For the majority, the objectives and policies relate to hydrological and ecological matters and assessment. The relevance to landscape and visual matters is made through objectives and policies that provide direction on the values associated with waterbodies, ie natural character, visual and recreational values. In relation to activities, structures and change to the beds of rivers and streams, the Freshwater Plan has directly relevant policy guidance in terms of landscape and visual amenity.

Natural Character

Objective 4.1.4 states:

- *The natural character of wetlands, and lakes and rivers and their margins, is preserved and protected from inappropriate subdivision, use and development.*

Policies 4.2.9 list characteristics to consider when assessing the impact on natural character of wetlands and rivers from development and include:

- *ecosystems, habitats and species; and*
- *water quality; and*
- *the natural flow characteristics and hydraulic processes (such as sediment transport) of rivers or the pattern and range of water level fluctuations that occur naturally in wetlands or lakes; and*
- *the topography and physical composition of river or lake beds and the course of the river.*

Policy 4.2.10 elevates the protection of the natural character for wetlands listed in Appendix 2 of the Plan. The list includes the Te Harakeke Swamp, and the policy seeks to avoid adverse effects on ecological process, which in turn impacts natural character.

These objective and policies are relevant to the Landscape and Visual Assessment because the proposed Expressway Project area traverses the Waikanae River, and streams, drains, and wetlands of varying ecological and landscape value. The Te Harakeke Swamp is not within the Project or Construction Footprint, but is within the wider context.

Amenity and Recreational Values

The following Freshwater objectives require outcomes that value the amenity and recreational aspects of waterbodies.

- *Objective 4.1.7: The amenity and recreational values of wetlands, lakes, and rivers are maintained and, where appropriate, enhanced.*
- *Objective 4.1.8: The quality of lawful public access to and along river and lake beds is maintained and, where appropriate, enhanced.*

The Waikanae River (State Highway 1 at R26 838 340 to the river mouth) is recognised as having regionally important recreational values for swimming and angling, and is listed in Appendix 5 of the Freshwater Plan. These amenity and recreational values are noted insofar as they are relevant for the landscape and visual effects analysis. The following policy (4.2.15) is not considered relevant to landscape and visual matters, as it focused on ecological and hydrological matters.

Whereas Policy 4.2.27 seeks *to encourage the restoration or rehabilitation of freshwater resources in the Region, including the establishment of wetlands, where appropriate*. This policy is directly relevant because of the areas of restoration and other mitigation measures part of the proposed Expressway Project.

Use of the Beds of Rivers and Lakes

Chapter 7 provides the framework for appropriate and inappropriate uses and structures in, on and over the beds of rivers and lakes. This Chapter also provides a development framework for appropriate land use development in floodplains, but recognises that district councils implement these floodplain/land use policies through district planning mechanisms.

Structures

This Chapter is relevant to the landscape assessment for the proposed Expressway because of the relationship of the Alignment and a new bridge over the Waikanae River, and any structures proposed on, over or in wetlands. In terms of landscape, character and visual issues contained in the policy framework, the following are considered to be relevant:

7.2.1 To allow the following uses within river and lake beds....

- the enhancement of the natural character of any wetland, lake or river and its margins;

7.2.2 To not allow the use of river and lake beds for structures or activities that have significant adverse effects on...

- natural or amenity values;

7.2.10 To ensure that all structures in or on the beds of rivers and lakes which are visible are adequately maintained so that:

- the structure is safe; and
- any adverse effects on the visual amenity of the area are minimised.

Planting

This Chapter also provides direction on planting in Policy 7.2.14 (below) and is therefore applicable to restoration and mitigation measures proposed as part of the proposed Expressway Project.

7.2.14 To ensure that the deliberate introduction of plants to a river or lake bed for flood mitigation, erosion protection, habitat restoration, or for mitigating non-point source discharges of contaminants, will not result in the displacement of desirable species which are already present.

The Plan defines 'desirable species' to include:

- *any native or introduced non-invasive plant species which is providing flood or erosion control;*
- *any species traditionally used as food or for other purposes by the tangata whenua;*
- *any native or introduced plant or animal species which contribute to the natural character of the river or lake; and*
- *excludes any weeds or pests listed in a Regional Pest Management Strategy.*

Regional Soil Plan

The GWRC has a statutory responsibility under the RMA to control of the use of land for the purpose of soil conservation, the avoidance or mitigation of natural hazards (which include erosion, land-slips, subsidence, and sedimentation), and the maintenance and enhancement of the quality of water in water bodies and coastal waters. To that end, the Regional Soil Plan addresses the sustainable management of soil, vegetation disturbance activities, soil disturbance activities, and how any potential adverse effect may be avoided, remedied or mitigated.

Soil and vegetation disturbance

The management of these activities are relevant to the landscape and visual assessment for the proposed Expressway because the management of earthworks during the construction phase and the design and implementation of newly planted areas as part of landscape mitigation are important considerations which the assessment will take account of. In particular, the following two policies are considered relevant:

Policy 4.2.14 states:

To avoid, remedy or mitigate the adverse effects of vegetation disturbance by promoting:

- *the maintenance and enhancement of vegetation in erosion prone areas;*
- *the conversion of erosion prone areas to forestry or soil conservation woodlots, or regeneration or active restoration to native bush;*

- *riparian management, including where this will help safeguard the life supporting capacity of aquatic ecosystems;*
- *the maintenance and retention of erosion control plantings.*

Policy 4.2.16 states:

To ensure that recognised erosion control and land rehabilitation techniques are adopted to avoid, remedy or mitigate any adverse effects resulting from soil disturbance activities.

Kāpiti Coast District Plan

The entire length of the proposed Expressway route is within Kāpiti Coast District. The use of land in the area is controlled under the Kāpiti Coast District Plan (KCDP), which became operative in 1999. Figure 1 in Appendix 7.A, Technical Report Appendices, Report 7, Volume 5 shows the relevant District Plan Zones.

The Alignment traverses a number of zones:

- Residential
- Rural
- Open Space
- River Corridor
- Ngarara Plan Change zone

The Alignment also directly abuts the Town Centre Zone and the Industrial Zone at Paraparaumu.

Issues

The KCDP identifies significant resource management issues which set the scene for the document. These resource management issues refer to each zone and broad district, and wide activity categories (such as Transportation). In terms of landscape and visual matters, the KCDP recognises the value of the appearance and character of the rural environment as a major determinant of the unique visual character of the district (pg B-12). The plan also recognises the potential impact of earthworks, other landform modification and the location of buildings, structures and services on the significant landscape features of the district. The amenity and character of residential areas is important, as is the continued provision of open space in the district. The Paraparaumu Town Centre is earmarked to be the 'heart' of the town, and the need for, and effects of, an additional bridge over the Waikanae River is recognised in connection with the Sandhills arterial route and future road connections (B-30, Section B.19.1).

Objectives and Policies

A summary of the key KCDP landscape, open space and visual amenity objectives and policies is set out in the following sections. The summary notes the key directions set out in the KDCP for the Kāpiti Coast landscapes and open spaces.

Residential Zone

Objective 1 sets the scene for expectations of the Residential Zone and states:

"Ensure that the low density, quiet character of the district's residential environments is maintained and that adverse effects on the amenity values that constitute this character and make the residential environments safe, pleasant and healthy places for residents are avoided, remedied or mitigated."

Policy 1 identifies a list of potential activities and processes which might adversely affect residential amenity, and are therefore given further consideration and provision in the district plan in the form of controls in the Residential Zone. The following listed activities relate to landscape, character, visual and open space matters:

- *the clearance of vegetation;*
- *changes to the landform;*
- *the loss of private gardens and open space;*
- *the creation of hard surfaces and lack of permeable area;*
- *the loss of landscaped frontages; and*
- *the imposition of buildings, structures, signs or other features that are visually obtrusive and out of character with the character of these environments:-*

The above matters require consideration in terms of the proposed Expressway Project, as the Alignment traverses through the residentially zoned areas of the Kāpiti Coast.

Policy 2 seeks to *ensure the adverse effects of residential use and development on the natural environment are avoided, remedied or mitigated*.

While this policy is targeted at ecological values, rather than explicitly landscape or character values, the explanation of the policy makes clear that maintaining the integrity of ecosystems will also contribute to the maintaining the natural character in the zone. This policy is used as the basis for permitted activity standards / resource consent requirements for earthworks and the removal of native vegetation, and is relevant in the overall consideration of the proposed Expressway earthworks and changes to natural character values.

Strategic Growth - North Waikanae

The proposed Expressway Alignment takes a rurally zoned path through the Waikanae township; to the west of the town and to the east of the coastal settlement. The Alignment continues north and passes through a mix of planning mechanisms that contribute to the northern growth area of Waikanae.

The KCDP incorporates both a strategic and zone based approach to facilitate urban growth to the north of Waikanae. At the strategic level, the KCDP includes two areas extending north of the Waikanae township:

- the Low Impact Urban Area (urban – semi-urban); and
- the Eco-Hamlet Area (rural).

These strategic growth areas are still zoned Rural, and the boundary between these two areas delineates the urban edge. To activate the Low Impact Urban Area and the Eco-Hamlet Area, future private plan change requests must be submitted and approved. Private plan changes are required to comprehensively design and provide for the strategic aspirations which are set out in the Subdivision and Development Chapter for these two Areas. The Ngarara Zone and Precinct and the Ferndale Precinct are examples of comprehensively planned and designed areas within the two strategic growth areas.

Ferndale Area

The Ferndale Area was zoned Residential via a private plan process. The structure plan, policy framework and design principles to facilitate the development of this Area aims to create a low density residential development, retention of the existing landform, creation of open space connections and maximises native planting in the landscape design.

The Ngarara Zone and Precinct:

The proposed Expressway adjoins to the north west of this development Precinct which comprises a large area of land situated north of the existing urban area of Waikanae. The Zone and Precinct were created via a private plan change request, which was made operative in 2010.

The Ngarara Zone incorporates six low density residential neighbourhoods. The detailed structure plan in the KCDP guides the future development of these neighbourhoods, to ensure the character and principles of the Zone are implemented at the resource consent stage.

The Ngarara Precinct adds a further five individual neighbourhoods, but remains rurally zoned and captures the essence of the KCDP's strategic 'Eco-Hamlet concept'. A separate structure plan to the Ngarara Zone, directs future subdivision and development of the Ngarara Precinct.

Fundamental to the Ngarara Zone and Precinct is the retention of the distinctive character of the site by the careful integration of built form with the rural coastal setting. Further, the Zone description goes onto state *that the goal of the development is to maintain existing ecologies, limit urban sprawl, and to maintain open space between neighbourhoods, while providing for residential and limited mixed use development. The density of development clusters decreases across the site from a higher density cluster with mixed use in the south west, to low density development in the north east. An area along the central dune ridges will be retained as a series of forest areas.*

Policies 1 – 19 directs future development to be in tune with the Ngarara structure plan and emphasises the importance of the ecological principles, the open spaces, the landform and character; and seeks minimal earthworks and avoidance of development on prominent locations.

The structure plan provides for the existing WLR designation. The proposed Expressway Alignment generally continues to follow the existing WLR designation but does deviate from it as it passes through Ngarara. It is anticipated that the layout of the Ngarara structure plan will be revised to take account of the proposed Expressway Alignment and footprint.

The consideration of the landscape, character and open space principles of this Zone and Precinct has therefore been included in the overall considerations of the landscape and visual assessment.

Rural Zone

The KCDP recognises that the *district's rural landscape is an important element of character of the Kāpiti Coast. The rural landscape contributes to people's appreciation of the area and the quality of life experienced by both rural and town dwellers*.

The KCDP categorises the district's rural land in to three broad rural 'environments' for the purpose of managing subdivision and consequential development. The categories are:

- *The Alluvial Plains*
- *The Coastal Dunes*
- *The Hill Country*

The proposed Expressway traverses through, the rural 'Coastal Dune' environment, which is described as the *sand country including the coastal foredune, consolidated sand dunes, interdune sandplains and wetlands*. The direction of the policies appears to provide a framework for managing effects from subdivision and consequential housing development, rather than use and development in its entirety, on the rural characteristics.

For the purposes of the Landscape and Visual AEE, the three rural categories are noted. Through the preparation and evaluation of the Landscape and Visual AEE, landscape characteristics and values along the proposed Expressway Alignment were refined. This analysis is an integral part of the overall landscape and visual effects assessment.

Outstanding Landscapes

The KCDP has policies on outstanding landscapes within the Rural (C.2), Earthworks (C.7.3) and Landscape (C.10) chapters.

The Landscape objective and policies identify the outstanding landscapes and Policy 4 ensures the following listed areas are protected from inappropriate subdivision, use and development through controls on subdivision and land uses:

- *The foothills of the Tararua Ranges including Pukehou hill.*
- *The wavecut escarpments behind Paraparaumu and Paekakariki.*
- *Kāpiti Island and associated Islands.*
- *The river landscapes of the Otaki and Waikanae Rivers.*
- *Ecological areas shown on the Planning Maps.*

Similarly, Policy 2 in the Rural Chapter states:

"Maintain, enhance and protect the district's outstanding landscapes in the Rural Zone from inappropriate subdivision, use and development".

The following outstanding landscapes are identified on the planning maps and have relevance to the proposed MacKays to Peka Peka Expressway:

- *The wavecut escarpments behind Paraparaumu and Paekakariki.*
- *The river landscapes of the Otaki and Waikanae Rivers.*
- *Kāpiti Island and associated Islands.*

The proposed Expressway runs immediately east of the Raumati Escarpment (a wave cut escarpment), crosses the Waikanae River and continues north-east of the inland dunes north of Waikanae. Kāpiti Island is a key landscape feature of the wider area and there are views of the Island from several points along the proposed Expressway and from adjoining properties. With the exception of the Waikanae River, these outstanding landscapes would not be directly affected but they are part of the wider visual catchment in which the proposed Expressway is centred.

Two other outstanding landscapes, *Foreshore and front dunes and Harakeke/Kawakahia wetlands*, identified on the planning maps are close to the proposed Expressway corridor but in relation to landscape and visual matters will not be affected by the proposal.

Earthworks

The KCDP provides direction on the evaluation of earthworks (C.7.3) with respect to the impact on landscape values. Policy 1 sets out assessment matters for general earthworks throughout the district. With respect to landscape values, the policy emphasises the need to assess:

- *the impact on prominent or visually sensitive landforms, including the coastal marine area, ridgelines, dunes, escarpments, native vegetation, wetlands and waterbodies;*
- *the extent to which any cut or fill can be restored or treated to resemble natural landforms; and*
- *the extent of screening by vegetation.*

Policy 2 provides for the outstanding landscape values and seeks to *Avoid, remedy or mitigate the adverse effects of earthworks on outstanding landscapes, and have regard to the extent to which the earthworks maintain and affect:*

- *The integrity and character of the underlying landform;*
- *The visual character, including legibility (clear definition) and coherence (continuity of pattern which gives the landscape a sense of unity);*
- *The cultural heritage values, including special meanings of sites and resources of the landscape to Maori;*
- *Indigenous vegetation, habitats and biological processes;*
- *Access and recreational opportunities;*
- *Views towards the landscape.*

The Construction of the proposed Expressway will require significant earthworks and therefore the consideration of both Policy 1 and 2 as part of the landscape and visual assessments is important.

Town Centre Zone

The proposed Expressway Alignment does not pass through the Paraparaumu Town Centre Zone but is on the north-west boundary of this Zone.

The Town Centre Zone is the means to give effect to the Council's vision for the town centre, which is intended to serve as a focal point for both the local community and district as a whole.

Objective 2 of this Zone states *To enable the development of the Paraparaumu Town Centre to proceed in a manner which ensures that it becomes an integral part of the wider central area and, in particular, that it is visually and physically linked to the retail core east of Rimu Road.*

The Town Centre Zone's policy framework identifies the importance of the existing sand dune landforms (Policy 2) and natural character values (Policy 5). While the Town Centre Zone objectives and policies are not directly relevant to the proposed Expressway Project, they do assist to inform the wider context of the Project and therefore the landscape character and visual assessment.

Open Space Zone

The proposed Expressway will traverse the north-east corner of Queen Elizabeth Park near Poplar Avenue and the current State Highway 1 alignment. Queen Elizabeth Park is a Greater Wellington

Regional Council (GWRC) asset and is designated as a recreation reserve (D0401) in the KCDP. The management of Queen Elizabeth Park is carried out by GWRC in accordance with their *Greater Wellington Parks Network Plan* (July 2011).

The KCDP also recognises the special recreation, landscape and amenity values of Queen Elizabeth Park and the underlying zoning (Open Space) and policy framework is reflective of this recognition. The KCDP objective for the Queen Elizabeth Park is "*To recognise that Queen Elizabeth Park provides for outdoor recreational use, while protecting a representative example of the natural landscape of the Kāpiti coastal plain.*"

The landscape and open space values of the Queen Elizabeth Park are another set of considerations for the landscape and visual assessment of the proposed Expressway route.

River Corridor Zone

The River Corridor Zone applies to the Waikanae River and the adjacent floodway. This Zone is primarily about natural hazard management, with policy links to the Natural Hazards, the Network Utilities and Open Space and Reserve Chapters. The Waikanae River is identified as an Outstanding Landscape and this is already discussed in Section 1.3.7.

Transport

The Transport objective seeks *To achieve a transport infrastructure that provides for efficient and safe movement of people and goods throughout the district and which avoids, remedies or mitigates adverse effects of existing and new traffic routes*.

The Transport policies acknowledge the provision of roads, and other forms of transport and emphasises the relationship of transport and landuses (Policy 7 and 8), particularly in the promotion of public transport. Policy 13 also encourages the use of improved rail passenger services to the district. There are policies which focus on the effects associated with new roads, including Policy 11 which states *Ensure the adverse effects of earthworks associated with new roads are avoided, remedied or mitigated*. Policy 11, and the reference back to the Earthwork policies (C7.3), is directly relevant to the Landscape and Visual Assessment due to the extent of earthworks necessary for the construction of the proposed Expressway Alignment.

Non RMA Documents

Wellington Conservation Management Strategy (CMS)

The Department of Conservation (DoC) manages the natural and historic values of the Conservation Estate, reserves and other lands it administers. DoC also aims to assess proposals for activities on adjoining land and water with regard to the impact on areas managed by the Department and advocate for the protection of the natural and historic resources present on the

areas. Conservation Management Strategies are comprehensive documents which provide direction for all areas administered by DoC and identify the ecological and natural values of specific areas, and the respective management issues, objectives and set out a list of implementation tasks. Some of the values and management issues set out in the Wellington CMS for the Kāpiti /Horowhenua district, related to the proposed Expressway Alignment include:

Indigenous plant communities of coastal and wetland forest remnants especially kohekohe forest which is now rare in the North Island, totara stands at Otaki, and wetland and dune plant communities.

Wetlands are associated with complex duneland dynamics. The natural mobility of dunes created the characteristic dune and basin landforms, but this is one of the most difficult features of duneland processes to conserve.

Landscape assessment is a high priority for this area. It can provide local authorities with the means to identify landforms and landscapes of value for future planning and management.

Waikanae Estuary Scientific Reserve comprises a freshwater lake and saltwater lagoon network surrounded by dunes and sandy beaches at the mouth of the Waikanae River. Most of the reserve is dominated by river, old river channels, saltmarsh and tidal flats. Southward longshore sediment drift causes the position of the rivermouth to migrate periodically.

While the focus of the values and issues are largely ecological, the landscape and visual analysis evaluates critical elements of the proposed Expressway Alignment including duneland landforms, indigenous vegetation, the Waikanae River and its environs.

The Greater Wellington Parks Network Plan

As mentioned in the previous discussion, GWRC owns and manages Queen Elizabeth Park. The *Greater Wellington Parks Network Plan* (July 2011) provides policies and rules for the management of the Wellington Region's regional parks and forests, including Queen Elizabeth Park.

Guiding Principles

The Parks Network Plan has a series of guiding principles, one of which states:

Protect the visual quality of significant landscapes from inappropriate development and use.

The Parks Network Plan provides specific policy on land management, key partnerships and projected changes for each regional park. The Queen Elizabeth Park has specific landscape and geological policies that contribute to the overall management focus of this regional park, and include:

(c) to protect the parks key landscape features and values from inappropriate use and development, specifically:

- *The beach from Raumati to Paekakariki*
- *The Whareroa dune complex*
- *All wetlands and streams*
- *The modified landscapes of Whareroa and Wainui pa.*

(d) To advocate for the protection of the following significant geological features which contribute to the landscape experience of Queen Elizabeth Park:

- *Kāpiti Island*
- *Te Ramoroa fan*
- *MacKays Crossing sea cliff.*

These features will not be affected by the proposed Expressway proposal.

Projected Changes

The Park Network Plan for Queen Elizabeth Park includes a section (6.7.5) on 'projected changes' and comprises a list of external influences, community projects and important working relationships. The list reflects the relationship with the NZTA and states:

Work with the NZ Transport Agency (NZTA) and other agencies to maximise recreational opportunities from any proposed roading developments by NZTA.

This statement and the corresponding map showing projected future changes (Map 17) broadly reflects options for the proposed Expressway Project traversing across the north-east corner of the Queen Elizabeth Park.

The Community's Vision for the Kāpiti Coast District Community Outcomes 2009

There are seven district-wide Community Outcomes set out in the 'Choosing Futures' document. Two of these outcomes state:

- *Outcome 1: There are healthy natural systems which people can enjoy*
- *Outcomes 2: Local character is retained within a cohesive District.*

The KCDC have focused the district-wide outcomes onto eight individual areas within the district: *The Greater Otaki; Waikanae North; Paraparaumu Town Centre; Paraparaumu Beach; Raumati Beach; Raumati South; Paekakariki; Otaihanga*. As a result, a set of locality-specific outcomes (Local Outcomes) for each of these areas.

The Local Outcomes identify a range of values including those which relate to natural features, unique characteristics and urban environments, and on the basis of the values a series of aspirations for these values are listed. For example the Otaihanga Local Outcomes emphasis the strong connection to Waikanae River and Estuary, the Otaihanga Oxbow, pockets of native bush, and the recreation values that are associated with these natural features. Outcomes for Raumati South include reference to the protection of the remaining dunes, and the Paraparaumu Town Centre values the open space network created by the Wharemauku Stream, key roads and the open spaces, including the dunes, associated with the Town Centre. The East/West view shaft to Kāpiti Island is also valued.

The Local Outcomes are relevant to the Landscape and Visual AEE, insofar as they provide another layer of information on natural and landscape values within the Kāpiti Coast District.

Conclusion

To conclude, Sections 6(a), 6(b) and 7(c) of the RMA set the guiding principles for landscape, natural character and amenity related evaluations. The values and policy direction from the KCDP and regionally planning documents are used to shape the evaluation process of the AEE analysis. Overall, the process and analysis involved in the Landscape and Visual AEE evaluates the impact of the proposed Expressway Project, including the proposed earthworks and new structures. This evaluation extends over a range of different landscapes along the proposed Expressway Alignment and proposes effective mitigation measures that are tailored to these individual environs.

Attachment 7.2- Methodology ZTV and Visual Simulations

Zone of Theoretical Visibility (ZTV)

The term 'Zone of Theoretical Visibility' (ZTV) is used to describe the area over which a development may be theoretically visible, and is derived by performing multiple "line of sight" calculations on a 3D Digital Terrain Model (DTM). The graphic output of this is most often presented as an overlay on a topographic map or aerial photograph. This technique is also known as a Zone of Visual Influence (ZVI), Visual Envelope Map (VEM) or Viewshed Map, however the term ZTV is generally preferred. It is important to note that:

- ZTV maps only represent where a development may be theoretically seen – that is, it may not actually be visible in reality due to localised screening by structures or vegetation, which are not generally modelled as part of the DTM (unless "above ground" data has been incorporated into the model - see below for explanation);
- ZTV maps indicate non-qualitative potential visibility only. They do not convey the nature or magnitude of visual effects, for example whether the effects will be positive or negative, and whether these will be significant or not;
- ZTV analysis takes into account the effects of earth curvature and light refraction; over a distance of 3 km this vertical correction is approximately 0.6m;
- It should be remembered that while ZTV is an extremely useful tool for visual assessment, it is important to recognise its limitations.

The following digital terrain models were prepared with ESRI ArcGIS software using 0.5m ground contour data and non-ground point LIDAR[23] – data supplied to the Project team by KCDC:

- existing ground DTM,
- grid sampled at 5m intervals;
- existing adjacent ground plus proposed earthworks DTM (the same DTM clipped to the extent of the construction Designation with the DTM of the proposed ground earthworks merged into it);
- existing above ground plus proposed earthworks DTM (a DTM incorporating non-ground point features such as trees, buildings and power poles, clipped to the extent of the construction Designation with the DTM of the proposed ground earthworks merged into it).

Using these DTMs, two separate ZTV analyses were run, using target points at every 10m along the proposed Expressway, offset 15m each side of the centreline and at a height of 3m above the ground surface:

[23] Light Detection and Ranging

1. Ground based ZTV with the theoretical visibility shown to a distance of 3km from each analysis point along the proposed Expressway;(Figure 2, Technical Report Appendices, Report 7, Volume 5)

2. Above ground ZTV with the visibility restricted to 300m from each target point, identifying only those areas where the proposed Expressway would not be visible. (Figures 11,24,36,50, Technical Report Appendices, Report 7, Volume 5)

Linear ZTV analyses depict the combined theoretical visibility of a linear feature from all target points within the nominated range (ie 3km and 300m), as opposed to the visibility from a single target point, as is common for non linear investigations.

Summary of parameters used in ZTV analysis:

Distribution of target points:	points spaced at 10m along Expressway
Location of target points:	15m offset each side of centreline
Height of target points:	3m
Observer Eye Height:	2m
Earth Curvature & Refraction:	0.07 (approx 0.6m at 3 km)
Base Spheroid used for computation:	WGS 84

Visual Simulations

Visual simulations have been prepared in accordance with the Best Practice Guide for Visual Simulations (BPG 10.2), issued by the NZ Institute of Landscape Architects (NZILA). The procedure was as follows:

- A range of representative viewpoints were selected, from which photographs were taken using a digital camera with a 50mm focal length lens equivalent. Each location was fixed using a GPS (Geographic Positioning System) unit;
- · Photographs from each viewpoint were then digitally stitched together to create a panorama with a 90 degree horizontal field of view (or in those cases with a restricted viewshaft, a single frame photo with a 37.5 degree horizontal field of view was used);
- A 3D digital terrain model (DTM) was created using 0.5m ground contour data and non-ground point (LIDAR) data supplied to the Project team by KCDC. This was clipped at the boundary of the construction Designation, and a DTM of the proposed earthworks was merged into it. Additional model detail such as bridge structures, noise walls and street lighting were added to the model;

- Camera views were generated of the model to match the photographs taken from the same locations, and each view was superimposed over the corresponding photographs, using identifiable reference points, terrain features and the known camera geometry in order to accurately register the two images together;
- Fully rendered, photo-realistic simulations were then produced, matching the ground textures and the light and atmospheric conditions of the original photographs as far as possible. A series of images have been produced for each viewpoint, showing the existing view, as the proposed Expressway will appear immediately following construction, and following 10 year's growth of proposed mitigation planting (where this is visible).
- The simulations were internally peer reviewed (by a company principal working in the same discipline), for both accuracy and photorealism, and amendments made as necessary.

Attachment 7.3- Landscape Mitigation Measures

MacKays to Peka Peka Expressway- Proposed Landscape Mitigation

Type of mitigation	Detail	Purpose of mitigation
Retain existing indigenous vegetation	Retain existing vegetation and protect during construction phase. Remnant forest, secondary regeneration, wetland, and riparian margin.	▪ Retain / enhance existing biodiversity or wildlife corridors ▪ Vegetation framework can anchor new plantings ▪ Visual screening of Expressway and associated structures.
Retain existing exotic vegetation	Retain existing vegetation and protect during construction phase. Generally semi-mature and mature trees, (shelter belts, woodlots, individual trees, and amenity trees from purchased properties.	▪ Retain existing tree structure/local character ▪ Vegetation framework can anchor new plantings ▪ Visual screening of Expressway and associated structures.
Mass planting	Trees and/or shrubs typically native species either a simple palette eg 1 species- kanuka or, revegetation style mixture of species. Could be exotic species- depending on vegetation composition of surrounding area Hydroseed Plant PB3/5 grade plants @ 1m centres Mulch	▪ Screen views of Expressway ▪ Screen views of noise walls ▪ Integrate Expressway planting with existing adjacent vegetation structure ▪ Integrate earthworks with adjoining topography/vegetation ▪ Enhance cycle/walkway amenity ▪ Enhance local biodiversity

Type of mitigation	Detail	Purpose of mitigation
	Maintain	
Mass Planting with tree enrichment	As above with additional planting of canopy tree species. Plant PB3/5 grade plants @ 1m centres Mulch Maintain 1x Pb 18 grade plant /100m^2 in year 2 or 3.	▪ Screen views of Expressway ▪ Screen views of noise walls ▪ Integrate Expressway planting with existing adjacent vegetation structure ▪ Integrate earthworks with adjoining topography/vegetation ▪ Enhance cycle/walkway amenity ▪ Enhance local biodiversity ▪ Additional trees to ensure successful establishment of taller tree species
Specimen trees underplanted with groundcover 'Urban' interchanges (Kāpiti, & Te Moana	Specimen trees (indigenous or exotic) underplanted with mixed shrubs/groundcover species (native or exotic) Hydroseed Plant PB3/5 grade plants @ 1m centres Mulch Maintain	▪ Enhance visual amenity at interchange areas. ▪ Provide shade/shelter in open interchange areas. ▪ Reflect existing vegetation structure and/or create distinct identity. ▪ Filter views of bridges/ structures ▪ Integrate earthworks with adjoining topography/vegetation ▪ Screen views of noise walls and other structures
Trees underplanted with	Mown or grazed grass with large exotic or indigenous	▪ Integrate adjoining pastureland with

Type of mitigation	Detail	Purpose of mitigation
Grass Open Rural landscapes and open Interchange areas and floodways	trees. Eg Willow poplar, pine macrocarpa, eucalypt, oak, Rural-Trees in small informal groups or shelterbelt/woodlot patterns Interchanges- Amenity trees formal or informal patterns, mown grass under Grass in rural areas to extend as close as possible to Expressway with 'Right to occupy' agreements.	Expressway corridor, by visually continuing pasture to carriageway edge. ■ Reflect/enhance the existing tree structure (rural Character/ local urban character) ■ Screen views to Expressway and ramps ■ Enhance open space and visual amenity at interchange areas. ■ Provide local shade/shelter in open interchange areas. ■ Reflect landscape character of the area
Riparian Planting	Riparian planting along streams and wetlands margins	■ Ecological – enhance natural character, biodiversity ■
Wetland Planting	Mixed wetland species for ecological and stormwater wetlands	■ Stormwater treatment ■ Erosion control
Flood Storage areas	Excavated areas of damp or soggy ground for flood storage 50% of the area to be planted with riparian species/ grass managed where practicable through grazing.	

Type of mitigation	Detail	Purpose of mitigation
Earth Bunds (including noise bunds)	Creation of new bunds. Modification of existing dune landforms.	▪ Screen views to Expressway (and Noise) ▪ Integrate Expressway earthworks with surrounding topography. ▪ Reformation for ground for planting ▪ Integration of cycle/walkway
Sculpting earthworks	rolling off cut/fill batters to integrate with natural landform	
Earthworks to integrate concrete noise walls	Earth will be ramped some way up the external faces of the concrete noise walls to, in effect , partially 'bury' them on one side. These earth ramps will also be planted, further integrating them into the landscape and screening them from view from beyond the Expressway corridor.	▪ Integration of built structures into landform. ▪ Visual mitigation

Appendix 7.A

Graphics Figures 1-64

Appendices: Refer to Volume 5, Technical Report 7

Appendix 7.B

Visual Simulations Figures VS1-VS16

Appendices: Refer to Volume 5, Technical Report 7