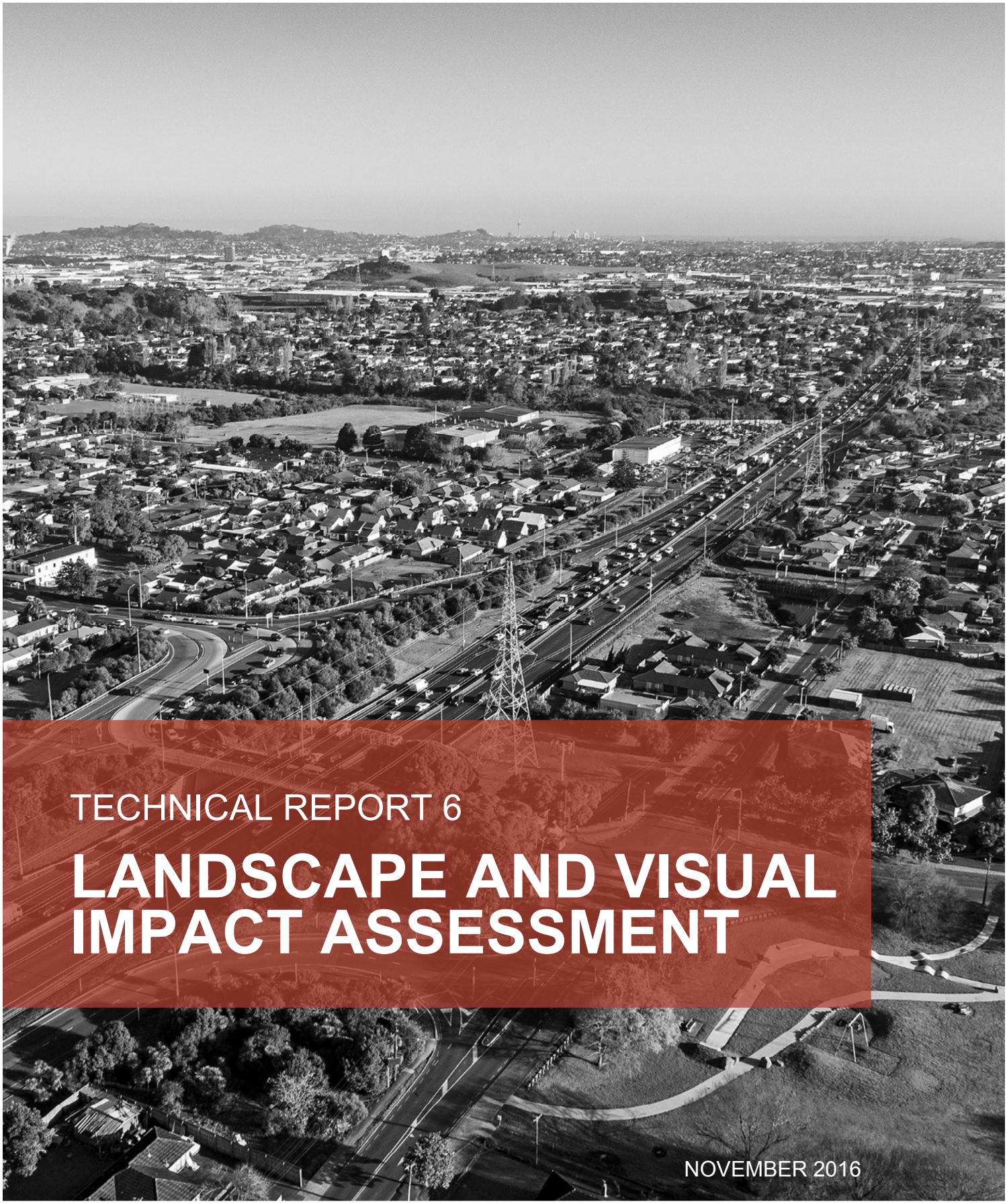

TECHNICAL REPORT 6

LANDSCAPE AND VISUAL IMPACT ASSESSMENT

NOVEMBER 2016

NZ TRANSPORT AGENCY WAKA KOTAHI

East West Link

isthmus

Quality Assurance Statement	
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Revision schedule					
Rev. Nº	Date	Description	Prepared by	Reviewed by	Approved by
0	November 2016	Final for Lodgement	Gavin Lister	Andrea Rickard	Patrick Kelly

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EXECUTIVE SUMMARY

Context

1. A consistent theme of the existing environment traversed by the East West Link (EWL) is the extent to which its natural and urban landscape has been treated as an industrial backyard and dumping ground over many decades. It has been used for such activities as refuse landfill, noxious industries, and large scale transport infrastructure.

2. The way in which the area has been perceived and managed during its recent history is at odds with its importance and centrality in earlier times. Themes of that earlier landscape include:

   - The strategic role of the area for the east-west Kāretu and Ōtāhuhu portages, and the north-south Ōtāhuhu land bridge;
   - The centrality of Māngere Inlet within a landscape encircled by volcanic features; and
   - Onehunga's position as the main town and port on the Manukau Harbour.

3. While the EWL Project has potential to increase the visual dominance of transport infrastructure, the severance of the urban area from the coast, and reclamation of Māngere Inlet, the Project also has the potential to help reverse some of the adverse effects of historical development and to positively contribute to restoration of the landscape. Such a strategy lies behind the Urban and Landscape Design Framework (ULDF) and measures incorporated in the Project design. In particular, the EWL provides a catalyst to help restore and rehabilitate Māngere Inlet. The Project will improve water quality, naturalise the shoreline and enhance access to and along the inlet. The Project will also help rehabilitate Ōtāhuhu Creek as a culturally important natural waterway.

4. Overall, the adverse effects will be appropriately mitigated and there will be substantial positive effects.

5. The following paragraphs summarise these matters for each of the geographic areas.

Sector One: Neilson Street Interchange and Galway Street connections

6. The natural and urban landscape in Sector 1 revolves around Te Hōpua ā Rangi volcanic explosion crater and tuff ring. However, the natural landform has been substantially buried and modified through landfill reclamation, urban development and state highway construction. The historical development has resulted in modification of the tuff ring's physical landform and reduction of its legibility. The area is characterised by industrial buildings and transport infrastructure, and poor connectivity between Onehunga and the port and harbour.

7. EWL will reduce the legibility of the Hōpua volcanic landform because of the increase in the number of traffic lanes encircling the outside perimeter of the crater and the construction of a new overbridge outside the north-west corner of the crater. The works will also accentuate the existing perception of the area as a transport interchange, further reduce its visual amenity, and increase the visual barriers between Onehunga town centre and Onehunga Wharf. Taken together, there will be a moderate degree of potential adverse effect additional to the existing situation.

8. The visual effects will be amplified during construction works. However, such works will be temporary in nature, and will take place within existing transport corridors where one might anticipate periodic highway construction.

9. Measures to address such potential adverse effects include:

- Streetscape works to improve the Onehunga Harbour Road vehicle connection between Onehunga town centre and the port, taking advantage of the substantial reduction in heavy traffic that will occur on this road;
- Locating EWL in a trench opposite the wharf area, and bridging the trench to connect with the Onehunga wharf area – and with Orpheus Drive to the west;
- Streetscape works to highlight the pedestrian / cycle route between Onehunga town centre and the port, tracing the crater rim on the west side of Onehunga Mall;
- Reinstatement of the cycle and pedestrian bridge connecting Onehunga Mall with Old Māngere Bridge (either the existing 'Old Māngere Bridge' or the planned 'new Old Māngere Bridge'), which will connect also with the proposed new shared path adjacent to EWL and the new shoreline path along Māngere Inlet; and
- Providing the opportunity for an artwork encircling the crater – envisaged at this stage as a circle of light that will highlight the circular form and presence of the crater and restore something of the legibility and presence that has been lost historically.

10. The artwork would highlight the presence of Te Hōpua volcanic landform, restore some legibility to the feature as a whole, and contribute to the aesthetic character of the node. The remaining measures would result in a small improvement in connectivity between Onehunga and the Onehunga Wharf Area compared to the existing situation.

Sector Two: Foreshore works along the Māngere Inlet foreshore

11. The northern shoreline of Māngere Inlet was formerly an intricate and deeply indented shoreline of basalt lava flows and tidal inlets. However, the shoreline was straightened and constructed as a seawall, and the inlets infilled with refuse. With the exception of Waikaraka Cemetery, the backdrop to the shoreline has been developed for industry. The historical development has resulted in substantial reclamation of the former harbour bed, burying of the lava shoreline features, discharge of contaminants to the harbour, dominance of the character by industrial activities, and severance of Onehunga from the Māngere Inlet. It could also be said that the Māngere Inlet was invested with a poor image.

12. EWL will have both potential adverse and positive effects on Māngere Inlet: On the one hand, there will be potential adverse effects as a consequence of further reclamation of the tidal mudflats and alignment of an four lane arterial road along the northern side of the inlet. On the other hand, there will be potential positive effects from naturalising the shoreline, improving the water quality from the inland catchments, improving access to the shoreline, and improving connections between Onehunga and Māngere Inlet.

13. Measures to achieve these outcomes include:
    - Connecting the cul-de-sacs into a completed street grid with a frontage to Māngere Inlet;
    - Designing the road and adjacent shared path to convey a positive urban character;
    - Naturalising the northern shoreline with landforms and inlets echoing the original shoreline features;
    - Incorporating wetlands to intercept and treat stormwater from the industrial catchments;
    - Providing a shoreline path to enable public access and appreciation of the naturalised shoreline; and
    - Incorporating elements to mitigate ecological effects including roosts and areas of naturalistic shoreline with no public access.

14. There will be also substantial disruption to the northern shoreline of Māngere Inlet during construction, and amplified adverse visual effects for Waikaraka Cemetery in particular. Such

works will be temporary in nature, and will be outweighed by the subsequent enhancement of visual amenity, natural character and shoreline access following completion of EWL.

15. Overall, the balance of landscape, visual and natural character effects in Sector 2 will be substantially positive. EWL will provide the opportunity to help restore and rehabilitate Māngere Inlet. It will provide a positive frontage to the Inlet in response to many years of it having been neglected and poorly treated.

Sector Three: Anns Creek from the end of the reclamation to Great South Road

16. Anns Creek is the last reasonably natural remnant of the Māngere Inlet northern shoreline – although it is nevertheless modified. It has a subtle assemblage of natural features, including areas of pāhoehoe lava classified as an ONF, an associated distinctive vegetation community, and a salt-to-fresh water sequence. Anns Creek is also partitioned into five parts by rail causeways, is infested with weeds, and the backdrop includes a rail marshalling yard, inland port, container storage, and large scale industry.

17. EWL is on viaduct for most of Sector 3. Potential effects on biophysical aspects of the landscape in Anns Creek are important because of the significance of the lava features and associated rare plant communities that include endangered plant species. This report relies on the analysis and detailed mapping of the lava features and vegetation communities in the Geological Heritage (*Volume 3: Technical Report 4*) and Ecology Reports in this regard. The Ecological Impact Assessment report describes how the alignment of the viaduct and location of the viaduct piers in the northern part of Anns Creek East largely avoids effects on important plant communities, although there will still be some adverse effects on plants located beneath the viaduct. The Geological Heritage Assessment report (*Technical Report 4*, section 6.3) concludes that the careful siting of viaduct piers and appropriate construction methods will similarly avoid adverse effects on the lava flow features.

18. There will be some adverse effects on more general aesthetic aspects of landscape and natural character because of the scale of the viaduct and its alignment across parts of Anns Creek. But while it will be prominent from a number of locations, it will nevertheless be in context with the industrial backdrop that includes, amongst other things, container storage areas in which containers are stacked higher than the viaduct.

19. There will also be amplified adverse visual effects during construction, and temporary closure of the existing path. Such effects will be temporary in nature, and will occur against an industrial backdrop in a modified setting, and will be offset by enhancements to the shoreline path following completion of EWL.

20. Design measures in this sector include:

    - Restoring the natural plant communities through removal of weeds and dumped spoil, enrichment planting, and pest control;
    - Recreating similar conditions and propagating the lava-field vegetation community and endangered plants to the new landforms in Māngere Inlet;
    - Interpreting and highlighting the significance of the lava and vegetation community from the coastal path and from the viaduct overlooking the east Anns Creek area;
    - Connecting the east-west pedestrian and cycle path to Great South Road and beyond (currently the path terminates at Hugo Johnston Drive); and
    - Improving the avifauna habitat in adjacent Māngere Inlet to support Anns Creek.

21. Overall, it is considered the adverse and positive landscape effects will be balanced in Anns Creek.

Sector Four: Great South Road to SH1 at Mt Wellington

22. Sector 4 includes the prominent natural landmark of Mutukāroa-Hamlins Hill, and culturally significant former route of the Kāretu portage that extended from the head of Anns Creek and connected with the Tāmaki River. The area is otherwise characterised by industrial activities, transport infrastructure and a high voltage transmission line.

23. The EWL will skirt the toe of Mutukāroa-Hamlins Hill and trace part of the Kāretu portage route. It will share a corridor with Sylvia Park Road, KiwiRail (Eastern Line), and the Ōtāhuhu-Onehunga transmission line.

24. There will be no adverse effects on Mutukāroa-Hamlins Hill. Rather, its role as a central landmark at the intersection of transport routes will be accentuated.

25. The EWL Sylvia Park Ramps will have some moderate adverse visual effects for passers-by on SH1 and surrounding roads, and for occupants of nearby industrial buildings. However, such effects will take place in the context of a landscape already dominated by transport infrastructure and industrial land uses.

26. There will also be some adverse visual effects arising from construction activities, but these will be temporary, and will take place in the context of a landscape dominated by transport infrastructure and surrounding industrial and commercial properties.

27. Positive outcomes in this sector include:

    - Improving connectivity for cyclists and pedestrians by the proposed extension of the shared path from Māngere Inlet through to Sylvia Park Shopping Mall (and potentially beyond as part of Auckland's wider cycle network); and
    - Improving connectivity and legibility of the road network through a new intersection node at the corner of Great South Road, Sylvia Park Road and the EWL along Māngere Inlet.

28. Overall, it is considered the adverse and positive landscape and visual effects will be balanced in this sector.

Sector Five: SH1 at Mt Wellington to the Princes Street Interchange

29. Sector 5 comprises the existing SH1 ('Southern Motorway') corridor between 'Tip Top corner' and the Princes Street Interchange. The land adjoining the corridor is partly industrial and largely residential.

30. EWL entails widening of SH1 by one lane in each direction and reconstructing the Princes Street Interchange. (

31. Ōtāhuhu Creek is the significant natural landscape feature. It is a main tributary of the Tāmaki River and is culturally important as part of the Ōtāhuhu portage. Currently the creek is constricted by the existing SH1 causeway and culverts, incidental spoil dumped on the creek margins, and weeds which infest the banks.

32. The proposed works include:

    - Removing the existing SH1 causeway and culverts and replacing it with a bridge;
    - Removing incidental reclamations from areas adjacent to SH1;
    - Clearing the creek banks of exotic weeds;
    - Removing some mangroves to re-establish an open channel upstream of the bridge; and
    - Providing a new bridge for pedestrian and cycle use adjacent to the SH1 bridge (the bridge will initially be used to divert traffic during replacement of the causeway and culverts).

33. These works will have substantial positive effects. They will enhance natural character, physically and visually open up what is a significant cultural route, and improve connectivity between two peninsulas currently severed by SH1. Ōtāhuhu Creek will also become a more prominent landmark from SH1.

34. There will be visual amenity effects as a result of adding lanes to SH1. In particular there will be adverse visual amenity effects for adjoining residential properties resulting from the wider motorway, loss of the existing green buffer within the corridor, installation of noise walls, and encroachment into some properties. There will similarly be a reduction in amenity for travellers on SH1 because of the replacement of the green buffer with a hard-edged noise walls. However, while noise walls have adverse visual effects in themselves, at the same time they will have amenity benefits for adjoining properties by screening SH1 and reducing noise. Recommended mitigation includes re-establishing vegetation to soften both sides of the walls. This includes planting between SH1 and noise walls, and offering landscaping for adjacent residential properties. In combination, such planting will re-establish a green buffer along the margins of the SH1 corridor.

35. The adverse visual effects will be amplified during construction, particular with respect of adjoining residential properties and on the immediate surroundings at Ōtāhuhu Creek. Such works will be temporary in nature, will take place in the context of an existing motorway, and will be offset by the enhancements once the EWL Project is completed.

36. Overall, the adverse effects along the boundary of the corridor in Sector 5 will be appropriately mitigated, and balanced by substantial positive effects at Ōtāhuhu Creek.

Sector Six: Onehunga local road works

37. Sector 6 comprises local works in Captain Springs Road and the new port link road. There are no effects of any note on the natural or urban landscape related to these works.

Recommended Remediation and Mitigation

38. The measures to remedy and mitigate adverse effects of the Project on the natural and urban landscape fall under the umbrella of the Urban and Landscape Design Framework (ULDF) which lays out the main design themes, principles and outcomes applying to the Project. The ULDF goes beyond the remediation and mitigation measures addressed in this report to also identify additional enhancement and future opportunities.

39. In summary, the main strategies to remedy and mitigate the adverse effects of the EWL Project include:

    - Enhancing the legibility of Te Hōpua explosion crater;
    - Reconnecting Onehunga with the Onehunga Wharf;
    - Rehabilitating Māngere Inlet through naturalising its northern shoreline and improving its water quality;
    - Connecting Onehunga with a positive frontage to Māngere Inlet;
    - Restoring the intricate mosaic of natural communities in Anns Creek;
    - Opening up Ōtāhuhu Creek, physically and visually, as a natural and culturally important waterway; and
    - Installing noise walls adjacent to SH1 softened with planting on both sides of the walls.

40. These strategies are discussed in more detail in this report and in the ULDF.

Table of Contents

Glossary of Technical Terms/Abbreviations

Abbreviation	Term
AEE	Assessment of Effects on the Environment
CMA	Coastal Marine Area
DoC	Department of Conservation
EWL	East West Link
EWLA	East West Link Alliance
MCA	Multi Criteria Analysis process
NZCPS	New Zealand Coastal Policy Statement 2010
NoR	Notice of Requirement
The NZ Transport Agency	New Zealand Transport Agency
ONFs	Outstanding Natural Features
PAUP	Proposed Auckland Unitary Plan
PWA	Public Works Act 1981
RMA	Resource Management Act 1991
SEA	Significant Ecological Area
SH(x)	State Highway (number)
The Plan	The Auckland Plan
ULDF	Urban and Landscape Design Framework

1 Introduction

1.1 Purpose and scope of this report

This report forms part of a suite of technical reports prepared for the NZ Transport Agency's East West Link project (the EWL or Project). Its purpose is to inform the Assessment of Effects on the Environment Report (AEE) and to support the resource consent applications, new Notice of Requirement and an alteration to existing designation required for the EWL. This report assesses the landscape and visual effects of the proposed alignment of the Project as shown on the Project Drawings in *Volume 2: Drawing Set*.

The purpose of this report is to:

- Describe the existing natural and urban landscape;
- Assess effects of the proposed EWL Project, including effects on:
  - The natural and urban landscape;
  - Natural character of the coastal environment;
  - Outstanding natural features; and
  - Views and visual amenity.
- Outline the design measures proposed to avoid, remedy or mitigate potential adverse effects; and
- Provide an overall conclusion on landscape and visual effects.

1.2 Project description

The EWL Project involves the construction, operation and maintenance of a new four lane arterial road from State Highway 20 (SH20) at the Neilson Street Interchange in Onehunga, connecting to State Highway 1 (SH1) at Mt Wellington as well as an upgrade to SH1 between the Mt Wellington Interchange and the Princes Street Interchange at Ōtāhuhu. New local road connections are provided at Galway Street, Captain Springs Road, the port link road and Hugo Johnston Drive. Cycle and pedestrian facilities are provided along the alignment. The primary objective of the Project is to address the current traffic congestion problems in the Onehunga, Penrose and Mt Wellington commercial areas which will improve freight efficiency and travel reliability for all road users. Improvements to public transport, cycling and walking facilities are also proposed.

For description purposes in this report, the Project has been divided into six sectors. These are:

Sector 1. Neilson Street Interchange and Galway Street connections

Sector 2. Foreshore works along the Māngere Inlet foreshore including dredging

Sector 3. Anns Creek from the end of the reclamation to Great South Road

Sector 4. Great South Road to SH1 at Mt Wellington

Sector 5. SH1 at Mt Wellington to the Princes Street Interchange

Sector 6. Onehunga local road works

A full description of the Project including its design, construction and operation is provided in Part C: Description of the Project in the Assessment of Effects on the Environment Report contained in *Volume 1: AEE* and shown on the Drawings in *Volume 2: Drawing Set*.

2 Experience

This report has been prepared by Gavin Lister for the East West Link Alliance.

2.1 Qualifications

Gavin has a Bachelor of Arts (Auckland University), Post-graduate Diploma in Landscape Architecture (Lincoln College), and Masters of Urban Design (Sydney University). He is a Fellow of the New Zealand Institute of Landscape Architects and a member of the Urban Design Forum.

2.2 Relevant experience

Gavin is a founder of Isthmus Group, a specialist landscape architecture, urban design and architecture practice. He has 28 years' professional experience throughout New Zealand in a range of project types including infrastructure and energy projects, housing and land development master-planning, public places and streetscape design, and guidelines and policy work.

Infrastructure projects Gavin has been involved with include the North Island Grid Upgrade Project; several Roads of National Significance (RoNS) including Transmission Gully, Basin Bridge, Pūhoi to Warkworth, Otaki to Levin, and the Alternative Waitematā Harbour Crossing; energy projects including the Hauauru ma Raki, Waitahora and Waverley wind farms, Tauhara geothermal power station, and the Huntly e3p plant; the northern runway for Auckland International Airport; the Ruataniwha Water Storage Project; and the CentrePort harbour deepening project in Wellington.

Projects where natural character are a central issue include mediation on natural character matters on behalf of the Department of Conservation in relation to the proposed Northland Regional Policy Statement, evidence on behalf of the Department in relation to the proposed Mokihinui hydro scheme, and provide advice to the Department on the proposed Milford-Dart Tunnel and Fiordland Link Monorail in relation to the World Heritage 'Statement of Universal Value'.

Gavin has also completed the Ministry of the Environment accreditation process for commissioners and is a member of Auckland Council's Panel of Independent Commissioners.

With respect to the Project area, Gavin led 'Mainstreet' projects for both Onehunga and Ōtāhuhu during the 1990s. His practice carried out the landscape work for the Taumanu–Onehunga Foreshore naturalisation project, and for the new 'old Māngere Bridge' project.

3 Assessment Methodology

The report addresses the natural and urban landscape, covering matters from the disciplines of landscape architecture and urban design. It includes within its compass matters relating to 'natural character' and 'visual effects'.

Given that landscape is a broad subset of the environment, the assessment relies on input from the other disciplines, particularly ecology, coastal processes, stormwater and groundwater science, and geomorphology.

The report is organised geographically for consistency with other disciplines. For example, effects are assessed in terms of sectors 1 – 6. Within each sector, effects are considered under the topics of natural landscape, urban landscape, visual, and natural character. Additional topics address effects on 'outstanding natural features' (ONF) and protected view shafts where this is relevant.

The following paragraphs set out further details:

3.1.1 Definition of 'landscape'

The following definition of 'landscape' is used, contained in the NZILA Best Practice Note 10:[1]

***'Landscape** is the cumulative expression of natural and cultural features, patterns and processes in a geographical area, including human perceptions and associations'*[2]

By extension the term includes urban elements, but we will make explicit reference to such elements in the definition. The main urban elements comprise the cadastral and street network, built form, and activities. In this case the natural and human features are closely intertwined, as are the histories and human associations with the area.

3.1.2 Description of the existing environment

The characteristics of the existing environment were analysed taking account of aspects contained in the definition (i.e. physical, perceptual, and associative). The following table lists typical factors considered:[3]

	Typical factors
Physical (or geographic) aspects (i.e. natural and cultural features and patterns)[4]	Natural • Geology and geomorphology • Topography and drainage patterns • Vegetation and soil patterns • Ecological and dynamic components Human (i.e. 'cultural') • Settlement, cadastral and street patterns

[1] New Zealand Institute of Landscape Architects, 2 November 2010, 'Best Practice Note 10.1: Landscape Assessment and Sustainable Management'.
[2] Visual appearance and views are a subset of 'landscape'. 'Visual effects' are a subset of 'landscape effects' and are usually associated with a specific method, see below.
[3] The list is similar to a list contained in the 'Lammermoor decision' (*Maniototo Environmental Society Incorporated and others v Central Otago District Council and Otago Regional Council* Decision C103/2009, paragraphs 201 to 204). The list is not exhaustive or fixed or a formula. It merely provides typical factors. . The relevance of any factor will depend on the context.
[4] i.e. Natural and Cultural features, patterns and processes)

	Typical factors
	• Built form • Land use
Perceptual aspects ('sensory' aspects)	• Geomorphic expressiveness (how obviously the landscape expresses the geomorphic processes) • Legibility (visual clarity and visibility of landmarks, edges, and character areas) • Visibility, public and private views (especially Auckland gateway views) • Aesthetic qualities (presence of water, skyline of cones, harbour edge and backdrop) • Coherence (the extent to which human patterns reinforce the underlying natural landscape or otherwise)
Associative aspects	• Tangata Whenua associations • Historical associations • Recreational use
	• Consideration of the factors listed above will take into account things that may be present only occasionally or seasonally or in different weather conditions (i.e. 'transient factors')5

The following comments are made on this list of factors:

- The list is not exhaustive;
- The factors are not necessarily of equal weight; and
- There is no formula (an active overall interpretation of the factors is required).

The analysis was carried out through **site visits** and **desk-top investigations**. Reference was made to other **disciplines** including the following:

- Ecology (terrestrial, marine, aquafauna);
- Heritage;
- Geological Heritage;
- Coastal processes; and
- Arboriculture.

The natural and urban landscape was described taking into account the factors listed above. This is more than a catalogue of factors. Rather, the landscape is a synthesis **of the qualities and characteristics** that give the area its distinctive character ('sense of place'). Several themes became apparent during the course of the assessment. These themes were aligned with the Urban and Landscape Design Framework.

Particular attention was paid to items identified in the Proposed Auckland Unitary Plan overlays, including the three 'outstanding natural features', 'volcanic viewshafts' and 'significant ecological areas'.

[5] The factors listed in the table cover all those in the so-called 'Pigeon Bay criteria' which have been used for some years.

3.1.3 Natural Character

Although there are overlaps in method and tasks, the 'natural character' of the existing environment was assessed **separately**. Reference was made to the following in terms of defining 'natural character':

- Policy 13 (2) of the NZCPS; and
- The definition in the Dept. of Conservation Guidance Note on the NZCPS:

1 **NZCPS Policy 13 (2)** states that "*natural character is not the same as natural features and landscape or amenity values and may include matters such as:*

(a) natural elements, processes and patterns;
(b) biophysical, ecological, geological and geomorphological aspects;
(c) natural landforms such as headlands, peninsulas, cliffs, dunes, wetlands, reefs, freshwater springs and surf breaks;
(d) the natural movement of water and sediment;
(e) the natural darkness of the night sky;
(f) places or areas that are wild or scenic;
(g) a range of natural character from pristine to modified; and
(h) *experiential attributes, including the sounds and smell of the sea; and their context or setting.*"

2 **The DOC Guidance Note** says that *"natural character is the term used to describe the natural elements of all coastal environments. The degree or level of natural character within an environment depends on:*

1. *The extent to which the natural elements, patterns and processes occur;*
2. *The nature and extent of modification to the ecosystems and landscape/seascape;*
3. *The degree of natural character is highest where there is least modification;*
4. *The effect of different types of modification upon natural character varies with context and may be perceived differently by different parts of the community.*

In this context 'elements, patterns and processes' means 'biophysical, ecological, geological and geomorphological aspects; natural landforms such as headlands, peninsulas, cliffs, dunes, wetlands, reefs, freshwater springs and surf breaks; and the natural movement of water and sediment"

By way of clarification, the following principles were adopted:

- Natural **character** is the **particular** combination of an area's **natural features** and **processes**.
- It comprises both **biophysical naturalness** and **perception of naturalness**;
- Factors influencing natural character (such as set out in Policy 13 (2)) are **not exhaustive** (some are likely to be more or less relevant to this particular project);
- Factors influencing natural character are **not necessarily of equal weight** (Some are likely to be more or less relevant to this particular Project).

The natural characteristics of the coastal environment were analysed and described having regard to both **biophysical** and **perceptual (experiential)** aspects, including the factors listed in Policy 13 (2) of the NZCPS. An overall synthesis of the area's natural character was made, in a similar fashion to that for landscape. In practice, the analysis dovetailed with that for 'natural landscape'.

The degree of natural character was evaluated against the following seven stage scale:

very low	low	mod-low	moderate	mod-high	high	very high

As a guide:

- Very high natural character generally means near to pristine indigenous vegetation cover, essentially no human structures or patterns, and strong experience of natural processes.
- High natural character generally means a high proportion of indigenous vegetation cover, visually unobtrusive land management (e.g. low intensity pasture), few and visually subservient human structures, and strong experiential aspects.
- Less-than-high natural character will generally mean one or more of the following: Mostly modified land cover (e.g. pasture, plantations), only remnant indigenous vegetation, obvious land management patterns, obvious or prominent human structures, modest experience of natural processes.

It is noted that the coastal environment in the EWL Project area is not classified as having 'high' natural character in the PAUP.[6]

3.1.4 Relevant Provisions

While the assessment focuses primarily on its core subject matter (natural character, landscape and visual), the assessment was framed in response to the relevant statutory provisions. These provisions were discussed with the Project Planner, and are briefly summarised in the report.

3.1.5 Assessment of Effects

Effects were assessed geographically because of the linear nature of the Project and the quite different landscape contexts. The effects were assessed for each of six sectors in common with the other disciplines. Within each sector, effects were assessed on the natural landscape, urban landscape, natural character, and visual amenity. While there is overlap between these matters, it is useful to treat them separately because they relate to different statutory provisions. Nevertheless, effects were summarised where appropriate to avoid unnecessary repetition.

While the focus was on permanent landscape and visual effects, effects during construction were also considered.

Effects are assessed as a combination of the nature of the effect, its significance in relation to context, its magnitude appraised against a seven point scale ('very low' to 'very high'), and the factors influencing the magnitude.

Effects were assessed against the existing environment. The report notes where adverse effects are additional to existing adverse situations

Effects identified and assessed included:

- Effects on natural character of the coastal environment;
- Effects on biophysical landscape processes including water quality and ecological health of the inlet (relying on input from other disciplines);
- Effects on landscape features, including those identified as ONFs;

[6] The way in which natural character is determined is indicated in section D11 of the PAUP (Decisions Version). The factors comprising natural character listed in Policy B8.2.2(1) are the same as those listed in Policy 13(2) of the NZCPS – in summary a combination of biopphysial and perceptual (experiential) matters. Schedule 8 of the PAUP tabulates assessment of individual areas of the coastal environment. Such assessments entail and overall evaluation taking into accout biophysical and perceptual matters. This is similar to the approach as described above.

- Effects on urban form and features – including the connection between Onehunga and harbour;
- Effects on aesthetic qualities of the landscape as a whole (such as the aesthetic qualities of Māngere Inlet, the gateway experience to Auckland on SH20);
- Visual amenity from public and private places, taking into account the places from where the works will be visible, sensitivity of audience, prominence and amenity of the Project (taking into account properties adjoining the works, and public places such as Waikaraka Cemetery, Mutukāroa-Hamlins Hill);
- Effects on landscape use and activities – including amenity of and access to coastal edge; and
- Effects on associative factors such as historical themes (Kāretu portage, Onehunga's relationship with harbour).

There are overlaps in effects with other disciplines, The approach taken in this report is to take such overlapping effects into account only to the extent that they are relevant to landscape and natural character matters. For example, effects on trees and natural vegetation are principally covered in the Arboriculture (*Volume 3: Technical Report 5 – Aboricultural Assessment*) and Ecology (*Volume 3: Technical Report 16 - Ecological Impact Assessment*.) reports.

3.1.6 Photosimulations

Photosimulations have been prepared and are provided in the drawing set for the Project (refer *Volume 2: Drawing Set*). The viewpoints were selected to represent key public viewpoints of the Project, with two photosimulations from each of sectors 1-5. The images are printed across two A3 pages so as to depict correct scale at a normal reading distance of 400mm and a field of view of just under 120o. A description of the methodology used to prepare these photosimulations is also included in the drawing set..

3.1.7 Measures to Avoid, Remedy or Mitigate Adverse Effects

Measures designed to avoid, remedy or mitigate adverse effects were discussed where they related to specific effects in each of the sectors under the heading 'Assessment of Effects'.

In addition, the design measures were described as an integrated package in a separate section of the report. The reason is that the design is seen as a whole rather than related to specific effects.

This section of the report sets out the over-riding themes and principles established in the ULDF and how these are specifically applied.

3.1.8 Conclusions

Finally, the main factors were summarised for each sector, and a conclusion of the overall effects made for that sector. This includes the overall conclusion that the Project is supportable from a landscape and urban design perspective.

4 Statutory Framework

An assessment of the Project against the statutory provisions is contained in the AEE and in Technical Report 2, 'Statutory Planning Context'. This report is primarily concerned with landscape and visual effects, but is written to facilitate an assessment against the statutory framework by the relevant experts and decision makers.

Those provisions most relevant to landscape and visual effects include the following:

- The overarching framework of **Part 2 of the RMA (1991),** including the purpose of the Act set out in section 5. Matters of national importance particularly relevant to landscape matters of the EWL Project include sections 6(a), 6(b), 6(c), 6(d) and 6(e). Other matters relevant to the landscape and visual design and assessment include sections 7(aa), 7(c) and 7(f);
- The **NZCPS (2010)** which states policies applying to the coastal environment. Policies particularly pertinent to the design measures and assessment of EWL include Policies 10, 13, 14, 15. These cover matters to do with reclamation, natural character, restoration and rehabilitation of natural character, and outstanding natural features in the coastal environment;
- The **Proposed Auckland Unitary Plan** (PAUP), Decisions Version;
- Relevant objectives and policies in the **Regional Policy Statement** chapters include chapters B3, B6, B7 and B8;
- Relevant provisions in the **Coastal** chapters include chapter F2 which includes objectives and policies relating to the General Coastal Zone; and
- Relevant objectives and policies in the **Overlay** chapters include those in chapters D9, D10 and D14 which relate to Significant Ecological Areas, Outstanding Natural Features, and Volcanic Viewshafts. The following **overlays** relevant to landscape matters apply to the EWL area:
  - Three Outstanding Natural Features (ONF) are identified in the vicinity of the EWL: "Hōpua explosion crater and tuff exposure", "Southdown pāhoehoe lava flows incl. Anns Creek" and "Hamlin's Hills sandstone ridges and rhyolitic tuff";
  - Significant Ecological Areas that cover Anns Creek, the remnant lava flow outcrops adjacent to Pikes Point, and a small salt marsh area in Hōpua crater; and
  - A volcanic cone viewshaft to Maungakiekie / One Tree Hill that passes over the intersection of the EWL Project and Galway Street.

5 Existing Environment

A consistent theme of the existing environment traversed by the East West Link (EWL) is the extent to which the natural and urban landscape has been treated as an industrial backyard over many decades.

In pre-European times the area occupied a central and strategic location on the Kāretu and Ōtāhuhu portages, occupying the route between Northland and Waikato. In early Pākehā years the area was similarly central. Historical maps, such as Hochstetter's geological map of 1859, depict the following:

- Onehunga's relative importance as an urban centre and port on the Manukau Harbour (Auckland's second harbour frontage);
- Ōtāhuhu's strategic location on the north-south land bridge;
- The centrality of Māngere Inlet surrounded by volcanic features, and its intricate former northern shoreline; and
- The closeness of the connections between the head of Māngere Inlet and the Tāmaki River.

However, comparison of the existing situation with such historical maps highlights the extent to which the area has been neglected and poorly treated including the following changes:

- Reclamation and straightening of the Māngere Inlet shoreline and infilling of the inlets with refuse;
- Industrial activities, including noxious industries, around the shoreline;
- Substantial north-south transport infrastructure; and
- Dislocation of Onehunga from the harbour.

For the purpose of more detailed description, the following section of the report divides the area into two natural and urban landscapes[7]:

- Onehunga - Māngere Inlet; and
- Ōtāhuhu land bridge.

This description should also be read in conjunction with the ULDF which contains plans, figures and further description.

5.1 Onehunga

5.1.1 Historical setting and character

Onehunga is Auckland's port on the Manukau Harbour. Hochstetter's map highlights its importance in Auckland's early years as the second largest urban centre on the isthmus. It was Auckland's second harbour frontage. In particular, it was the main port for coastal connections to the south prior to the completion of the North Island Main Trunk Railway.

Prior to Pākehā settlement, Onehunga and Māngere were important settlements because of their strategic location with respect of connections by water to the Waikato. Onehunga became a Pākehā garrison town during the 1860s Waikato Wars for similar reasons.

[7] 'Landscape is the cumulative expression of natural and cultural features, patterns and processes in a geographical area, including human perceptions and associations' (Definition of 'landscape' from NZILA Best Practice Guide 10.1)

Onehunga was laid out with a distinctively square grid street-pattern centred on the main street of Queen Street (now Onehunga Mall) and a principal cross-axis on Church Street.

Queen Street is aligned with Maungakiekie to the north, and continued south to the port by way of the rim of Te Hōpua crater. Onehunga has the character of an 'urban village' with its own history, institutions and distinctive features. Its historic character is reflected in the high proportion of villas and bungalows, from relatively grand houses on the hill overlooking the harbour west of the town centre (e.g. Normans Hill Road) to more modest houses on the lower lying land to the east. The main street has the two-storey Victorian and Edwardian buildings characteristic of New Zealand's older town centres.

Particular landmarks include the Anglican church and graveyard on Onehunga's central intersection, the Catholic Church on the intersection of Church and Galway Streets (the steeple of which is a landmark from Māngere Inlet), and civic buildings such as the former Post Office and Carnegie Library. There were historical industries some of which utilised the freshwater springs flowing through the lava. This historical industrial area subsequently merged with the later extensive industrial development of Te Pāpapa. Residential areas are to the north of the town centre, while industrial areas lie to the south between the town centre and the harbour. The railway terminus of the Onehunga Line is at the southern end of the main street, adjacent to the intersection of Onehunga Mall and Neilson Street.

Onehunga's connection with the Manukau Harbour can be described under three sectors:

- Western beaches to the west;
- Te Hōpua ā Rangi and Onehunga Wharf to the south; and
- Māngere Inlet to the south-east.

5.1.2 Western beaches

Onehunga's recreational connection with the Manukau Harbour – its 'front door' – was the former west-facing beaches along Beachcroft Avenue. This shoreline had sandy beaches backed by pōhutukawa-clad cliffs, an outlook down the main harbour, and was overlooked by well-to-do residential streets. The connection was severed by the construction of SH20 in the 1970s. The Onehunga Foreshore project, funded largely by the Transport Agency, was carried out recently to remedy this severance by recreating a naturalised shoreline on reclaimed land seaward of SH20. The shoreline includes nine beaches and a series of headlands and reefs, with contoured parkland forming a buffer between SH20 and shore. Two of the larger beaches are sand for use by people, whereas pebble and shell were used for other beaches to provide different character and habitat. The area is connected with the township by two footbridges over SH20.

5.1.3 Te Hōpua ā Rangi

Onehunga's 'reason for being' was its port and strategic location on the harbour. The main street extended south of the town centre tracing the rim of Te Hōpua crater to the port and the original Māngere Bridge. Auckland's first railway and one of its main tram lines also terminated at the port.

However, even in its early days, the township and port were somewhat separated by the intervening crater. Te Hōpua crater was a tidal lagoon but was suitable for only shallow draught boats. A reminder of this era is the 1911 Manukau Yacht and Motor Boat Club (now the Aotea Sea Scouts hall) built on the tuff rim between the lagoon and harbour. The lagoon was reclaimed in the 1930s to create playing fields ('Gloucester Park'), and was subsequently bisected by SH20. The former lagoon entrance in the south-west corner of the crater is now blocked by the road embankment. Urban development covers most of the tuff rim and its outer slopes, although there are some places where the inner scarp of the crater is discernible (most noticeably on the north and east sides).

Te Hōpua is one of several volcanic explosion craters which are a characteristic feature of the Auckland Volcanic Field – others include Ōrākei Basin, Lake Pupuke, Panmure Basin, Māngere Lagoon, Tank Farm, Pukaki Lagoon and Crater Hill. It is relatively small and has a low tuff rim, the highest part being in the north-east corner nearest Onehunga town centre and the lowest part in the south-west corner

where it was breached by the harbour to create the former lagoon. It is described in the New Zealand Geopreservation Inventory as follows:

> *Hōpua volcano is a small explosion crater with a low tuff ring about 500 m in diameter. The original crater was breached by the sea and filled with marine sediments. Although damaged by reclamation and motorway construction, the tuff ring is still discernible as a volcanic feature. An intertidal exposure of Hōpua tuff in the Manukau Harbour foreshore contains large blocks of basalt*

Te Hōpua's geomorphology is most evident in the circular form of Gloucester Park and the circular alignment of the road tracing the eastern and southern portions of the rim (Onehunga Mall). The following modifications, however, detract from Te Hōpua's integrity and legibility:

- Urban development on much of the rim and outer slopes of the tuff ring;
- Reclamation around the outside perimeter of the tuff ring perimeter including the port to the south, and the former inlets to the east and north-west;
- The alignment of Onehunga Harbour Road which does not follow the crater rim but drops away from Onehunga Mall in the south-east corner; and
- The bisection of the crater by SH20, which is exacerbated by the planting parallel with SH20 and the contrasting landscape treatments either side of SH20 (open playing fields on the north-east half, revegetated wetlands on the south-west half).

5.1.4 Te Hōpua as an Outstanding Natural Feature

Te Hōpua is identified as an 'outstanding natural feature' in the PAUP Decisions Version. The reasons for its classification listed in Appendix 3.1 of the notified version of the PAUP were limited to earth science grounds – namely the extent to which the feature (a) contributes to the understanding of Auckland's geology, (d) is a component of a recognisable group of geologically associated features, (g) has potential value for public education, and (h) has potential to provide additional understanding of Auckland's geology. The decisions version of the PAUP adopted the recommendations of the Independent Hearing Panel which added a further reason to Schedule 6 - "(e) the extent to which the landform or geological feature or site contributes to the aesthetic value or visual legibility of the wider natural landscape". Te Hōpua is classified as a 'Type B' feature which is described as "smaller more fragile landforms" and "small landforms or other features that could be damaged or destroyed by relatively small-scale land disturbance or constructions."[8] Given Te Hōpua's classification as an ONF in the PAUP, regard needs to be had to the earth science and aesthetic/legibility matters for which it is classified. In assessing effects on such matters, consideration would also need to be had to the fact that its natural form and aesthetic qualities are already substantially modified. The following points are made in this regard:

- The mapped ONF does not encompass the whole volcanic feature. Rather the mapping is restricted to those portions that remain in open space – namely parts of the former crater floor and those small parts of the tuff ring that have not been built on;
- The feature's aesthetic value and visual legibility are already substantially diminished by the extent of physical modifications, urban development around the rim, and the state highway through the middle of the crater; and
- It is understood that Te Hōpua's earth science value derives from it being a component of the Auckland Volcanic Field as a whole rather than its intactness or value as a feature in itself. The NZ Geopreservation Inventory notes that the feature is *"considerably damaged by reclamation and motorway…".* The Geological Heritage Assessment by Professor Ian Smith notes that "although

[8] The types are described in Table D10.4.1 of the PAUP Decisions Version

with knowledge and a wider perspective Hōpua can be recognised as a volcanic centre it is probably one of the least obvious volcanoes in the Auckland field." The report goes on to conclude that "in its current state Hōpua represents little value as a volcanic feature characteristic of the Auckland Volcanic Field". (Technical Report 4 Geological Heritage Assessment).

5.1.5 Onehunga Wharf

The original Onehunga wharf curved out from the shoreline of Te Hōpua crater to reach the deep channel. The area between the wharf and Te Hōpua crater was later reclaimed to form the current hardstand.

The Landing Restaurant and Bar (formerly the 'Manukau Tavern'), is an historic hotel overlooking the port and is a remnant of the port's history – although it is now on an orphaned section of the former main road between Onehunga and the port and is somewhat lost between flanking buildings .

The Port of Onehunga lost a large part of its traffic upon the completion of the North Island Main Trunk railway line in 1909 and the subsequent decline of coastal shipping. In recent years the port has been mainly limited to fishing boats, occasional coastal freighters and the Holcim cement carrier, the latter of which is being discontinued.

Nevertheless, the port is a landmark characterised by its composition of the cargo sheds and silos, its relatively small scale, its connection with Old Māngere Bridge (the pedestrian and cycle connection to the Māngere side of the inlet), and the views down the harbour towards the Manukau Heads, In particular, there are views from the Māngere Harbour Crossing bridge over the Port which is a memorable waymark on the route into Auckland from the airport. In this regard it is noted that the Old Māngere Bridge is also part of the Airport to CBD National Cycling Path, and Te Araroa National Trail which likewise connects with the airport. The Transport Agency plans to replace the existing Old Māngere Bridge' with a 'new Old Māngere Bridge', anticipated to be constructed during 2017. The EWL works, however, are designed to tie in with either the existing or new Old Māngere Bridge.

Panuku, Auckland Council's development organisation, is exploring ideas to redevelop the port as a mixed use destination, and to strengthen connections between Onehunga town centre and the port. As discussed above, there has always been somewhat of a separation between Onehunga town centre and the port because of the intervening volcanic crater. Such separation has been exacerbated by SH20, poor sightlines and low streetscape amenity between Onehunga and Onehunga Wharf, , and the heavy traffic which dominates Onehunga Harbour Road.

5.2 Māngere Inlet

5.2.1 Centrality of the inlet

Māngere Inlet is the central element of landscape upstream of Onehunga Wharf. The main natural landmark is the inlet itself, characterised by its channels and tidal mudflats, its luminous qualities in contrast to the surrounding urban land, and its reflection of the sky.

The inlet is encircled by distinctive volcanic cones: Māngere to the south, Maungakiekie (One Tree Hill) to the north, and Ōtāhuhu (Mt Richmond) to the east – and also the sandstone hill of Mutukāroa (Hamlins Hill) which resembles a volcanic landform at first glance. The volcanic cones stand out above the relatively subdued urban landscape surrounding the inlet. (Two additional volcanic cones were removed by historical quarrying – Rarotonga / Mt Smart and Te Apunga o Tainui / McLennan Hills). As with the western view toward the Manukau Heads, the eastern view over Māngere Inlet is one of the memorable waymarks on the trip between Auckland and the airport.

There is a small island, Ngārango o Tainui, in the south-east corner of the inlet. The name commemorates the portaging of the Tainui waka over the Ōtāhuhu isthmus, and refers to the wooden skids which were left on the island following their use. The island is marked by macrocarpa trees which are used as a bird roost. There is also a distinctive long shell bank in the middle of the inlet although it is under water at high tide.

5.2.2 Northern shoreline

If the port was Onehunga's reason for being, and its western beaches its recreational frontage to the Manukau, Māngere Inlet became its industrial backyard.

The northern shoreline, in the vicinity of the EWL route, was formerly an intricate volcanic shoreline comprised of lobes of lava protruding into the tidal mudflats. There were three main lobes comprising (i) Pikes Point, (ii) Waikaraka Cemetery and (iii) the northern side of Anns Creek. Historical photos depict intertidal mudflats with a shoreline tracery of islets, reefs and fingers of lava. The two main inlets penetrated almost as far as Neilson Street in the east and Princes Street in the west – distances of approximately 500m – 600m from the main inlet. The lava mostly originated from Maungakiekie (One Tree Hill) and Rarotonga (Mt Smart), but a small and distinctive finger at Anns Creek came from Maungarei (Mt Wellington). The shoreline lava was a continuation of lava flows which further inland included such features as grottos, springs and collapsed lava caves that are characteristic of Onehunga.

The intricate natural shoreline, however, was straightened, and the inlets behind filled with refuse and other landfill. Such reclamation buried almost all previous features of the northern shoreline except for two small distal (outer) remnants of lava flows that remain beyond the rip rap sea wall. The larger of the two remnants comprises a rocky reef beyond the former Pikes Point, while the smaller comprises scattered rocks west of Waikaraka Cemetery (beyond the end of Victoria Road). Both of these lava features are intertidal with scattered islets/rocks colonised by mangroves. The Geological Heritage Report describes these features as "…not particularly significant or accessible, however an opportunity exists to enhance their value by providing public access and some interpretive material. A link between the tuff cone of Te Hōpua and the lava flow features on the Anns Creek area provides the opportunity for a volcanically themed park." (Technical Report 4 Geological Heritage Assessment)

There are also two small remnants of the former tidal inlets:

- 'Miami Stream' is a small remnant of the much larger inlet that formerly occupied the west side of Pikes Point. Most of the inlet was reclaimed by landfill, leaving a narrow section alongside Miami Parade. This remnant is tidal by virtue of a culvert under the seawall, and its head is fed by the stormwater discharge culvert from the catchment. It is colonised by mangroves. In visual terms it appears a degraded waterway because of its artificial perimeter, the rubbish evident within the inlet, and the surrounding industrial activities; and
- A small remnant saltmarsh immediately east of Te Hōpua crater. It is confined on its landward side by the edge of a landfill and reclamation, has a seawall on its outer edge, and is crossed by the walkway/cycleway on a structure. Nevertheless, it comprises a remnant salt marsh and colonising mangroves.

The esplanade reserve and path has a somewhat isolated character, hidden away behind industrial sites. While the industrial backdrop has low amenity, and the esplanade reserve itself is relatively dull, the path nevertheless affords attractive outlook over the tidal inlet to the backdrop volcanic cones of Māngere and Ōtāhuhu/Mt Richmond.

5.2.3 Industrial Backdrop

The reclaimed land has subsequently been developed for industrial activities which forms a backdrop to Māngere Inlet.

There is a distinct contrast between the fine-scale urban development pattern of Onehunga and the coarse scale of the Te Pāpapa and Southdown industrial backdrop.

During Auckland's earlier years Te Pāpapa comprised small farms, including market gardening on areas of good volcanic soil such as on Pikes Point. The road network is typified by no-exit roads connected back to Church Road or Neilson Street. However, during the second half of the twentieth century Te Pāpapa and Southdown were developed as a manufacturing and transport area together with the adjacent Penrose and Mount Wellington areas. At the same time, there was an increase in the

scale of landfill reclamation, in particular the large Pikes Point landfill, which was subsequently also converted to industrial and logistics use.

As a consequence, Te Pāpapa and Southdown retain a coarse and non-permeable street pattern, typically large lots, and large scale industry. Of particular note are the inland ports at the eastern end of the inlet accessed from the Main Trunk Railway.

Occasional remnants from the earlier rural history of the area include Waikaraka Park and Waikaraka Cemetery which were formerly on a low promontory in the harbour but are now flanked on either side by industrial development.

In summary, Māngere Inlet was effectively treated as Auckland's dumping ground where noxious industry was located and refuse was deposited. The area has been degraded physically and perceptually.

5.2.4 Anns Creek

Anns Creek was formerly part of a much more extensive swampy area that flanked the south-east side of Mutukāroa-Hamlins Hill and which was part of the Kāretu portage.[9]

Whereas the reefs at Pikes Point and Victoria Road/Waikaraka Cemetery are lava from Maungakiekie and Rarotonga (Mt Smart), the rock features at Anns Creek are a lava stream originating from Maungarei (Mt Wellington). It has a pāhoehoe surface which is different in appearance from the other rubbly lava features around the Māngere Inlet. The surface is smoother and has a ropey appearance that evokes the lava's fluid nature. The Anns Creek lava also contains a mix of distinctive and sometimes rare indigenous shrubs, together with exotic weeds. (*Volume 3: Technical Report 16 - Ecological Impact Assessment*).

The lava features are classified as an ONF in the PAUP Decisions Version as 'Southdown pahoehoe lava flows incl. Anns Creek'. They are classified as a 'Type B' feature (smaller more fragile landforms)and described in Schedule 6 as follows:

> *"One of few examples of pahoehoe surfaces on basalt lava flows in the Auckland volcanic field. Several small flow lobes (probably from Mt Wellington volcano) are visible from the coastal walkway on Māngere Inlet and at Anns Creek between Great South Road and the railway line."*

In that regard the following points are made:

- The feature is mapped as a number of discrete lava outcrops rather than a single area;
- The outcrops are classified on earth science grounds, namely the extent to which they contribute to the understanding of Auckland's geology, are outstanding representative examples of the diversity of landform and geological features of Auckland, are part of a recognisable group of geologically associated features, have potential value for public education, and are in a good state of preservation. As discussed above, the lava flows also have ecological value because of the associated assemblage of distinctive vegetation. However, the feature does not have high aesthetic value because the rock outcrops are scattered and have low prominence; and
- While the walkway passes some of the outcrops in Anns Creek West, access is restricted to those in Anns Creek East.

[9] Portages of early Auckland – to and from the Waitemata, Brian Hooker, http://folksong.org.nz/he_tangi_te_kiwi/portages_of_early_auckland.html, retrieved 1 August 2016

5.2.5 Natural character of Māngere Inlet

Natural character comprises both biophysical and perceptual aspects. It includes the extent to which natural processes and features are intact and the area appears natural.

Despite the modifications, Māngere Inlet itself is still essentially a natural feature. It is dominated by the tidal processes, and is characterised by the natural channels and shoals and such transient features as the wading birds.

Nevertheless, the natural processes and appearance have been substantially altered.

- Much of the shoreline and former seabed has been modified through reclamation. In particular, the natural northern shoreline is buried beneath reclamation and refuse landfill. The original 7.5km^2 area of the inlet is reduced by 1.8km^2 (24%). (*Technical Report 15-Coastal Processes*, page ii);
- It is understood that tidal processes have been altered by constrictions at the mouth of the inlet by port and bridge reclamations;
- The inlet acts as a natural sediment and contaminant sink. Sedimentation is amplified compared to pre 1950 rates. (*Technical Report 15 - Coastal Processes*);
- Water quality is reduced through untreated stormwater runoff from adjacent industrial land, and from percolating leachate. (*Technical Report 12 - Stormwater Assessment, Technical Report 13 - Groundwater Assessment, Technical Report 17 - Contaminated Land Assessment*);
- The surrounding terrestrial fringes have been urbanised with reduced habitat;
- Similarly, the natural appearance is substantially altered through the straightness of the northern shoreline, the backdrop of industrial development, infrastructure such as Manukau Harbour Crossing which visually encloses the mouth of the inlet, and the railway causeways across Anns Creek; and
- At a finer scale, the experience of the esplanade reserve along the northern shore of the inlet is characterised by a dual character. While the outlook over the inlet is reasonably natural, the shoreline itself is a straight rip-rap edge, and the inland margins are dominated by industrial structures and security fences.

In summary, the overall natural character of Māngere Inlet is considered to be moderate-low (3 on a 7-point scale).

5.3 The Ōtāhuhu isthmus

5.3.1 Setting and character

The Ōtāhuhu isthmus occupies a strategic location for both north-south and east-west movement.

Prior to Pākehā settlement, the Ōtāhuhu isthmus held the portages linking the Tāmaki River/Waitematā and the Manukau. At a broader context, the isthmus held the water-borne route between Northland and Waikato. Hochsetter's map highlights the proximity of the headwaters of channels in the Māngere Inlet and Tāmaki River.

There were two portages:[10]

[10] Portages of early Auckland – to and from the Waitemata, Brian Hooker,http://folksong.org.nz/he_tangi_te_kiwi/portages_of_early_auckland.html, retrieved 1 August 2016

- The shorter Ōtāhuhu portage is over the low ridge between Ōtāhuhu Creek and a small creek (Fairburn Creek) on Māngere Inlet, and is most famously linked to the Tainui waka – an event recorded in several place names in the area; and
- The longer but flatter Kāretu portage was via the swampy ground between Anns Creek and Kāretu, an inlet on the Tāmaki River.

Ōtāhuhu (Mt Richmond) contained pā controlling the isthmus, and the adjacent Mutukāroa-Hamlins Hill was likewise a large settlement overlooking the portage.

Ōtāhuhu township was subsequently established for similar strategic military reasons, controlling the Great South Road built during the 1860s Waikato Wars.

Like Onehunga, Ōtāhuhu was a distinct town with its own history and its own suite of institutions and features. The town centre straddles Great South Road along the low ridge. Industrial activities are located largely around the western and northern perimeter of the isthmus along the railway lines, Great South Road and the Mount Wellington Highway. Industries included the Westfield freezing works and railway marshalling yards along the shore of Māngere Inlet west of Ōtāhuhu, and the Municipal Abattoirs, Southdown Freezing Works and more recent manufacturing in the Anns Creek area beyond the northern perimeter of Ōtāhuhu. Residential areas, on the other hand, are weighted more heavily to the east side of the isthmus.

5.3.2 Mutukāroa-Hamlins Hill

EWL follows Sylvia Park Road along the toe of Mutukāroa-Hamlins Hill, joining SH1 in the vicinity of Tip Top corner. With the exception of Mutukāroa-Hamlins Hill, the surrounding land uses in this area are industrial. This section of the Project roughly follows the Kāretu portage and the former marshland at the head of Anns Creek (now largely reticulated through stormwater pipes). Also shoe-horned into the corridor are Auckland's eastern railway line, and the Transpower Ōtāhuhu – Henderson 220kV overhead electricity transmission line.

Mutukāroa-Hamlins Hill is made up of the 'Waitemata Sandstone' that underlies much of Auckland, although it appears somewhat similar to the volcanic cones surrounding Māngere Inlet because of its steep sides and stand-alone nature. It is classified as an ONF in the PAUP Decisions Version. Apart from the rhyoltic tuff on top of the hill, Mutukāroa is classified as a Type A landform which are described as "large landfoms" and "landforms that are sufficiently large and robust to withstand small-scale land disturbance or constructions without significant impact."[11] Mutukāroa-Hamlins Hill is described in Schedule 6 as follows:

> *'Hamlins Hill is one of the least modified sandstone ridge complexes remaining in Auckland. Ridges like it are some of the most common landforms beneath urban Auckland, but unmodified and undeveloped examples are rare. Hamlins Hill also includes the best inland exposure of rhyolitic tuff in Auckland City, in an exposure 10 m wide and up to 2 m high. Its position on top of the hill suggests the rhyolitic ash is from airfall or a pyroclastic flow and not reworked by water as is more common.'*

In addition to such earth science significance, Mutukāroa-Hamlins Hill is a prominent landmark rising above the surrounding urban development and encircled by key transport routes (SH1, South Eastern Arterial, Great South Road and the KiwiRail southern and eastern rail lines). It has cultural history associated with its former occupation as a settlement overlooking the Kāretu portage. The wide views from the summit ridge in particular include a view down the Māngere Inlet in the direction of the Manukau Heads.

[11] The types are described in Table D10.4.1 of the PAUP Decisions Version

The upper parts of Mutukāroa-Hamlins Hill remain undeveloped, partly because for many years it was retained as holding paddocks for the adjacent Southdown Freezing Works. However, there has been some encroachment onto the flanks of the hill such as the South East Arterial along the north-east side of the hill and the Pacific Rise office park in the south-east corner. The steep flanks and open tops now fall within the Mutukāroa-Hamlins Hill regional park and a restoration project is underway, with relatively recent indigenous planting.

5.3.3 South of Tip Top corner

There is a sharp transition in adjacent land use at properties on Panama Road, between the industrial activities to the north and the suburban housing that adjoin the balance of the Project area to the south.

This section of the EWL will entail widening the existing SH1 which is flanked by housing on both sides – in some instances houses that are quite close to the state highway. An exception is industrial uses adjacent to SH1 just south of the Ōtāhuhu Creek crossing.

5.3.4 Ōtāhuhu Creek

The only noteworthy natural feature in this area is Ōtāhuhu Creek, the crossing of which is to be widened as part of the Project. As discussed above, the creek is a tributary of the Tāmaki River and it was part of the Ōtāhuhu portage. Downstream of SH1 the creek has an open tidal channel in the order of 80m wide, fringed with mangroves along the banks. However, the mangroves converge on the channel in the vicinity of the SH1 causeway and culverts. While Ōtāhuhu Creek continues some 700m upstream of the state highway bridge, it is constricted with mangroves with no clear channel. The banks also contain extensive weed vegetation that further constrains views along the creek. For these reasons, the creek is no longer a prominent waymark on SH1, and its former role as a portage is not recognisable.

5.3.5 Natural character of Ōtāhuhu Creek

The most obvious natural process in Ōtāhuhu Creek is the coming and going of the tide. It is understood the Tāmaki River estuary as a whole has been affected through reclamations, sedimentation from land development, and reduction in water quality from discharges and run-off. In the vicinity of SH1, the constriction of the culverts appears to have exacerbated the choking of the creek headwaters with mangroves.

Similarly, the natural appearance has been altered. Views along the formerly open channel have been reduced, the fringing vegetation along both banks is mostly mown grass and exotic trees, and the backdrop is suburban fences and housing. The presence of SH1 further reduces the natural appearance.

Overall, the Ōtāhuhu Creek in the vicinity of the EWL has low-moderate natural character (3 on a 7 point scale).

5.3.6 Te Apunga o Tainui (McLennan Hills)

Te Apunga o Tainui was a cluster of small scoria cones immediately north-east of Ōtāhuhu which have been removed through quarrying. However, the volcano generated the extensive lava flows that forms the Panama Road peninsula and which are expressed in the shape of the Tāmaki River shoreline. The toe of the lava is also understood to have blocked the former course of the Tāmaki River along the southern side of Mutukāroa-Hamlins Hill – forcing the Tāmaki River to cut a new route in the opposite direction to the Waitematā – the marshy former course of the river becoming the Kāretu portage. The lava is also evident in the outcrops at Tip Top corner.

5.3.7 Ōtāhuhu (Mt Richmond)

While the volcanic cone of Ōtāhuhu / Mt Richmond is more than 600m from EWL, it is worth mentioning as part of the context. Ōtāhuhu is a complex landform comprising several scoria cones within a large explosion crater and surrounding tuff ring. The cones are terraced with pā remains. As discussed above, this area controlled both the Ōtāhuhu and Kāretu portages.

6 Assessment of Effects

Effects are assessed for each of the Project's six geographic sectors:

- Sector 1: Neilson Street Interchange and Galway Street connections;
- Sector 2: Foreshore works along the Māngere Inlet foreshore including dredging;
- Sector 3: Anns Creek from the end of the reclamation to Great South Road;
- Sector 4: Great South Road to SH1 at Mt Wellington;
- Sector 5: SH1 at Mt Wellington to the Princes Street Interchange; and
- Sector 6: Onehunga local road works.

Within each sector the effects are assessed in terms of the following topics, bearing in mind that there are substantial overlaps between the topics:

- Effects on the natural landscape;
- Effects on the urban landscape;
- Visual effects;
- Effects on natural character (where relevant); and
- Effects on outstanding natural features (where relevant).

Measures to avoid, remedy or mitigate adverse effects are discussed within each sector, and are also summarised in a more integrated manner in a separate section of the report under the heading 'Remediation and Mitigation'. Such measures also fall under the umbrella of the ULDF which should be read in conjunction with this assessment.

6.1 Sector 1: Neilson Street Interchange and Galway Street connections

The main natural and urban landscape issues in sector 1 are:

- Effects on Te Hōpua volcanic landform – its physical form, aesthetic values and legibility;
- Effects on connections between Onehunga town centre and Onehunga Wharf; and
- Visual effects of the EWL – particularly the Neilson Street Interchange overbridge and the Galway Street intersection.

6.1.1 Effects on the natural landscape

The natural landscape in this area revolves around the Te Hōpua volcanic explosion crater and tuff ring which is a pivot between Onehunga town centre and Onehunga Wharf. Potential effects include physical damage of the landform and effects on its legibility.

There will be little physical damage of intact elements of the volcanic landform. Apart from a minor encroachment into the side of a remnant section of the tuff ring in the north-west corner (adjacent to the Neilson Street Interchange overbridge) the works will otherwise be constructed on previous reclamation around the south-east and south sides of the crater rim and the infilled former crater.

There are groups of trees on parts of the tuff ring that contribute to the amenity and legibility of the landform, including a group of pōhutukawa north of the Aotea Sea Scout Hall (trees numbered 79-90 on Tree Location Plan 1 in Appendix C of *Volume 3:Technical Report 5 - Arboricultural Assessment*) and west of the Motel. The trees are within the designation but outside the footprint of the EWL road. It is recommended measures be taken to retain these trees, where practicable, to help maintain the legibility of the crater. If it is not practicable to retain the group of pōhutukawa north of the Aotea Sea Scout Hall, then replacement trees should be planted.

The works will, however, detract from the feature's legibility as follows:

- The increase in complexity of roading around the landscape feature, including the Neilson Street Interchange overbridge, will distract from the already poor legibility of the feature;
- Specifically, the approach ramps to the Neilson Street Interchange overbridge will interrupt the visual relationship between the crater/former lagoon and the harbour. The approach ramps will be approximately 5m above ground level across the location of the original channel between the harbour and the former crater lagoon. The overbridge will also weaken the context of the former Manukau Yacht and Motor Boat Club building (now the Aotea Sea Scouts Hall) with respect of its relationship to the former crater lagoon (although the hall's principal relationship with the harbour will be maintained); and
- The Neilson Street Interchange overbridge will visually dominate the very small section of tuff ring which is only a couple of metres high in the north-west corner of the crater, although the group of pōhutukawa on this section of tuff will moderate such effects.

However, to put such effects in perspective:

- The volcanic landform already has low legibility. It is currently not an obvious volcanic feature except to those who are aware of its existence; and
- The works will mostly take place on areas that are already substantially modified.

The effect of EWL on legibility or aesthetic value of the feature will therefore be only moderate.

6.1.2 Effects on Outstanding Natural Feature

'Hōpua explosion crater and tuff exposure' is classified as an Outstanding Natural Feature (ONF) in the PAUP Decisions Version.

The reasons for the classification as listed in Schedule 6 of the PAUP are the extent to which the landform (a) contributes to the understanding of geology of the region (d) is a component of a recognisable group of geologically associated features, (g) has potential value for public education, (h) has potential to provide additional understanding of Auckland's geology, and (e) contributes to the aesthetic value or visual legibility of the wider natural landscape.

While EWL will encroach into the mapped ONF, the works will occur where the landform has been previously modified. Professor Smith concludes that (in terms of earth science matters) any effects on the subdued topographic feature in the north-west corner will have only negligible effects (refer *Volume 3: Technical Report 4 - Geological Heritage Assessment, section 6.1*).

Consideration of the effects of EWL on the aesthetic value and visual legibility of the wider natural landscape with respect to the ONF needs to have regard to the following:

- Te Hōpua's naturalness is substantially reduced by previous modifications including (i) a causeway and seawall closing off the former channel between the crater lagoon and the sea, (ii) reclamation of the former crater lagoon, (iii) reclamation of the seabed that formerly wrapped around the outer edges of the tuff rim in the north-west and east, (iv) reclamation of the port area to the south between the tuff ring and Onehunga Wharf, (v) urban development over most of the rim and outer slopes of the tuff ring, and (vi) bi-section of the rim and crater by SH20;
- Te Hōpua's aesthetic value is reduced by the dominant presence of SH20 across the crater, the industrial buildings around the rim of the tuff ring, and such things as the two high voltage transmission lines crossing the crater; and
- Te Hōpua is not visually prominent and has low legibility. It is considered that most passers-by would not recognise it as a volcanic crater. It is, more evident in aerial photos than on the ground.

Taking these factors into account, the EWL Project will have only moderate effects on the aesthetic value and visual legibility of the wider natural landscape with respect of the mapped ONF.

It is recommended that an artwork be commissioned to encircle the crater. While the form would be determined by the artist, it is envisaged at this stage as a circle of light that will highlight the circular form and presence of the crater. This is a realistic way of highlighting the form of the crater given the constraints and scale of urban development (i.e. urban development around the rim, an urban motorway bisecting the crater, vegetation within Gloucester Park partially obscuring the crater form). Such an artwork would highlight the presence of Te Hōpua volcanic landform, restore some legibility to the feature as a whole, and contribute to aesthetic character of the node.

6.1.3 Effects on natural character

The EWL Project will add to the existing clutter of infrastructure around Te Hōpua and reduce legibility of the Te Hōpua explosion crater and tuff ring as a former coastal landform as discussed above. However, this part of the coastal environment is already characterised by infrastructure and other urban features. The works will mostly take place on land that has already been modified by earlier works.

The works will also remove an area of glasswort salt meadow in the vicinity of the Galway Street intersection. The ecological effects are addressed in *Volume 3: Technical Report 16 - Ecological Impact Assessment*. In terms of natural appearance, this area is small and dominated by a substantially modified shoreline and backdrop of industrial and transport infrastructure.

Therefore, there will be only a low reduction in natural character as a result of EWL in Sector 1.

6.1.4 Effects on the urban landscape

As described in the existing environment section, Te Hōpua explosion crater has always separated Onehunga town centre from its port. The tenuous connection was further weakened by subsequent industrial development, construction of SH20 and re-configuration of the local street network.

The EWL will add a further physical and visual barrier between Onehunga town centre and Onehunga Wharf. Such a connection has particular relevance because of Panuku's stated intentions to develop the port as a mixed use area.

Without mitigation, there would be moderate adverse effects on what are already poor connections. Measures to remedy and mitigate this situation include the following:

- EWL Project will remove most of the heavy traffic that currently dominates the route between Onehunga and the Port (Onehunga Harbour Road and a section of Onehunga Mall). This will improve the amenity of this connection and provides opportunities for street upgrade works;
- Street upgrade works will be undertaken on both Onehunga Harbour Road and Onehunga Mall. The main pedestrian and cycle route will follow Onehunga Mall via the existing underpass beneath SH20. Streetscape works for this route will be on the west side of Onehunga Mall, tracing the crater rim. It will comprise a generous width shared path. The vehicle route will follow Onehunga Harbour Road and will also have streetscape enhancements. The local overhead power lines on this section of Onehunga Mall and Onehunga Harbour Road are to be placed underground[12];
- Locating EWL in a trench will reduce the extent to which EWL is a visual barrier between Onehunga and Onehunga Wharf. A 50m to 70m wide 'land bridge' will connect Onehunga Harbour Road with the port in the vicinity of The Landing so that the physical connection between The Landing and the Port will be re-established (At present the Landing is separated from Onehunga Port by the intervening Onehunga Harbour Road and security fencing);
- The existing pedestrian and cycle bridge will be replaced over EWL to retain the existing connection with either the existing Old Māngere Bridge or the planned 'new Old Māngere Bridge' which is

[12] For the avoidance of doubt, this does not refer to the Transpower high voltage transmission line

anticipated to be completed before construction of EWL. (The bridges connect to opposite ends of a short causeway and are structurally independent of each other); and

- There will be improvements in the connectivity between Old Māngere Bridge[13] and the proposed new coastal path to the east along the shore of Māngere Inlet, and to the west along Orpheus Drive which will no longer be part of an on-ramp to SH20.

Overall, the physical and visual severance effects created by the EWL will be mitigated by the positive effects of the improved physical connection to the Onehunga Wharf area (the new wide bridge spanning the EWL trench) and the adjacent cycle / pedestrian paths, and the streetscape enhancements.

Particular consideration is required of Aotea Sea Scouts Hall which occupies an unusual location with respect to the existing roads and EWL. The hall was originally built on a narrow spit between the former crater lagoon and the Manukau Harbour, and oriented towards the sea. The location is now opposite the intersection of the northbound SH20 off-ramp with Orpheus Drive. The historic building stands alone as something of a sentinel landmark. EWL will have both adverse and positive effects on its setting and amenity. Adverse effects will arise because the approach ramps to the Neilson Street Interchange overbridge will be constructed approximately 18m east of the hall, with a slip lane and Orpheus Drive between the ramps and the hall. The ramp will be faced with an approximately 5m high retaining wall. To put it another way, the proposed on-ramp will be a more dominant structure and will increase the existing severance between the hall and the western part of Gloucester Park. However, the Orpheus Drive access to the hall will be much quieter than at present because it will no longer carry state highway ramp traffic. To put the visual amenity effects in perspective, the eastern outlook and connections from the hall are already affected to some extent by the existing state highway, and the hall's primary western outlook to the harbour will not be affected.

6.1.5 Visual effects

EWL will increase the extent to which the area is dominated by state highway and road infrastructure. The most prominent elements will be the Neilson Street Interchange overbridge, the Galway Street intersection, and the highway works around the outside perimeter of Te Hōpua tuff ring.

The following photosimulations illustrate views of EWL in sector one:

- **Photosimulation 1**: From Taumanu/Onehunga Foreshore Reserve looking southeast to Neilson Street Interchange ; and
- **Photosimulation 2**: From 61 Onehunga Mall looking west across Gloucester Park (Te Hōpua explosion crater) toward Neilson Street Interchange overbridge.

People who will experience EWL in this vicinity include:

- Travellers on SH20, EWL and connecting local roads;
- Pedestrians and cyclists using local routes such as Old Māngere Bridge and Orpheus Drive;
- People occupying buildings around Te Hōpua crater rim;
- Users of the Aotea Sea Scouts Hall; and
- Users of Taumanu - Onehunga Foreshore (the recently completed shoreline naturalisation project) and the adjacent Manukau Cruising Club.

The following paragraphs describe the effects on these different groups.

[13] Such references to Old Māngere Bridge apply to either the existing bridge or the 'new Old Māngere Bridge' which is expected to be built prior to EWL.

- Travellers on SH20 and EWL: The new interchange and associated roads around Te Hōpua will be in keeping with general expectations for such urban roads and state highway interchanges. However, it is relevant to note that the Te Hōpua node is also one of the memorable waymarks for people entering Auckland from the south because of elevated views over Onehunga Wharf and down the Manukau Harbour towards the heads. EWL will increase the dominance of this node by highway works and detract somewhat from the composite views.
- Galway Street: A group of pōhutukawa approximately 4m-5m tall which currently make a moderate contribution to the amenity of this street, fall within the works footprint and will need to be removed (*Volume 3:Technical Report 5: Arboricultural Assessment, section 2.3.1)*. It appears that the trees are sufficiently small that they would lend themselves to transplanting. It is recommended they be incorporated elsewhere in the project to retain their amenity;
- Pedestrians and Cyclists: The Onehunga Wharf area is a node for walking and cycling routes. It is the northern bridgehead of Old Māngere Bridge from where routes connect (i) west around Orpheus Drive to the Waikōwhai Walkway, (ii) north to Onehunga town centre, and (iii) east along the northern shore of Māngere Inlet. For users of these routes the proposed EWL will add to the visual dominance of traffic and roading already generated by the existing SH20 and Onehunga Harbour Road. On the one hand the route to the west will be improved because Orpheus Drive will become a separate local road (currently it is shared with state highway ramps), on the other hand it will be adjacent to the backdrop of the Neilson Street Interchange overbridge. Similarly, the route north along Onehunga Mall will be improved by the substantial drop in traffic (especially trucks) using this route. The route to the east will follow a similar configuration as at present, but will parallel the new EWL – either on the shared path adjacent to the road, or on a recreational shoreline path incorporated in the re-naturalisation of the Māngere Inlet shoreline;
- Occupants of Nearby Buildings: The outlook from buildings on the tuff ring overlooking Te Hōpua crater is already dominated by foreground motorway. EWL will not fundamentally change, but will intensify, this character. For instance, the most noticeable changes for occupants of the apartments and motel on the southern side of the crater rim will be the new overbridge to the northwest, and reforming of the northbound SH20 off-ramp. However, the overbridge will be in the middle-ground approximately 300m-450m away and beyond the remnant tuff ring and pōhutukawa trees, and the foreground will continue to be dominated by the existing state highway. A similar situation will exist for buildings on Onehunga Mall on the eastern side of Te Hōpua Rim where views of the overbridge will be reasonably distant and beyond the existing foreground motorway. Most of the buildings in this area are used for industrial or commercial activities which are less sensitive to visual amenity effects. Similarly, the nearest properties to the interchange in Neilson Street are industrial premises that are already located adjacent to the existing state highway ramps. The EWL and Galway Street intersection will have some adverse amenity effects on adjacent premises on the east side of Onehunga Mall (including industrial properties and some apartments). Such effects will be in the context of an outlook dominated by industrial development, and will be offset to an extent by the removal of the existing heavy traffic from the immediately adjacent Onehunga Harbour Road;
- Aotea Sea Scouts Hall: As discussed above, the approaches to the Neilson Street Interchange overbridge and slip lane will detract from the hall's visual amenity. Nevertheless, to put such effects in perspective, users of the scout hall are transitory, the eastern outlook is already affected by the existing state highway, and the hall's primary western outlook to the harbour will not be affected; and
- Taumanu - Onehunga Foreshore and Manukau Cruising Club: The Neilson Street Interchange will become part of the outlook from parts of Taumanu-Onehunga Foreshore including the existing footbridge over SH20. However, it will be relatively distant (the overbridge will be more than 350m from the footbridge to Taumanu-Onehunga Foreshore), and will be viewed in the context of existing state highway. (Refer Photosimulation 1).

6.1.6 Volcanic viewshafts

The Galway Street intersection falls beneath a Regionally Significant Volcanic Viewshaft (O11) to One Tree Hill, identified in the PAUP Decisions Version, originating from SH20 at the Manukau Harbour

Crossing bridge. However, the view shaft contours in the vicinity are approximately RL 22-24m – well above the height of EWL works.

For completeness, EWL will not affect Regionally Significant Volcanic Viewshafts M5 and M6 to Mount Māngere which originate north and south of EWL respectively and are oriented in a different direction from the Project.

6.1.7 Effects during construction

There will be substantial disruption to the Neilson Street Interchange and Galway Street area during construction and the adverse visual effects will be amplified. This includes the raw earthworks and clutter typical of such highway works including materials storage, machinery operation, cranes, temporary traffic diversions, portable buildings, hoardings etc. The effects will be high in such locations as Gloucester Park, the buildings surrounding Gloucester Park, the southern end of Taumanu-Onehunga Foreshore (given that end of the reserve adjoins the end of the designation) and Onehunga Wharf (taking into account that part of the wharf hardstand will be used as a construction area). The works will also detract from amenity for travellers on SH20. However, such effects will be temporary in nature, and will take place in an existing highway corridor where one might reasonably anticipate highway construction works from time to time. By way of illustration, the works will be somewhat similar to the situation experienced at the interchange currently being constructed at the intersection of SH20 and Kirkbride Road.

Measures, as is normal, will be required to maintain traffic connections during construction, including the pedestrian and cycle access between Onehunga and Old Māngere Bridge.

6.1.8 Sector one summary and conclusion

The natural and urban landscape in sector 1 revolves around Te Hōpua ā Rangi volcanic explosion crater and tuff ring. However, the natural landform has been substantially buried and modified through landfill reclamation, urban development and state highway construction. The historical development has resulted in modification of the tuff ring's physical landform and reduction in its legibility. The area is characterised by industrial buildings and transport infrastructure, and poor connectivity between Onehunga and the port and harbour.

EWL will reduce the legibility of Te Hōpua volcanic landform because of the increase in the number of traffic lanes encircling the outside perimeter of the crater and the construction of a new overbridge outside the north-west corner of the crater. The works will also accentuate the existing perception of the area as a transport interchange, reduce its visual amenity, and increase the visual barrier between Onehunga town centre and Onehunga Wharf. There will be a moderate degree of potential adverse effect compared to the existing situation.

The visual effects will be amplified during construction works. However, such works will be temporary in nature, and will take place within existing transport corridors where one might anticipate periodic highway construction.

Measures to address such potential adverse effects include:

- Streetscape works to improve the Onehunga Harbour Road vehicle connection between Onehunga town centre and the port, taking advantage of the substantial reduction in heavy traffic that will occur on this road;
- Locating EWL in a trench opposite the wharf area, and bridging the trench to connect with the Onehunga wharf area – and with Orpheus Drive to the west;
- Streetscape works to highlight the pedestrian/cycle route between Onehunga town centre and the port, tracing the crater rim on the west side of Onehunga Mall;
- Reinstatement of the cycle and pedestrian bridge connecting Onehunga Mall with Old Māngere Bridge (or the proposed new Old Māngere Bridge), which will connect also with the proposed new paths along Māngere Inlet; and

- Providing the opportunity for an artwork encircling the crater – envisaged at this stage as a circle of light that will highlight the circular form and presence of the crater and restore something of the legibility and presence that has been lost historically.

The artwork would highlight the presence of Te Hōpua volcanic landform, restore some legibility to the feature as a whole, and contribute to aesthetic character of the node. The remaining measures would result in a small improvement in connectivity between Onehunga and Onehunga Wharf compared to the existing situation.

6.2 Sector 2: Foreshore works along the Māngere Inlet foreshore

Sector 2 comprises the straight northern shoreline of Māngere Inlet (the Anns Creek component of the northern shoreline forms Sector 3). The main landscape and urban design issues in sector 2 are:

- Effects on the inter-tidal mud-flats and remnant lava reefs along the northern shoreline;
- Effects on the natural character of Māngere Inlet;
- Visual effects of EWL; and
- Effects on connections between Onehunga and Māngere Inlet.

6.2.1 Effects on the natural landscape

The northern shore of Māngere Inlet formerly comprised lava flows in tidal mudflats creating an intricate and deeply indented shoreline. However, the inlets were filled and the northern shoreline is now an artificial straight line bordered by a rip-rap seawall. The EWL is to be constructed on embankment that straddles this shoreline, partly on land and partly in the CMA. The works will require removal of the vegetation which has been planted within this reserve strip. The road will typically be at RL4.5m, approximately 1 – 1.5m higher than the typical existing ground level. The road will accentuate the straight shoreline and form a potential barrier between the land and Māngere Inlet.

To address such potential effects it is proposed to naturalise the shoreline on the seaward side of the EWL, to improve natural character and public connection with Māngere Inlet. A local precedent for such naturalisation is the Onehunga Shoreline Restoration Project (Taumanu - Onehunga Foreshore) completed in 2015.

The proposed works comprise two major landforms, and a third smaller one, to echo the original shoreline, and to be in scale with Māngere Inlet as a whole. The landforms will comprise the following main components:

- Peninsulas faced in basalt rock designed to echo fingers of lava. These spidery and craggy landforms will be slightly higher than the EWL road (up to approximately RL6.0m on high points) and will contain pōhutukawa and other coastal vegetation;
- Pebble and shell banks with a height of approximately RL2.5m-2.8m; and
- Marshland contained behind the pebble banks and peninsulas. These will comprise wetlands and biofiltration areas to treat stormwater from the inland catchments. While they are designed to operate as freshwater systems, they will contain salt-tolerant rushes (such as oioi (Apodasmia similis, wiwi/sea rush (Juncus kraussii, Juncus maritimus) and kukaraho/marsh clubrush (Bolboschoenus fluviatilis) and are intended to appear similar to estuarine marshland. The nominal base of the wetlands is approximately RL0.0.

The landforms will be created over a mudcrete core.

A coastal path will connect the landforms by means of a ‘boardwalk’ offset from the EWL at a typical distance of 20m – 40m. The boardwalk alignment roughly follows that of the Mean Sea Level contour so that it is anticipated that mangroves will colonise between the boardwalk and the EWL embankment, but that the area on the seaward side of the boardwalk will remain open (although the boardwalk will be

aligned through mangroves in areas for variety). The 'boardwalk' may be built of a range of materials, and incorporate artwork. It is envisaged as a feature that will create its own interest and amenity.

The reclamation required to construct the road and landscape works within the Inlet will result in loss of approximately 24.2 ha seafloor footprint (for the boardwalk, the reclamation, and coastal occupation below MHWS associated with the reclamation), some of which will be tidal. It will result in loss of habitat for marine organisms and foraging areas for wading birds as discussed in the ecology report (*Volume 3:Technical Report 16 - Ecological Impact Assessment*). On the other hand, the works will have the following positive effects:

- The constructed landforms will restore a more natural appearance to the shoreline and rehabilitate the existing straight line sea wall, echoing the original pattern of lava flows and inlets. The landforms will also substantially increase shoreline length. At a detail level, the shoreline is to include a sequence of rocky basalt reefs and islets, and pebble/shell banks. The intent is to restore some of the intricacy of the former shoreline;
- Although the road embankment will encroach on the landward end of the remnant lava flows at Pikes Point and opposite the end of Victoria Street, the balance of these features are to be retained and integrated with the re-naturalised shoreline– giving them a more natural context. The boardwalk will be fixed to the side of the road embankment at the Pikes Point lava flow to avoid encroaching onto the feature;
- The orientation of the new landforms perpendicular to EWL, and the trees and slightly higher elevation of the landforms, will reduce the prominence of the road embankment. It will avoid the potential situation of a road perched above a shoreline. Rather, the design will help embed the road behind the landforms;
- Likewise, the mangroves that will establish on the inland side of the 'boardwalk' will soften the appearance of the EWL embankment, as well as buffer the coastal path and provide habitat for such species as banded rail;
- The wetlands and biofiltration beds within the reclaimed area will treat stormwater from the inland industrial catchments and improve the water quality of Māngere Inlet (*Volume 3: Technical Report 12-Stormwater Assessment*). The intent is that the wetlands appear part of transitional shoreline features rather than typical land-based stormwater ponds. It is considered that naturalisation of the shoreline requires landforms of sufficient size to suit the scale of Māngere Inlet as a whole. The wetlands will contribute to that visual scale while fulfilling a water quality function. The wetlands may enhance the perception of kaitiakitanga and the exercise of stewardship over the inlet;
- Likewise, it is understood the EWL embankment itself will reduce leachate contamination by reducing tidal infiltration into the landfills, and increasing the dwell time of any leachate passing out through the embankment. (*Volume 3: Technical Report 13-Groundwater Assessment*);
- The eastern landform contains two 'headlands' and a pebble-and-shell bank that will not have access from the walkway so as to provide some separation to improve the habitat value for seabirds. Opportunities are also being sought to improve avifauna habitat in the inlet as a whole, through use of such features as reinstated salt-marsh. (*Volume 3: Technical Report 16 - Ecological Impact Assessment* and
- The proposed coastal path will provide a closer connection with the Māngere Inlet shoreline for people compared to the existing situation. The path will connect and meander between varied shoreline features.

The design approach to restoring Māngere Inlet was developed at the instigation of, and in consultation with, the Mana Whenua group as described in *Volume 4*: *Urban and Landscape Framework*. Hui held during the design process highlighted iwi's view that the Māngere Inlet is currently in a poor state. Principles identified including restoring respect towards the inlet and harbour, restoring water quality by treating stormwater to the highest practicable level, restoring habitat for species inhabiting the inlet, and allowing for people to connect with the inlet.

At the same time, there was a desire to balance these outcomes with minimisation of reclamation. These principles were incorporated into the three design themes in the ULDF:

- Respect the place;
- Restore the whenua; and
- Reconnect the people.

The following design techniques have been used to maximise naturalisation of the shoreline while minimising the potential reclamation footprint:

- Limiting reclamation to separate landforms rather than a continuous reclamation seaward of EWL, and using 'boardwalks' instead to tie the landforms together;
- Aligning the landforms perpendicular to the road to maximise the shoreline width relative to footprint (as well as echoing the two basalt lava flows that originally formed the shoreline);
- Maximising the extent of shoreline features within the inter-tidal zone – i.e. so that they are alternately exposed and covered during the tidal cycle. Such features will be transitional (part of both the land and harbour) and will reflect the former tracery of the original shoreline;
- Use of a combination of wetland and biofiltration beds to reduce the potential footprint for stormwater treatment; and
- Using innovative techniques, such as internal timber baffles, to reduce footprint and increase the impression of the wetlands as continuous estuarine marshland.

Taken together, the proposed mitigation works will help to:

- Rehabilitate the natural appearance of Māngere Inlet;
- Rehabilitate the physical qualities of the inlet;
- Soften the appearance of the EWL;
- Enhance public access to and connection with the inlet; and
- Help restore the 'mana' of Māngere Inlet.

6.2.2 Effects on natural character

There is overlap between landscape and natural character matters, and, as with the former, there will be both adverse and positive effects on natural character:

- On the one hand, there will be adverse biophysical effects because of the reduction of tidal mud flats, the subsequent reduction in foraging habitat for wading birds, and changes in natural coastal processes. On the other hand, there will be some biophysical benefits resulting from the improved quality of water discharged to the inlet (from both stormwater and leachate contamination), and some offset measures incorporated in the design such restored saltmarsh areas. These matters are addressed in the respective ecology and natural processes reports; and
- Likewise, on the one hand the introduction of a busy road, including heavy traffic, will detract from perceptions of natural character, although in the context of the existing industrial backdrop to the inlet. At the same time, the re-naturalised shoreline will have a more natural appearance and will enable a more natural experience of Māngere Inlet.

In summary, there will be a mix of adverse and positive effects on biophysical and perceptions aspects of natural character, but taking these matters together, it is considered that the Project will go some way to restoring natural character.

6.2.3 Effects on the urban landscape

Onehunga currently has only a weak connection with Māngere Inlet. The inlet is largely 'walled-off' behind industrial properties, access is limited to the end of a handful of no-exit roads, and the existing coastal walkway is somewhat isolated. While Waikaraka Cemetery does have a frontage to the inlet, the cemetery is inward focused with views partly blocked by a row of pōhutukawa trees.

The EWL could potentially form an additional barrier between Onehunga and Māngere Inlet. However, it is considered it will strengthen connections in the following ways:

- EWL will provide a frontage making Māngere Inlet more visible and 'front of mind';
- EWL is intended to have the character of an urban arterial road. The shared path on the seaward side of the road is to have a design quality that conveys a high amenity setting. To put it another way, the design is to convey that Māngere Inlet is worthy of greater respect than has been the case during the last 70 years or so. The path is to have a generous width (total of 4.8m including cycle paths and footpath), quality wall and hand-rail details, crafted street furniture, fittings (such as lights) with good aesthetic quality;
- The re-naturalised shoreline and coastal path will similarly create a positive frontage to the Māngere Inlet and enhance public connection to the inlet;
- The EWL Project will complete the southern part of Onehunga's street grid by tying together three cul-de-sacs. It will connect the ends of Galway Street and Captain Springs Road into the EWL, and also tie the end of Alfred Street to the coastal path. (*Volume 3: Technical Report 1 - Traffic and Transport Assessment,* at section 7.4.3.2 notes that the existing informal path between Miami Parade and the shoreline is expected to be able to be retained to provide a pedestrian connection with EWL. To illustrate how these links will help connectivity between Onehunga with the Manukau, it will enable circular walking routes between Onehunga, the Taumanu Foreshore, Onehunga Wharf, and Māngere Inlet; and
- The EWL Project will provide a choice of path along the Māngere Inlet. The shoreline path will be at approximately RL2.8m, while the path beside the road will be more elevated at approximately RL4.5m. The path beside the road is likely to appeal to 'commuters', but it is envisaged that the upper and lower paths might also be used in tandem as part of circular routes (e.g. one way on the lower path, back on the upper path). The upper path will provide slightly more elevated views over the inlet, as well as surveillance of the shoreline path.

6.2.4 Visual effects

The following photosimulations illustrate views of EWL in sector two:

- **Photosimulation 3**: From SH20 Mahunga Drive off ramp looking north-east across Māngere Inlet; and
- **Photosimulation 4**: From Ōtāhuhu-Mount Richmond looking west toward Anns Creek.
- **Photosimulation 11**: From Waikaraka Cemetery looking south toward EWL.

The proposed shoreline naturalisation is also illustrated by drawings in section 5 of the UDLF.

People who will experience this sector of the EWL Project include:

- Travellers on the proposed EWL;
- People with views across Māngere Inlet, in particular people in vehicles crossing the Manukau Harbour Crossing bridge;
- Users of the shoreline path;
- Visitors to Waikaraka Cemetery and the adjacent proposed new sports fields; and
- Occupants of adjoining industrial sites.

The following paragraphs describe the visual effects for such groups:

- Travellers on the East West Link: Such people will constitute a new 'audience' for views of Māngere Inlet. While the road itself will be in keeping with likely expectations for a major urban arterial, and the industrial backdrop on the inland side has relatively low amenity, the EWL will nevertheless provide a high amenity outlook over Māngere Inlet to the backdrop volcanic cones. The naturalised shoreline will provide an attractive foreground to this outlook;
- Views of EWL across Māngere Inlet: There will be both adverse and positive effects on views across the inlet toward EWL. On the one hand, the Project will introduce a busy arterial road along the northern shoreline. However, to put this in perspective, the shoreline is currently characterised by a rip rap seawall, a thin band of vegetation and a backdrop of industrial properties. On the other hand, the proposed mitigation works will create a more naturalistic appearance, particularly for the elevated views from the Manukau Harbour Crossing Bridge. As discussed earlier, the proposed landforms are to be contoured so that parts are slightly higher than the road, and the intent is to promote colonisation of mangroves between the headlands to soften views of the road embankment. On balance, it is considered the views across Māngere Inlet will be enhanced;
- Shoreline Path: The EWL Project will replace the existing coastal path with a new path along the naturalised shoreline, as well as new paths beside the road itself. While the new shoreline path will be affected by the presence of traffic (including a proportion of heavy vehicles), it will nevertheless have a higher amenity. Compared with the existing path, the new shoreline path will be closer to the water, will meander around a sequence of landforms and inlets, and engage with a greater variety of landform and shoreline features. It is likely to attract more users because of the new path's greater visibility and its stronger connection with Māngere Inlet. There will be reasonable separation of the shoreline path (vertically and horizontally) from EWL, and the planted landforms and mangroves will provide a buffer. The presence of EWL will also improve surveillance of the paths. The upper path beside the road is likely to appeal more to 'commuters', but will nevertheless have an attractive outlook over Māngere Inlet;
- Waikaraka Cemetery: At present the cemetery is tucked out-of-the-way between industrial precincts. The Project will change this situation by opening a frontage to the road and traffic on the Māngere Inlet side of the cemetery – and also that of the sports fields planned by Auckland Council on the triangular area east of the cemetery. The embankment will be elevated a little above ground level of the cemetery (approximately 1.5m), but will be approximately 10m - 20m beyond the existing cemetery boundary wall – roughly 25m - 35m from the nearest graves. There will also be a pedestrian and cycle bridge over EWL adjacent to the end of Alfred Street. The Project will detract from the current secluded and relatively quiet atmosphere. However, the visual effects of the road, including the visual effects of the pedestrian/cycle bridge, will be softened by the retention of the existing stone wall and row of pōhutukawa along the boundary (EWL will be glimpsed between these trees). The trees are within the designation but outside the footprint of the EWL road (*Volume 3: Technical Report 5 - Arboricultural Assessment,* section 2.3.2*)*. It is recommended measures be taken to retain these trees to help maintain amenity for Waikaraka Cemetery. The EWL road will be more prominent from the open area that is to be developed as sports fields east of the cemetery. However, visual amenity effects on this area are not considered to be of significance given the nature of sports fields. Effects would be mitigated by extending the row of pōhutukawa trees along the southern boundary of the this area; and
- Adjacent Industrial Properties: Effects on the visual amenity of adjacent industrial properties are not considered to be of any significance. The area is typified by warehousing and manufacturing in large, internally-focused buildings. The area does not have high visual amenity. In many cases the EWL will be adjacent to rear yards bounded by security fencing.

6.2.5 Effects during construction

There will be substantial disruption to the northern shore of Māngere Inlet during construction. The main potential adverse landscape effects will comprise:

- Closure of the existing shoreline reserve and coastal path, and removal of the existing planted vegetation within the esplanade reserve;

- Visual effects arising from construction of the EWL road and the shoreline naturalisation; and
- Reduction in natural character as a result of construction activity.

The northern shoreline of Māngere Inlet will take on the character of a construction site. By way of illustration, the effects will be similar to those experienced during construction of Taumanu-Onehunga Foreshore, although in this case they will take place against an industrial backdrop.

The most significant visual effects during construction will be from Waikaraka Cemetery, where the works will disrupt the existing relatively peaceful atmosphere. The effects on this area will be 'high'. However, the existing stone wall and pōhutukawa trees will soften views of the works and reduce the potential impact. The visual effects from other adjoining properties will be limited by the industrial nature of such properties. Visual effects from other public places will be limited by distance, for instance in longer views across Māngere Inlet.

To put the construction effects in context, they will occur in an area with moderately low natural character, will be temporary in nature and will lead to substantial positive effects following completion of EWL.

6.2.6 Sector two summary and conclusion

The northern shoreline of Māngere Inlet was formerly an intricate and deeply indented shoreline of basalt lava flows and tidal inlets. However, the shoreline was straightened and constructed as a seawall, and the inlets infilled with refuse. With the exception of Waikaraka Cemetery, the backdrop to the shoreline has been developed for industry. The historical development has resulted in substantial reclamation of the former harbour bed, burying of the lava shoreline features, discharge of contaminants to the harbour, dominance of the character by industrial activities, and severance of Onehunga from the Māngere Inlet. It could also be said that the Māngere Inlet was invested with a poor image.

EWL will have both adverse and positive effects on Māngere Inlet.

- On the one hand, there will be adverse effects as a consequence of reclamation of the tidal mudflats and potential adverse effects of the alignment of a four-lane arterial road along the northern side of the inlet; and
- On the other hand, there will be positive effects from naturalising the shoreline, improving the quality of water discharges from the inland catchments, improving access to and along the shore, improving connections between Onehunga and the Māngere Inlet, and improving the image and mana of the inlet.

There will be also substantial disruption to the northern shoreline of Māngere Inlet during construction, and amplified adverse visual effects for Waikaraka Cemetery in particular. Such works will be temporary in nature, and will be outweighed by the subsequent enhancement of visual amenity, natural character and shoreline access following completion of EWL.

The balance of landscape, visual and natural character effects in Sector 2 will be substantially positive. EWL will provide the opportunity to help restore and rehabilitate Māngere Inlet. It will provide a positive frontage to the Inlet in response to many years of it having been neglected and poorly treated.

6.3 Sector 3: Anns Creek from the end of the reclamation to Great South Road

Sector 3 comprises Anns Creek at the north-east corner of Māngere Inlet. Within sector 3, EWL will be almost entirely on a viaduct skirting the northern part of Anns Creek. The only exception is a short stretch of embankment at the intersection with Hugo Johnston Drive, and where EWL returns to grade at Great South Road. A 'direct' shared cycle/pedestrian path will be incorporated on the viaduct. The coastal path will follow the Anns Creek shoreline as far as Hugo Johnston Drive where it, too, will connect with the path on the viaduct.

The main landscape and urban design issues are:

- Effects on remnant aspects of the natural landscape including the fresh-to-salt water sequence in Anns Creek, the lava field along the northern shore, and the associated vegetation;
- Effects on parts of the lava field classified as an outstanding natural feature; and
- Visual effects of the viaduct.

6.3.1 Effects on the natural landscape

The natural landscape is a subtle but distinctive collection of features. Anns Creek is the only remnant of the inlets that formerly characterised the northern shore of Māngere Inlet. The Anns Creek shoreline comprises the toe of lava flows from Rarotonga-Mount Smart and Maungarei-Mount Wellington. In contrast to Sector 2, Anns Creek is characterised by an intricate shoreline. In places the lava has a pāhoehoe surface – a smooth but rucked up appearance that evokes the fluid nature of hot lava. The vegetation associated with the lava is a distinctive shrubland and herb field that is a unique community containing rare and threatened plant species (*Volume 3: Technical Report 16 - Ecological Assessment* (Terrestrial and Herpetofauna), page ii). Anns Creek itself contains a sequence between mudflats, mangrove forest, salt marsh, and brackish wetland. It is the remnant of an ecotone that would once have extended to a freshwater marshland around the toe of Mutukāroa-Hamlins Hill.

Such natural elements exist in the context of modifications which include encroachment into the edges of Anns Creek by reclamation, partitioning of the inlet into five parts by existing railway causeways, and weed infestations. The PAUP Decisions Version also depicts a designation for a further unbuilt railway connection across the inlet. It is understood that there is reclamation consent that has not been fully implemented at the head of the inlet.

Although EWL is mostly on viaduct across this area, there is potential for piers and construction to damage the significant lava features and mosaic of vegetation communities (both terrestrial and estuarine). There is also potential for some indirect rain-shadow or shading effects on vegetation beneath the viaduct. The extent to which such effects are avoided will depend on the precise location of piers and the detailed construction methodology. These matters are addressed in detail in *Volume 3: Technical Report 4 - Geological Heritage* and *Volume 3: Technical Report 16 - Ecological Impact Assessment* on which this report relies. The Ecological Impact Report describes how the alignment of the structures in the northern part of Anns Creek East has largely avoided effects on plant species. However, there will still be adverse effects on the plant species located beneath the proposed structures. The Geological Heritage Report concludes that adverse effects on the lava flows can largely be avoided by careful siting of piers and appropriate planning during the construction phases.

In terms of aesthetic aspects, the viaduct will be a dominant structure because of its height and length. It will be approximately 10m high and approximately 1.4km long. To put this in perspective, the landscape is currently dominated by an industrial backdrop for which the permitted building height standard in the PAUP Decisions Version is 20m. The existing backdrop includes containers which from observation are commonly stacked up to six high (15.6m) and higher on occasion), an expansive rail marshalling yard, a power station, and a high voltage transmission line. Anns Creek itself is partitioned into five parts by railway causeways. (There is a designation depicted in the PAUP Decisions Version that would provide for a further causeway which would partition the inlet into six parts). In summary, the bridge will add to the industrial backdrop of what is already a substantially modified corner of Māngere Inlet.

6.3.2 Effects on natural character

There is overlap between effects on the natural landscape discussed above and effects on natural character. In summary, there will be potential adverse effects on biophysical aspects of natural character including the significant lava features, the associated lava-field vegetation community with endangered plant species, and the saltwater to freshwater communities. The extent of such effects depends on the precise pier locations and detailed construction methods in relation to the detailed pattern of lava features and vegetation. The landscape report relies on the findings of the Geological Heritage and Ecological Impact reports that such effects can be largely, but not completely, avoided.

The EWL viaduct will also detract from the overall natural appearance of the area, although such effects will take place against the existing context of a substantially modified landscape with an industrial backdrop.

The strategy followed in this section of the Project design has been to avoid as far as practicable any adverse effects on the lava features and associated community.

Beyond that, the more general effects on the natural landscape and natural character will be mitigated by rehabilitating parts of Anns Creek itself. Such mitigation includes:

- A restoration programme that addresses the whole of the creek between Great South Road and the open Māngere Inlet including removal of weeds and dumped spoil, and restoring indigenous vegetation (both estuarine and the terrestrial lava field communities);
- In particular, restoring the top of Anns Creek immediately adjacent to Great South Road;
- Recreating similar conditions and propagating the lava-field vegetation community and endangered plant species to the new landforms in Māngere Inlet; and
- Interpreting the lava features, the associated plant communities, and the cultural significance of the Kāretu Portage. Such interpretation could occur from ground level on the coastal path (for instance on the spidery lava flow that protrudes furthest into Anns Creek), from the viaduct which provides an elevated view over Anns Creek East – an area that is otherwise not readily accessible to the public, and potentially by artwork within Ann Creeks East.

6.3.3 Effects on ONF lava features at Anns Creek

Several areas of lava at Anns Creek are classified and mapped in the PAUP Decisions Version as an ONF. The values for which they are classified in Schedule 6 of the PAUP relate to earth science, namely the extent to which they (a) contribute to the understanding of Auckland's geology, (c) are outstanding representative examples of the diversity of landform and geological features of Auckland, (d) are part of a recognisable group of geologically associated features, (g) have potential value for public education, and (i) the state of preservation of the feature. There is also a distinctive assemblage of plants (ferns, herbs and shrubs) growing in conjunction with the lava including some rare and endangered species as discussed in the terrestrial ecology report (*Volume 3: Technical Report 16-Ecological Impact*). The lava features are not classified for aesthetic or other landscape reasons, although they are distinctive and interesting.

As discussed above, it is understood that the viaduct piers and construction work will largely avoid these features which have been precisely mapped by the ecology and geological heritage experts, although there will still be some adverse effects on the plant species below the proposed structures. This report relies on the Geological Heritage Report and Terrestrial Ecology Report in this regard. Otherwise, there are no other landscape values for which the ONF is recognised.

6.3.4 Effects on urban landscape

EWL will have little adverse effect on the urban landscape in this sector. The road will be in keeping with the character of adjacent transport and industrial activities. While EWL will have some disruption on the industrial properties traversed, such disruption will be minimised by traversing properties on an elevated structure. At the same time, EWL will have positive effects by creating a more interconnected street network, connecting Onehunga and the industrial areas with the intersection of Great South Road and Sylvia Park Road and tying in the cul-de-sac end of Hugo Johnston Drive.

6.3.5 Visual Effects

The following photosimulations illustrate views of EWL in Sector three:

- **Photosimulation 4**: From Ōtāhuhu-Mount Richmond looking west toward Anns Creek;
- **Photosimulation 5**: From coastal walkway in Anns Creek looking north-west toward EWL viaduct; and

- **Photosimulation 6**: From Mutukāroa-Hamlins Hill looking west over EWL viaduct across Anns Creek

People who will experience this sector of EWL include:

- Travellers on the proposed EWL itself;
- People travelling on Great South Road and the nearby KiwiRail lines;
- People with long views across the Māngere Inlet or from elevated places such as Mutukāroa – Hamlins Hill;
- Occupants of adjoining industrial properties; and
- Users of the coastal path.

The following paragraphs describe the visual effects for such groups:

- East West Link: As discussed in relation to Sector Two, travellers on the EWL will constitute a new 'audience'. The road itself will be in keeping with likely expectations for an urban arterial. The road will provide wide views because of its elevation, such views contrasting between the gritty industrial landscape on the one side and views over Māngere Inlet or to Mutukāroa–Hamlins Hill[14] on the other. The elevated section will also open up new views across the industrial foreground toward Maungakiekie/One Tree Hill;
- Great South Road and KiwiRail lines (the railway lines form part of the North Island Main Trunk used by the Auckland-Wellington passenger train, and the Eastern and Southern Line commuter routes): EWL will be a prominent feature in views from the railway line and Great South Road. The long viaduct will form the backdrop to the outlook over Anns Creek and will add to the industrial encroachment onto this remnant natural area. However, it will be seen in context with the surrounding industrial character:
- Views across Māngere Inlet: The length (approximately 1.4km) of the viaduct will amplify the visibility and prominence of EWL in such views. Nevertheless, the viaduct will be reasonably distant in views from across Māngere Inlet (approximately 1.4km–2.0km from the nearest point on the southern shore), will be seen in the context of the industrial backdrop, and will appear much lower than the backdrop of Mutukāroa-Hamlins Hill which is some 55m high;
- Views from Mutukāroa-Hamlins Hill: From Mutukāroa, the EWL will be one element of an expansive industrial landscape spread out west of the ill. Given the roughly 45m difference in elevation between the viaduct (approximately RL10m) and western summit of Mutukāroa (approximately RL55m-59m), EWL will appear similar in height to other urban features around the bottom of the hill;
- Adjacent Industrial Properties: Effects on the visual amenity of adjacent industrial properties are not considered to be of any significance. The area is typified by such large scale activities as storage of containers and imported cars, the 'inland port' railway marshalling area, and the power station. It does not have high visual amenity even compared to some other industrial areas; and
- Shoreline Path: The group of people most adversely affected in this sector will be users of the coastal path that traces the shoreline of Anns Creek. The EWL viaduct will cross the existing path twice and will otherwise be a prominent backdrop to people using the path. While the effects will be moderately high, they will also be in the context of an existing industrial backdrop to this area. On the other hand, EWL will usefully extend the path to the east by way of the path on the bridge. At present the path terminates at Hugo Johnston Drive – the route further east blocked by the railway

[14] The plans depict a signage gantry near Mutukāroa-Hamlins Hill at the eastern boundary of Sector 4. This is discussed under Sector 5 because potential effects relate to views of Mutukāora.

line. EWL will enable the path to cross the railway line, to connect with Great South Road, Mutukāroa-Hamlins Hill, and ultimately to Sylvia Park Mall Shopping Centre.

6.3.6 Effects during construction

The main potential adverse landscape effects will comprise:

- Visual effects, and effects on perceptual aspects of natural character; and
- Temporary closure of the existing shoreline reserve and path.

The protection of lava features, vegetation and habitat, permanently and during construction, are addressed in the Geological Heritage and Ecological Impact reports as discussed earlier.

Visual effects will be amplified during construction but the adjoining properties are not sensitive to visual effects and public views are typically transitory and reasonably distant – for instance across Māngere Inlet, from elevated places on Mutukāroa-Hamlins Hill, and from passers-by on Great South Road and the railway line.

The temporary closure of the coastal path will be offset by enhancement of the shoreline route following completion of EWL, specifically the enhanced character along the northern shore of Māngere Inlet, and the connections to Great South Road and further east.

Overall, such construction effects will be temporary in nature, and will occur in the context of an area with moderate natural character and amenity.

6.3.7 Sector three summary and conclusion

Anns Creek is the last reasonably natural remnant of the Māngere Inlet northern shoreline – although it is nevertheless modified. It has a subtle assemblage of natural features, including areas of pāhoehoe lava classified as an ONF, an associated distinctive vegetation community, and a salt-to-fresh water sequence. Anns Creek is also partitioned into five parts by rail causeways, is infested with weeds, and the backdrop includes a rail marshalling yard, inland port, container storage, and large scale industry.

EWL is on viaduct for most of Sector 3. Potential effects on biophysical aspects of the landscape in Anns Creek are important because of the significance of the lava features and associated rare plant communities that include endangered plant species. This report relies on the analysis and detailed mapping of the lava features and vegetation communities in the Geological Heritage and Ecology Reports in this regard. The Ecological Impact Assessment (Terrestrial) report describes how the alignment of the viaduct and location of the viaduct piers in the northern part of Anns Creek East largely avoids effects on important plant communities, although there will still be some adverse effects on plants located beneath the viaduct and other ecological values (*Technical Report 16: Ecological Impact Assessment)*. The Geological Heritage Assessment report concludes that the careful siting of viaduct piers and appropriate construction methods will similarly largely avoid adverse effects on the lava flow features (*Technical Report 4: Geological Heritage Assessment, section 6.3)*.

There will be some adverse effects on more general aesthetic aspects of landscape and natural character because of the scale of the viaduct and its alignment across parts of Anns Creek. But while it will be prominent from a number of locations, it will nevertheless be in context with the industrial backdrop that includes, amongst other things, container storage areas in which containers are stacked higher than the viaduct.

There will also be amplified adverse visual effects during construction, and temporary closure of the existing path. Such effects will be temporary in nature, and will occur against an industrial backdrop in a modified setting, and will be offset by enhancements to the shoreline path following completion of EWL.

Measures to mitigate adverse effects include:

- Restoring the natural plant communities through removal of weeds and dumped spoil, enrichment planting, and pest control;

- Recreating similar conditions and propagating the lava-field vegetation community and endangered plants to the new landforms in Māngere Inlet;
- Interpreting and highlighting the significance of the lava and vegetation community from the coastal path and from the bridge overlooking the east Anns Creek area; and
- Connecting the east-west pedestrian and cycle path to Great South Road and beyond (currently the path terminates at Hugo Johnston Drive).

Overall, it is considered the adverse and positive landscape effects will be balanced in Anns Creek.

6.4 Sector 4: Great South Road to SH1 at Mt Wellington

Sector 4 comprises the area between Great South Road and the interchange with State Highway 1 (SH1) at Tip Top corner. EWL will share a corridor with Sylvia Park Road, KiwiRail (Eastern Line), and the Ōtāhuhu-Henderson A 220kV transmission line. It will skirt the toe of Mutukāroa-Hamlins Hill and trace part of the historical Kāretu portage that traversed the marshy area between the head of Anns Creek and the Tāmaki River.

The Sylvia Park Ramps connecting EWL with SH1 will be on flyover structures spanning the Mount Wellington Highway, KiwiRail lines, Clemow Drive, and (for the southbound ramp) the existing state highway. The curving southbound ramp will join SH1 below the Tip Top building. A stormwater wetland is proposed on the west side of SH1 in the vicinity of the ramps.

The main landscape and urban design issues are:

- Visual effects of the flyover ramps - including any impacts on views to landmarks: i.e. Mutukāroa-Hamlins Hill and the Tip Top building;
- Visual effects for adjacent industrial and commercial properties; and
- Visual effects on Mutukāroa-Hamlins Hill.

6.4.1 Effects on the natural landscape

There will be few adverse effects on the natural landscape. EWL does not encroach onto Mutukāroa-Hamlins Hill which is the only significant natural feature in the vicinity. A small basalt cut face at Tip Top corner will be lost but, while it is a feature of interest because it expresses the underlying geology, the cutting itself is not natural. There are no remaining natural watercourses or natural vegetation that will be affected.

6.4.2 Effects on the urban landscape

Changes to the urban landscape will be relatively modest:

- A strip of industrial properties sandwiched between Sylvia Park Road and the railway line (excluding the Stratex site at the western end of Sylvia Park Road) is to be removed to accommodate the widened road. The east-west pedestrian and cycle shared path will be aligned within a landscape strip on the southern side of Sylvia Park Road will be a positive effect. This shared path will be on the alignment of the Kāretu portage, which provides opportunities to highlight this former connection in the landscape design.
- The shared path will continue eastwards alongside the railway line, beneath the Mount Wellington Highway and SH1, to a point where it connects to the Sylvia Park Shopping Centre. The finish point would provide the opportunity for a logical extension further east beyond the shopping centre.
- Some street trees along Sylvia Park Road will need to be removed, the loss of which would be offset by greater opportunities for re-planting along the shared path landscape strip;

- The Great South Road intersection will become a more significant node – a major intersection between north-south and east-west routes, landmarked by Mutukāroa and Anns Creek. This will have some positive effects on connectivity and urban form legibility;
- Likewise there will be connectivity benefits from the extension of the east-west shared path to connect with the Sylvia Park Mall Shopping Centre; and
- The overhead local power lines along Sylvia Park Road will be undergrounded which will have a small positive effect on visual amenity.[15]

6.4.3 Visual Effects

The following photosimulations illustrate views of EWL in Sector 4:

- **Photosimulation 7**: From Mutukāroa-Hamlins Hill looking east over EWL-SH1 ramps and SH1 at Tip Top corner; and
- **Photosimulation 8**: From adjacent to Tip Top building looking north-west toward Mutukāroa-Hamlins Hill.

People who will experience Sector 4 of the EWL include:

- Travellers on SH1 and the proposed new EWL;
- Travellers on the KiwiRail and local road network;
- People using the Mutukāroa-Hamlins Hill parkland;
- Users of the pedestrian and cycle shared path; and
- Occupants of nearby commercial and industrial sites.

The following paragraphs describe the visual effects for such groups:

- **SH1 and EWL**: The Sylvia Park Ramps will be prominent structures for travellers on both SH1 and the EWL. At present the Tip Top building is a waymark associated with a bend in SH1.[16] The EWL interchange is likely to alter people's 'mental maps' of the area: The Tip Top building is likely to become associated in people's 'mental maps' with the interchange in addition to the bend in SH1. For southbound SH1 travellers, the southbound EWL ramp will partially obstruct views of the Tip Top building from a section of SH1. However, the building's elevated position means it will retain sufficient visibility to remain a landmark, and it will become even more prominent from the southbound EWL ramp. For northbound SH1 travellers, the EWL southbound ramp over SH1 will have a small impact on views of Mutukāroa-Hamlins Hill. To put this into perspective, the first glimpses of the hill will be affected over a distance of approximately 200m. However, the clear views of Mutukāroa, which are not gained until some 300m north of the proposed ramp, will not be affected. At the same time, the northbound EWL ramp will open up new views of Mutukāroa-Hamlins Hill for travellers moving from SH1 west onto EWL. There will be two signage gantries over Sylvia Park Road, one near the west end of Mutukāroa and the other near the east end.[17] However, such gantries typically have only fleeting effects on visibility because of their thin dimensions. In this instance the location of the western gantry is alongside Mutukāroa so would have minimal effects on the oblique views to the hill, taking into account much lower height of the gantry (approximately 8m

[15] To avoid doubt, this does not include the Transpower high voltage transmission line

[16] The building is a landmark partly because of its position above a bend in the motorway, and partly from common usage that originated when the building stood out more clearly from its surroundings and had eye-catching gardens in front of the building.

[17] The western gantry is in Sector 4 but is discussed here because it potentially affects views to and from Mutukāroa

to the top of the main signs compared to approximate 50m-60m to the top of Mutukāroa). The gantry would not affect the eastbound EWL views approaching the intersection with Great South Road. Similarly, the eastern gantry is alongside the hill so would not affect oblique views. The existing Transpower 220kV Henderson to Ōtāhuhu (HEN-OTA A) transmission line will also be modified to accommodate the ramps between EWL and SH1. Tower 14, which is a 'pylon' located on the boundary of 6 and 8 Monahan Road (opposite the Tip Top building) will be replaced by a pole structure of similar height (54m) in an immediately adjacent location. Tower 15, which is a pylon located adjacent to the Turners and Growers site, is to be replaced by twin poles also 54m high adjacent to the existing tower. These twin poles will be located between the north and south-bound EWL-SH1 ramps. New twin poles (Tower 15B) will be built on the north side of the ramps in order to lift the transmission line above the ramps. The new twin poles will be 52m high and located in the triangle between the railway line, Mount Wellington Highway, and SH1. They will add to the visual clutter of a node already dominated by infrastructure. The additional height and clutter will be offset to some extent by the use of poles, which are generally regarded as being more attractive than conventional 'pylons' lattice towers. (The new pole structures are illustrated on Photosimulation 8).

- **Railway and local road network**: EWL will increase the extent to which the area is dominated by **transport infrastructure. The scale and character of Sylvia Park Road will change, and the** Eastern Rail Line and Mount Wellington Highway will be crossed by additional overbridges. While it will add another layer, the interchange will be seen in the context of what is already a complex array of arterial roads, railway line, SH1, and transmission line;
- **Mutukāroa-Hamlins Hill**: For people using the park, the clearest views of EWL will be from knolls at the southern end of Mutukāroa-Hamlins Hill. The Sylvia Park Ramps in particular will be prominent structures in such an outlook. Nevertheless, EWL will be part of a middle-ground landscape already characterised by infrastructure and a matrix of industrial buildings. The difference in elevation means that a viewer on the hill is somewhat detached from the surrounding landscape at the toe of the hill. For example, the ramps will be approximately 30m lower than the top of the hill. Where they cross the Mount Wellington Highway the ramps will be some 400m away, and beyond foreground buildings. Therefore, there will be no effects of any significance on the visual amenity of Mutukāroa. Refer Photosimulation 7;
- **Pedestrian and cycle shared path**: Users of the shared path will constitute a new 'audience'. The visual amenity of the route is not high because the path will be adjacent to a major traffic route, will parallel the railway line, and will pass under several structures. Such amenity is a consequence of the existing nature of the area. Nevertheless, this section of the shared path will still constitute an overall amenity for users – providing a useful connection to Sylvia Park Mall Shopping Centre. It will also pass along a landscape strip parallel to Sylvia Park Road which will help improve amenity and provide the opportunity to recognise the Kāretu Portage; and
- **Adjacent properties**: The potentially most affected properties include those on Pacific Rise, the Turners and Growers site, and the Tip Top site:

  - The sites potentially most affected within the business park are Nos. 8 and 9 Pacific Rise which are opposite the proposed Sylvia Park Ramps. The ramps will be between 8m – 13m high opposite these properties. However, there will be approximately 20m separation across Sylvia Park Road and existing foreground pōhutukawa trees will partially filter views. No. 9 Pacific Rise is oriented in the opposite direction so that there are few windows to the south toward the EWL. The outlook is already characterised by busy urban arterial roads, backdrop state highway, and the foreground transmission line. For these reasons the effects on visual amenity will be moderate-low;

  - The Turners and Growers site is oriented north towards EWL. The main building is a covered market that is inherently inward focused, so the visual effects will be restricted mainly to the car park. The Sylvia Park Ramps will be approximately 12m high but more than 100m from the main building. The outlook is also already characterised by the state highway and railway corridor. While the ramps will reduce visibility of the Turners and Growers site from SH1 to a small degree (views from the southbound lanes will be filtered beneath the Sylvia Park Ramps) there will be a

gain in visibility from the new EWL. For these reasons any adverse visual effects are considered to be low;

- The Tip Top building faces across SH1 towards Mutukāroa-Hamlins Hill.[18] The southbound EWL ramp will rise over the middle-ground of this outlook and will pass very close to the building as it sweeps to join SH1. The ramp will encroach into the existing gardens where it joins SH1 and its outer edge at this location will be a retaining wall, all of which will detract from visual amenity. However, the Tip Top building is elevated and will continue to command views over SH1. For these reasons the effects on visual amenity will be moderate for this property; and

- The southbound EWL ramp will also curve past three other industrial properties north of the Tip Top site, including a warehouse at 99A Carbine Road that the ramps will pass very close to (2m). However, those properties are inward focused warehouses. Visibility will be limited to car parks which are already adjacent to the existing state highway. Therefore, any visual amenity effects will be low for these properties.

6.4.4 Effects on Mutukāroa ONF

Those parts of Mutukāroa that fall within the reserve boundaries are mapped as an ONF in the PAUP Decisions Version. Reasons for which it is classified as an ONF in Schedule 6 of the PAUP are the extent to which the hill (a) contributes to the understanding of Auckland's geology, (b) is rare or unusual (c) is an outstanding representative example of the diversity of landform and geological features of Auckland, (e) contributes to the aesthetic value or visual legibility of the wider natural landscape, (f) has community associations or public appreciation, (g) has potential value for public education, (h) has potential to add to the understanding of Auckland's geological and biological history, and (i) the state of preservation of the feature. Schedule 6 describes Hamlins Hill as a rare, unmodified example of the Waitematā sandstone ridges that underpin much of Auckland, and that it also contains the best example of a rhyolitic tuff deposit in Auckland on top of the hill – supposed to have been deposited there from air fall or pyroclastic flow.

The Project will not physically encroach onto Mutukāroa-Hamlins Hill. Likewise, there will be only minor effects on views to and from the hill as discussed above under the heading '6.4.3 Visual effects' above. Rather, the hill's role as a landmark surrounded by transport routes will be accentuated.

6.4.5 Volcanic Viewshaft to Maungakiekie/One Tree Hill

For completeness it is also noted that EWL will not affect the Regionally Significant Volcanic Viewshafts O3 and O4 from SH1 to Maungakiekie/One Tree Hill, which originate well north of the Project and are oriented in the opposite direction.

6.4.6 Effects during construction

Within Sector 4 the construction works will be confined to existing transport corridors, although there will be substantial disruption along the vicinity of Sylvia Park Road and at the connection with EWL to SH1. The main potential adverse effects will be visual, which will be amplified during construction.

However, visual effects from Mutukāroa will be limited by the relative difference in elevation as discussed above, and the location of the works within an existing industrial urban landscape. Such effects will be moderate-low and of little significance. Visual effects from adjoining properties will be moderated by the industrial or commercial nature of such adjoining properties.

[18] While the Tip Top building falls within Sector 5, it is discussed here because the outlook from the building is arcoss the area falling within Sector 4.

The works will be very prominent from such roads as SH1, Sylvia Park Road and Mt Wellington Highway. But such effects will be seen in the context of a transport dominated landscape where one might reasonably anticipate periodic construction works, and from where views are typically transitory.

Overall, the visual effects of construction in Sector 4 will be temporary in nature, and will not appear out of context in an area dominated by transport infrastructure.

6.4.7 Sector four summary and conclusion

Sector 4 includes the prominent natural landmark of Mutukāroa-Hamlins Hill, and culturally significant former route of the Kāretu portage that extended from the head of Anns Creek and connected with the Tāmaki River. The area is otherwise characterised by industrial activities, transport infrastructure and a high voltage transmission line.

The EWL will skirt the toe of Mutukāroa-Hamlins Hill and trace part of the Kāretu portage route. It will share a corridor with Sylvia Park Road, KiwiRail (Eastern Line), and the Ōtāhuhu-Onehunga transmission line.

There will be no adverse effects on Mutukāroa-Hamlins Hill of any note. Rather, the hill's role as a landmark at the centre of transport routes will be accentuated.

The EWL Sylvia Park Ramps will have some moderate adverse visual effects for passers-by on SH1 and surrounding roads, and for occupants of nearby industrial buildings. However, such effects will take place in the context of a landscape already dominated by transport infrastructure and industrial land uses.

There will also be some adverse visual effects arising from construction activities, but these will be temporary, and will take place in the context of a landscape dominated by transport infrastructure and surrounding industrial and commercial properties.

Positive effects in this sector include:

- Improving connectivity for cyclists and pedestrians by the proposed extension of the shared path from Māngere Inlet through to Sylvia Park Shopping Mall (and potentially beyond as part of Auckland's wider cycle network); and
- Improving connectivity and legibility of the road network through a new intersection node at the corner of Great South Road, Sylvia Park Road and the EWL along Māngere Inlet.

Overall, it is considered the adverse and positive landscape and visual effects will be balanced in this sector.

6.5 Sector 5: SH1 at Mt Wellington to the Princes Street Interchange

Sector 5 comprises the SH1 corridor between Tip Top corner and the Princes Street Interchange at Ōtāhuhu – the southern end of the EWL Project. The proposed works include widening the existing state highway one lane in each direction and reconfiguring the Princes Street interchange. Widening will entail removal of existing vegetation within the state highway corridor, installing noise walls, and encroaching into some adjoining properties. Those properties at the north end are industrial, while those from Panama Road south are mostly residential.

The main landscape and urban design issues are:

- Effects on the natural and cultural value of Ōtāhuhu Creek;
- Visual effects for travellers on SH1, particularly arising from the removal of vegetation and installation of noise walls; and
- Visual effects for adjoining properties.

6.5.1 Effects on the natural landscape

The only significant natural feature is Ōtāhuhu Creek, a tidal arm of the Tāmaki River important because it is also part of the historic Ōtāhuhu portage.

The creek is constricted by the existing causeway and culverts of SH1. As a consequence, there is no longer an open channel along the creek. Rather, the creek upstream of SH1 is choked by mangroves. Ōtāhuhu Creek is also visually constricted by weed vegetation on the banks. For instance, while there are a number of pōhutukawa trees, the banks adjacent to the state highway crossing also include bamboo, phoenix palms, black wattle, woolly nightshade and privet.

While the proposed EWL works include widening SH1 by one lane in each direction, at the same time it will remove the causeway and culverts and replace them with a bridge.

An additional bridge to take temporary traffic diversions during construction is also to be retained on the east side of SH1 as a pedestrian and cycle connection.

The landscape strategy is to restore Ōtāhuhu Creek as a physically and visually open waterway. Proposed measures include:

- Replacing the existing causeway and culverts with a bridge – an aspect that is incorporated in the Project;
- Removing incidental reclamation adjacent to SH1;
- Avoiding noise walls within the creek corridor (confining them to boundaries with residential properties;
- Removing weed species on the banks in the vicinity of SH1 to maximise views along the creek;
- Removing sufficient mangroves to reinstate an open channel both upstream and downstream of SH1; and
- Installing markers (for instance artwork) to highlight Ōtāhuhu Creek as a waymark on SH1.

Collectively, this package of works will enhance the existing situation. They will help restore the natural landscape of the Ōtāhuhu Creek in line with its cultural significance, and will increase the creek's visual presence as a waymark from SH1.

6.5.2 Effects on natural character

The only location in which natural character effects arise is at Ōtāhuhu Creek. These matters overlap with natural landscape matters discussed above.

EWL will have positive effects on physical aspects of natural character because of the replacement of the causeway and culvert with a bridge, removal of incidental reclamation adjacent to SH1, and removal of weed species from the creek banks in vicinity of SH1.

The opening up of the waterway and removal of weed vegetation that currently blocks views will also have some positive effects on the appearance of natural character.

6.5.3 Effects on the urban landscape

Because works will be confined to the margins of the existing state highway corridor, effects on the urban landscape will be largely confined to effects on adjacent properties.

Otherwise, the main urban landscape matter is the reconfiguration of the Princes Street Interchange. While the works will not fundamentally change the existing situation, there will be connectivity benefits from increasing the capacity of the crossings and intersections (at present, residents can become 'trapped' on the Princes Street peninsula because of congestion of the interchange) and from the more

direct and legible footpaths on the new configuration of the Princes Street overbridge. Although the bridge is skewed, it will improve on the current dog-leg arrangement.

As discussed, the bridge to be used for temporary traffic diversion during construction of the SH1 bridge over Ōtāhuhu Creek is to be retained following construction as a bridge for pedestrian and cycle use linking the Princes Street East peninsula with the Panama Road peninsula. Both peninsulas are currently somewhat cut-off by SH1 with limited connections to the rest of the urban area. Despite their proximity, the only connection between the two peninsulas is via a circuitous route. The proposed bridge would improve connectivity between the two areas, and also help connect coastal reserves along both sides of Ōtāhuhu Creek.

6.5.4 Visual Effects

The following photosimulations illustrate views of EWL in Sector 4:

- **Photosimulation 9**: From Panama Road overbridge looking south along the SH1 corridor; and
- **Photosimulation 10**: From banks of Ōtāhuhu Creek at Deans Place looking west toward SH1.

People who will experience Sector 4 of the EWL include:

- Occupants of adjacent properties;
- Travellers on SH1;
- Passers-by on the Panama Road and Princes Street overbridges; and
- Passers-by on the banks or waters of Ōtāhuhu Creek.

The following paragraphs describe the visual effects for such groups:

- Industrial Properties: There are warehouses and other industrial properties adjacent to SH1 for a short distance south of Tip Top corner. One of these (16 George Bourke Drive) is oriented to make use of exposure to passers-by on SH1; the remaining buildings are typically inward-focused and the yards typically used for car parks and storage. There is some vegetation within the state highway corridor on the eastern side of the corridor. The widening will remove the existing vegetation buffer on the eastern boundary, will introduce retaining walls along boundaries, and will reduce the separation distance between buildings and SH1. In one instance, SH1 will be within 2.5m of a building. However, the visual amenity effects on these properties will be limited by their industrial and typically inward-looking nature. There is an industrial property adjoining SH1 on the south-west bank of the Ōtāhuhu Creek. It comprises a yard and a large shed, a high fence along the boundary, and pole mounted hoardings making use of the visibility from SH1. Given the nature of the property, any visual amenity effects of the proposed widening adjacent to the boundary will be low in degree and significance;
- Residential properties: Most of Sector 5 is bordered by residential properties. Details of the visual amenity effects will vary between each property. In summary, though, there will be adverse visual effects because the separation with SH1 will decrease and noise walls will be installed along the boundaries, in many cases replacing a green buffer. The noise walls will typically be 3m in height (there are instances where lower noise walls will be required), roughly 1.2m higher than one might normally anticipate with a boundary wall or fence to a residential property. A 3m wall will be somewhat more dominant than a 1.8m wall depending on proximity to the house, and will cast a little more shade. However, the height-in-relation-to-boundary standards, which are intended to control such effects, are 2.5m plus 45^{o} in the Mixed Housing Suburban zone which applies to roughly half the residential properties adjacent to SH1 in Sector 5, or 3m plus 45^{o} for the Mixed Housing Urban and Terrace House and Apartment zones which apply to the balance of such residential properties meaning that boundary walls at approximately this height could be built as a permitted activity. While noise walls have some adverse visual effects in themselves, at the same time they will screen SH1 and have amenity benefits by reducing noise as described in the acoustic report (Technical Report 7 Traffic Noise and Vibration Assessment). The appearance of the walls could be mitigated by planting on the residential side. Such planting can include dense vegetation to soften the walls and

also trees to grow higher than the walls to reduce their apparent scale. Such trees would also add to the amenity of the SH1 corridor. It is recommended that a condition be included that requires an offer be made to property owners to carry out such planting (including parameters around quantity and process). The noise walls are also to be designed with regard to their aesthetic appearance as set out in the ULDF, which is particularly relevant for locations where planting is not preferred or is not feasible.;

- SH1: The visual amenity for travellers on SH1 will reduce because the existing green buffer will be replaced with a hard-edged noise walls. The additional lanes and shoulders will also amplify the scale and hard character of the corridor. To put such effects in perspective, the existing vegetation is of mixed quality, is limited in depth, and has gaps in places which reveal a mix of fence style and exposure to rear yards. Nevertheless, the vegetation filters views of adjacent properties and creates the impression of a reasonably green buffer on either side of SH1. Proposed mitigation includes by planting in front of the noise walls following construction. Such planting can include climbing plants and dense shrub planting, augmented by trees where possible to provide an appropriate scale. In addition to softening the walls, the vegetation will reduce the potential for graffiti that such high visibility surfaces are prone to;
- Panama Road and Princes Street overbridges: Visual amenity will reduce for those crossing over the widened SH1 because of the increase in scale of the motorway, the introduction of noise walls and removal of existing vegetation that lines the motorway (more substantial adjacent to Panama Road than Princes Street). The effects will be moderate taking into account the context of the motorway and transitory nature of such views. The recommended planting on both sides of the noise walls will mitigate such effects;
- Passers-by on the banks or waters of Ōtāhuhu Creek: The existing motorway crossing of the creek will be increased in width by one lane in each direction, and there will be a new bridge parallel with the motorway. Adverse visual effects of such increased width of structure will be offset by the replacement of the existing causeway and culverts which will open up views along the creek beneath the new bridges. Visual amenity will also be enhanced by the removal of weeds, and restoration of an open channel along the creek.

6.5.5 Effects during construction

Construction works in Sector 5 occur mostly within the existing SH1 motorway corridor. The main exception will be at Ōtāhuhu Creek where the works will be exposed to a broader area. The main potential adverse landscape effects comprise;

- Visual effects on adjoining properties and for passers-by; and
- Effects on natural character of Ōtāhuhu Creek

The most significant adverse visual effects will be from residential properties adjoining the route. Effects on these properties during construction will potentially be very high – depending on details specific to each site – taking into account proximity to the works, removal of vegetation, works to install noise walls adjacent to property boundaries, and disruption within properties themselves. Factors that mitigate such effects are their temporary nature, the fact that such properties adjoin an existing motorway where one might anticipate periodic works, and the eventual amenity benefit of the noise walls following construction.

The visual effects on the industrial properties in Sector 5 will be limited by the nature of such properties.

People travelling on SH1 will be subject to reduced visual amenity during construction. However, such effects will be limited by the transitory nature of the views, and the location within the existing motorway corridor where one might anticipate such types of work.

The works will detract from natural character of a section of Ōtāhuhu Creek for the duration of construction works. Such effects will be temporary, will take place in an area with moderate-low natural character, and will lead to enhanced natural character following completion of the works.

Overall, the construction works in Sector 5 will have significant adverse visual amenity effects on adjoining residential properties. Such effects will be temporary in nature, will occur in an existing motorway corridor where one might expect such works periodically, and will be offset by the subsequent enhancement of amenity provided by the noise walls and recommended planting. Similarly, there will be temporary detraction from natural character of Ōtāhuhu Creek, which will be outweighed by the enhancement of natural character following completion of EWL.

6.5.6 Sector five summary and conclusion

Sector 5 comprises the existing SH1 ('Southern Motorway') corridor between 'Tip Top corner' and the Princes Street Interchange. The land adjoining the corridor is partly industrial and largely residential.

EWL entails widening of SH1 by one lane in each direction, and reconstructing the Princes Street Interchange.

Ōtāhuhu Creek is the significant landscape feature in Sector 5. It is a main tributary of the Tāmaki River and is culturally important as part of the Ōtāhuhu portage. Currently the creek is constricted by the existing state highway causeway and culverts, and incidental spoil dumped on the creek margins.

The proposed works at Ōtāhuhu Creek include:

- Removing the existing SH1 causeway and culverts and replacing them with a bridge;
- Removing incidental reclamations from areas adjacent to SH1;
- Clearing the creek banks of exotic weeds;
- Removing some mangroves to re-establish an open channel upstream of the bridge; and
- Providing a new pedestrian and cycle bridge adjacent to the SH1 bridge (the bridge will initially be used to divert traffic during replacement of the causeway and culverts).

These works will have substantial positive effects by opening up the creek corridor, (physically and visually), and restoring natural character. The works will improve connectivity between the Panama Road and Princes Street peninsulas, and highlight Ōtāhuhu Creek as a waymark on SH1..

There will be adverse visual amenity effects as a result of adding lanes to SH1. In particular there will be potentially adverse effects for adjoining residential properties resulting from the increased scale of the motorway, loss of the green buffer, installation of noise walls, and in some cases encroachment into properties. However, while noise walls have adverse visual effects in themselves, at the same time they will screen SH1 and reduce noise. There will similarly reduced amenity for travellers on SH1 because of the replacement of the existing green buffer with a hard-edged boundary of noise walls.

Proposed mitigation of visual aspects includes re-establishing vegetation in the SH1 corridor in front of the noise walls, and offering planting within affected properties on the opposite side of the noise walls. The combination of such vegetation will soften the appearance of the walls, reduce the potential for graffiti, and re-establish something of a green buffer on either side of the corridor.

The adverse visual effects will be amplified during construction, particular with respect of adjoining residential properties and on the immediate surroundings at Ōtāhuhu Creek. Such works will be temporary in nature, will take place in the context of an existing motorway, and will be offset by the enhancements once the EWL Project is completed.

Overall, the adverse effects along the boundary of the corridor in Sector 5 will be appropriately mitigated, and will be balanced by substantial positive effects at Ōtāhuhu Creek.

6.6 Sector 6: Onehunga local road works

Sector 6 comprises the following local road upgrades in conjunction with the EWL:

- Widening of Captain Springs Road between EWL and the intersection with Neilson Street; and
- A new road connection between the EWL and the inland ports. [19]

There are no landscape and urban design issues of any note with Sector 6.

6.6.1 Effects on the natural landscape

There are no natural landscape matters that will be affected. In each case the land is modified and there are no natural features of note.

6.6.2 Effects on the urban landscape

As discussed above, there will be some benefits in tying together the southern end of Onehunga's street grid. Captain Springs Road is relatively important in this respect because it extends through both industrial and residential parts of Onehunga, linking with Neilson Street, Church Street and Mount Smart Road. Likewise, the port link road will connect Miami Parade through to EWL.

The Project avoids encroaching onto Waikaraka Park. It will not encroach on the historical basalt wall along its boundary, the basalt caretaker's cottage at the intersection of Captain Springs Road and Neilson Street. While some small street trees adjacent to the kerb in Captain Springs Road will be removed, such trees are in the order of 3m high and of low landscape significance. The large trees that make the major contribution to the streetscape and Waikaraka Park, and which are located outside the road reserve, will not be affected (see Tree Location Plan 2 in Appendix C of *Technical Report 5: Arboricultural Assessment*.

6.6.3 Visual Effects

People potentially affected include:

- Users of Waikaraka Park and the adjacent planned sports fields; and
- Occupants of adjacent industrial properties.

The following paragraphs describe the visual effects for such groups:

- Waikaraka Park: There will be no visual amenity effects of significance on users of the park. While Captain Springs Road will become busier, the works will take place outside the park and, in particular, outside the stone boundary wall and the large trees within the park boundary; and
- Occupants of industrial properties: The widening of Captain Springs Road will encroach into the berm and may require removal of some trees in front of industrial properties on the eastern side of the road, although the trees make only a low contribution to amenity. It appears that works can be undertaken in a way that avoids encroaching into yards used for car parking. While there will be some visual effects on these properties, such effects will be limited due to the commercial and industrial nature of these properties. The local overhead power lines will be undergrounded to accommodate the works which will have a small positive effect on visual amenity (see *Drawing Set 12 - Utilities Relocation*.

[19] Other works on local roads, such as Hugo Johnston Drive and Galway Street, are included as part of the other respective sectors

- The port link road will be entirely within an area devoted to large scale industrial activities and will have no adverse visual effects on adjacent properties.

6.6.4 Effects during construction

Construction works associated with the new road link between EWL and the inland ports will occur within an industrial area dominated by extensive transport infrastructure, and will have no landscape or visual effects of any significance.

Construction works on Captain Springs Road will take place in the existing road, and will be similar in scale to works that commonly take place in such urban roads. The adjoining industrial and sports field activities (including the adjacent club buildings) are relatively less sensitive to such effects.

6.6.5 Sector six summary and conclusion

In summary, there are no adverse effects of any note on the natural and urban landscapes in the Sector 6 local road works.

7 Recommended Enhancement and Mitigation

While measures are discussed above in relation to particular effects, this section of the report summarises the design measures which were conceived as an integrated package. These measures are designed to mitigate adverse effects, and to go some way to restoring the existing environment.

7.1.1 Urban and Landscape Design Framework

The measures fall under the umbrella of the ULDF which sets out:

- Three high level design themes;
- Principles and outcomes that apply across the Project as a whole (for example outcomes for such elements as earthworks, bridges, paths, walls, road-side furniture, landscaping); and
- Principles and outcomes that apply to specific localities

The ULDF goes beyond the mitigation measures addressed in this report to also identify additional opportunities for enhancement and future opportunities.

The three design themes underpinning the ULDF are:

- Respect the place;
- Restore the whenua; and
- Reconnect the people

'Respect the place' addresses such matters as responding to the natural and urban landscape, expressing the cultural footprint of mana whenua, and interpreting the area's heritage. In particular it is to reverse the lack of respect given to the area during the development of the last 80 years or so.

Restore the whenua addresses the rehabilitation of the land and water, particularly the rehabilitation of Māngere Inlet and Ōtāhuhu Creek.

Reconnect the people addresses the transport connections for all modes (motorists, cyclists, and pedestrians), connection between Onehunga and the port, and connections between Onehunga and the Māngere Inlet.

7.1.2 Enhancement and Mitigation Design Strategies

The proposed strategies to remedy and mitigate adverse effects of EWL are to:

- Rehabilitate and restore the degraded landscape of Māngere Inlet;
- Reconnect Onehunga with Māngere Inlet and its port;
- Enhance the legibility and aesthetic qualities of Te Hōpua explosion crater and tuff ring;
- Restore Anns Creek; and
- Rehabilitate and re-open (physically and visually) Ōtāhuhu Creek.

7.1.3 Enhancement and Mitigation Design Measures

Measures to rehabilitate and restore Māngere Inlet include:

- Creating a naturalistic shoreline with landforms and inlets echoing the original shoreline features;
- Incorporating wetlands and biofiltration beds as integral parts of the landforms to improve water quality from the industrial catchments inland. Configuring the wetlands to naturalistic landforms;

- Providing public access by way of a coastal path that enables people to re-connect with the re-naturalised shoreline, coupled with a more elevated 'promenade' adjacent to EWL overlooking Māngere Inlet; and
- Incorporating elements to mitigate ecological effects, such as restored salt marsh, and pebble/shell banks (for dotterel) on Landform 3 separated from areas to which people have access.

Details of the Māngere Inlet re-naturalisation include:

- Creating shoreline details that recreate the tracery of rocky reefs, islets, pebble and shell banks;
- Incorporating shoreline details within the tidal range, to recreate the low-lying nature of the original lava features and an intricate transition between land and tidal inlet;
- Incorporating the remnants of the original lava flows at Pikes Point and opposite Victoria Street into the re-naturalised shoreline;
- Designing the basalt landforms perpendicular to EWL to reflect the original lobes of lava and to maximise the shoreline width while minimising the required footprint;
- Promoting colonisation of mangroves adjacent to the EWL embankment on the sections between the basalt landforms. The mangroves are to provide a buffer between road and boardwalk in these sections, and habitat for species such as banded rail and fernbird; and
- Using salt tolerant rushes to treat stormwater, so that the wetlands appear as if they are estuarine marshland rather than typical land-based stormwater ponds.

The landforms comprise three main components:

- Rocky lobes intended to echo the original lava flows. The highest points of these components will be slightly higher than the EWL road (approximately RL6.0m), and will include trees and other coastal vegetation;
- Low (approximately RL2.5-2.8) pebble and shell banks. The purpose of these is to hold the wetlands; and
- Wetlands contained by the rocky points and pebble/shell banks. The wetlands are to treat stormwater. However, they are to use species typical of estuarine areas, and are to appear as continuous marshland taking their shape from the landform. Timber baffles are to be used for internal divisions to help maintain a more continuous marshland and minimise footprint.

Measures to reconnect Onehunga with Māngere Inlet include:

- Creating a coastal path that engages with the re-naturalised shoreline;
- Tying in the cul-de-sacs and completing the southern edge to Onehunga's street grid, creating a frontage to Māngere Inlet;
- Detailing EWL with a higher than conventional amenity so that it conveys a positive frontage to the inlet. The path on the seaward side is to have a character of a 'promenade' between Captain Springs Road and Port of Onehunga. Elements will include a generous width, quality wall and hand-rail design, crafted street furniture, high quality fittings such as lights. There are opportunities to add interpretation or art given the area's natural and cultural history, and its recent environmental history; and
- In general terms, designing a positive frontage to Māngere Inlet, reversing decades of it having been treated as an industrial backyard and dumping ground.

Measures to enhance the legibility and aesthetic qualities of Te Hōpua explosion crater include:

- Highlighting the crater rim by continuing tree planting around the rim; and
- Providing opportunity for an artwork – envisaged as a 'circle of light' – that would highlight the circular form and presence of the crater.

Measures to reconnect Onehunga town centre with its port include:

- Enhancing the pedestrian amenity of Onehunga Mall – focusing on the western side of the street tracing the crater rim and highlighting the original connection between Onehunga and the port;
- Enhancing the amenity of Onehunga Harbour Road as the main vehicle connection; and
- Placing the EWL in a trench so as to bridge the connection to Onehunga Wharf and Orpheus Drive.

Measures to rehabilitate Anns Creek include:

- Rehabilitating the upper reaches of Anns Creek adjacent to Great South Road, removing weeds;
- Recreating similar conditions and propagating the plant communities to the new landforms in Māngere Inlet; and
- Interpreting the lava outcrops and associated plant communities as part of a linear sequence of interpretation connecting features of the natural landscape.

Measures to rehabilitate Ōtāhuhu Creek include:

- Removing the existing causeway and culverts in favour a new bridge to open up the physical connection along the creek;
- Removing spoil dumped adjacent to SH1;
- Removing sufficient mangroves to provide a clear channel upstream of SH1;
- Clearing weeds from the banks to open up views along the creek;
- Replacing exotic weeds with indigenous vegetation where it does not impede views; and
- Avoiding noise walls that encroach into the corridor.

8 Conclusion

Much of the landscape traversed by the EWL has suffered the effects of being used as an industrial backyard and a dumping ground.

- Te Hōpua volcanic explosion crater and tuff ring has been substantially modified and covered with urban development and infrastructure;
- The former intricate volcanic shoreline of the Māngere Inlet has been buried beneath refuse landfill;
- Māngere Inlet has been subject to contamination from industrial discharges, leachate leakage and untreated stormwater;
- Māngere Inlet has been walled off behind industrial development;
- Anns Creek has been partitioned by causeways, encroached upon by reclamation, and infested with weeds; and
- The former Kāretu and Ōtāhuhu portages have been submerged beneath urban development and Ōtāhuhu Creek has become constricted, both physically and visually.

While the EWL Project has potential to increase the visual dominance of transport infrastructure, the severance of the urban area from the coast and reclamation of the Māngere Inlet, it also has the potential to help reverse some of the adverse effects of historical development and to positively contribute to restoration of the landscape. Overall, the adverse effects will be appropriately mitigated and there will be substantial positive effects.

Strategies to achieve this include:

- Restoring the neglected Māngere Inlet landscape;
- Connecting Onehunga with Māngere Inlet;
- Connecting people with the naturalised shoreline of Māngere Inlet;
- Reconnecting Onehunga and the Onehunga wharf area;
- Rehabilitating Anns Creek; and
- Restoring and widening (physically and visually) the Ōtāhuhu Creek corridor.

The EWL Project, seen as a whole, will go some way to restoring the natural and urban landscape.