



MWH

BUILDING A BETTER WORLD

STAGE 2 REPORT

Arterial Traffic Study Selection of Best Arterial Route Options

Prepared for Nelson City Council

MAY 2010

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NELSON CITY COUNCIL

Arterial Traffic Study Selection of Best Arterial Route Options

CONTENTS

| | |
|--|----|
| Executive Summary..... | 3 |
| 1 Introduction..... | 5 |
| 1.1 Study Objective..... | 5 |
| 1.2 Study Structure | 5 |
| 1.3 Stage 2 Report..... | 5 |
| 2 Selection Methodology | 5 |
| 3 Long List of Options | 6 |
| 4 Roading Infrastructure Options | 7 |
| 4.1 Option A – Part-Time Clearways | 7 |
| 4.2 Option B – Southern Arterial..... | 8 |
| 4.2.1 Option B1 – Southern Arterial with exclusive links..... | 9 |
| 4.2.2 Option B2 – Southern Arterial with One Way Links “B.O.R.N Bypass”..... | 10 |
| 4.2.3 Option B3 – Southern Arterial with Flyover/Underpass..... | 11 |
| 4.2.4 Option B4 – Southern Arterial with Viaduct..... | 12 |
| 4.3 Option C – Southern Route via Marsden Valley | 13 |
| 4.4 Option D – Tahunanui to Haven Drive Tunnel..... | 14 |
| 4.5 Option E – Annesbrook to Emano Street Tunnel | 15 |
| 4.6 Option F – Tahunanui to Washington Valley Tunnel..... | 16 |
| 4.7 Option G – Princes Drive to Whakatu Drive Link..... | 17 |
| 4.8 Option H – Rocks Road Four Laning..... | 18 |
| 4.9 Option I – Waimea / Rutherford Four Laning..... | 19 |
| 5 Rail Infrastructure Options | 20 |
| 5.1 Option J – Freight Rail on old Railway Reserve | 20 |
| 5.2 Option J1 – Rail in Port Hills Tunnel | 21 |
| 5.3 Option K – Light Rail | 22 |
| 6 Public Transport Options..... | 23 |

| | | |
|-----|--|----|
| 6.1 | Phase A | 23 |
| 6.2 | Phase B | 23 |
| 6.3 | Phase C | 24 |
| 6.4 | Phase D | 24 |
| 6.5 | Proposed Passenger Transport Network | 25 |
| 7 | Travel Demand Management..... | 26 |
| 8 | Fatal Flaw Analysis | 27 |
| 8.1 | Arterial Traffic Benefits | 27 |
| 8.2 | Cost..... | 29 |
| 9 | Stage 3 Options..... | 31 |
| 9.1 | Option A: Part time clearways | 31 |
| 9.2 | Option B: Southern Arterial..... | 31 |
| 9.3 | Option H: Rocks Road Four Laning..... | 32 |
| 9.4 | Option I: Waimea / Rutherford Four Laning..... | 32 |

LIST OF TABLES

| | |
|--|----|
| Table 8-1 : Arterial Traffic Benefits..... | 27 |
| Table 8-2 : Cost of Options..... | 30 |

LIST OF FIGURES

| | |
|---|----|
| Figure 4.1-1 Option A - Part time clearways | 7 |
| Figure 4.2-1 Option B - Southern Arterial..... | 8 |
| Figure 4.2-2 Option B1 - Southern Arterial with exclusive links | 9 |
| Figure 4.2-3 Option B2 - Southern Arterial with one way links (B.O.R.N Bypass)..... | 10 |
| Figure 4.2-4 Option B3 - Southern Arterial with Flyover/Tunnel | 11 |
| Figure 4.2-5 Option B4 - Southern Arterial with Viaduct | 12 |
| Figure 4.3-1 Option C - Southern Route via Marsden Valley..... | 13 |
| Figure 4.4-1 Option D – Tahunanui Drive to Haven Road Tunnel | 14 |
| Figure 4.5-1 Option E - Annesbrook to Emano Street Tunnel | 15 |
| Figure 4.6-1 Option F - Tahunanui to Washington Valley Tunnel..... | 16 |
| Figure 4.7-1 Option G - Princes Drive to Whakatu Drive Link..... | 17 |
| Figure 4.8-1 Option H - Rocks Road Four Laning..... | 18 |
| Figure 4.9-1 Option I - Waimea / Rutherford Four Laning..... | 19 |
| Figure 5.1-1 Option J - Freight Rail in the old Railway Reserve | 20 |
| Figure 5.2-1 Option J1 - Rail in Port Hills Tunnel..... | 21 |
| Figure 5.3-1 Option K - Light rail | 22 |
| Figure 6.3-1 Proposed Passenger Transport Network..... | 25 |

Executive Summary

The principal objective of the Nelson Arterial Traffic Study is to determine the best transport system configuration between Annesbrook and the QEII/Haven Rd roundabouts that will improve the City as a whole. This includes an assessment not just of transport related impacts but also of other economic, social, environmental and cultural impacts.

The purpose of this Stage 2 report is to present the selection of the best arterial route options (a short list of options) from a long list identified through collation of earlier studies and public consultation inputs.

Consequently, this report is structured to outline the selection methodology, the identified long list of options with associated descriptions and broad-brush commentary of their benefits and disadvantages, document a fatal flaw analysis of those options and the rationale for the identification of the short list.

The long list of options was to include both roading and alternatives to roading such as more intense public transport and improvements to travel demand management programmes (e.g. car pooling and tele-commuting). It was also to include options regardless of cost or effectiveness.

To reduce this long list of options down to a 'short list' of options, the options were initially looked at in relation to whether they had a 'fatal flaw'. The criteria for the fatal flaw were whether the option was unduly expensive (likely to cost more than \$100-200M) or whether the option could potentially help meet the objectives of the study and assist 'arterial traffic' in the future. Arterial traffic was taken not to mean motor vehicles in particular, but the transport of people and freight via an arterial network, be this on road or other transport corridor.

This fatal flaw analysis has used a figure of approximately \$100-200M as the price point which is expected to be too expensive for Council and the NZTA to consider funding within at least the next 20 years, and possibly further. For example, the impact of a \$100-200M local project would be to require about \$50-100M of Council "Local share" funding, which analysis has shown, in today's market conditions, would currently require a 8.3%-16.5% increase on annual property rates for many decades. This increase could be higher if interest rates go up again in a stronger economy.

The remaining options were then reviewed broadly in relation to both the fatal flaws analysis considerations and the draft multi-criteria analysis criteria to select those options likely to deliver the optimum transport route configurations for the city as a whole in the long term. A summary of the options considered and the fatal flaw review are provided in the table over page.

From the fatal flaw analysis, four options warrant further consideration. These are:

- **Option A: Part time clearways (plus PT and TDM)**
- **Option B: Southern Arterial (plus PT and TDM) including consideration of a flyover or an underpass at Toi Toi Street**
- **Option H: Rocks Road Four Laning (plus PT and TDM)**
- **Option I: Waimea Rd / Rutherford St Four Laning (plus PT and TDM)**

Whilst the Public Transport option was considered to not warrant progressing as a stand-alone option due to no significantly affecting arterial traffic, it is considered that Public Transport would provide the valuable benefits and scoring of other options under the MCA framework if implemented in an integrated fashion with those options. To this end, it is proposed to include Phase A public transport as well as the bus infrastructure improvements proposed in the RLTS within all four options.

Similarly, Travel Demand Management by itself is unlikely to have a significant impact on arterial traffic unless it is combined in a package with viable and attractive alternatives to the private car. Accordingly, TDM would need to be implemented with significant improvements to the public transport system and further walking and cycling improvements. To this end, some level of TDM will be included in all options investigated in Stage 3.

The above four options (A, B, H, I) will be taken forward to the next stages of the study, combined with public transport and TDM measures for optimisation.

| Option | Significant Benefit to Arterial Traffic? | Cost less than \$100-200M? |
|--|---|--------------------------------------|
| Option A: Part time clearways | Yes | Yes |
| Option B: Southern Arterial | Yes | Yes |
| Option B1: Southern Arterial with exclusive links | Yes. No significant benefit over Option B | |
| Option B2: BORN Bypass | Yes. No significant benefit over Option B | |
| Option B3: Southern Arterial with Flyover | Yes | Yes |
| Option B4: Southern Arterial with Viaduct | Yes. No significant benefit over Option B3 | No, Would considerably exceed \$100M |
| Option C: Southern Route via Marsden Valley | No. Route unlikely to be attractive to arterial traffic | |
| Option D: Tahunanui to Haven Drive Tunnel | Yes | No, Would exceed \$200M |
| Option E: Annesbrook to Emano Street Tunnel | Yes | No, Would exceed \$200M |
| Option F: Tahunanui to Washington Valley Tunnel | Yes | No, Would exceed \$200M |
| Option G: Princes Drive to Whakatu Drive link | No. Adds traffic to local streets | |
| Option H: Rocks Road four laning | Yes | Yes |
| Option I: Waimea Rd / Rutherford St four laning | Yes | Yes |
| Option J: Freight Rail in Railway Reserve | No. Freight would not transfer to rail | |
| Option J1: Rail in Port Hills Tunnel | No. No significant benefit over Option J | |
| Option K: Light Rail | Yes. Although likely to be minor | No, Would exceed \$200M |
| Option L: Public Transport | No, not by itself and needs major TDM measures co-ordinated. Effects likely to be minor | Yes |
| Option M: Travel Demand Management | No. But would complement other options, especially Option L. | Yes |

1 Introduction

1.1 Study Objective

The objective of the Nelson Arterial Traffic Study is to determine the best transport system configuration between Annesbrook and the QEII/Haven Rd roundabouts that will improve the City as a whole.

This includes an assessment, not just of transport related impacts but also of other economic, social, environmental and cultural impacts.

The final deliverable from this study will be a preferred transport system configuration that can be progressed to scheme assessment design and subsequently submitted for statutory approvals, funding approvals and implementation.

1.2 Study Structure

This study methodology is divided into four distinct stages, as follows:

- Stage 1: Selection of best arterial route options: present and future conditions
- Stage 2: Selection of best arterial route options
- Stage 3: Evaluation of best arterial route options
- Stage 4: Determination of preferred arterial transport configuration and comparison with existing arterial traffic routes.

Stage 1 has already been completed and was reported in two reports, relating to Stage 1 and Stage 1B (April and May 2010)..

1.3 Stage 2 Report

This report covers the second stage of the study, that being the selection of the best arterial route options. In doing so this document reports on:

- The selection methodology (see Section 2)
- The long list of options (see Section 3)
- The roading infrastructure options, the rail infrastructure options, the public transport options and the travel demand management option (see Sections 4-7)
- The fatal flaw analysis, reducing the long option list to a short list (see Section 8)
- Reducing the short list of options down to the best arterial route options for further investigation in later stages (see Section 9)

2 Selection Methodology

A two stage process has been adopted for the selection of the best arterial route options.

The first stage of this process was to create a 'long list' of options, which includes all options that have previously been considered or investigated as well as any that were raised in the consultation responses for the North Nelson to Brightwater Strategic Study.

The long list of options was to include both roading and alternatives to roading such as more intense public transport and improvements to travel demand management programmes (e.g. car pooling and telecommuting). It was also to include options regardless of cost or effectiveness.

To reduce this long list of options down to a 'short list' of options, the options were initially looked at in relation to whether they had a 'fatal flaw'. The criteria for the fatal flaw were whether the option was unduly expensive or whether the option could potentially help meet the objectives of the study and assist 'arterial traffic' in the future. Arterial traffic was taken not to mean motor vehicles in particular, but the transport of people and freight via an arterial network, be this on road or other transport corridor.

The remaining options were then reviewed broadly in relation to both the fatal flaws analysis considerations and the draft multi-criteria analysis criteria to select those options likely to deliver the optimum transport route configurations for the city as a whole in the long term. However, this was done by using existing known information on the options rather than undertaking further investigations as part of the study. This review undertaken at a second Decision Making Team workshop reduced the short list down to the 'Best Arterial Route Options'.

3 Long List of Options

For the initial long list, options typically involved corridors and modes rather than specific layout and/or operational details.

The improvement options were allocated into four categories;




- Road infrastructure improvements
- Rail infrastructure improvements
- Public transport improvements
- Travel demand management improvements

The options under each of these categories are presented in this section.

The costs of all options have been roughly estimated and grouped in the following brackets shown below

| Option Cost | |
|-------------|-----------------|
| \$ | <\$20M |
| \$\$ | \$20M - \$50M |
| \$\$\$ | \$50M - \$100M |
| \$\$\$\$ | \$100M – \$200M |
| \$\$\$\$\$ | >\$200M |

The indicative alignments of the options are also shown on a map background. The following table shows the key to the alignments:

| Alignment Type | |
|---|--|
|  | Proposed Alignment – New or Upgraded Route |
|  | Alignment Unknown |
|  | Tunnel |

4 Roothing Infrastructure Options

4.1 Option A – Part-Time Clearways

(Cost \$)

This option proposes to install part time (initially peak-hour) clearways on Rocks Road and Waimea Road. Northbound traffic in the AM peak will use the Rocks Road clearway and southbound traffic in the PM peak will use the Waimea Road clearway. Outside the clearway periods the lanes would be available for parking. This is similar to Option 1 as presented in the North Nelson to Brightwater Consultation.

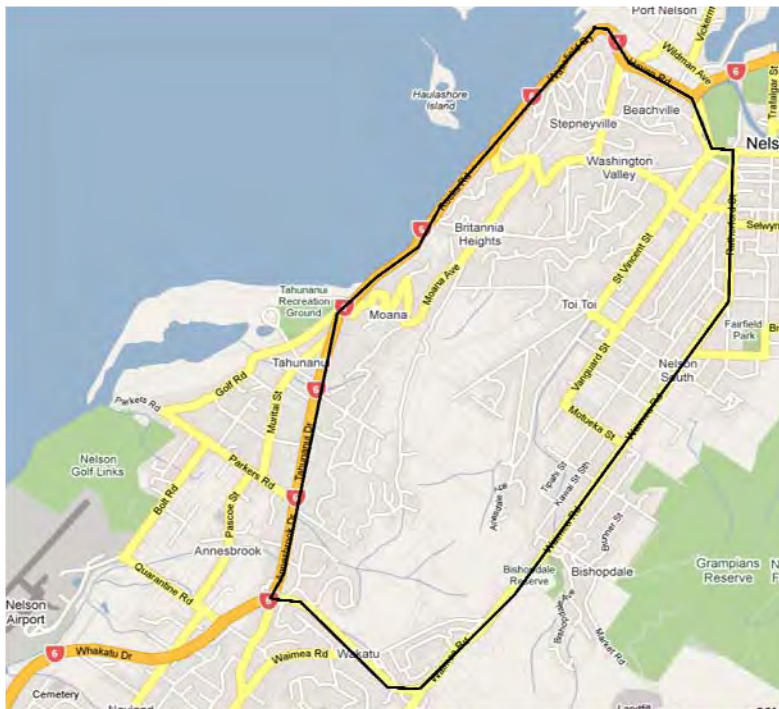


Figure 4.1-1 Option A - Part time clearways

Possible operational variations to this option include:

- full time three lanes on both routes.
- using the clearways for high occupancy vehicles only;
- using the clearways for freight vehicles only;
- using the clearways for buses and taxis only;
- using both the clearways in both peaks or additional times; and

| Pro and Cons of Part time clearways | |
|--|--|
| Pros | Cons |
| <ul style="list-style-type: none"> • Relatively inexpensive • Decreases travel times | <ul style="list-style-type: none"> • Benefits only in peak period if restricted to those times • Relies on limited traffic volume increase or travel change behaviour • Property access difficulties • Removal of structures and feature trees in road • Impacts on the historic nature of Rocks Road including the installation of a seawall, the stabilisation of cliffs and relocation / removal of the historic fence. • Rocks Road susceptible to storm events/sea level rise • Community opposition • Parking enforcement challenges |

4.2 Option B – Southern Arterial

(Cost \$\$)

This option proposes to construct a new two lane road between St Vincent Street and Beatson Road. This option is similar to the Southern Corridor Local Arterial Road presented as Option 2 in the North Nelson to Brightwater study. It is a lower standard than the Southern Link in that it provides one lane in each direction with relatively narrow shoulders and at-grade rather than grade separated intersections.

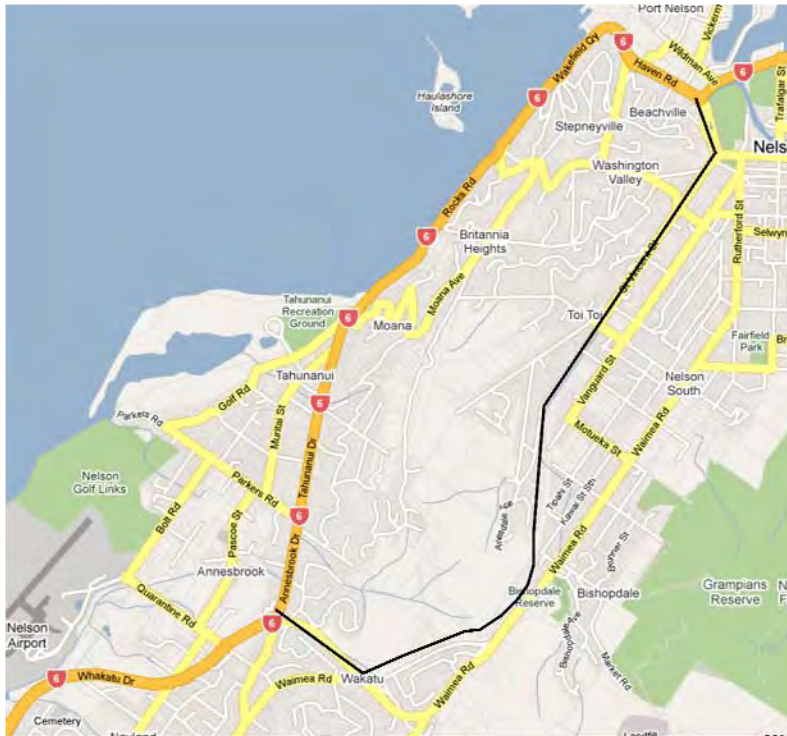


Figure 4.2-1 Option B - Southern Arterial

Variations on this option include:

- constructing a route with grade separated interchanges (i.e. the Southern Link)
- using the link only for public transport (and/or high occupancy vehicles and taxis)
- making the link compulsory for freight (to get trucks off Rocks Road)
- conversely not allowing freight to use the link (if there are air quality issues)
- constructing portions of the arterial as four lane carriageway

Other significant variations are discussed further below.

| Pro and Cons of the Southern Arterial Road | |
|--|---|
| Pros | Cons |
| <ul style="list-style-type: none"> • Reasonable costs • Significant increase in capacity resulting in a decrease in travel times • Relief of traffic volumes for Rocks Road and Waimea Road • Preserves cycle facility on old rail reserve | <ul style="list-style-type: none"> • An increase in capacity could result in less people switching to public transport due to relatively less time savings to buses • Consent issues including air quality and noise • Opposition from Victory community • Community severance • Could introduce more vehicles into the CBD • Potential loss of rail reserve cycleway |

4.2.1 Option B1 – Southern Arterial with exclusive links

(Additional Cost \$)

This variation to Option B proposes to remove the Beatson Road roundabout and establish exclusive links between Main Road Stoke with Waimea Road and Annesbrook roundabout with Option B above as shown in Figure 4.2-2 below.

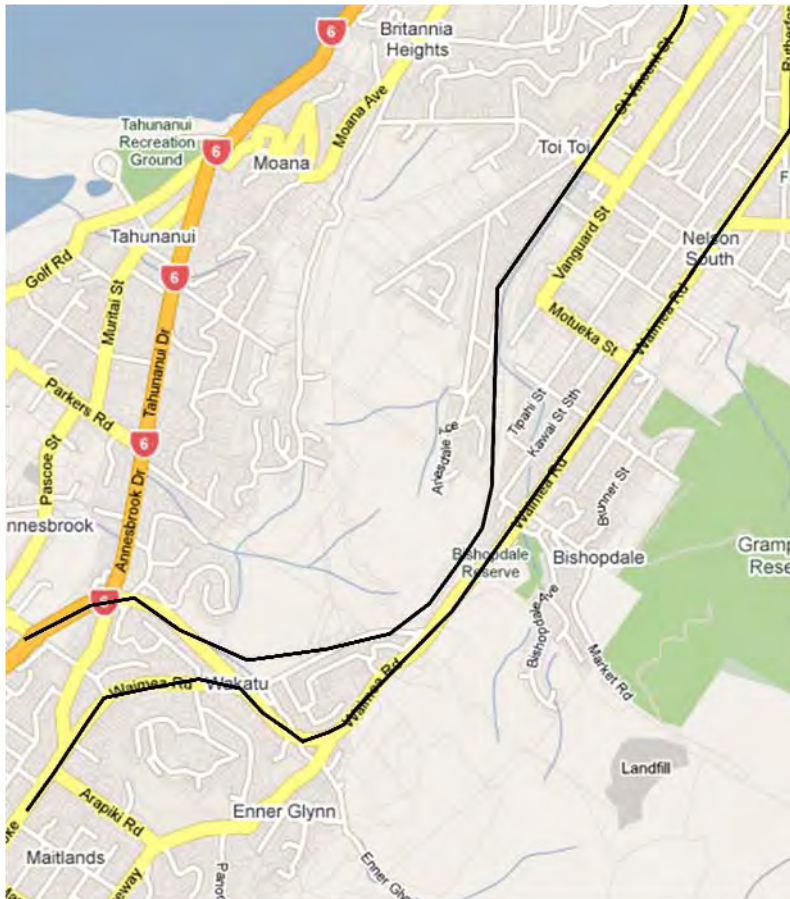


Figure 4.2-2 Option B1 - Southern Arterial with exclusive links

| Pro and Cons of Southern Arterial with exclusive links | |
|---|---|
| Pros | Cons |
| <ul style="list-style-type: none"> • Relatively inexpensive addition to Southern Arterial • Decreased travel times as exclusive links result in fewer intersections, and associated safety benefits | <ul style="list-style-type: none"> • All Southern Arterial issues • Connectivity issues for local traffic • Could create capacity issues on Main Road Stoke • Does not provide significant additional benefit |

4.2.2 Option B2 – Southern Arterial with One Way Links “B.O.R.N Bypass”

(Additional Cost \$-\$\$)

This option is a variation of the Southern Arterial which includes one way links between Whakatu Drive and the intersection of Waimea Road and Beatson Road. The new road north of Beatson Road will be one way for northbound traffic and the southern link along Waimea Road between Chings Road and Whakatu Drive will be one way for southbound traffic. The scheme includes two grade separated interchanges.



Figure 4.2-3 Option B2 - Southern Arterial with one way links (B.O.R.N Bypass)

| Pro and Cons of Southern Arterial with one way links (B.O.R.N Bypass) | |
|--|--|
| Pros | Cons |
| <ul style="list-style-type: none"> Decreased travel times due to less intersections | <ul style="list-style-type: none"> All Southern Arterial issues Expensive addition to Southern Arterial Does not provide significant additional benefit |

4.2.3 Option B3 – Southern Arterial with Flyover/Underpass

(Additional Cost \$\$/\$\$\$)

This option involves the construction of a 400m long flyover crossing Toi Toi Street connecting with the southern link option on the railway reserve as shown in Figure 4.2-4 below.

Another option would be to install a underpass at this location instead of a flyover, however this would incur significant additional cost (\$\$\$).

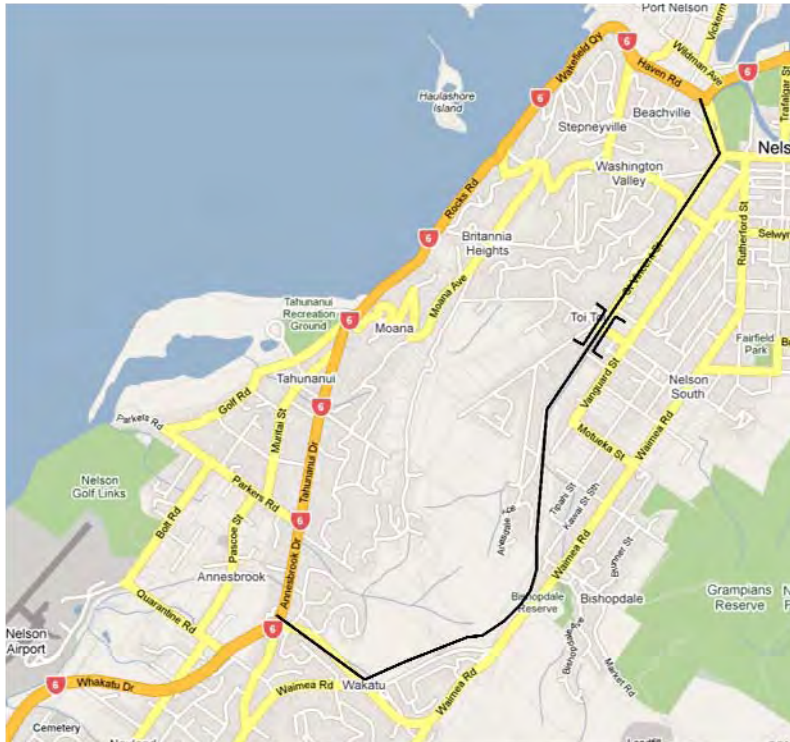


Figure 4.2-4 Option B3 - Southern Arterial with Flyover/Tunnel

| Pro and Cons of Southern Arterial with Flyover/Tunnel | |
|--|---|
| Pros | Cons |
| <ul style="list-style-type: none"> Decreases travel times as no stopping at intersections Retains existing traffic volumes at Toi Toi Street intersection Relief of traffic volumes for Waimea Road Safety benefits for Victory pedestrians and cyclists as less traffic than at grade options | <ul style="list-style-type: none"> Expensive addition Flyover visually intrusive Flyover socially intrusive Many Southern Arterial issues remain Constructability issues Tunnel has funding issues Potential land requirement issues |

4.2.4 Option B4 – Southern Arterial with Viaduct

(Additional Cost \$\$\$)

This option involves the construction of a viaduct from Haven Road to the railway reserve south of Victory School to link in with the Southern Arterial as shown in Figure 4.2-5 below.

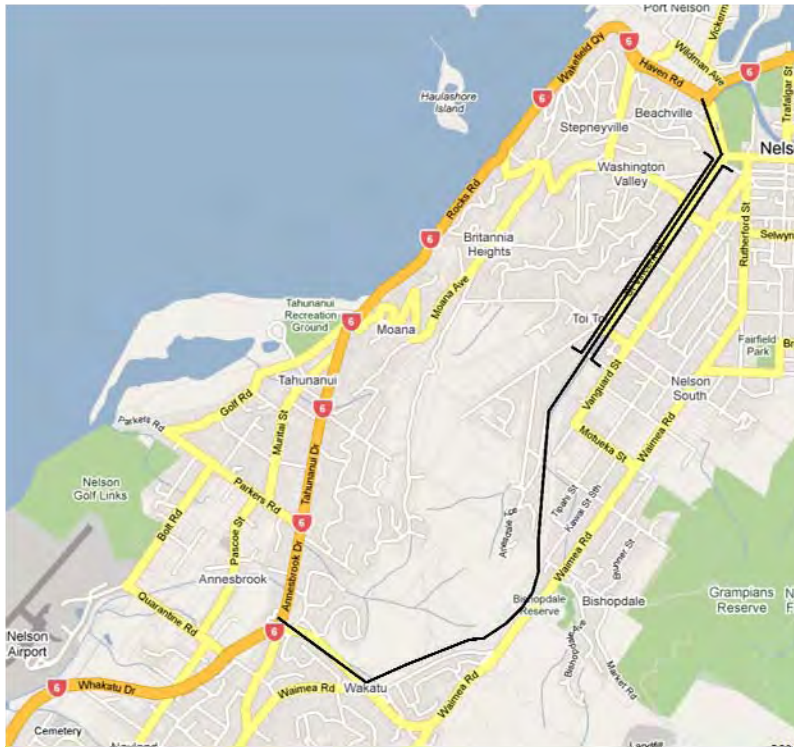


Figure 4.2-5 Option B4 - Southern Arterial with Viaduct

Pro and Cons of Southern Arterial with Viaduct

| Pros | Cons |
|--|--|
| <ul style="list-style-type: none"> • Decreases travel times as no stopping at intersections • Retains existing traffic volumes within Victory • Relief of traffic volumes for Waimea Road • Safety benefits for pedestrians and cyclists as less traffic on St Vincent Street and Waimea Road • Relief of traffic volumes on Rocks Road | <ul style="list-style-type: none"> • Very expensive addition to Southern Arterial • Visually intrusive • Air quality still an issue • Constructability issues • Potential land requirement issues • Local connectivity issues • Takes traffic past city centre so may result in additional travel distances • Does not provide significant additional benefits compared to (shorter) flyover |

4.3 Option C – Southern Route via Marsden Valley

(Cost \$\$\$\$)

This option involves the construction of a southern corridor road to connect to Richmond (Hill Road) with Brook Street as shown in Figure 4.3-1 below.



Figure 4.3-1 Option C - Southern Route via Marsden Valley

| Pro and Cons of Southern Route via Marsden Valley | |
|---|--|
| Pros | Cons |
| <ul style="list-style-type: none"> • Purpose built by-pass route from Richmond to Nelson with few intersections • Decrease in traffic volumes on Waimea Road and Rocks Road | <ul style="list-style-type: none"> • Very expensive • Available only to Richmond and more southern traffic • Doesn't address southern suburbs of Nelson • Consent and land issues • Large increase in traffic volumes in the Brook area, other residential areas and through-traffic through CBD • Terrain issues • Ecological issues |

4.4 Option D – Tahunanui to Haven Drive Tunnel

(Cost \$\$\$\$\$)

This option proposes to construct a tunnel through the Port Hills from Tahunanui Drive to Haven Road with grade separated bridges at Haven Road as shown in Figure 4.4-1 below.

It should be noted that there have been several suggestions to use tolling to fund the tunnel options. Experience has shown that there is resistance to tolls for projects as expensive as tunnels which do not provide large travel distance reductions. It is estimated that the cost recovery would only be around 5%-10% of the project cost.

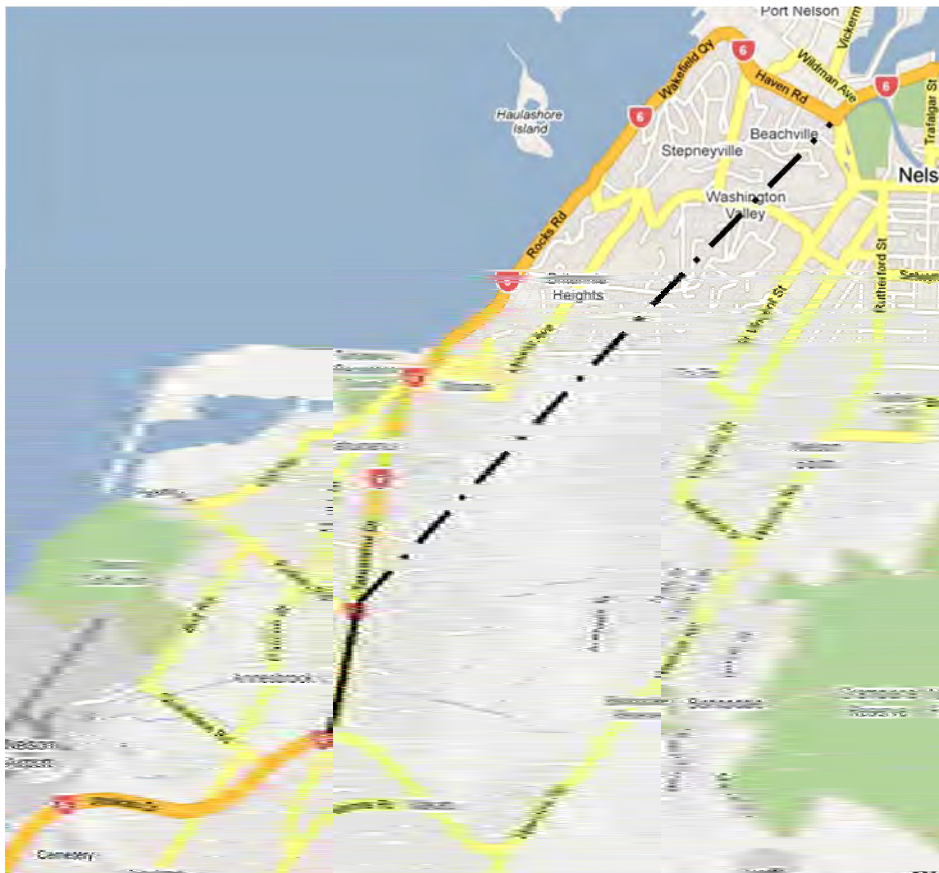


Figure 4.4-1 Option D – Tahunanui Drive to Haven Road Tunnel

| Pro and Cons of Tahunanui Drive to Haven Road tunnel | |
|--|--|
| Pros | Cons |
| <ul style="list-style-type: none"> • Direct access to the Port from south of Tahunanui thus reduced freight and lower traffic volumes on Rocks Road • Decreased travel times | <ul style="list-style-type: none"> • Extremely high cost • Constructability issues • Funding issues |

4.5 Option E – Annesbrook to Emano Street Tunnel

(Cost \$\$\$\$-\$\$\$\$\$)

This option involves the construction of a tunnel through the Port Hills from Annesbrook to Emano Street, or a tunnel from Tahunanui to Emano Street as shown in Figure 4.5-1 below.

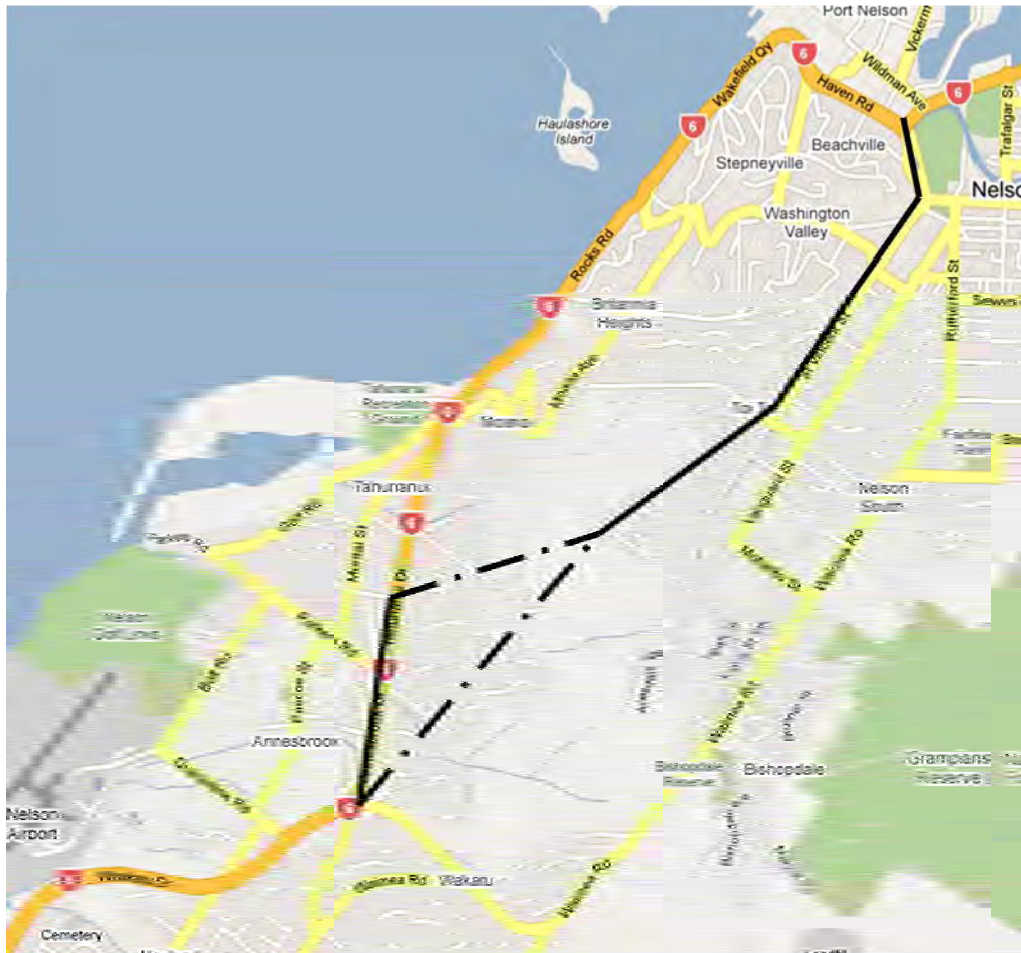


Figure 4.5-1 Option E - Annesbrook to Emano Street Tunnel

| Pro and Cons of Annesbrook to Emano Street tunnel | |
|---|--|
| Pros | Cons |
| <ul style="list-style-type: none"> Decreased travel times Decrease in traffic volumes on Waimea Road and Rocks Road | <ul style="list-style-type: none"> Very expensive Increased traffic volumes for the Victory community Constructability issues Funding issues |