

**SH20 Manukau Harbour Crossing Project
Appendix 8 : Urban Design Assessment**

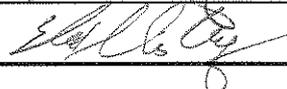
Appendix 8 – Urban Design Assessment

NOTE:

Report annotated September 2006 to refer to project updates described in August 2006 Section 92 Response Reports.

Refer to notes on following page

Document Acceptance

Action	Name	Signed	Date
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SH20 Manukau Harbour Crossing Project Annotation Notes

Reference Note
in text

- 1** Proposed form of interchange revised August 2006 to “quarter diamond” configuration. Refer to August 2006 Interchange Report and s.92 Response Report to Auckland City Council.
- 2** Temporary reclamations no longer proposed. Coastal Permit application for temporary reclamation at Onehunga Harbour Road withdrawn August 2006.
- 3** Extent and area of proposed reclamation revised. Refer August 2006 s.92 Response Report to Auckland Regional Council.
- 4** Coastal Permit applications for replacement of Old Mangere Bridge were lodged in May 2006 but withdrawn in August 2006 to enable further consideration of design options. General information relating to the proposed replacement bridge as described within this AEE remains relevant. New consent applications will be lodged at a later date as appropriate. The concept design for the replacement bridge will be confirmed at that time.
- 5** The proposed designation no longer includes the Manukau Cruising Club lease area (refer August 2006 s.92 Response Report to Auckland City Council). The building, carparking area and boat ramp are no longer directly affected by the works.
- 6** Stormwater management proposals revised. Refer August 2006 s.92 Response Report to Auckland Regional Council.

SH20 Manukau Harbour Crossing Project

Annotation Notes

Background

Transit's proposals for the Manukau Harbour Crossing Project were submitted to Auckland City Council, Manukau City Council and the Auckland Regional Council in May 2006.

All three Councils requested further information from Transit, and this information was provided in August 2006. The requests for further information were made in accordance with Section 92 of the Resource Management Act 1991.

Preparation of this additional information has resulted in some revisions to the original proposals, and these are reflected in supplementary documentation dated 28 August 2006. The key revisions made are summarised below.

Key Revisions

- The proposed form of the motorway interchange at Gloucester Park has been revised from a "diamond" to a "quarter diamond" configuration.
- The extent of reclamation proposed within the Manukau Harbour has been reduced – only one area of reclamation is now proposed, this being along Onehunga Harbour Road and Orpheus Drive, east of the Manukau Cruising Club.
- The Manukau Cruising Club and associated parking area is no longer affected by the proposed works.
- Coastal Permit applications relating to demolition of the old Mangere Bridge and replacement with a new pedestrian and cycle bridge have been withdrawn to enable further consideration of design options.
- Stormwater management proposals have been refined to offer an improved degree of treatment prior to discharge to the receiving environment.

Notification Documentation

The documents submitted with the consent applications and Notices of Requirement in May 2006, along with the more recent information prepared in response to requests from the Councils for further information are available in full for viewing as part of the public notification process.

To avoid confusion, the May 2006 documentation has been annotated where appropriate to refer to the recent revisions summarised above and described in the August 2006 reports.

Reports Referred to in Annotations – Full Titles

<i>Title</i>	<i>Date</i>	<i>Status / revision</i>
August 2006 Interchange Report		
Report: SH20 Manukau Harbour Crossing Project - Gloucester Park Interchange: Further Consideration of Alternatives	28 August 2006	Rev A Final
s.92 Response Report to Auckland City Council		
Report: Response to Auckland City Council Requests for Further Information under Section 92 of the Resource Management Act 1991	28 August 2006	Final
s.92 Response Report to ARC		
Report: Response to Auckland Regional Council Request for Further Information under Section 92 of the Resource Management Act 1991	28 August 2006	Final

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Executive Summary

This report is an urban design assessment of the impacts of the SH20: Manukau Harbour Crossing Project (the Project).

SH20 projects generally and the Manukau Harbour Crossing in particular are consistent with policy contained in the Auckland Regional Land Transport Strategy (RLTS), including the requirement to consider walking and cycling across the Manukau Harbour.

Other than noise walls widening the existing main carriageway does not introduce major new effects. The proposed Duplicate Bridge sits alongside the existing Mangere Bridge, which creates less adverse visual effects than separate new local crossings would.

The location of the Duplicate Bridge and Gloucester Park Interchange are, from an urban design perspective, the most appropriate options to allow high quality pedestrian and cycling links along the Old Mangere Bridge, Onehunga Mall, Onehunga Harbour Road and Orpheus Drive.

Proposed enhancements to Onehunga Harbour Road, Old Mangere Bridge and Orpheus Drive are included in the Project to improving walking and cycling routes as well as urban amenity. These areas will require agreement with Auckland City Council (ACC) to proceed.

Importantly the form of the Project is not likely to preclude future rapid transit links across the Manukau Harbour.

1 Introduction

Architecture Brewer Davidson Ltd has been engaged by Opus International Consultants on behalf of Transit New Zealand (Transit) to undertake an urban design assessment of a proposal to construct a duplicate Manukau Harbour Crossing Bridge, a new interchange at Gloucester Park and additional lanes along State Highway 20 (SH20).

It comprises one of a series of specialist reports that have been commissioned by Transit New Zealand for the project. These will form part of the supporting documentation for the Notice of Requirements and Resource Consents that are to be lodged under the Resource Management Act 1991 (RMA) with Manukau City, Auckland City and Auckland Regional Councils.

The objective of the urban design assessment is to provide an analysis of the project from an urban design perspective. The assessment must be sufficiently robust to assess the extent to which the effects (positive and negative) of the Project can be avoided, remedied or mitigated in terms of the RMA.

2 Project Understanding

2.1 Proposed Works

The Project will widen SH20 between Queenstown Road and Walmsley Road interchanges from four lanes to six lanes, with bus priority on shoulder lanes where practical, plus auxiliary lanes between Rimu Road and Gloucester Park interchanges. The existing Mangere Bridge will be duplicated to the east (i.e. a second bridge will be built) so that four traffic lanes and a shoulder lane for bus priority will be provided in each direction. Pedestrian and cyclist usage will continue to be provided along the line of the Old Mangere Bridge by way of a replacement structure (Mangere Footbridge).

The existing Gloucester Park split interchange will be upgraded to a grade separated ~~diamond~~ arrangement connected to Neilson Street. The Project will require alterations to local streets (Rimu Road/Mahunga Drive, Neilson Street/Gloucester Park Road, Orpheus Drive) and modification to access arrangements to surrounding properties affected by the upgraded interchange at Gloucester Park Road. **1**

The Rimu Road/Mahunga Drive Bridge will be replaced to allow motorway widening. Further south at Tararata Creek, a new off ramp bridge and widened motorway bridge is required. At the Queenstown Road underpass additional retaining walls and abutments will be required. The Beachcroft Avenue and Hastie Avenue footbridges will also need to be replaced to allow motorway widening. Noise walls as described in Volume 2 Appendix 6 Noise & Vibration Assessment are required along the route for acoustic mitigation. There will be reclamation alongside Orpheus Drive, from Onehunga Harbour Road to the Manukau Cruising Club, in order to maintain access to Orpheus Drive, ~~provide parking around the Club buildings and improve pedestrian/cyclist amenity.~~ The Sea Scout's Hall will also be moved to a new location along the seawall in the reclamation. **5**

3 Methodology

The urban design assessment has been prepared to identify potential impacts of the Project on the form and function of the affected communities, connections between communities and to the Manukau Harbour. To complete this assessment the following tasks were undertaken.

1. Urban Design Framework

- Review existing land use patterns and character assessment
- Review existing national, regional and district council documents
- In particular assessment of Project compatibility with Auckland Regional Growth Strategy & Auckland Regional Land Transport Strategy
- Assess bridge and interchange alternatives against urban design framework

2. Physical Effects

- Review current and potential pedestrian, cycle & passenger transport linkages
- Effects on property access and community infrastructure

3. Visual Effects

- Assess bridge duplication and interchange form
- Assess impact of noise walls
- Other visual assessments undertaken by landscape architect

4. Outline mitigation and enhancement opportunities in response to effects assessment

The following assessment criteria were used:

- Part II Resource Management Act
- Section 6 – protection of outstanding natural features
- Section 7 – maintenance & enhancement of amenity values
- Section 7 - maintenance & enhancement of the quality of the environment
- Transit NZ Environmental Plan: Sections 6.6 & 6.9
- Road & Traffic Authority, New South Wales: Bridge Aesthetics, July 2003
- Road & Traffic Authority, New South Wales: Noise Wall Design Guidelines, draft November 2005

- New Zealand Urban Design Protocol
- Transit New Zealand Urban Design Implementation Principles
- Land Transport Management Act Objectives
 - i. Assists economic development
 - ii. Assists safety & personal security
 - iii. Improves access & mobility
 - iv. Protects and promotes public health
 - v. Ensures environmental sustainability
- Auckland Regional Growth Strategy 1999 (ARGS)
- Auckland Regional Land Transport Strategy 2005 (ARLTS)
- Auckland Regional Passenger Transport Plan 2003
- Auckland City District Plan: Isthmus Section 1999
- Auckland City Growth Management Strategy 2003
- Manukau City District Plan 2002

4 Existing Community Environment

4.1 General

Analysis of the existing environment is divided into four areas. The Manukau Harbour and its foreshore are the dominant landscape features in the Project area. However, the Mangere Bridge and Onehunga foreshore areas have developed differently and are therefore analysed separately. Inland neighbourhoods to each side of the Manukau Harbour complete the four analysed areas. Refer Urban Design Land Uses Drawing UD01 for the extent of each area.

4.2 South of Rimu Road

The area south of Rimu Road is set back from the Manukau Harbour foreshore so has a typical suburban character. Low density detached housing borders the area to the west of SH20. The area is zoned Residential 6 Heritage in the Manukau City District Plan. The heritage zoning however pertains more to older housing around Mangere Bridge town centre itself, whilst the houses beside the motorway are more modern. They are generally of moderate quality and one or two storeys high. Existing planting has matured sufficiently to provide reasonable visual privacy in the rear yards of this housing. An existing footbridge at Hastie Avenue provides the only access across SH20 between Walmsley Road and Rimu Road.

Industrial buildings and the Te Puea Memorial Marae abut SH20 on the eastern side. The buildings are generally single level 9-12 metre high structures containing warehousing or light industrial activities. Offices for these businesses are mostly located on Mahunga Drive. The view from the motorway is primarily of blank walls and service yards partially screened by grassed mounds. The existing planting barely screens the Te Puea Memorial Marae and its associated housing.

4.3 Mangere Bridge Foreshore

Contemporary urban design extols the virtues of streets located along the edges of parks or reserves. Streets with cars and pedestrians provide more passive surveillance for a public space than rear boundary fences of private property. Tamaki Drive foreshore is a successful example of this type of space. Kiwi Esplanade has the same basic structure and the open space will increase in value as suburbs on both sides of the Manukau Harbour intensify. The existing SH20 alignment minimises visual effects on the foreshore by being located away from the housing and main reserve area.

The other main feature is the Old Mangere Bridge (Figure 1). The bridge is used for pedestrian and cycle access to Onehunga, is popular for fishing and includes a boat ramp on the southern embankment. Coronation Road leads directly from the Old Mangere Bridge to Mangere Bridge town centre. Pedestrians and cyclists prefer to use the Old Mangere Bridge rather than the walkway under the motorway bridge as it is safer and is a more direct route between town centres.



Figure 1: Old Mangere Bridge looking north to Onehunga

4.4 Onehunga Foreshore

In contrast the Onehunga foreshore has virtually no usable public space and is dominated by industrial activities and SH20. Old photographs show beaches, foreshore shops and houses along the Onehunga foreshore north of the flooded tuff ring. Beachcroft Avenue is the historic foreshore and SH20 and Orpheus Drive are on reclaimed land. Manukau Cruising Club and the Sea Scout's Hall are located on Orpheus Drive. However the motorway dominates Orpheus Drive as the only separation is a chain link fence. There is no defined footpath or cycleway and little landscaping on Orpheus Drive to attract people. The motorway severs Orpheus Drive from Onehunga Town Centre so it is an indirect link for pedestrians and cyclists travelling from Hillsborough to Onehunga. Having said this, the views to Manukau Harbour Heads and Mangere Mountain are superb and Orpheus Drive has great potential as a foreshore area if it is better connected and offers better amenity.

The remains of the tuff ring are barely visible. The apartments and hotel on Onehunga Harbour Road sit on the southwestern part of the tuff ring. Onehunga Mall Road sits on the southeastern part of the tuff ring, and the industrial buildings on Selwyn and O'Rorke Streets sit on the northern section. Originally the breached tuff ring was tidal but the area was reclaimed in the 1930's and 1940's. SH20 bisects the tuff ring with Gloucester Park located on the eastern half and an infrequently used outdoor space located in the western half. Recognition of the tuff ring is important geologically and offers opportunities for improving open space amenity on the foreshore.



Figure 2: Intersection Neilson Street & Onehunga Mall

The Mangere Bridge undercroft and Old Mangere Bridge's northern approach is the public area most affected by industrial development and the motorway. Large numbers of pedestrians and cyclists use the Old Mangere Bridge to travel between the two town centres despite the low amenity of the route. Travelling south a pedestrian or cyclist faces an unpainted pedestrian crossing at the Neilson Street and Onehunga Mall intersection¹(Figure 2). Then a pedestrian or cyclist must use the Onehunga Mall extension and motorway underpass, as there is no footpath or cycle shoulder on the parallel section of Onehunga Harbour Road (Figure 3). There is no pedestrian crossing at the Onehunga Mall and Onehunga Harbour Road intersection.



Figure 3: Intersection of Onehunga Mall extension (right) and Onehunga Harbour Road (left). Note no footpath on the left hand side of Onehunga Harbour Road.

¹ This is not a Transit issue as it is outside the Project area.



Figure 4: Motorway Underpass



Figure 5: Mangere Bridge Walkway

An uninviting underpass links Onehunga Mall extension to the pedestrian walkway beneath the motorway bridge (Figures 4 & 5). The walkway is seldom used as it is perceived as being unsafe and does not lead directly toward the Mangere Bridge residential area. A footpath on the opposite side of the underpass has no offset at the bottom of a slope to prevent cyclists veering onto Onehunga Harbour Road. Again, there is no pedestrian crossing where the footpath crosses Onehunga Harbour Road. From Onehunga Harbour Road a pedestrian climbs up approximately 3 metres to the abutment

where the Old Mangere Bridge used to cross Onehunga Harbour Road. This is an extremely narrow path for a cyclist. The abutment forces pedestrians to climb up then back down to the Old Mangere Bridge that is at the same level as Onehunga Harbour Road. Refer to the Mitigation Section 7 for improvements to the northern approaches. Auckland City Council (ACC) has completed a boardwalk along the Waikaraka foreshore. There is no footpath connection on Onehunga Harbour Road at the western end of the boardwalk.

4.5 Onehunga Town Centre

The ACC Growth Strategy designates Onehunga as a Priority 2 town centre for intensification. It is situated at the end of the Manukau Road bus corridor and is close to SH20. Housing is in demand as a less expensive area on the Central Isthmus. Conversion of Onehunga Mall back to a traditional mainstreet from a pedestrian only mall has been a commercial success (Figure 6). The smaller mainstreet shops sit in contrast to the successful Dressmart outlet mall one block back from the main street.



Figure 6: Onehunga Mall looking north from Princes Street

ACC has rezoned large areas between the retail main street and around Gloucester Park to mixed-use to encourage new residential and commercial activities. This southern expansion of the town centre follows the pedestrian desire line to the Old Mangere Bridge. The Project has no direct physical effects on the town centre; it is the forecast traffic flows to the Gloucester Park interchange that have the most significance. This flow of traffic with large numbers of trucks cuts across the pedestrian desire line at the Neilson Street/Onehunga Mall intersection (Figures 2 & 13). Streets near this intersection are vehicle dominated and there is little pedestrian amenity. Buildings are utilitarian in nature and contribute to a low quality townscape.

5 Outcomes from the Community Consultation

The consultation feedback is outlined in the Volume 2 Appendix 4 Consultation Reports dated 22 December 2005. Urban Design was not raised specifically in consultation, but issues with urban design implications included;

Traffic Effects

- Many submissions were concerned if Mangere Bridge duplication was best option to remove congestion on local roads. These issues are discussed in the Section 6.2 Bridge and Interchange Alternatives.

Walking & Cycling

- Retention of Old Mangere Bridge as a cycling and walking link.

Improve existing pedestrian links between Onehunga to Mangere Bridge town centres.

Pedestrian and cycling links across the Old Mangere Bridge and Orpheus Drive are discussed in Section 6.3 of this report.

Strategic Planning

Lack of integrated planning for road and passenger transport.

Gloucester Park Interchange

Visual effects of Gloucester Park Interchange.

Impact on volcanic tuff ring “Hopua”.

Pedestrian access to Orpheus Drive across new interchange.

These issues are discussed in Section 6.3 of this report.

Kiwi Esplanade Reserve Area

- Protection of the heritage trail.
- Avoid use of the reserve area for construction.
- Avoid the area identified for a proposed Waka Club.

5

On going discussions are taking place with the Manukau Cruising Club and Sea Scouts whose sites are affected by the Project. ~~It is proposed to reconfigure the Manukau Cruising Club's carparking and launching area as part of the Orpheus Drive reclamation.~~ The Sea Scouts Hall will be relocated away from the interchange ramps along the reclaimed coastal edge.

Transit's response to these urban design issues raised by the consultation process is contained within Volume 2 Appendix 4 Consultation Reports and within the assessment and mitigation sections of this report.

6 Assessment of the Urban Design Issues

This section is divided into three parts; firstly the Project is assessed against national and regional planning strategies. This assessment examines the Project's compatibility with the sustainable urban form proposed by the Auckland Regional Growth Strategy (ARGS) and Auckland Regional Land Transport Strategy (ARLTS). Compliance with the New Zealand Urban Design Protocol and the Transit Environmental Plan is considered.

Secondly the Mangere Bridge duplication and Gloucester Park interchange are individually assessed to consider the context of both in the urban environment, considering their scale and key community concerns.

Lastly, local effects are discussed, using the four precincts that were used to assess the existing environment in section 4 above.

6.1 National/Regional Framework Documents

6.1.1 Regional Growth Strategy & Regional Land Transport Strategy

Although the ARGS and ARLTS encourages passenger transport improvements it realises that Auckland's current low-density urban form will remain dependent on road connections for some time. Consequently the RLTs supports completion of SH20.

“Although high quality passenger transport services will be important, major new passenger transport investments alone cannot provide the same level of accessibility as roading investment”²

Completion of SH20 generally and specifically increasing capacity across the Manukau Harbour at Mangere/Onehunga is consistent with the ARGS & ARLTS. In addition the ARLTS requires the Project to include planning for passenger transport and walking/cycling.

“The investigation should include passenger transport options, and provision for cyclists and pedestrians”.³

² ARLTS page 90

³ ARLTS page 90

6.1.2 South Western Transport Corridor Strategy Study

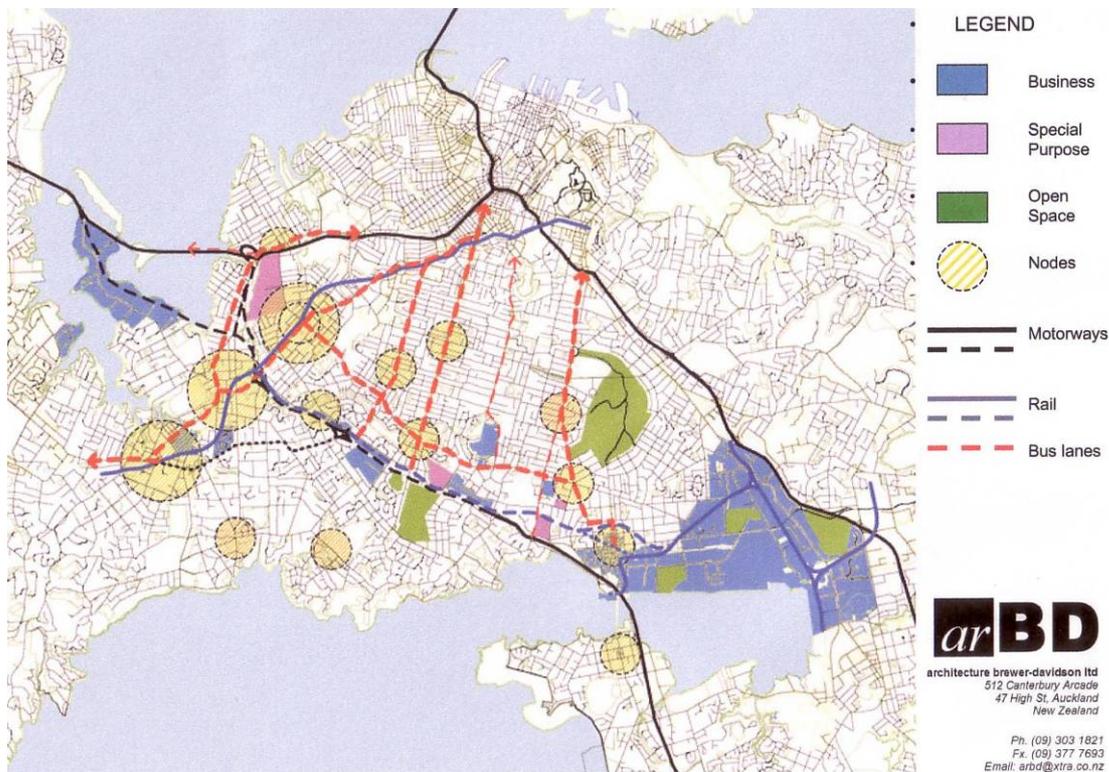


Figure 7: South West Corridor Study

The South Western Transport Corridor Study (Figure 7) was undertaken by Transit⁴ to identify options for managing transport demand, and to identify the most appropriate way to accommodate the growth in transport demand. Brewer Davidson was engaged to undertake the urban design assessment as part of the Study.

The Study demonstrated that both motorway and passenger transport infrastructure improvements are required to meet expected growth. Key urban design conclusions were that completion of SH20 would remove substantial traffic volumes from major arterial roads especially on the central Isthmus. This will allow the implementation of bus priority measures along these arterials. This in turn would support the proposed land use pattern of medium density town centres located along the arterial roads.

Rail would offer fewer benefits in the medium term, as the existing Avondale Southdown railway designation does not follow an alignment that would serve proposed intensified town centres. However the ability to provide rapid transit and link existing rail lines should be protected for the longer term.

⁴ In conjunction with ACC, Manukau City Council and the Auckland Regional Council.

The Study concluded that the completion of SH20 projects should take into account bus corridor opportunities in the medium term, and not conflict with the Avondale Southdown railway designation in the long term.

6.1.3 Cycle Strategies

Both Auckland and Manukau City cycle strategies recognise the desire line on the Old Mangere Bridge. Auckland City proposes a strategic cycle route requiring off-road facilities along Orpheus Drive linking to Onehunga Harbour Road and the Old Mangere Bridge (Figure 8). This route links to the facilities being built as part of the SH20 Mount Roskill Extension and to Onehunga town centre. Manukau City Council proposes a route along Coronation Road linking the Old Mangere Bridge to Mangere Bridge town centre and south.

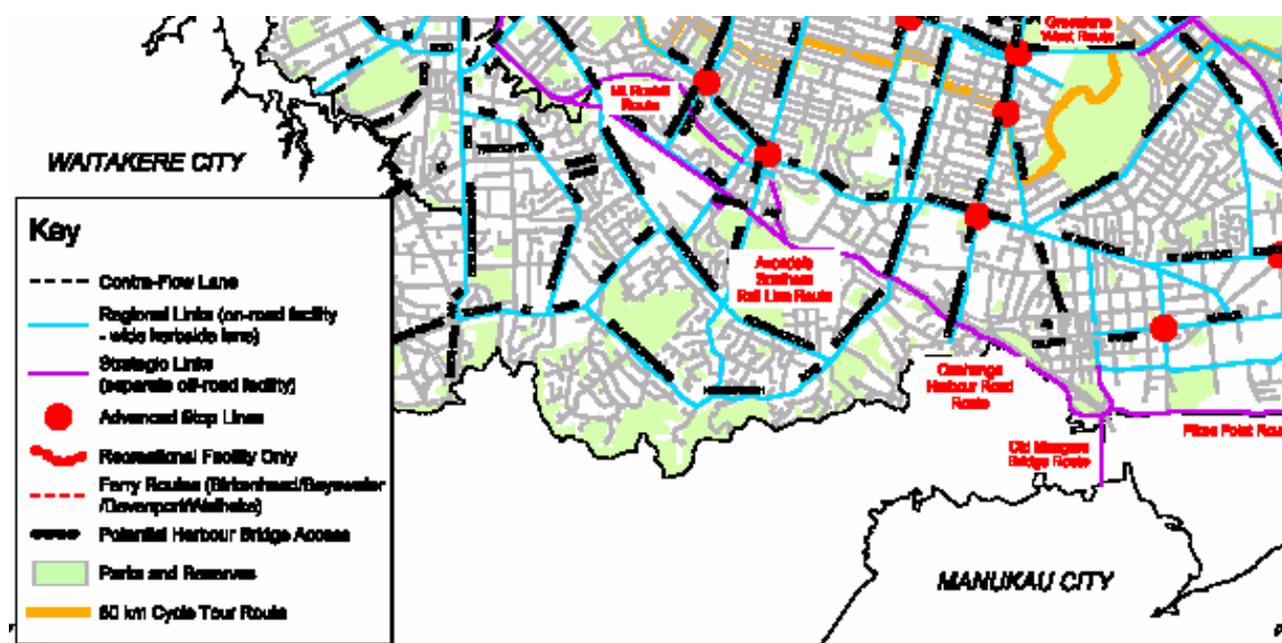


Figure 8: Cycle Strategy Map

6.1.4 New Zealand Urban Design Protocol⁵

Transit is a signatory to the NZ Urban Design Protocol. The Protocol identifies seven essential design qualities that create quality urban design; the seven Cs. The four qualities most relevant to the Project include;

Context

Design decisions for the Project have been taken with the topographical and urban context in mind. The historical relationship between Onehunga and the Manukau Harbour, the strategic value of Kiwi Esplanade and the future urban form of Onehunga & Mangere Bridge are examples. Off-corridor effects of traffic accessing the motorway are considered even though it is beyond the Project area.

⁵ Ministry for the Environment, 2005

Character

It is difficult to avoid negative local character effects with motorway projects. Therefore mitigation is proposed that addresses the affected character. For example the Gloucester Park interchange has different types of effects. On the Onehunga side planted batters are proposed to address visual effects at Gloucester Park. Reclamation along Orpheus Drive is proposed to improve pedestrian and cycle linkages along the foreshore. Materials and artwork that refer to the volcanic tuff ring and Onehunga's maritime history can be used in the Gloucester Park Interchange. Maori influence artwork can be included in the noise wall adjacent to the Te Puea Memorial Marae to create a sense of place.

Choice

The focus on walking/cycling and the effort to not preclude future rapid transit has been an important factor in design decisions. This is important to provide choice in transport modes to encourage sustainable transport.

Connections

Vehicle accessibility is an obvious focus of a Transit project. The improved pedestrian and cycle linkages especially across the Old Mangere Bridge are also vital connections. These connections and the avoidance of precluding future rapid transit options is vitally important to facilitate the sustainable urban form envisaged by the Auckland Regional Growth Strategy.

6.1.5 Transit Environmental Plan

The Environmental Plan provides a framework by which Transit can exercise its statutory responsibilities under the Land Transport Management Act 2003 and the Resource Management Act 1991.

“Visual Quality” is dealt with in Chapter 6.6: of the Environmental Plan. Much of Chapter 6.6 does not apply in detail to the Project, as it is more concerned with the landscaping of rural rather than urban highways. However, the key objectives outlined in section 6.6.2 of the Environmental Plan in relation to ‘visual quality’ are as follows:

- Incorporate multi-purpose landscaping as an integral part of all new State highway construction projects; and
- Improve the visual quality of the existing State highway network.

Chapter 6.9: of the Environmental Plan deals with Land Use Planning. This chapter is concerned with landuse transport integration and forward planning. The Project is an alteration to existing infrastructure so does not alter the existing context or introduce new severance effects (other than Gloucester Park Interchange's visual effects). Relevant issues for the Project include consideration of alternative modes of transport and connections between Onehunga and Mangere Bridge town centres.

6.1.6 Option Comparison



Figure 9: Plan of Bridge Alternatives

The following points are comparison of the route options in terms of complying with the ARGs & ARLTS and South Western Transport Corridor Strategy Study: The Western Crossing option would locate vehicle connections on the most likely route for future rapid transit services, as it is a direct link between Onehunga and Mangere Bridge town centres.

- Both Eastern Crossing options direct traffic away from Onehunga Town Centre but severely impact on existing open foreshore on the Mangere Bridge side.
- Although the Mangere Bridge Duplication routes traffic closer to Onehunga Town Centre (along Neilson Street) it removes traffic from Onehunga Mall south of Neilson Street. This will improve conditions on the main cycling and pedestrian desire line.
- The Eastern Crossing option leaves the existing split diamond interchange at Gloucester Park. Traffic wanting to travel north on SH20 will have to use Onehunga Mall to access the existing on-ramps. Northbound SH20 traffic travelling to Neilson Street will use the same route in reverse. This traffic conflicts with the desire to create a high quality pedestrian/cycling route across the Old Mangere Bridge.

6.1.7 Assessment of Project

The Project fulfils aims of the regional documents and studies due to the following features;

- Mangere Bridge Duplication along SH20 best serves the strategic vehicle links as specifically listed in the ARLTS.

- Gloucester Park Interchange location removes traffic from Onehunga Mall south of Neilson Street improving cycling and pedestrian amenity along the main desire line between Onehunga and Mangere Bridge town centres.
- There is no detailed planning for rail connections across the Manukau Harbour. However rail is likely to serve both Mangere Bridge & Onehunga town centres. A low level bridge is more likely given the elevation of both town centres and the constrained geometric design for rail. The Project does not preclude a low level bridge on either the eastern or western side of SH20, or rail through the Gloucester Park Interchange..
- The Orpheus Drive reclamation and removal of traffic from Onehunga Harbour Road will facilitate cycling along routes identified in cycling strategies.
- Inclusion of bus shoulder provisions on Mangere Bridge and the Duplicate Bridge and access roads to Onehunga and Mangere Bridge town centres.
- Enhancement of road structures is included in the Project to comply with the Visual Quality Section of the Transit New Zealand Environmental Plan. Refer to details in Section 7: Mitigation and Enhancement Measures.

6.2 Bridge Alternatives

Four bridge alternatives (Figure 9) associated with the route selection have been reviewed from an urban design perspective. They are:

- Option 2: Bridge Duplication
- Option 3: Local Western Crossing
- Option 4: Local Eastern Crossing
- Option 5: Local Eastern Crossing (Maungakiekie Community Board Option)

Option 1 was a widening of the existing Mangere Bridge. This was discarded, as it was structurally unfeasible. The options are fully explained in the consideration of alternatives section of the AEE, Chapter 3.

6.2.1 Option Comparison

The Mangere Bridge Duplication (Option 2) widens the existing motorway alignment and provides more vehicle capacity than the local bridge options. This is important to provide general vehicle accessibility but as the South Western Transport Corridor Strategy Study demonstrated it is also important to remove traffic from arterial roads and allow for “off-corridor” passenger transport improvements.

The Western Crossing (Option 3) proposed a new bridge along the Old Mangere Bridge alignment. This provides a direct route linking Onehunga & Mangere Bridge town centres.

However, directing large traffic volumes into the centre of the nodes is at odds with the ARGS and it may be better to protect this route for future rapid transit.

Both Eastern Crossings (Options 4 & 5) divert traffic away from Onehunga town centre but transplant congestion effects to the Mangere Bridge foreshore. In addition, as this area adjoins high quality public open space, the eastern crossing options have the potential to introduce significant adverse effects.

While bridge duplication has been determined as the appropriate option in terms of a strategic vehicle route it is important to address the off-corridor effects of heavy traffic severing Onehunga's historic connection with the Manukau Harbour. This issue is considered in Section 6.3 of this report.

6.2.2 Visual Effects

The proposed Duplicate Bridge deck will be visible from Hillsborough and Onehunga Heights. The new deck of the Duplicate Bridge sits immediately alongside the existing Mangere Bridge. While the new deck is visible it is an extension of an existing element, whereas the Eastern or Western Crossing options will create new separate elements and therefore more adverse visual effects.

The supporting structure becomes more important for lower views from Mangere Bridge or the Onehunga foreshore. Matching the existing pier layout will create the simplest visual arrangement, but the groupings of four piers supporting alternate longer and shorter arches is a more expensive structural solution (Option 1 in Figures 10, 11 & 12). Option 3 has the longest consistent span but piers land within the long span of the existing bridge and therefore it is the most cluttered visually. Option 2 is preferred as it has a consistent span length with the new piers being located within the existing short span length. While the relationship between the existing and new piers will vary, overall the long span will remain clear physically.

Figure 11 are true (unfolded) elevations of the options and Figure 12 are photomontages of the three structural options looking from Kiwi Esplanade. Figure 11 & 12 demonstrate that Option 2 maintains much of the visual clarity of Option 1 whilst being more practical structurally.

In summary the Duplicate Bridge is a larger and higher structure, but as it is positioned immediately alongside the existing bridge it visually becomes an extension of the existing Mangere Bridge. Local crossings although smaller would add new structures and be more complex visually. Option 2 achieves visual clarity in its relationship with the existing pier locations and is more practical structurally than Option 1.



Figure 10: Duplicate Bridge Pier Options: Top Left Option 1, Top Right Option 2 & Bottom Left Option 3

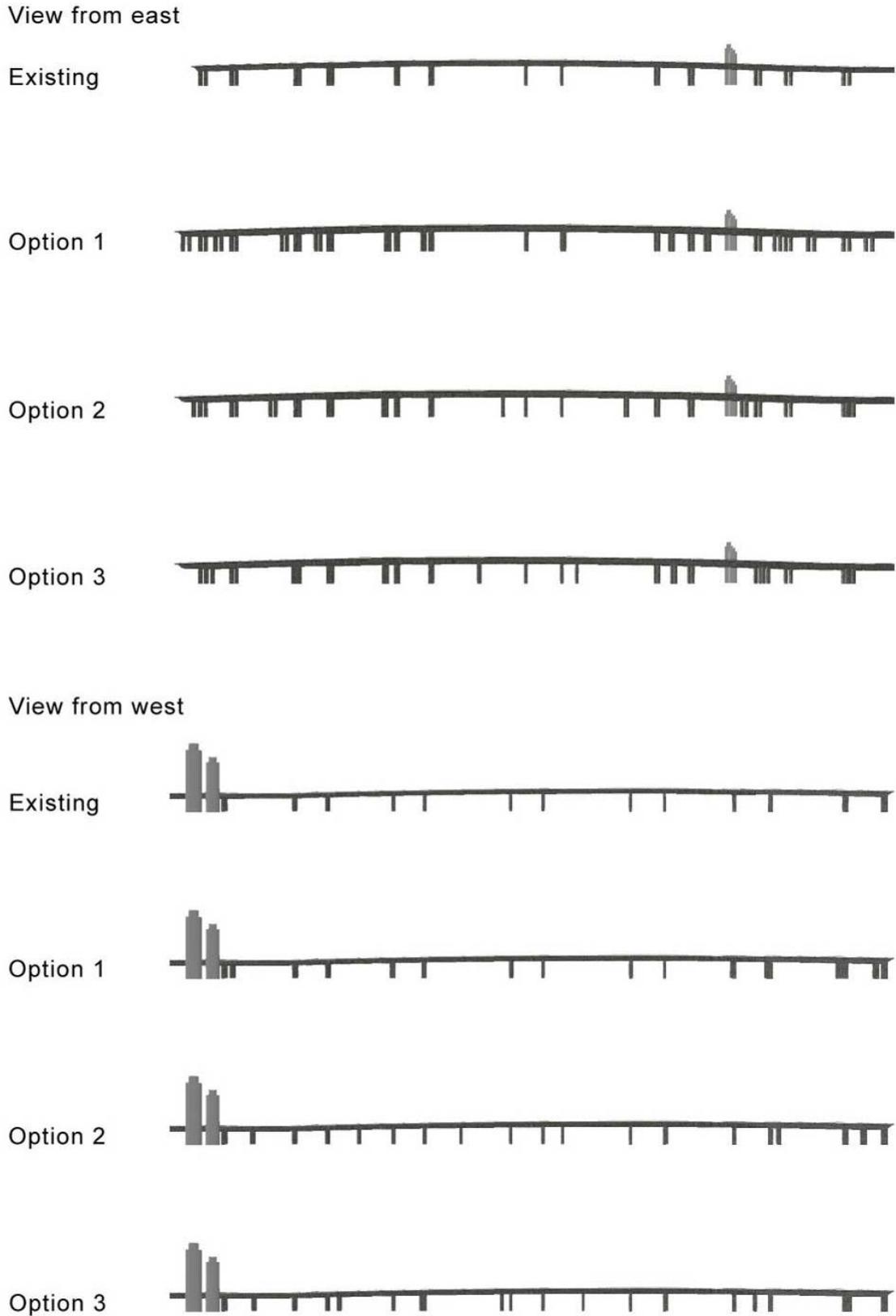


Figure 11: View of structural options for bridge duplication from northern approach to Old Bridge



Existing Bridge



Option 1



Option 2



Option 3

Figure 12: View from Kiwi Esplanade. From top to bottom; existing bridge, option 1, option 2 & option 3

6.3 Gloucester Park Interchange Alternatives

From an urban design perspective there are two key aspects to consider with the proposed Gloucester Park Interchange. Firstly, the interchange location provides a direct link with Neilson Street but does the traffic sever Onehunga town centre from the Manukau Harbour? Secondly, the interchange overbridge reconnects Onehunga with Orpheus Drive but does the visual effect of the interchange's embankments offset this benefit?

6.3.1 Option Comparison

Alternative interchange locations were examined along the SH20 alignment. The urban design perspective of these options is;

- Relocation to the immediate south increases the incursion into the volcanic tuff ring and Neilson Street traffic still severs the town centre/foreshore link
- Relocation to the Onehunga foreshore could allow access to Neilson Street further to the east avoiding the Neilson Street/Onehunga Mall intersection. But the interchange ramps would adversely affect the foreshore itself.
- Relocating to the north along SH20 would affect Gloucester Bay Reserve, draw Neilson Street traffic further around Onehunga town centre and require reclamation along Orpheus Drive. The proposed interchange utilises existing reclamation.
- The Onehunga Mall and Onehunga Harbour Road loop is currently the route for all northbound traffic entering or exiting SH20. Currently 32,000 vehicles use Onehunga Mall south of Neilson Street. Much of this traffic is trucks accessing the Southdown industrial area, the motorway and to a lesser extent Onehunga Port. The proposed interchange provides a direct link to Neilson Street, removing traffic from the loop roads. Traffic on Onehunga Mall south of Neilson Street will decrease to 10,800 vehicles per day with an interchange that includes a link to Onehunga Harbour Road. Therefore traffic can be vastly reduced on the main pedestrian/cycle desire line between Onehunga and Mangere Bridge town centres. The Gloucester Park interchange overbridge creates a new link between Onehunga town centre and Orpheus Drive.
- The Eastern Crossing alternatives would direct southbound traffic away from the Neilson Street/Onehunga Mall intersection, but northbound traffic from Neilson Street would still use the Onehunga Mall loop to access SH20.

6.3.2 Visual Effects

These issues are mentioned in passing as the visual effects are fully assessed in Volume 2 Appendix 9 Landscape and Visual Assessment. The interchange's embankments are large visual elements that could further detract from an area with little visual amenity. Retaining walls are proposed between the ramps and the main motorway alignment to minimise the physical intrusion into the tuff ring and other property. These retaining walls should be visually enhanced for the motorway driver's view.

Grassed batters are proposed on the exterior ramp faces other than the lock up site on the north-eastern section of the interchange. In order to ensure this site is usable after construction retaining walls are proposed to minimise physical intrusion. However the blocks of land from Church Street to Neilson Street have been rezoned to Mixed Use from Business 4 and are likely to include more residential development in the future. Grassed batters are preferable to retaining walls as an outlook for this area, but the visual catchment is small and may not be justified. These issues should be assessed during the design development of the Project.

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A 1.8 metre high noise wall is located beside the northbound lanes shielding adjacent residences and the Landing Hotel. Presently the area is of low amenity and the ground is approximately 3 metres below the motorway as this is where the underpass is located. Therefore the 1.8 metre high wall is not significantly changing the area's appearance. Design measures described in Section 7.0 will mitigate the visual effects.

6.3.3 Assessment

Overall the combination of bridge duplication and Gloucester Park interchange location offers the best potential for relinking Onehunga to the Manukau Harbour along Onehunga Mall and to Orpheus Drive. Traffic/pedestrian conflict is confined to the Neilson Street/Onehunga Mall intersection rather than along Onehunga Mall (Figure 13). The improvements on Onehunga Mall would result in increased traffic on Neilson Street around Selwyn Street. Balancing vehicle flows; pedestrian crossing and the bus route out of Selwyn Street will require detailed consideration in the next phase of work.

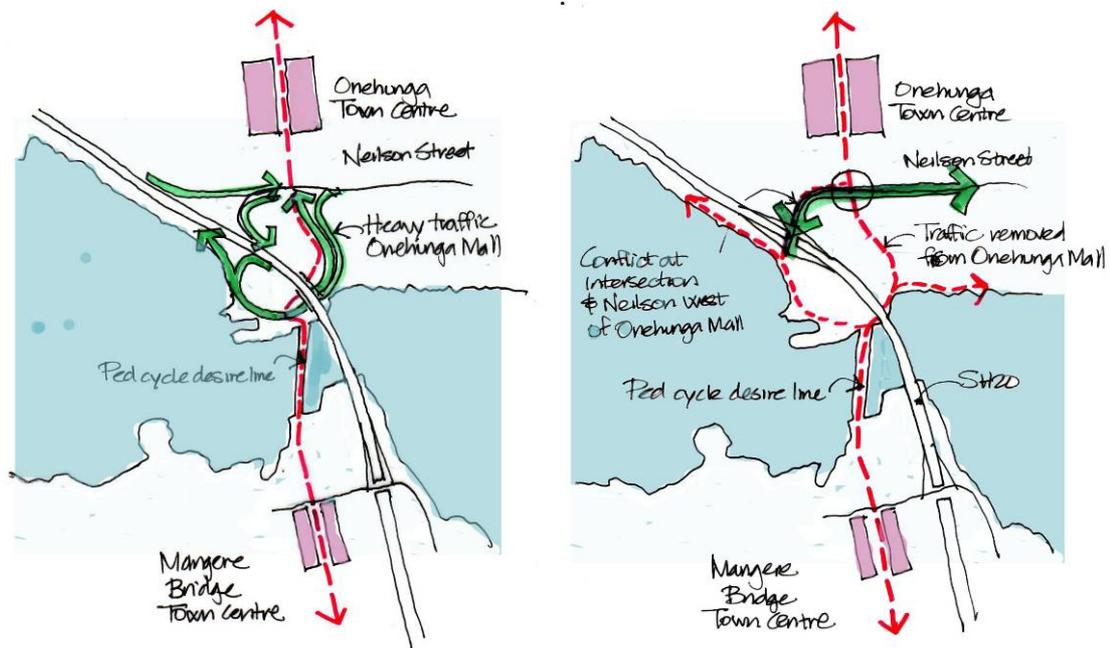


Figure 13: Vehicle/Pedestrian Conflicts, existing left proposed right

6.4 Localised Effects

6.4.1 South of Rimu Road

Existing SH20 has few severance effects, as it is located between residential and industrial areas. The business land centred on Mahunga Drive is small in area with the inner Manukau Harbour foreshore to the east so pedestrian/cycle numbers travelling from Mangere Bridge appears to be small.

A 2.5 metre high noise wall is required along the boundary above the Walmsley Road off ramp. Locating the noise wall down the bank will leave space for screen planting to the

house side. Locating a 2.5 metres high wall on the boundary will have moderately significant visual effects on residential amenity. Refer Section 7 for mitigation measures. The 1.5 metre high wall on the opposite side of SH20 will have no visual effects as it is not high and adjacent to an industrial area.

The Project widens SH20 toward the industrial area and the motorway shoulder generally remains in the same location alongside the residential area to the west. However noise walls are required along the entire length from Rimu Road south to Coronation Road. The acoustic benefits and visual effects of noise walls are a trade-off to be considered in consultation with the property owners. But at heights of 2.5 to 2.8 metres they are higher than domestic scale fences and will affect sunlight admission into the rear yards. Precise measurements should be undertaken during design development to try and reduce the height to 2.0 metres. If locating the noise wall inside the motorway boundary reduces the height then this too should be considered. If the noise walls remain at 2.5 to 2.8 metres high then they will have a moderately significant effect on residential amenity. Refer Section 7 for mitigation measures.

The existing Hastie Avenue footbridge is well located to encourage walking between the residential and employment areas. The footbridge only has steps while the proposed design has ramps to increase accessibility (Figure 14). The ramps on the residential side should be designed to minimise overlooking of private property and intrusion on outlook. Refer to the Hastie Avenue Footbridge notes in the mitigation section.



Figure 14: Hastie Avenue footbridge viewed from Crawford Avenue

Generally blank warehouse walls and service areas are located against the eastern side of SH20. Therefore despite SH20 being widened toward these properties visual effects for these properties are minimal.

A 190-metre long 3.0 metre high noise wall is located south of the Rimu Road Bridge adjacent to the Te Puea Memorial Marae and its associated housing. Options include

planting to screen the wall, or designing the wall in conjunction with the Marae. With either of these options the wall should have minor visual effects.

6.4.2 Mangere Bridge Foreshore

The Project's physical effects on Kiwi Esplanade are confined to the motorway widening and bridge abutments. Abutments and bridge structure along the foreshore should be designed to allow a future walkway. Large concrete faces and piers could be considered for artwork opportunities. Design of the southbound off ramp should leave sufficient room for a potential walkway from Kiwi Esplanade under the SH20 bridge to Mahunga Drive.

6.4.3 Onehunga Foreshore

Mangere Bridge Duplication will increase the shadowing around the northern approaches to the Old Mangere Bridge. The bridge undercroft area around Onehunga Harbour Road is of extremely low amenity (Figure 15). Improved streetscape and pedestrian/cycle connections on Onehunga Harbour Road and Old Mangere Bridge will offset the increased shadowing and enhance the area. Closing the motorway underpass (Figure 4) and the walkway under Mangere Bridge to the public could be considered (Figure 5). Improvements along Onehunga Harbour Road and Onehunga Mall to Neilson Street are outside the Project scope but should be included to complete a new pedestrian/cycle route. Refer Section 7 for details.



Figure 15: Bridge undercroft at Onehunga Harbour Road

The Gloucester Park Interchange embankments will dominate the foreshore area around Orpheus Drive. The proposed reclamation along Orpheus Drive will allow sufficient width for grassed embankments instead of retaining walls and mitigate this potential dominance. From an urban design perspective the priority is to create a pedestrian promenade and public access to the water along Orpheus Drive. Therefore the pedestrian path should be located along the coastal edge and Orpheus Drive should be located alongside the promenade for passive surveillance reasons. Parking can be located at the base of the embankment. However this cross section will need to take into account ramp vehicle manoeuvring at the Manukau Cruising Club and the existing power pylons.

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The Sea Scout's Hall is relocated due to the height of the ramp for the Gloucester Park Interchange. The exact location is to be determined but the hall should cantilever from a seawall or batter to maintain its current relationship with the water.

6.4.4 Onehunga Town Centre

The main issue is the conflict between traffic using Neilson Street to access the proposed Gloucester Park Interchange and the pedestrian/cycle link along Onehunga Mall. The Gloucester Park Interchange analysis in Section 6.3 demonstrates that the Project significantly minimises this pedestrian/cyclist conflict.

Planted embankments are important on the Onehunga side of the proposed Gloucester Park Interchange. The existing industrial area has been rezoned for mixed use so more residential developments are likely. This land is generally at the same elevation as the interchange and planted batters will provide better outlook than retaining walls.

A 1.8 metre high noise wall is required along Seacliffe Road. At 1.8 metres high it can appear as a domestic scale fence and is in a position unlikely to be a graffiti target. Therefore the visual effects are minor.

7 Mitigation & Enhancement Measures

This section details mitigation and enhancements by area.

7.1 Onehunga Harbour Road & Old Mangere Bridge Approaches

The mitigation measures are to provide a high quality pedestrian and cycling linkage between Onehunga and Mangere Bridge Town Centres. The route begins at Neilson Street and ends at the southern embankment so extend well outside the Project area. Therefore it is unclear which parts fall under the jurisdiction of Transit, Auckland City Council or Manukau City Council. The whole cycle/pedestrian route is described here for completeness, with the recommendation that the three authorities negotiate an agreement for extent of individual responsibility for implementation. These measures are termed mitigation due to the ARLTS requirement to include pedestrian and cycling links in the Project.

- Refer Drawing UD-04
- New-shared cycle/footpath, on-road cycle lane and streetscaping along Onehunga Harbour Road (Figures 16 & 17).
- Pedestrian crossings along Onehunga Harbour Road.
- Remove the northern abutment to the Old Mangere Bridge. Extend cycle and footpath at grade to the proposed footbridge. Locate footpath on eastern side of approach to leave room for landscaping to screen Port storage area. Leave space for rail link and existing Port access underpass, **OR**, new path up alongside existing abutment to leave Port rail tunnel in place (Figures 18 & 19).
- Pedestrian lighting along new areas as above.
- Redesign southern embankment of Old Bridge to allow pedestrian access past turning heads and ramp access.



Figure 16: Onehunga Harbour Road existing

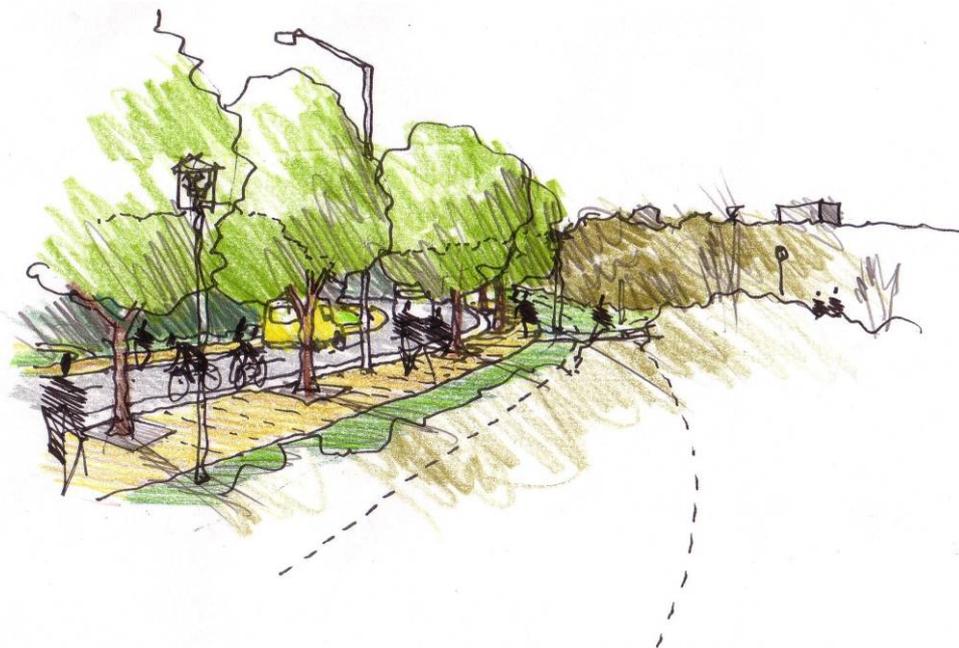


Figure 17: Possible Onehunga Harbour Road streetscape



Figure 18: Northern abutment Old Bridge existing



Figure 19: Possible Northern abutment Old Bridge

7.2 Orpheus Drive Foreshore/Gloucester Park Interchange

- Refer Drawing UD-03
- Reclamation to allow planted/grassed batters rather than retaining walls on “outside” faces of interchange to mitigate visual effects.
- Reclamation to align Orpheus Drive access from Onehunga Harbour Road away from the tuff ring. A cross section (Figure 20) is drawn showing urban design objectives i.e. the shared footpath/cycle is located on the coastal edge, Orpheus Drive with an on-road cycle lane is located beside the pedestrian path for passive surveillance reasons and parking is located on the motorway side of Orpheus Drive. This is an enhancement to the above mitigation.
- Detailed design is required to resolve conflicts this cross-section creates with Manukau Cruising Club boat ramp functions. The Manukau Cruising Club wants a suitable manoeuvring area for reversing boats and Orpheus Drive should be outside this area. The Manukau Cruising Club is also likely to want trailer parking close to the ramp and clubhouse. In this scenario Orpheus Drive is located behind the parking areas. The conflicting desires described in these last two bullet points cannot be resolved without detailed consultation and design.

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- Relocate Sea Scout Hall as required by realignment of Orpheus Drive. The Sea Scout Hall should extend out from a sea wall to maintain the existing relationship to the water.
- Artwork enhancements to overbridge and retaining walls on motorway side of interchange embankments to mitigate visual effects.
- Adequate width for cycling and pedestrians across interchange overbridge and pedestrian crossings or signals at all intersections including free left hand turns. This is a mitigation measure given the ARLTS requirement to include cycling and pedestrian provisions.

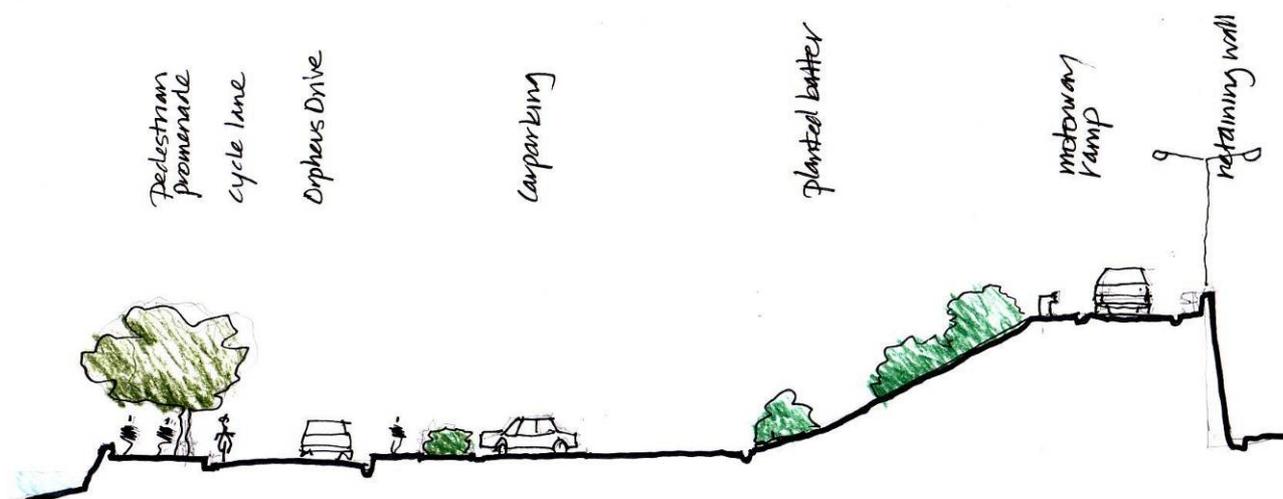


Figure 20: Orpheus Drive Cross Section – possible Urban Design outcome

7.3 Roadside Elements

Visual enhancement of roadside elements includes

- Artwork enhancement for abutments, and safety railings at Hastie Avenue footbridge, Rimu Street overbridge, Duplicate Bridge, Gloucester Park Interchange overbridge and Beachcroft Avenue footbridge.
- Noise wall on Walmsley Road off-ramp (Chainage 560-780 Table 2 page 17 Volume 2 Appendix 6 Noise and Vibration Assessment). Locate noise wall down bank to off-ramp so that screen planting can be positioned on the house side.
- Noise walls from chainage 920 to 1990 on western side parallel to Crawford Avenue. Refer Table 2 page 17 Volume 2 Appendix 6 Noise and Vibration Assessment. Detailed design and location options to reduce height of noise walls to 2.0 metres. Screen planting where possible on motorway face to discourage graffiti.
- Noise walls from chainage 1800 to 1990 on eastern side adjacent to Te Puea Memorial Marae. Refer Table 2 page 17 Volume 2 Appendix 6 Noise and Vibration

Assessment. These walls should reflect the location of the Marae and incorporate artwork designed in conjunction with the tangata whenua.

- Screen planting and/or artistic enhancement of the noise wall between Gloucester Park and Onehunga Harbour Road (Chainage 3195-3345 Table 2 page 17 Volume 2 Appendix 6 Noise and Vibration Assessment). The interior of this wall should be integrated visually with the Gloucester Park Interchange ramp walls. Look to reduce length of wall north of apartments to reduce impact on view to Manukau Harbour.
- The Seacliffe Road noise wall (Chainage 4900-5000 Table 2 page 17 Volume 2 Appendix 6 Noise and Vibration Assessment) can be built as residential type timber fence and have little effect on the adjacent residential properties.
- Artwork enhancement for motorway safety barriers.
- Feature lighting of Mangere Bridge and Duplicate Bridge.

Mitigation measures include

- Detailed design of access ramps on western side of Hastie Avenue footbridge to minimize overlooking of private property and intrusion of views. Start access ramp from the southern side of Hastie Avenue Road reserve so that the ramp length behind the private properties to the north is minimized.
- Increase width of replacement Beachcroft footbridge to allow cycling. Better integration into reserve space.

8 Conclusions

Completion of SH20 generally and the Project is consistent with the ARGGS & ARLTS. In addition the ARLTS requires the Project include planning for passenger transport and walking/cycling.

Completion of SH20 will remove substantial traffic volumes from major arterial roads especially on the central isthmus. This will allow the implementation of bus priority measures along these arterials. Growth plans in these areas are medium density town centres located along existing bus routes. Therefore completion of SH20 will assist in the implementation of bus transit corridors as well as increasing accessibility for freight vehicles on the motorway itself.

SH20 is an existing motorway. Widening the existing main carriageway does not introduce major new effects. Even the Mangere Bridge duplication sits alongside the existing bridge so creates less adverse visual effects than separate new local crossings.

The Mangere Bridge duplication and Gloucester Park Interchange location are the best options to allow high quality pedestrian and cycling links between the Old Mangere Bridge, Onehunga Mall and Orpheus Drive. By including these off-corridor elements the Project is improving walking and cycling as well as vehicle accessibility.

By selecting the Duplicate Bridge rather than the western local crossing route the Project does not preclude future rapid transit links across the Manukau Harbour on the Old Mangere Bridge alignment.