

Before the Board of Inquiry
Waterview Connection Project

in the matter of: the Resource Management Act 1991

and

in the matter of: a Board of Inquiry appointed under s 149J of the Resource Management Act 1991 to decide notices of requirement and resource consent applications by the NZ Transport Agency for the Waterview Connection Project

Rebuttal evidence of **Andrew Murray (Transport)** on behalf of the
NZ Transport Agency

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REBUTTAL EVIDENCE OF ANDREW MURRAY ON BEHALF OF THE NZ TRANSPORT AGENCY

INTRODUCTION

- 1 My full name is Andrew Peter Murray. I refer the Board of Inquiry to the statement of my qualifications and experience set out in my evidence in chief (*EIC*) (dated 12 November 2010).
- 2 I repeat the confirmation given in that statement that I have read and agree to comply with the Code of Conduct for Expert Witnesses in the Environment Court.

PURPOSE OF EVIDENCE

- 3 The purpose of my rebuttal evidence is to respond to certain aspects of the evidence lodged by submitters. Specifically, my evidence will respond to the expert transport evidence of:
 - 3.1 Mr Ian Clark, on behalf of Auckland Council and Auckland Transport (Submitter No. 111-1);¹ and
 - 3.2 Mr John Parlane, on behalf of Sir Harold Marshall (Submitter No. 120-2).
- 4 I also respond to transport-related issues raised by:
 - 4.1 Mr David Mead (Submitter No. 130-1);
 - 4.2 Sir Harold Marshall (Submitter No. 120-1);
 - 4.3 Professor Tim Hazledine (Submitter No. 15-1); and
 - 4.4 Barbara Cuthbert and Max Robitzsch (Submitter No. 79-1).
- 5 A number of common issues were raised by a number of witnesses, which I will address in terms of the issue, including:
 - 5.1 Provision of a pedestrian and cycle connection between Waterview and Point Chevalier;²
 - 5.2 Sector 8 cycle way (although this is predominantly covered under my Response to the evidence of Mr Clark).³

¹ References are to the Submitter's Evidence as listed on the EPA website.

² Including witnesses: Margaret Watson (252-1), Robert Black (186-1), Duncan McKenzie (167-3), David Mead (130-1), Bill McKay (185-1), David Shearer (178-1), Louise Taylor and William Aldworth (200-1), Shirley Upton (103-1).

³ Including witnesses: Margaret Watson (252-1), Ian Clark (111-1), Robert Black (186-1), Belinda Chase (126-1), Barbara Cuthbert (79-1), Duncan McKenzie (167-3), David Shearer (178-1).

- 6 In addition, I will comment on relevant aspects of the section 42A Reports prepared for the EPA, namely:
- 6.1 Section 42A Report prepared by Environmental Management Services (*EMS*) dated 7 December 2010 (*Section 42A Report*);
 - 6.2 Addendum Section 42A Report dated 20 December 2010 (*Addendum Report*); and
 - 6.3 Final Air Quality Report, dated 14 January 2011 (*Air Quality Report*).
- 7 Finally, this evidence also includes comments on the expert transport caucusing held on 21 January 2011 and 28 January 2011.⁴

EVIDENCE OF IAN CLARK FOR AUCKLAND COUNCIL / AUCKLAND TRANSPORT

- 8 Mr Clark considers that three additional measures should be added to the Waterview Connection Project (*Project*), as follows:⁵
- 8.1 Improvements to the SH16 St Lukes Interchange;
 - 8.2 The provision of a northbound bus lane on Great North Road, approaching the SH16 Waterview Interchange (including an improved cycle/pedestrian facility⁶); and
 - 8.3 The completion of a cycleway along SH20, connecting to the SH16 cycleway.
- 9 While I agree with the desire for and broad benefits of these three projects, I disagree with the suggestion that these must be included as part of the Project,⁷ as I discuss below.

St Lukes Interchange

- 10 Mr Clark suggests that upgrades to the St Lukes Interchange (*Interchange*) should be included as part of the Project because they:

... are necessary, partly to resolve existing deficiencies and partly to mitigate effects of the project ...⁸

⁴ As at the date my rebuttal evidence was finalised, the expert report had not yet been signed, so I have not attached it to my rebuttal.

⁵ Statement of evidence of Ian Clark, paragraphs 3.1 and 11.1.

⁶ Statement of evidence of Ian Clark, paragraphs 7.8.

⁷ I agree, however, that the proposed works on Great North Road present an opportunity to provide the bus lane described in paragraph 7.2 of Mr Clark's evidence, and this is reflected in the proposed Operational Traffic condition OT.1(a).

- 11 I agree that St Lukes Interchange has existing deficiencies, but I do not consider that overall the Waterview Project will cause an adverse effect on the Interchange that requires mitigation. I explain my reasoning for this below.
- 12 **I agree with Mr Clark's analysis**⁹ that the predicted change in traffic flows at the St Lukes Interchange as a result of the Project are likely to increase delays for some movements and reduce delays for others. Mr Clark suggests the need for mitigation is due to his assessment of perceived adverse effects of the Project, noting his assessment of 10 hours extra delay in the morning peak and 6 hours less delay in the evening peak. I therefore presume he has based his assessment of an adverse effect on the morning peak.
- 13 I would firstly raise caution about assessing the delay effects of a large Project such as this by only looking at a single location in isolation. It is the users of the Interchange, not the Interchange itself, that experience any adverse delay effects and the Interchange is but one small component of their journey.
- 14 Motorists who pass through the Interchange may well get significant benefits from the Project for their overall journey, even though they may experience slightly more delay at isolated locations on that journey, such as at the Interchange. To demonstrate this issue, I have used the models of the Project to investigate the predicted time-savings for motorists who use the Interchange. The analysis is included in **Annexure A** to my rebuttal evidence,¹⁰ and shows that 94% of vehicles passing through the Interchange in the morning peak either have no material change or a positive time-saving following completion of the Project, with only 6% of users experiencing a material increase in travel time.
- 15 Notwithstanding this analysis of the fuller journey, I have also **considered Mr Clark's assessment of local** delay at the Interchange. While I accept that at face value Mr **Clark's** analysis shows that there could be additional delay in the morning peak period, it is my view that any judgement as to whether there is an adverse effect should include assessment of the effects on delay across the whole day, and not just the 2 peak periods.

⁸ Statement of evidence of Ian Clark, paragraph 6.6.

⁹ Statement of evidence of Ian Clark, paragraph 6.4.

¹⁰ Headed "Assessment of Journey Time Savings for Users of the St Lukes Interchange".

- 16 I also note that in Mr **Clark's** analysis report (attached as Appendix A to his evidence), he concludes that:

... the net effects of the Waterview Extension Project at the St Lukes Interchange are predicted to make the operation of the interchange slightly worse. (my emphasis)¹¹

- 17 I disagree that the net effects represent an adverse effect. I have estimated that the Project would have a beneficial impact on St Lukes Interchange outside the morning peak, and therefore it is likely that the combined positive effects in the evening peak and off-peak periods would outweigh the negative effects in the morning peak identified by Mr Clark, resulting in a net overall positive effect of the Project. My estimation of the non-peak effects are shown in **Annexure B** to my rebuttal evidence.¹²
- 18 Additionally, Mr Clark has only considered the effects on motorist delays. As noted in my EIC,¹³ the Project is expected to significantly reduce traffic flows on St Lukes Road approaching the Interchange (6,400 vpd reduction predicted) and a reduction is also predicted on the overbridge (1,600 vpd reduction). These reduced flows are likely to improve the environment for pedestrians and cyclists at this location (although this would not be sufficient to address the existing problems).
- 19 So while I agree with Mr Clark that there may be additional delay on one isolated part of the journey and for one part of the day for one mode at the Interchange, when the fuller journey, other periods of the day and other modes are considered, I conclude that the Project would have a beneficial transport impact on the users of the St Lukes Interchange.
- 20 It is on this basis that I disagree with Mr Clark's assertion that the Project will have an overall adverse effect on St Lukes Interchange that would require mitigation.
- 21 I note that this issue, including my additional analysis described above, was discussed at the caucusing of traffic experts, and was not resolved. Mr Clark continued to maintain that the Project creates an adverse effect requiring mitigation based on the expected additional delay at the Interchange in the morning peak. As outlined above, I disagree with this on the basis that almost all (94%) of the users of the Interchange in the morning peak are not detrimentally affected, including 37%¹⁴ who gain a material benefit (and beneficial effects are also expected outside the morning peak).

¹¹ Page ii in Appendix A to Mr **Clark's** evidence.

¹² Headed "**Assessment of Non-Peak Delay Impact at St Lukes Interchange**".

¹³ Paragraph 146 of my EIC.

¹⁴ See Annexure A to my Rebuttal Evidence.

22 Finally, I note that the NZTA has commenced a separate study investigating improvements to St Lukes Interchange and has offered to work closely with Auckland Transport in that regard.¹⁵

Great North Road Buslane

23 As stated in my EIC,¹⁶ I do not consider the northbound bus lane on Great North Road suggested by Mr Clark¹⁷ (and included in the submission of Auckland Council) is required to mitigate adverse transport effects of the Project, and Mr Clark does not state otherwise.

24 I agree with Mr Clark's paragraph 7.7 where he states that:

... there is an opportunity to enhance the benefits of the project by the creation of the bus lane as part of re-instatement of Great North Road.

25 This was acknowledged and reflected in my suggested amendment to Operational Traffic condition OT.1(a) (attached to my EIC), that explicitly states that the Network Integration Plan (*NIP*) should consider this opportunity.

26 I note that Mr Clark also supported a shared pedestrian/cycle path on the western side of Great North Road in the same area, again as part of reinstatement of this road.¹⁸ I also agree with this, noting its inclusion as a specific performance measure in the proposed condition OT.1(a).

27 While I agree with this in principle, I would expect that the design of that facility (including the width) would be considered in more detail when the extent of re-instatement of this section of Great North Road is known.

28 In summary, I consider that this issue is adequately addressed by proposed Operational Traffic condition OT.1(a).

29 This issue was discussed in expert caucusing and some further amendments to condition OT.1 were agreed in relation to **Auckland Transport's role**. I understand this issue is resolved as a result.

SH20 (Sector 8) Cycleway

30 In his evidence, Mr Clark supports¹⁹ the Auckland Council's submission requesting that an additional cycle lane be added to more directly connect the cycleways in Alan Wood Reserve and SH16 (i.e. a direct cycle lane through Sector 8). As stated in my

¹⁵ As confirmed in Mr **Tommy Parker's rebuttal evidence**.

¹⁶ Paragraph 170 of my EIC.

¹⁷ Statement of evidence of Ian Clark, paragraphs 3.1, 7.9 and 11.1.

¹⁸ Statement of evidence of Ian Clark, paragraphs 7.8 and 7.9.

¹⁹ Statement of evidence of Ian Clark, paragraph 8.4.

EIC,²⁰ I do not disagree with the general desire for improved cycling facilities, however I do not consider that it is necessary for the Sector 8 cycleway to be included as part of the Project.

31 In coming to this conclusion, I have considered the following factors:

31.1 Whether it is required to mitigate an adverse effect of the Project;

31.2 Contribution to the objectives of the Project;

31.3 The rationale for its inclusion presented by Mr Clark; and

31.4 The form and detail of the Sector 8 cycleway suggested by submitters.

32 I address each factor in turn.

Consideration of Adverse Effects

33 Mr Clark accepts that a Sector 8 cycleway is not required to mitigate adverse effects of the Project on the existing cycle network (paragraph 8.4 of his evidence). I agree with that.

34 However, Mr Clark goes on to state that the Project:

...will have significant adverse effects (in a general sense) on the local communities, particularly during the construction phase.²¹

35 While he does not state what those significant adverse effects are, as he has not suggested it is needed to mitigate transport effects, I understand they are not transport effects that he is referring to. As I am providing expert evidence on transport issues, I cannot comment on what non-transport effects these may be, or whether the requested cycleway would appropriately mitigate any such effects.

Consideration of Project Objectives

36 Amongst the Project objectives, the specific objective related to cycling and pedestrians is Objective 4:²²

To support mobility and modal choices within the wider Auckland Region:

- By providing opportunities for improved public transport, cycling and walking

²⁰ At paragraph 114 of my EIC.

²¹ Statement of evidence of Ian Clark, paragraph 8.4.

²² Section 3.3 of the AEE.

- 37 The Project contributes to this Objective by providing enhanced pedestrian/cyclist facilities through and across Hendon Park and Alan Wood Reserve and along SH16, and also through the opportunities for enhanced pedestrian facilities and/or usage brought about by the expected reduction in traffic and truck flows across much of the local road network (including those routes identified in **Auckland Council's** 20-year cycle network plan).
- 38 Further, this objective is contributed to by the **NZTA's commitment** to prepare a Network Integration Plan (in consultation with Auckland Transport) which (amongst other things):²³
- shall address such matters as pedestrian/cycleways, lane configuration, traffic signal co-ordination, signage and provision for buses
- 39 As a result, I do not consider that the Project is failing to meet this objective if the Sector 8 cycleway is not provided. Moreover, I note that the Project does not preclude its completion in the future, should Auckland Council choose to do so.
- 40 Therefore, I conclude that provision of the Sector 8 cycleway by the NZTA is not reasonably necessary to meet the objectives of the Project.
- 41 Whether the Sector 8 cycleway is necessary to meet this objective was discussed in expert caucusing and agreement was not reached on this issue.

Stated Rationale for Including the Cycleway

- 42 Mr Clark bases his support for inclusion of the Sector 8 cycleway as part of the Project on three reasons:²⁴
- (a) Providing the connection would enable the potential benefits of the existing SH20 and SH16 cycleways to be realised and it will enhance the overall transportation benefits;
 - (b) It would be more efficient to provide the connection as part of the overall project;
 - (c) Providing the connection would be consistent with various strategic and policy directives.
- 43 I address each of these reasons in turn.

²³ See Operational Traffic condition OT.1.

²⁴ Statement of evidence of Ian Clark, paragraph 8.4.

Enhancing Transport Benefits

- 44 I agree that some form of improved cycle connection through this area is likely to make cycling easier and more attractive and hence improve the cycle network. However, I note that this statement could be applied to any improvement to the cycle network and to other parts of the Auckland Transport cycle network, and not only to the NZTA SH20 and SH16 cycleways (for example, providing enhanced facilities here could assist benefits being 'realised' on other existing cycleways in the cycleway network).²⁵ Also, the extent that the benefits of the existing SH16 and SH20 cycleways would be realised by this connection is uncertain, given that the proposed connection is less direct and potentially less attractive than the existing routes via the local road network (as I discuss later in this evidence).
- 45 Therefore, while a Sector 8 cycleway could enhance the benefits of the overall cycling network, I do not see that this in itself would make it necessary for the cycleway to be provided as part of the Project.

Cost Efficiencies

- 46 Mr Clark suggests that constructing the cycleway as part of the Project is likely be more cost effective (in terms of consenting, consultation and construction), than if done at a later stage by Auckland Transport.²⁶ While I am not an expert on the potential cost savings of combining the construction work packages, I would note that the proposed cycleway is likely to require additional and specific consenting, consultation and land ownership issues to be addressed,²⁷ which would be required irrespective of whether it is led by the NZTA or Auckland Transport. Jurisdictional and land ownership issues cannot be ignored. Again, I do not see potential cost efficiency as a reason in itself to require the cycleway to be provided as part of the Project.

Policy Considerations

- 47 Mr Clark also suggests that the cycleway should be included as part of the Project as it is consistent with various strategies and policies to do so.²⁸ I agree that a cycleway of this nature would be consistent with various policy directives of NZTA, and while I understand the NZTA appreciates the benefits of a completed cycle network (all over Auckland, not just at Waterview), that does not mean such a connection is required to mitigate the effects nor to meet the specific objectives of this Project.

²⁵ For example, cycle lanes on Carrington Road, Clarke Street in New Lynn or on Great North Road through Point Chevalier, Western Springs and Grey Lynn.

²⁶ Statement of evidence of Ian Clark, paragraph 8.10.

²⁷ As confirmed in the EIC of Ms Amelia Linzey (Third statement).

²⁸ Statement of evidence of Ian Clark, paragraph 8.11.

48 I also respectfully note that the same or similar policy directives apply to Auckland Transport. For example, under roles and responsibilities, Auckland Transport²⁹ describe its main tasks as:

- (a) **To design, build and maintain Auckland's roads, ferry wharves, cycleways and walkways.** (my emphasis)
- (b) Co-ordinate road safety and community transport initiatives such as school travel.
- (c) Plan and fund bus, train and ferry services across Auckland.

49 Under its description of the Auckland Regional Cycling Network, Auckland Transport states that it will:

Provide well connected, safe spaces to cycle, both on and off road.³⁰

50 I attach a map showing the Auckland Regional Cycling Network as **Annexure C** to my rebuttal evidence, and note the explanatory statement, which reads:

Building the Regional Cycle Network: The Regional Cycle Network will be designed and partially-funded by local councils. Other funding from Land Transport New Zealand, through the yearly Auckland Land Transport Programme which ARTA manages.

51 I note that while this Network Plan was developed by the various former Auckland district councils and ARTA, it is now adopted by Auckland Transport, which supersedes the transport functions of those previous organisations.

52 It is clear that both the NZTA and Auckland Transport have policy directives and roles in providing cycling facilities, and therefore I consider it to be a joint and region-wide responsibility, and not solely the responsibility of the NZTA as part of this particular Project.

Form of the Sector 8 Cycleway

53 Based on his quoting of the Urban and Landscape Design Framework of June 2010, I presume Mr Clark is referring to a proposal to provide a cycleway connection from Alan Wood Reserve over the railway via a bridge at Soljak Place, then through the Harbut Reserve to Phyllis Reserve, then via a new high level bridge over Oakley Creek to Great North Road near Blockhouse Bay Road. This is consistent with the submission of the former Auckland City Council, although I note that it suggested an alternative crossing of

²⁹ Auckland Transport Website: <http://www.aucklandtransport.govt.nz/about-us/our-role-organisation/Pages/default.aspx>.

³⁰ Auckland Transport Website: <http://www.aucklandtransport.govt.nz/moving-around/biking-cycleways/MapsAndMore/Pages/AucklandRegionalCycleNetwork.aspx>.

Oakley Creek further north near Alford Street may also be acceptable.³¹ I indicate these possible locations of the cycleway in **Annexure D**.

- 54 While such a facility may provide benefits, it would seem to only partially provide for the full connection between the SH20 and SH16 cycleways, as requested in **Council's** (and various other) submissions. Specifically, I consider that such a cycleway has the following potential issues:
- 54.1 The preferred option to connect to Great North Road near Blockhouse Bay Road would not directly connect to the existing SH16 cycleway. Instead, it would still require cyclists to use the section of Great North Road between Blockhouse Bay Road and Alverston Street, where there is no off-road facility.
- 54.2 While this would not be an issue for the alternative option connecting near Alford Street, I understand that that option would require the cycleway to run through the Unitec site³² and hence require additional RMA approvals.
- 54.3 From my observations, the predominate movement on the SH16 northwestern cycleway is from commuter traffic to/from the CBD, namely eastbound in the morning and westbound in the evening. I would expect this pattern to also apply for cycle movements through this area (Sector 8), with dominant flows from the south towards the CBD in the morning and the reverse in the evening. For this movement, the proposed cycleway would involve a significantly longer journey to meet the SH16 cycleway than via the more direct route via other existing roads and cycle lanes. I have estimated that from the SH20 cycleway at Richardson Road to the SH16 cycleway at Carrington Road, the cycleway proposed by Auckland Council and Auckland Transport would be between 900 and 1,100 metres longer than the more direct route via Richardson Road, Woodward Avenue and Carrington Road.
- 54.4 Additionally, the proposed route would need to drop to almost sea-level at the Great North Road Interchange before climbing back up to Carrington Road, and both climbs would be undesirable to cyclists. Therefore, the predominate commuter cyclist traffic is likely to find the surface routes more attractive than the proposed cycleway route.

³¹ Submission of Auckland City Council (Submitter No. 111), paragraph 173.

³² Submission of Auckland City Council (Submitter No. 111), paragraph 173.

- 54.5 Alternative routes running completely through the Unitec site (as suggested in the evidence of Ms Barbara Cuthbert³³), would remove the significant elevation changes, but would only slightly reduce the additional journey length. However as noted above, an additional surface designation or consent approvals would be required, neither of which are part of the current application.³⁴
- 54.6 The fairly dense foliage and outward facing configuration of properties surrounding the Harbutt Reserve would have poor natural surveillance, which is an important consideration in pedestrian/cycle links. This issue is noted in the Draft SH20 Western Ring Route Open Space Report,³⁵ which recommends acquisition of additional properties by Council to open up views into the reserve to address this concern.³⁶
- 54.7 While an off-road facility would generally be considered safer than an on-road cycle-lane, it would not prove to be safer for cyclists if they chose a more direct alternative route.
- 55 In summary, while Mr Clark and the Auckland Council submission (and others), suggest that a direct connection of the SH20 and SH16 cycleways should be an important part of the Project, in my opinion, the proposed cycleway requested may not actually provide such a complete connection. It would potentially be less attractive to the dominant commuter movements than the more direct route via existing roads and cycle lanes.
- 56 I raise these issues not to suggest that construction of such a facility is not feasible or desirable, but simply to outline that there would be numerous issues (including route planning, safety, design, land ownership and consenting issues) to be worked through, and that simply providing an off-road facility through Sector 8 may not be the best way to improving cycle links in this area.
- 57 In summary, it is my view that the local and regional cycling network would be enhanced by improvements to the cycling network in this area and that both the NZTA and Auckland Transport have roles in achieving that.

³³ Statement of evidence of Barbara Cuthbert on behalf of Cycle Action Auckland (Submitter No. 79-1), paragraph 5(a).

³⁴ Third statement of evidence of Amelia Linzey. (paragraph 51.2).

³⁵ 'Draft SH20 Western Ring Route Open Space Report' by Dave Little (Stephen Brown Environments) (May 2010), Section 2.3 – Detail Areas, Harbutt Reserve, page 34: This is a non-lodged document available at: <http://www.waterviewapplication.nzta.govt.nz/NonLodgedDocuments.aspx>.

³⁶ The area of additional land that would be required is outlined by a black dotted line on the plan on page 34 of 'Draft SH20 Western Ring Route Open Space Report'. From my reading of this plan, I estimate this would be more than 20 properties.

58 However, I am not convinced that provision of that facility must form part of the Project for the following reasons:

58.1 It is not required for mitigation of adverse traffic effects of the Project; and

58.2 It is not reasonably necessary to meet the objectives of the Project.

Proposed Amendment to Condition OT.1

59 Mr Clark suggests a change to Operational Traffic condition OT.1,³⁷ proposing that the wording be changed from the NIP being reviewed to being approved by Auckland Transport.

60 This issue was covered in caucusing, where the experts agreed to replace the need for consultation with and review by Auckland Transport, with a simpler direction for the NIP to be developed collaboratively with Auckland Transport. This amended condition OT.1 will be attached to the caucusing report.³⁸

EVIDENCE OF JOHN PARLANE AND SIR HAROLD MARSHALL

61 Sir Harold Marshall and Mr Parlane have provided evidence regarding additional connections to SH20, as requested in the submission of Sir Harold. The original submission suggested an on-ramp to SH20 from Carrington Road.³⁹ However, the evidence of both Sir Harold and Mr Parlane also outline a suggested off-ramp from SH20 to Great North Road. Both Mr Parlane and the Section 42A Report⁴⁰ seek additional investigation of such connections, which I outline below.⁴¹

62 In this section of my evidence, I discuss the need and effect of such ramps from a transport perspective. Geometric and traffic safety issues are discussed in the rebuttal evidence of Mr Robert Mason, and I refer to Annexures D and F to his evidence which include a draft design-concept for the ramps.⁴²

63 As stated in my EIC,⁴³ it is considered desirable to have matched on and off-ramps. However, I accept that it is not unheard of to have only a single ramp at specific locations. Consequently, in my

³⁷ Statement of Evidence of Ian Clark, paragraph 10.10.

³⁸ Not yet signed at the time my rebuttal evidence was finalised.

³⁹ As discussed in the Statement of evidence of Sir Harold, paragraphs 11.2-11.3.

⁴⁰ See Section 42A Addendum Report, paragraph 4.2 (5), page 21.

⁴¹ This issue is also addressed in the rebuttal evidence of Mr Rob Mason, Mr Andre Walter and Ms Amelia Linzey.

⁴² I repeat those drawings in **Annexure E** to this rebuttal evidence for convenience (given that I will be presenting evidence before Mr Mason at the Board hearing).

⁴³ Paragraph 109 of my EIC.

rebuttal evidence, unless otherwise stated I refer to the provision of ramp(s) at this location to mean either just a southbound on-ramp or both on and off ramps.

64 My assessment of these ramp(s) has included consideration of the following factors:

64.1 Local access;

64.2 Ramp and network efficiency;

64.3 Local benefits;

64.4 Adverse transport effects; and

64.5 Project objectives.

Local Access

65 Mr Parlane supports investigation of additional access ramps to connect SH20 with Waterview/Point Chevalier and Carrington.⁴⁴ He is critical of the assessment in my EIC⁴⁵ where I showed that travel distances between those local communities and SH20 via the local network were shorter than using the suggested new on-ramp. He suggests that travel times rather than distances should be used, as travel times are the main measure of efficiency. I note a similar criticism in the evidence of Sir Harold⁴⁶ where he suggests that travel time should be used to measure the utility of the system.

66 I agree that travel times are the major (but not only) measure of utility and benefit when assessing new transport infrastructure. However, I stand by the use of distance in my analysis as it was used to assess accessibility of the local community to the SH20 motorway. While accessibility can be measured in many ways, the key point of my analysis was to show that there are various ways to access SH20 from the Waterview/Point Chevalier/Carrington community and that a proposed additional ramp would not significantly improve accessibility.

67 I would also note that this view is shared in the evidence of Mr David Mead, where he states that:⁴⁷

... these communities already have reasonable access to the motorway network

⁴⁴ Statement of evidence of John Parlane, paragraph 23.

⁴⁵ Paragraphs 106-107 of my EIC.

⁴⁶ Statement of evidence of Sir Harold Marshall, paragraph 32.4.

⁴⁷ Statement of evidence of David Mead (Submitter No. 130-1), paragraph 5.9.

68 However, I have further estimated the potential improvement to local accessibility by examining the level of use of the ramp(s), as indicated in the traffic models. For this, I investigated the demand from each of the local communities to travel south on SH20, and then the proportion of that demand which would actually use a new southbound onramp. These results are shown in **Table 1** below from the year 2016 models.

Table 1: Proportion of Southbound Demand using On Ramp

Catchment Area	Proportion of Daily Southbound Demand using On Ramp
Carrington	33%
Waterview	40%
Pt Chevalier	96%
Westmere (west)	42%
TOTAL	46%

69 This table shows that while practically all traffic from Point Chevalier wishing to head south on SH20 would use the proposed on-ramp (as would be expected), only 40% of those from Waterview would use the ramp and only 33% of those from Carrington. The traffic wishing to head south not using the ramp would continue to use the local network. I conclude from this analysis that the proposed on ramp would provide more attractive access from Point Chevalier, but it would only be attractive to a low proportion of the Carrington and Waterview catchments. While this analysis only considers the on ramp, broadly similar results would be expected for the northbound off ramp, due to its similar location relative to the local communities that it would serve.

70 In my EIC⁴⁸ I presented information on the distances to SH20 from Waterview, Point Chevalier and Unitec using the local network. I have expanded on that by using the traffic model to identify the routes that traffic would be most likely to take through the local network. I attach that analysis as **Annexure F**, from which I have determined that the most likely routes to access SH20 would be:

70.1 From Waterview (see Figure F2):

- (a) Blockhouse Bay Rd-New Windsor Rd-Maioro St; or
- (b) Blockhouse Bay Rd-New North Rd, Hendon Ave, Richardson Rd; or

⁴⁸ Paragraph 106 of my EIC.

(c) Gt North Rd, Carrington Rd, Mt Albert Rd, Dominion Rd.

70.2 From Point Chevalier (see Figure F3):

(a) Carrington Rd, Mt Albert Rd, Dominion Rd; or

(b) Carrington Rd, Woodward Rd, Richardson Rd; or

(c) Gt North Rd, St Lukes Rd, SH16.

70.3 From Unitec (see Figure F4):

(a) Carrington Rd, Mt Albert Rd, Dominion Rd; or

(b) Carrington Rd, Woodward Rd, Richardson Rd.

71 In my opinion, it is these routes that a proportion of traffic from those communities would use even if an on-ramp was provided. For example, the 60% of southbound traffic from Waterview not using the on ramp would use these local roads (see Table 1 above).

Ramp and Network Efficiency

72 I accept that local users of the ramp(s) may gain faster travel times, however I have also raised the point that such ramps are likely to be inefficient.⁴⁹ By this, I was referring to the fact that while users of the ramps may gain an individual benefit, this may be at the expense of increased congestion to other users. I was referring in particular to the modelling undertaken (and described in my EIC at paragraph 108), that showed that the location of the proposed new intersection on Carrington Road to access the southbound on ramp is expected to perform poorly, with queuing blocking back and interrupting the near-by intersection at Great North Road. This poor performance is a function of the constraints of the adjacent Carrington Road Bridge and the close spacing to the Great North Road Interchange.

73 Mr Parlane states that:⁵⁰

Consistency requires that the same measures of total efficiency used to justify the SH20 Motorway are applied to the two missing ramps. My advice to you is that there are no grounds to consider that either of these ramps will be inefficient. They are likely to be as efficient as any other motorway ramps or any other motorway project.

74 To further investigate the utility/efficiency of the proposed Carrington Road ramp(s), I have assessed their benefits using the same modelling procedures used to assess and evaluate the full Project. This has involved running the 2016 and 2026 network

⁴⁹ Paragraph 110 of my EIC.

⁵⁰ Statement of evidence of John Parlane, paragraph 13.

models for the three modelled peaks and processing the network wide travel costs using the same procedures as used to assess the full scheme.

- 75 These tests were undertaken for two scenarios, firstly with just the southbound on ramp added, then again with both the on and off-ramps included. I present the key outputs in **Annexure G**,⁵¹ which includes network-wide statistics for vehicle operating costs, total network travel times and congested network travel times.
- 76 Those results show that with both ramps added, there would be some travel time benefits during some peak periods, but with disbenefits during interpeak periods. When aggregated to annual values, this resulted in net disbenefits (i.e. a deterioration in network performance) for both 2016 and 2026, and a subsequent overall disbenefit of \$6.5 million Net Present Value when accumulated over the analysis period. The analysis of just the on-ramp showed even worse travel time disbenefits, and a net disbenefit of \$7.5 million.
- 77 This then confirms that when aggregated across the network, the network is less efficient with the new ramp(s) suggested by Sir Harold and Mr Parlane than without them. I note that these results of the traffic analysis of the proposed ramp(s) were provided to the caucusing session of transport experts.
- 78 Given that providing the proposed ramp(s) would involve additional capital and operating costs but result in a disbenefit, in my opinion, their construction as part of this Project could not be considered an efficient use of resources.
- 79 On a matter of detail (and covered further in the rebuttal evidence of Mr Mason), I note that in relation to the on-ramp, Sir Harold suggests a lane configuration entering the tunnel which has only one lane from SH16 to SH20 southbound (known as Ramp 3),⁵² with the other two lanes being allocated to the ramp from SH16 (east) and the new ramp from Carrington Road respectively.
- 80 However, such an arrangement would not leave sufficient capacity for the motorway-to-motorway connection between SH16 and SH20. The traffic model indicates an hourly flow on Ramp 3 at 2026 of some 2,300 vehicles per hour, which would exceed the capacity of a single ramp (estimated here at between 1,900 and 2,000 vehicles per hour). Therefore, such an arrangement would not be appropriate. Any new on-ramp from Carrington Road would therefore need to merge with the ramp from SH16 east (Ramp 1) before it joined the two lanes from Ramp 3.

⁵¹ Headed "Network Wide Analysis of Carrington Road On and Off Ramps".

⁵² Statement of evidence of Sir Harold, paragraph 19.

Local Benefits

81 In his evidence (at paragraph 9), Sir Harold states that:

The proposal provides a benefit to the wider public of Auckland but it does so to the cost of the local community.

82 From a transport perspective, I note that the Project is expected to deliver transport benefits to the local communities including Waterview, Point Chevalier, and Carrington through reduced flows and congestion on Great North Road, reduced flow and congestion at the Point Chevalier town centre (especially the intersection of Great North Road/Carrington Road), and reduced traffic flows on Carrington Road, Woodward Road and Richardson Road. Additionally, users of the wider road network from those communities would benefit from the reduced congestion elsewhere in the network as a result of the Project.

Adverse Effects

83 The Project does not reduce the accessibility to SH20 for the communities of Waterview, Point Chevalier and Carrington, and nor am I aware of an adverse transport effect of the Project on these communities. Therefore, I do not consider that additional ramps to SH20 proposed by Sir Harold are required to mitigate any adverse transport effects.

Project Objectives

84 The specific objectives of the Project related to this issue are Objectives 2 and 5:⁵³

2. To improve accessibility for individuals and businesses and support regional economic growth and productivity:

- by improving access to and between centres of future economic development

5. To improve connectivity and efficiency of the transport network:

- by separating through traffic from local traffic within the wider SH20 corridor

85 The analysis undertaken above indicates that while accessibility may be marginally improved for communities⁵⁴ who would use the ramps, the resulting impact on the rest of the network would be detrimental in terms of network efficiency. Therefore, I consider that overall, inclusion of the ramp(s) would be contrary to the objectives of the Project.

⁵³ Section 3.3 of the AEE.

⁵⁴ I also note that these communities are not likely to be the 'centres of future economic development' referred to in Objective 2.

Conclusion

- 86 Based on this analysis, I conclude that Sir Harold's proposed ramp(s) should not be provided as part of the Project for the following reasons:
- 86.1 They would only marginally improve accessibility from SH20 to the Waterview and Carrington communities;
 - 86.2 They would have a detrimental effect on the efficiency of the wider network;
 - 86.3 They are not required to mitigate an adverse transport effect;
 - 86.4 They would not be an efficient use of resources; and
 - 86.5 Overall, they would not positively contribute to the Project objectives.
- 87 Therefore, I conclude that such ramps in this location are not necessary.

Caucusing

- 88 There was extensive discussion on this issue during expert caucusing, but agreement could not be reached on whether provision of the ramps was required to mitigate the effects of the Project and/or whether their provision is reasonably necessary to achieve the objectives of the Project.
- 89 **While the experts agreed on the general "desirability" of local connections to SH20 between Maoro Street and SH16, (which I understand to mean "nice to have" in a conceptual sense prior to consideration of the feasibility or effects), my position remains that the provision of ramps in this specific location is not reasonably necessary for this Project and would, to the contrary, have a detrimental effect on the efficiency of the wider network.**
- 90 In my opinion, more than sufficient technical information has been provided to Mr Parlane to confirm that the Project will not adversely affect accessibility to the Waterview, Carrington and Point Chevalier communities.⁵⁵

⁵⁵ Including Technical Reports G.18 Transport Assessment and G.25 Traffic Modelling (Table 6.5 showing reductions in flow on Gt North Road and Carrington Road, Table 6.12 showing time savings on Gt North Road and Carrington Road and, the assessment of accessibility in my EIC (paragraphs 105-107); the information on users of the ramps (Table 1 above) and network efficiency (see Annexure to my rebuttal). These last two items were also made available at the two expert transport caucusing sessions.

EVIDENCE OF DAVID MEAD

Benefits of the Project

- 91 In his evidence, Mr Mead questions the magnitude and sustainability of the longer-term benefits of the Project, and concludes that: ⁵⁶

Until the shape of that [spatial] plan is known, then it is my view that it is premature to claim long term travel time benefits.

- 92 I agree that the assessed benefits are somewhat sensitive to future land use patterns. However, as the Project will address existing problems of poor connectivity and congestion on the Western Ring Route, I do not consider that the pending Spatial Plan for the new Auckland Council would significantly alter the fundamental source of the travel time benefits, being savings from a more direct and faster route through the Western Ring Route and reduced congestion on large sections of the surrounding network.

- 93 Mr Mead seems to imply that future time savings should be discounted because without the Project, land use growth and travel patterns would alter to such an extent as to make those future benefits unlikely. I disagree.

- 94 I would firstly note that the effects of the Project on travel patterns have been assessed, as described in my EIC.⁵⁷ I confirm Mr Mead is correct that the same land use pattern was used for the Do Minimum and Option scenarios.

- 95 However, I note that the land use forecasts used in the analysis are derived from the regional planning, notably the Regional Growth Strategy and the Regional Land Transport Strategy (*RLTS*), and as such, they reflect the desired form and location of growth in the region. I also note that the RLTS regional planning includes the Project on the basis of accommodating the planned growth. Therefore, it can be inferred that provision of the Project is consistent with regional planning for land use development, and such plans could be undermined if the Project is not provided. This then would suggest that the benefits of the Project are likely to be greater than just travel times. Mr Mead seems to accept this in paragraph 5.5 of his evidence, where he states that:

... the additional land use development enabled could be claimed as a benefit.

- 96 The **NZTA's** procedures used to assess the benefits of a project in New Zealand do not include evaluating alternative land use patterns, presumably because of the extreme difficulty and

⁵⁶ Statement of evidence of David Mead, paragraph 5.8.

⁵⁷ Paragraphs 38, 133 and 162.2 of my EIC.

uncertainty of doing so.⁵⁸ Subsequently, the travel time savings calculated do, to some extent, reflect those effects. This means that motorists presented with the improved accessibility of the Project **may choose to 'capitilise' those benefits by moving to areas** made more readily accessible.

97 Therefore, I do not consider that it would be appropriate to discount future travel time savings due to uncertainty of the effect on future land use, without directly assessing what those costs or benefits could be. Given that no such procedures exist in NZ, it would be inappropriate to simply discount future transport benefits.

98 While I agree the exact future land use and travel patterns are uncertain, I disagree that they should simply be discounted because of that uncertainty, especially only on the basis of Auckland **Council's plans to refine their land use planning.**

Traffic Effects on Grey Lynn

99 Mr Mead is concerned about extra traffic predicted on the network in the Grey Lynn/Point Chevalier and Westmere areas.⁵⁹

100 I note Mr Mead's comments about extra traffic through the Grey Lynn area. As stated in my EIC,⁶⁰ I expect this extra traffic will be able to be managed on the network without an overall significant adverse effect. While extra traffic can have an effect, I note that the residents of the Grey Lynn area will accrue direct benefits from the Project, especially in terms of improved access to SH20 (including the Airport), and from reduced congestion elsewhere. I used the models to investigate this and by way of example, found that for travel to or from the Airport, the Project was expected to generate the following time savings:⁶¹

100.1 Up to 6.4 minutes from Grey Lynn;

100.2 Up to 5.7 minutes from Point Chevalier;

100.3 Up to 2.2 minutes from Waterview; and

100.4 Up to 6.4 minutes from Westmere.

101 Additionally, analysis using the model of all possible locations for travel to/from the Grey Lynn area found the following:

⁵⁸ This is discussed at paragraph 32 of the Rebuttal evidence of Mr Mike Copeland.

⁵⁹ Statement of evidence of David Mead, paragraphs 2.3 and 6.2.

⁶⁰ Paragraphs 137-139 of my EIC.

⁶¹ Values vary depending on the direction and peak period, but all showed positive savings.

- 101.1 As a result of the Project, between 40% and 46% of locations would have a travel time saving greater than 0.5 minutes (depending on time and direction);
 - 101.2 Between 1%-15% of locations would be more than 0.5 minutes slower; and
 - 101.3 The remaining 45%-55% of locations would have no impact greater than +/-0.5 minutes).
- 102 Overall therefore, while some extra traffic is expected in parts of the Grey Lynn area, it is my opinion that the traffic can be accommodated in capacity terms, and that other possible effects of extra traffic will be offset by the improved travel times to/from this area. Therefore, I disagree with Mr Mead that there are likely to be adverse effects from the Project in the Grey Lynn, Point Chevalier and Westmere areas.

Traffic Effects at St Lukes Road

- 103 I agree with Mr Mead that the existing pedestrian and cyclist facilities through the St Lukes Interchange are poor and I note he now accepts that the Project will result in less traffic in this area.⁶²

Traffic Effects at Point Chevalier

- 104 Mr Mead raises concerns about the potential effect of traffic on the Point Chevalier town centre.⁶³ In transport terms, the Point Chevalier town centre is dominated by the high traffic flows and congestion at the major Great North Road/Carrington Road intersection, both expected to be reduced as a result of the Project.
- 105 To demonstrate this effect, I present in **Table 2** below the expected change in daily traffic at this intersection (note that the town centre is predominantly located on the Great North Road east approach, immediately adjacent to the intersection).

Table 2: Change in 2026 Daily Flows at Point Chevalier

Approach ⁶⁴	Flow without Project	Flow With Project	Change
Gt North Road west	31,300	19,400	-11,900
Point Chevalier Road	18,200	19,800	1,600
Gt North Road east	15,200	15,200	-
Carrington Road	32,600	23,200	-9,400
Total Through intersection	48,650	38,800	-9,850

⁶² Statement of evidence of David Mead, paragraph 6.6.
⁶³ Statement of evidence of David Mead, paragraphs 6.7 and 6.9.
⁶⁴ Two-way flows are used except for the 'total through intersection'.

- 106 Here it can be seen that very substantial reductions in traffic are expected at this intersection. While much of that is on the movement between Great North Road west and Carrington Road, the overall reductions will be of benefit to the adjacent town centre in terms of delays and other traffic-related effects. The effect on Great North Road east through the main centre is negligible, and I note that the predicted increase on Point Chevalier Road is due to traffic that would otherwise have used the parallel residential roads, such as Huia Road and are shifting back to the arterial network.
- 107 Therefore, I conclude that the Project will create transport benefits, rather than adverse effects, on the Point Chevalier town centre.

EVIDENCE OF TIM HAZLEDINE

Excess of Benefits of Costs

- 108 Professor Hazledine questions the certainty of the benefits exceeding the costs, and in particular states that the discounted benefits are "... *roughly equal to the NPV [Net Present Value] of the predicted construction costs of the scheme*".⁶⁵ To this I simply note that:

108.1 While the BCR has been assessed as between 1.2 and 2.1 (as shown in the EIC of Tommy Parker⁶⁶), with the 1.2 value considered a lower-end value excluding agglomeration benefits, Professor Hazledine only refers to that lower-end figure.

108.2 That even with the lower value of 1.2, benefits are expected to exceed costs by \$300 million (NPV). With the BCR of 2.1, benefits would exceed costs by \$1,500 million. I would not consider that to be negligible as Professor Hazledine implies.

108.3 While the construction costs will end after a short-term, the benefits will continue to accrue in future years. However in the economic analysis, only 25 years of benefits are claimed.

- 109 Therefore, I consider that the assessed transport benefits of the Project exceed the expected costs by a significant margin.

Alternative Option to Reduce Congestion

- 110 Professor Hazledine suggests an alternative approach to reducing congestion via road pricing.⁶⁷ The concept of road pricing is discussed in the rebuttal evidence of Mr Copeland.⁶⁸ I would simply note that the objectives of the Project are not solely (or even

⁶⁵ Statement of evidence of Tim Hazledine, paragraph 9.

⁶⁶ Paragraph 83 of Mr Parker's EIC.

⁶⁷ Statement of evidence of Tim Hazledine, paragraphs 13-18 and 29.

⁶⁸ Statement of Rebuttal Evidence of Mike Copeland, paragraphs 6-10.

predominantly) related to reducing congestion. This is reflected in the modelling and analysis where significant direct time savings are expected from the completion of the WRR, even in non-congested times. For example, of the total transport benefits assessed, 62% are assessed to occur outside the morning and evening peak periods.

- 111 While I do not dispute that road pricing can reduce congestion and accrue significant travel time savings, I do not consider that road pricing would meet the objectives of the Project and wider Western Ring Route, as defined both by the NZTA and in the RLTS. Specifically, congestion pricing would fail to meet the following objectives of the Project:

111.1 Connecting SH16 to SH20;

111.2 Separating through and local traffic within the wider SH20 corridor;

111.3 Providing an alternative to the existing SH1 corridor through Auckland that links the northern, western and southern parts of Auckland; and

111.4 Securing SH16 against inundation.

EVIDENCE OF BARBARA CUTHBERT AND MAX ROBITZSCH

Delay to Pedestrians at Te Atatu Interchange

- 112 Ms Cuthbert and Mr Robitzsch (on behalf of Cycle Action Auckland), outline in their evidence a concern about cyclist movements at the Te Atatu Interchange, stating:⁶⁹

..we consider that the current proposals for interchanges like Te Atatu (up to four sets of traffic signals to be crossed in sequence) would be a major hurdle to good cycling connectivity.

- 113 Although the number of at-grade crossings for east-west cyclists will be greater in the Project than in the current scheme, I note that the largest crossing (over the main north-south vehicle lanes on Te Atatu Road) becomes a 2-stage crossing rather than the current long, single-stage crossing over both carriageways. This gives greater flexibility for the signal phasing to be optimised for individual movements, such as cyclists. For example, the calibrated traffic model of the existing network includes signal phasing in which the east-west crossing operates for only 30 seconds in a 120-second cycle. With the Project, the two east-west crossings get 89 and 54 seconds respectively of a 136 second cycle.⁷⁰ The new

⁶⁹ Statement of evidence of Barbara Cuthbert/Max Robitzsch, paragraph 5(c).

⁷⁰ These are example values for the 2026 am peak.

crossing of the westbound on-ramp gets 40 seconds in the 136 second cycle.

- 114 During detailed design, that phasing could be better optimised for cyclists by introducing a new signal phase to stop traffic on the westbound on-ramp to permit cycle crossings at other appropriate times in the cycle. This issue was discussed in expert transport caucusing where it was agreed⁷¹ to include a specific performance measure in the NIP required under proposed Operational Traffic condition OT.1. The amended condition OT.1 will be attached to the Transport Caucusing Report.⁷² It was agreed that an additional performance measure should be included in the NIP, to consider and identify opportunities to optimise signals to minimise delay to both vehicles and cyclists.

CONNECTIVITY BETWEEN WATERVIEW AND POINT CHEVALIER (VARIOUS SUBMITTERS' EVIDENCE)

- 115 Various witnesses have requested a direct pedestrian and cycle facility be provided over SH16 between Waterview and Point Chevalier. This facility is presented by witnesses as being necessary to mitigate stated adverse effects of the Project on the existing route between these communities. For example, Margaret Watson (Submitter No. 252-1) states in her evidence:⁷³

This link will restore historical severance resulting from the construction of SH16 and mitigate the effects of increased severance from adjoining communities. It will reconnect the Waterview Community with its access to water. It will provide a safe link into the substantial open space of Pt Chevalier including the water at Eric Armshaw Park, sportsfields at Walker Park, the coastal walkway and on to Coyle Park. Currently, these facilities are not easily accessible to Waterview residents.

- 116 In the evidence of David Shearer (Submitter No. 178), he states that such a link would:⁷⁴

... mitigate the loss of connections for Waterview residents who are impacted particularly by the motorway interchange.

- 117 Winston Aldworth and Louise Taylor (Submitter No. 200-1) state in their evidence that:⁷⁵

Access to Pt Chev would be restricted by the new motorway.

⁷¹ Max Robitzsch of Cycle Action Auckland attended the expert transport caucusing.

⁷² Not yet signed as at the date my rebuttal was finalised.

⁷³ Statement of evidence of Margaret Watson, paragraph 43.1(v).

⁷⁴ Statement of evidence of David Shearer, paragraph 5(h).

⁷⁵ Statement of evidence of Aldworth and Taylor, paragraph 6(d).

118 Mr Robert Black states in his evidence that:⁷⁶

I view the proposed walkway around and under the interchange as unpleasant, noisy, polluted and circuitous.

119 In response, I do not agree that the Project will create an adverse effect on pedestrian and cyclists between Waterview and Point Chevalier, for the reasons discussed below.

120 As identified in my EIC,⁷⁷ there are two existing pedestrian/cycle routes between Waterview and Point Chevalier:

120.1 A grade-separated route via the pedestrian bridge over Great North Road then the cycle-way beside Unitec up to Carrington Road; and

120.2 The existing at-grade route through the Interchange.

121 The off-road route will not be affected by the Project and will remain a quality cycle route.

122 The at-grade route through the Interchange will have the same number of road crossings as at present but will benefit from the reduced traffic flows at the main crossing points predicted as a result of the Project, as shown in **Table 3** below.

Table 3: Change in Daily Flows for Pedestrian Crossings at Waterview

Road Crossing	Flow without Project	Flow with Project	Change
Westbound On Ramp	14400	8400	-6000
Gt North Road NBD	19500	18500	-1000
Gt North Road, SBD	6500	5500	-1000
Westbound Off Ramp	800	600	-200

123 As can be seen, reductions are expected on all at-grade crossings, with a total reduction of 8,200 vehicles per day. As well as the general benefits of reduced traffic, these reductions are also likely to permit lower cycle times at the traffic signals, meaning potential for reduced delays to pedestrians and cyclists.⁷⁸

⁷⁶ Statement of evidence of Robert Black, paragraph 17.

⁷⁷ Paragraph 115 of my EIC and see also Figure 5.2, page 77 of Technical Report G.18.

⁷⁸ This is addressed in proposed Condition OT.1 that relates to development of a Network Integration Plan.

- 124 A connection is also provided as part of the Project on the north side of the Interchange to connect to Eric Armshaw Park. This will be a new connection not currently possible.⁷⁹
- 125 Additionally, Mr Duncan McKenzie (Submitter No.167-3) states that the removal of houses on the western side of Great North Road will reduce the passive surveillance for pedestrians and cyclists, therefore making that section of the cycleway less safe.⁸⁰ In response, I note that:
- 125.1 Once the Project is constructed, Great North Road is still expected to have some 43,000 vehicles per day in this section, which would provide a high level of visibility, including of the existing cycleway on the eastern side (which has no current residential surveillance); and
- 125.2 In my EIC, I recommended that Operational Traffic condition OT.1 be amended to specifically require the Project to investigate opportunities to provide an enhanced pedestrian/cyclist facility on the western side of Great North Road between Oakley Avenue and the interchange.
- 126 Therefore, I do not agree **with submitters' concerns** that the Project would create an adverse effect for trips between Waterview and Point Chevalier.
- 127 At expert caucusing, Mr McKenzie and I disagreed on whether the Project causes an adverse effect on the existing cycle-pedestrian links between Waterview and Point Chevalier. As explained above, in my view the Project does not. However, we did agree that even if there was an adverse traffic effect from the Project, this kind of pedestrian/cycle link over SH16 is unlikely to be appropriate mitigation.

COMMENTS ON SECTION 42A REPORTS

- 128 I have considered the comments related to transport in the Section 42A Report and Addendum Report. Section 3.3 of the Addendum Report provides a summary of the Transport issues raised in the original Section 42A Report and includes references to where these are addressed in the EIC. I repeat that table in **Annexure H** to my rebuttal evidence, including additional references to my EIC showing where those issues are addressed further. Where issues were not explicitly addressed, I add further comments.

⁷⁹ Referred to in the EIC of Lynne Hancock (paragraph 104) and included AEE, Part F, in Plans F16.210-212.

⁸⁰ Statement of evidence of Duncan McKenzie, paragraph 9.5.3.

- 129 The key transportation issue raised in the Conclusions of the Addendum Report is point 5 in Section 4.2, being:

Issues or matters of clarification remain regarding local connections at Waterview Interchange for walking, cycling and vehicle access. Preliminary design options should be drawn up to demonstrate comparative effects (benefits and costs).

- 130 I have been cognisant of this in preparing my rebuttal evidence, especially addressing the transportation effects of the extra connections requested by submitters in more detail. Concept design alignments for local ramps to link to SH20 are appended in the rebuttal evidence of Mr Robert Mason and at **Annexure E** to my rebuttal evidence. The detailed traffic analysis of those ramp(s) is contained in my rebuttal evidence and was presented to the caucusing of transport experts.

- 131 Sections 3.3.1 and 3.3.4 of the Addendum Report comment on the approach to cycling and pedestrian connectivity, specifically noting:

Our overview assessment of the evidence presented by the Applicant is that cycling and walking provision is provided to the extent necessary to ensure that potential adverse effects of the Project are mitigated.

In summary, the Project is viewed as 'enabling' other cycling and walking opportunities to occur as part of wider regional plans and strategies, but as part of separate projects. The Applicant concludes that many submitter proposals are more suitably promoted by Auckland Transport.

- 132 I agree with those statements in regard to mitigation of adverse effects, however in my opinion the Project goes further than that and provides a positive contribution to cycling and pedestrian travel.
- 133 I also note that a consolidated set of plans showing the proposed cycling/pedestrian links has been provided to the Board on 28 January 2011.

COMMENTS ON EPA AIR QUALITY REPORT

- 134 I have also considered the Air Quality Report prepared by Emission Impossible Ltd for the Board (dated 14 January 2011). I have identified two traffic-related issues referred to in that Report, namely:

134.1 The use of average traffic conditions, **rather than 'high traffic'** flows in the emissions analysis; and

134.2 Concern about the level of induced traffic.⁸¹

⁸¹ Section 42A Air Quality Report, paragraphs 9, 162, and 172.

- 135 I have met with the authors⁸² of the Air Quality Report and discussed these issues (25 January 2011). Following that discussion, the authors indicated that they were satisfied with the traffic modelling used as the basis for the emissions work, and this would be addressed in the caucusing reports being prepared separately by the air quality and transport experts.
- 136 In **Annexure I** to this evidence (headed, Response to Traffic Issues Raised in Air Quality Report), I include additional information and comment on this issue, as discussed with the Air Quality Report authors.

CONCLUSIONS

- 137 Based on further analysis and the issues raised in the evidence of submitters, I have concluded the following:
- 137.1 I disagree with the evidence of Mr Clark requesting inclusion of an upgrade to the St Lukes Interchange, on the basis that my analysis indicates an overall beneficial rather than adverse effect of the Project at that location.
- 137.2 I agree with the evidence of Mr Clark requesting inclusion of a bus lane and pedestrian/cycle lane on Great North Road as part of the reinstatement of that section of road, and this is reflected as a performance measure in proposed condition OT.1.
- 137.3 I disagree with the evidence of Mr Clark that a Sector 8 cycleway should be provided as part of this Project, as it is not required to mitigate adverse transport effects and I do not consider it is reasonably necessary to meet the objectives of the Project. However, I agree that such a cycleway could have benefits and could enhance the Project objectives.
- 137.4 I disagree with the evidence of Sir Harold Marshall and by Mr Parlane that additional on and off ramp(s) to SH20 should be provided at Carrington Road. My detailed analysis showed that a local connection to SH20 would only marginally improve accessibility to the Waterview and Carrington communities (but more so to Point Chevalier), but would have a detrimental effect on the wider network and hence represent an inefficient use of resources. I therefore concluded that such ramps are not needed.
- 137.5 I disagree with Mr Mead's suggestion that there will be adverse effects of the Project at Grey Lynn and Point Chevalier for the following reasons:

⁸² The meeting was held with only one of the authors, whom advised that the other author would accept the outcomes of the meeting.

- (a) My assessment shows significant reduction in traffic and congestion at Point Chevalier, not an adverse effect; and
- (b) I consider that any potential transport effect associated with extra traffic predicted in Grey Lynn would be offset by the significant benefits those areas accrue from improved access to SH20 and reduced congestion elsewhere in the network.


137.6 I also disagree with Mr Mead where he suggests that future travel time benefits should be discounted until the Spatial Plan is completed, because my Assessment of traffic and transportation effects already includes the currently preferred growth scenario developed for the Auckland Region (which includes completion of the Project), and no evidence is provided that it will change significantly.

137.7 I agree with Professor Hazledine that road pricing can reduce congestion. However, I do not consider road pricing to be an appropriate alternative option to achieve the Project objectives.

137.8 I disagree with the various submitters who requested a pedestrian/cycle link between Waterview and Point Chevalier because, in my opinion, the Project is creating a benefit to the existing pedestrian/cyclist connections there and not an adverse effect requiring that kind of mitigation.

138 I have addressed the key residual transport issue identified in the Addendum Report, namely to consider the requested connections to SH20 in greater detail.

139 I have provided additional information to the authors of the Air Quality Report to satisfy the issues raised regarding traffic predictions, and this will be confirmed in the separate caucusing reports of the air quality and transport witnesses.



Andrew Murray
February 2011

ANNEXURE A – ASSESSMENT OF JOURNEY TIME SAVINGS FOR USERS OF THE ST LUKES INTERCHANGE

- 1 The analysis was based on the same 2026 am peak model runs used as input to Mr Clark’s local analysis of the St Lukes Interchange.
- 2 The journey times between each origin and destination were extracted for the No Project and With Project scenarios and compared to get time savings.
- 3 The distribution of time savings is shown in Figure 1 below for vehicles which are predicted to use the Interchange in the No Project scenario. Users of the Interchange were defined as any vehicle passing through the same two intersections used in Mr Clark’s analysis, namely the Great North Road/St Lukes Road Intersection and the St Lukes Road/Westbound ramps intersection.

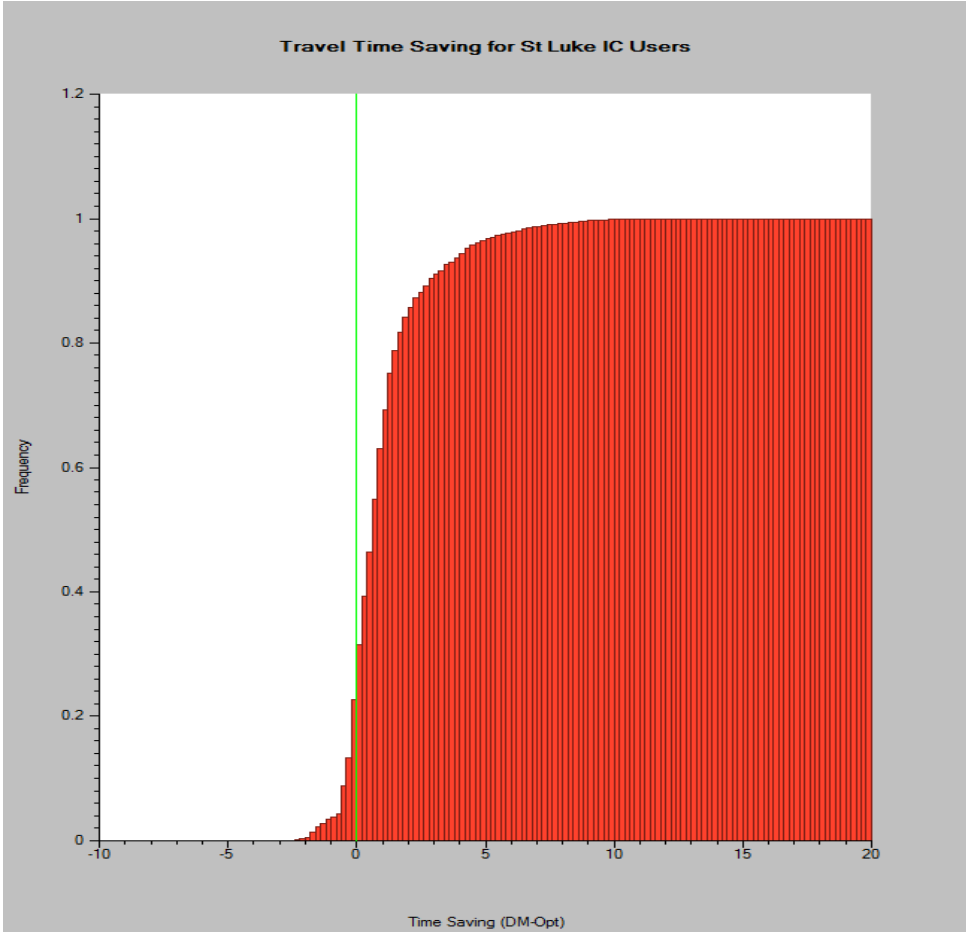


Figure A1: Distribution of Time Savings for Users of St Lukes Interchange

- 4 This analysis shows that some vehicles get a disbenefit, however the vast majority are either unaffected or obtain travel time benefits. For the purposes of this analysis, I have used a 0.5 minute threshold to separate out the vehicles with low or no change.

- 5 On this basis, the analysis indicates that 57% of vehicles have no material effect (less than a 0.5 minute change), 6% get worse travel time (more than 0.5 minute increase), and 37% gain an improvement of more than 0.5 minutes.

- 6 I also undertook analysis of some of the 6% of users of the Interchange who are predicted to get additional delay in the morning peak. A representative example was the movement from the northern part of Mt Albert (Linwood Avenue area), crossing SH16. Further analysis of all trips from that area showed that while users may get some additional delay in the morning peak for some of their movements crossing SH16, the vast majority of their movements would either be unaffected or obtain a reduction in travel time. For example, the models indicated that when aggregated across all 416 trips leaving that zone in the morning peak, a total of 87 vehicle minutes of travel time was expected to be saved.

ANNEXURE B – ASSESSMENT OF NON-PEAK DELAY IMPACT AT ST LUKES INTERCHANGE

- 1 My estimate of the non-peak effects is based on a consideration of the predicted change in flow at the same two intersections analysed by Mr Clark. In the Table below, I summarise the predicted change in flow at the two intersections that make up the Interchange, both in terms of total traffic through the intersections and for the key conflicting movements. It is the conflicting movements that are likely to have the biggest influence on the traffic signal operation and hence the delays at the intersection.

Table 4 Flow Change at St Lukes Interchange (vehicles/2 hours)

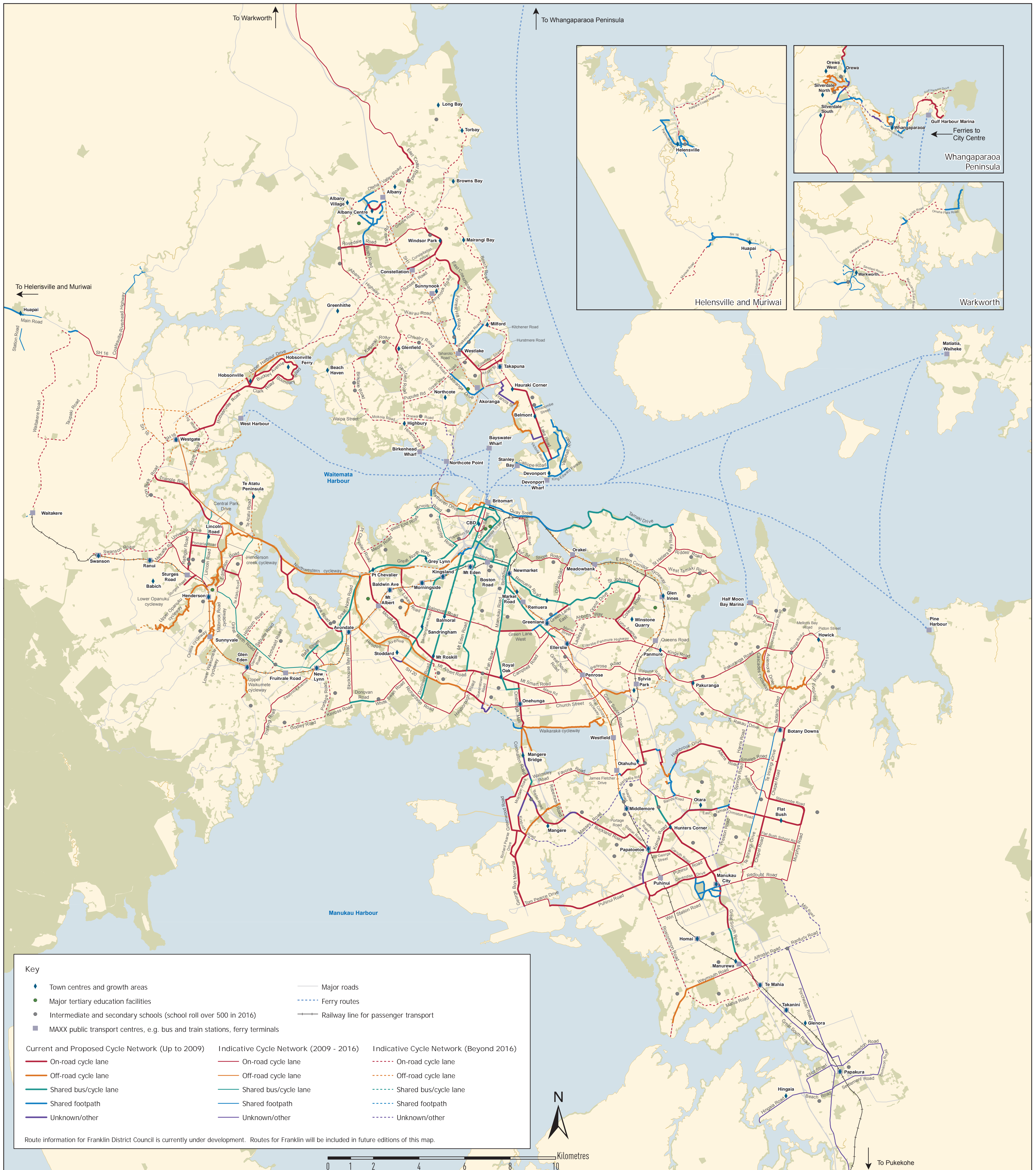
Location	Flow	No Project	Project	Change
AM PEAK				
Gt North/St Lukes	Total	6283	6397	+114
	Conflict	2748	1974	-774
St Lukes/Ramps	Total	6761	6467	-294
	Conflict	4141	4359	+218
INTERPEAK				
Gt North/St Lukes	Total	5161	5062	-99
	Conflict	1887	1482	-405
St Lukes/Ramps	Total	6604	5994	-610
	Conflict	4084	3793	-291
PM PEAK				
Gt North/St Lukes	Total	6376	6413	+37
	Conflict	2098	1664	-434
St Lukes/Ramps	Total	7730	7199	-531
	Conflict	4779	4518	-261

- 2 Here it can be seen that the Project reduces the total and conflicting flow through the intersections for all scenarios, except in the am peak at the Great North Road/St Lukes Road intersection. This single occurrence of increased conflicting flow is likely to be the cause of the increased delay found in Mr Clark's detailed analysis. The reduced conflicting flows in the pm peak are likely to result in reduced delays, which is consistent with Mr Clark's findings. Therefore, there appears to be a good correlation between the change in conflicting flow and the likely change in delay. On this

basis, it is most likely that there will be a reduction in delay during the non-peak period.

ANNEXURE C - MAP SHOWING THE AUCKLAND REGIONAL CYCLING NETWORK

Auckland's Regional Cycle Network



Auckland's Regional Cycle Network

This map shows existing and proposed cycle routes across the Auckland region. It also shows priority locations for linking to these routes to improve connectivity across the region. These include:

- > All town centres and growth areas (as listed in Schedule 1 of the Regional Policy Statement)
 - > All passenger transport stations on the Rapid Transit Network, major interchanges and all ferry terminals
 - > Intermediate and secondary schools (with a roll over 500 in 2016)
 - > All major tertiary institutions
- Combined, these routes and links make up the Regional Cycle Network.

Auckland Regional Transport Authority (ARTA) will prioritise proposals to build parts of the Regional Cycle Network in the Auckland Land Transport Programme.

The Regional Cycle Network was developed by ARTA in conjunction with local councils. Each council is working with ARTA to deliver improved cycling infrastructure across the region. This will ensure the cycling target in the Regional Land Transport Strategy is reached – to build at least half the Regional Cycle Network by 2016. The overall goal is to double the number of cycle trips around the region.

As well as showing the routes that make up this first half of the network, this map also includes routes that will provide better connectivity when the entire network is completed, but are not currently planned to be implemented before 2016.

The Regional Cycle Network as shown here covers more than 900 kilometres, of which more than 100 kilometres already exists. Potential links that would connect key destinations to the network would cover many more kilometres if implemented.

Building the Regional Cycle Network

The Regional Cycle Network will be designed and partially-funded by local councils. Other funding will come from Land Transport New Zealand, through the yearly Auckland Land Transport Programme which ARTA manages. For further information, please see the Sustainable Transport Plan online at www.arta.co.nz

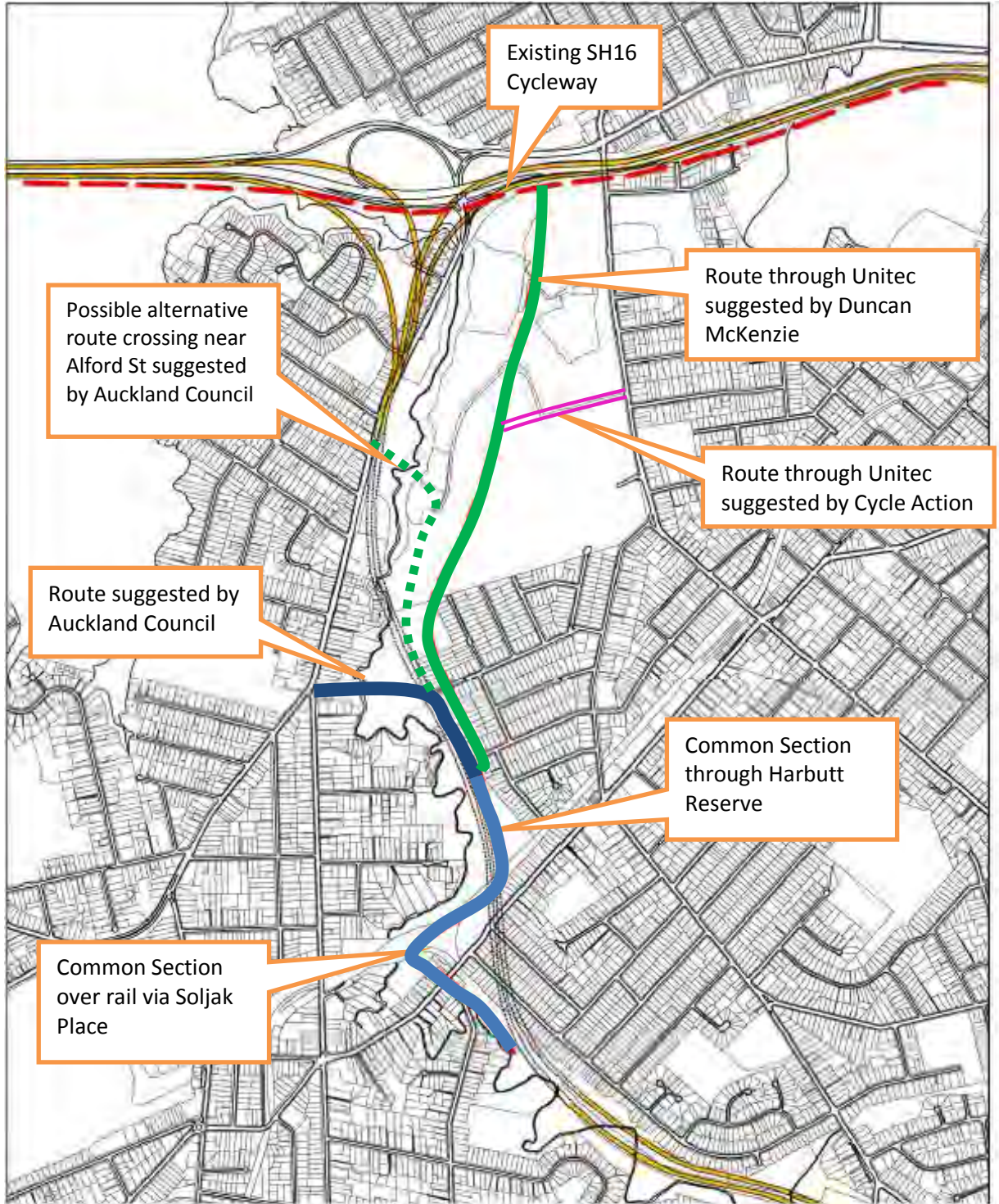
Auckland Transport
An Auckland Council Organisation

Auckland Regional Transport Authority
Auckland City Council
Franklin District Council
Papakura District Council
Manukau District Council
North Shore City Council
Rodney District Council
Waitakere District Council

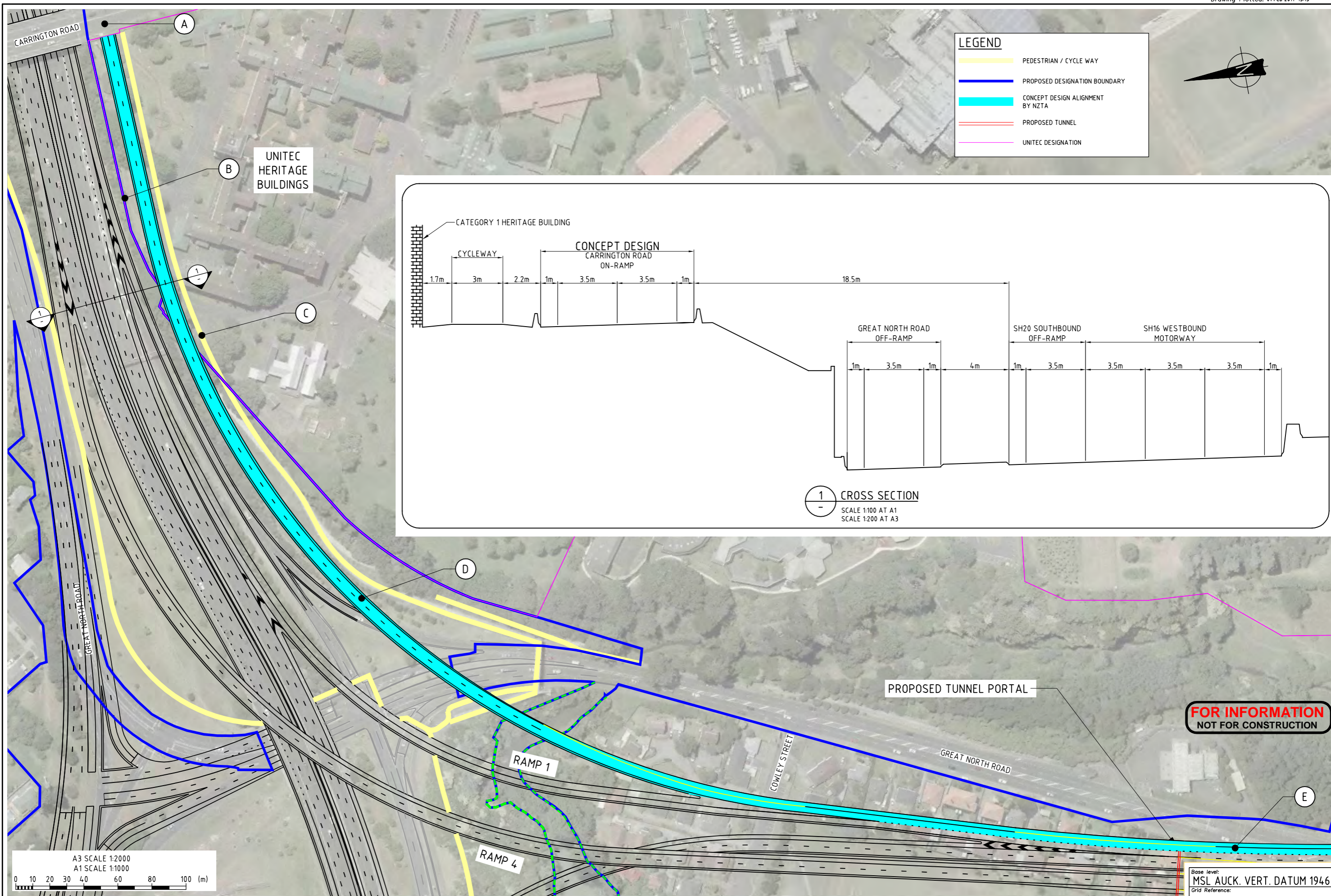
Produced by |

ANNEXURE D - MAP SHOWING SUGGESTED SECTOR 8 CYCLEWAY

This map shows the approximate location of the various alternative routes suggested for the Sector 8 cycleway.

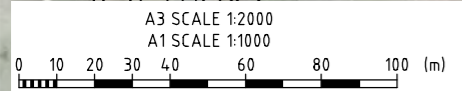
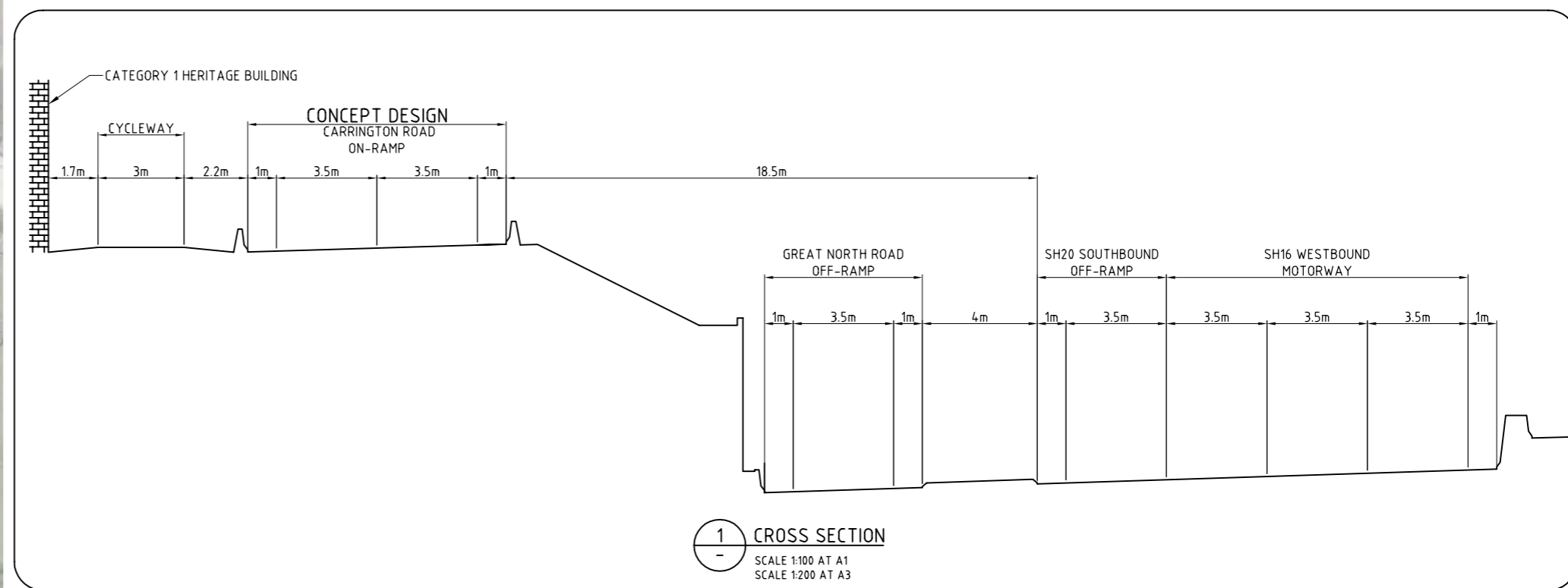


**ANNEXURE E – CONCEPT DRAWINGS FOR LOCAL ON AND OFF
RAMPS SOUGHT BY SUBMITTERS (PREPARED BY BECA)**



LEGEND

- PEDESTRIAN / CYCLE WAY
- PROPOSED DESIGNATION BOUNDARY
- CONCEPT DESIGN ALIGNMENT BY NZTA
- PROPOSED TUNNEL
- UNITEC DESIGNATION



No.	Revision	By	Chk	Appd	Date
C	ISSUED FOR INFORMATION	ME			01.02.11
B	ISSUED FOR INFORMATION	ME			27.01.11
A	ISSUED FOR REVIEW	ME			26.01.11

Drawing Originator:

Original Scale (A1)	Design Engineer	RM
1:1000	Review Engineer	BM
Reduced Scale (A3)	Drafting Checked	ME
1:2000	Consultant Approval	AL
	Received by Beca	



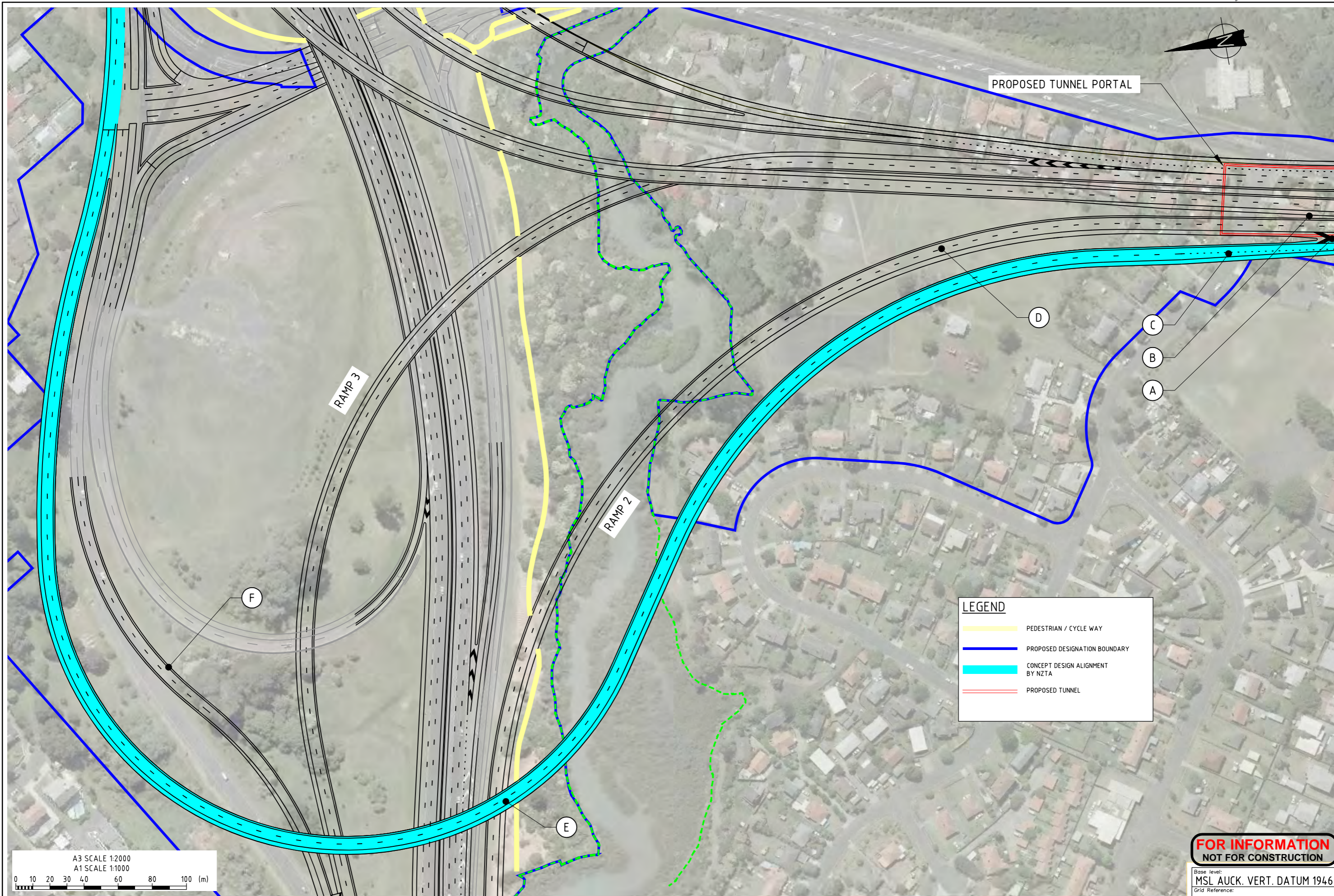
Project: **WATERVIEW CONNECTION PROJECT**
 SH16 / SH20

Title: **OPTION DEVELOPMENT**
 SH20 CARRINGTON RD SBD ON RAMP
 CONCEPT DESIGN

Base level:	MSL AUCK. VERT. DATUM 1946
Grid Reference:	MT EDEN 2000
Originator No.	
Project No.	20.111-3-D-C-109-423
Rev.	C

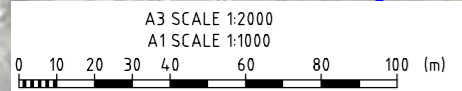
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Document No. 20.111-3-D-C-109-423.dwg



LEGEND

- PEDESTRIAN / CYCLE WAY
- PROPOSED DESIGNATION BOUNDARY
- CONCEPT DESIGN ALIGNMENT BY NZTA
- PROPOSED TUNNEL



**FOR INFORMATION
NOT FOR CONSTRUCTION**

Base level:
MSL AUCK. VERT. DATUM 1946
Grid Reference:
MT EDEN 2000
Originator No.
Project No. 20.111-3-D-C-109-424
Rev. C

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No.	Revision	By	Chk	Appd	Date
C	ISSUED FOR INFORMATION	ME			01.02.11
B	ISSUED FOR INFORMATION	ME			27.01.11
A	ISSUED FOR REVIEW	ME			26.01.11

Drawing Originator:		Original Scale (A1) 1:1000	Designer RM
		Reduced Scale (A3) 1:2000	Reviewer BM
			Drafting Checked ME
			Consultant Approval AL



Project: **WATERVIEW CONNECTION PROJECT**
SH16 / SH20

Title: **OPTION DEVELOPMENT SH20 CARRINGTON RD SBD OFF RAMP CONCEPT DESIGN**

Document No. 20.111-3-D-C-109-424.dwg

ANNEXURE F – LOCAL ROADS USED TO ACCESS SH20 SOUTHBOUND

The following figures show the paths taken to access SH20 and areas south from the Waterview, Point Chevalier and Unitec areas.

Figure F2: Paths south from Waterview

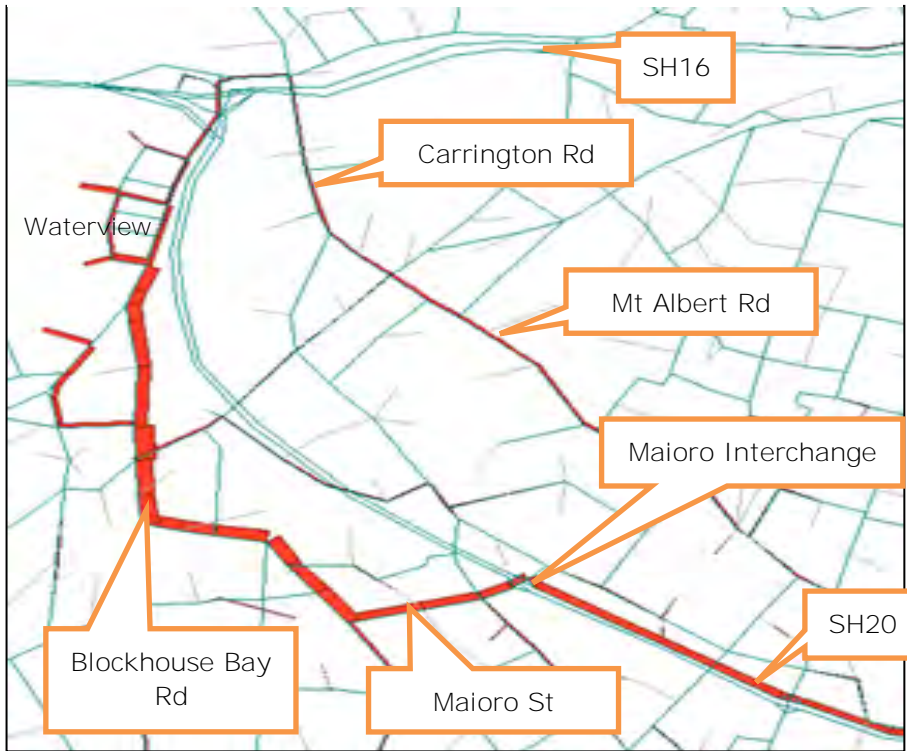
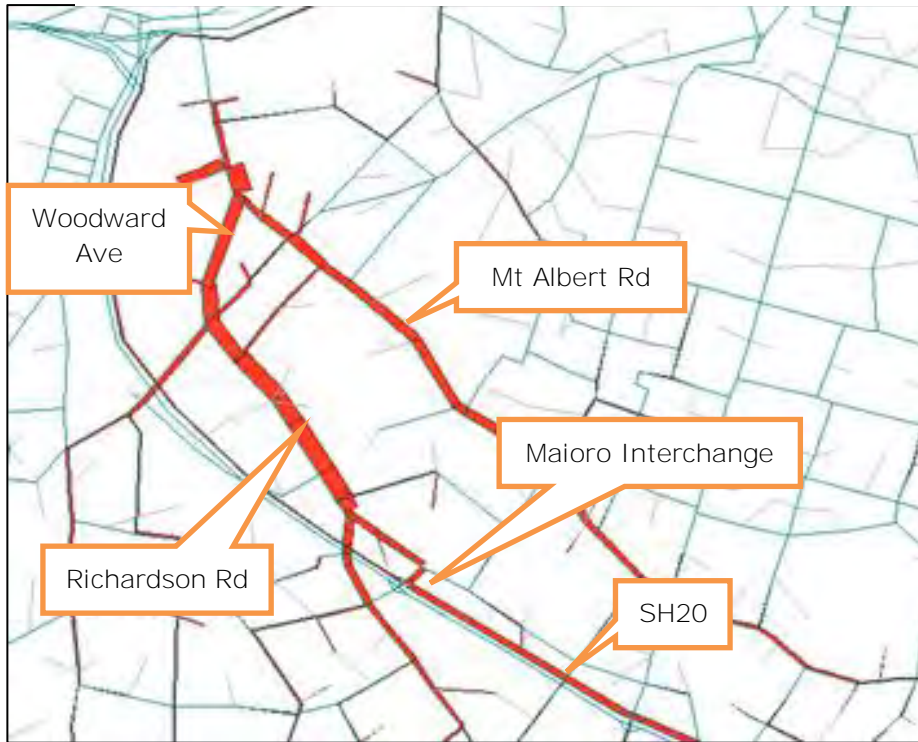


Figure F3: Paths South from Point Chevalier



Figure F4: Paths South from Unitec



ANNEXURE G – NETWORK WIDE ANALYSIS OF CARRINGTON ROAD ON AND OFF RAMPS

Network statistics were extracted for a sub-area of the model to reduce the influence of 'noise' in the wider network.

Table 5: 2016 Network Statistics for On-Ramp

Measure	Scenario	AM Peak	Interpeak	PM Peak
Vehicle-Operating Costs (\$)	No Ramp	193,052	161,271	200,264
	With Ramp	192,941	161,531	200,422
	Change	-111	260	158
Vehicle-Hours of Travel Time	No Ramp	14,255	10,909	14,527
	With Ramp	14,225	10,919	14,522
	Change	-30	10	-5
Vehicle-Hours of congested Travel Time	No Ramp	6,386	3,280	6,124
	With Ramp	6,373	3,296	6,107
	Change	-13	16	-18

Table 6: 2016 Network Statistics for On and Off Ramp

Measure	Scenario	AM Peak	Interpeak	PM Peak
Vehicle-Operating Costs (\$)	No Ramp	193,052	161,271	200,264
	With Ramp	192,913	161,547	200,496
	Change	-139	276	232
Vehicle-Hours of Travel Time	No Ramp	14,238	10,907	14,520
	With Ramp	14,222	10,914	14,514
	Change	-16	7	-6
Vehicle-Hours of congested Travel Time	No Ramp	6,386	3,280	6,124
	With Ramp	6,386	3,300	6,114
	Change	0	20	-10

**ANNEXURE H – ADDITIONAL REFERENCES TO TRANSPORT ISSUES
RAISED IN THE SECTION 42A REPORT, SECTION 3**

S42A Report Paragraph Reference	Topic for further consideration (Paraphrased)	Applicant's Evidence in Chief Reference (EIC): (No./paragraph)
7.2.14	Address the network capacity allocation and efficiency on the transport network	1/45-80 3/152-157 3/163-167
7.2.19	The scope for the detailed design to provide for dedicated bus lanes as part of the Te Atatu Interchange.	2/16-22 3/119-121, 3/178-182 3/163-167
7.2.20	Provision of at grade cycleway connection on Sector 8.	3/112-124, 37/51-52
7.2.21 7.2.22	Confirm the scope of approach, responsibilities and partnership arrangements associated with the Network Integration Plan to demonstrate how the Project's "wider benefits" are to be realised.	1/86-105 1/170-173, 3/68-71 3/231
7.2.23	Provision of an integrated set of drawings showing pedestrian pathways, cycleways, bus lanes and bus ways for the Project and detailing for each interchange	2/16-22 3/61-64 3/163-171, 29/101-113 29/153-157
7.2.24	Provision of current and possible future bus service provision on the local road network in relation to SH20 corridor	1/176-183 2/53-59 See para H.1 below
10.2.12 10.2.33	Provision of safe, direct pedestrian and cycle movements through the Te Atatu Interchange	2/25-31 3/119-121, 3/178-182
10.5.7	How do site specific traffic management plans reconcile with the timetable presented in G.21 Construction Environmental Management Plan.	
10.6.35 10.6.39 10.6.40	Feasibility of enhancing north-south pedestrian/cycleway connectivity between Waterview-Pt. Chevalier.	1/142-150, 1/156-161, 2/60-65 3/115-118, 37/52
10.7.17	Evaluate the opportunity to improve the cycleway network by upgrading the Carrington Road / Sutherland Road crossing and improvements to the St. Lukes Road interchange to enhance the safety of the (off-road) cycleway network.	2/53-65 See para H.2 below

10.8.97	Assess the merits of a northbound bus lane between Oakley Avenue and Waterview Interchange as part of the reconstruction of the road above the cut and cover tunnel.	3/168-171
10.8.98	Assess the merits of a Great North Road western shared pedestrian and cycle route consistent with the standard of other project shared paths on the western side of Great North Road from Oakley Avenue to Waterview interchange.	3/61-67, 3/112-114, 3/117-118 5/75-77, 37/51-52
10.9.30 10.9.31	Determine partnership opportunities for an at grade cycle pedestrian network in Sector 8.	
10.9.33	Determine whether wider public transport improvements over time can be achieved in part through the Project and with support from the various transport agencies.	1/176-183 3/114 3/158-159
10.10.98	Confirm Kiwi Rail's views regarding the use of the designated rail corridor for amenity purposes.	5/68 30/94
10.10.106	Clarify that the Project does not compromise the prospect for a rail station precinct provided at Stoddard town centre Road shops.	
13.1.15	Confirm the Project's compatibility with a 10 year plan to implement the development of a rapid transit network and quality transit network under the Auckland Passenger Transport Network Plan 2006-2016.	1/85-105 3/163-167 ⁸³

H.1 In relation to the issue raised in paragraph 7.2.24 of the Section 42A Report requesting information on bus services, I refer to Technical Report G.18 (Transport Assessment), which shows up to 59 services for the 2-hour peaks and 339 buses per weekday currently on Great North Road.⁸⁴ Although future bus services are not known precisely, being part of the Quality Transit Network (*QTN*), the aspirations for this route include 10 minute frequencies during peaks, 20 minute frequencies interpeak and 60 minute frequencies during evenings and weekends.⁸⁵

H.2 In relation to the issue raised in paragraph 10.7.17 of the Section 42A Report, I refer to paragraphs 9 to 20 of this rebuttal evidence in relation to the St Lukes Interchange. With regard to the cycleway

⁸³ I note that in paragraph 167 of my EIC I state that "*..the development or provision for RTN in the SH16 corridor would not be consistent with the regionally-developed Passenger Transport Plan*". This was based on the Passenger Transport Plan showing no RTN on SH16 in the area covered by this Project, however a possible future RTN west of Lincoln Road is indicated. Hence the statement should more correctly have only referred to the section of SH16 east of Lincoln Road.

⁸⁴ G.18 Table 4-5, Route 7 shows buses on Great North Road.

⁸⁵ Technical Report G.18 Section 4.2.2.

crossing of Carrington Road to Sutherland Street, I note that the Project does not have an adverse effect on the cycleway at this location (actually a benefit is expected from the significantly reduced traffic flows), nor is an upgrade of this existing crossing reasonably necessary to achieve the objectives of the Project. Therefore while an upgrade there may be desirable, I see no reason why it must be included as part of this Project.

ANNEXURE I – RESPONSE TO TRAFFIC ISSUES RAISED IN THE SECTION 42A AIR QUALITY REPORT

1 The following is a response to the traffic issues raised in Section 42A Air Quality Report (dated 14 January 2011).

Use of Average Flows and Speeds

2 I understand that the vehicle-emission analysis for surface streets has used the output from the traffic models, in terms of traffic flows and speeds, to assess emissions across various parts of the day. That traffic model data was for the three weekday peak periods (am, pm and interpeak), each of which represent the average weekday conditions for those periods.

3 The Section 42A Air Quality Report states that:

We do not consider that the average weekday traffic flow rates and associated speeds are appropriate for prediction of worst case air quality impacts.⁸⁶

4 The Report also quotes the Transport Good Practice Guide (referred to as the GPG) as stating:

... traffic data for a 'high' traffic day are needed.⁸⁷

5 To address this issue, I have investigated what the difference is likely to be between an average weekday scenario **and a 'high' traffic scenario**.

6 In terms of traffic flows, this was relatively straightforward based on the extensive data collected by the NZTA on various parts of the network. This involved:

6.1 Analysis of a full year of available traffic count data on SH16 as well as the data available for a shorter period on SH20;

6.2 **Definition of a 'high traffic' day as being represented by the values between the 90th and 95th percentile weekday traffic flow⁸⁸, which was found to correlate to between the 93th and 97th percentile flow on any day;**

6.3 **Consideration of the 'high' flow level in relation to the average, for both the individual sites and for the combined flow. This combined flow is considered more representative**

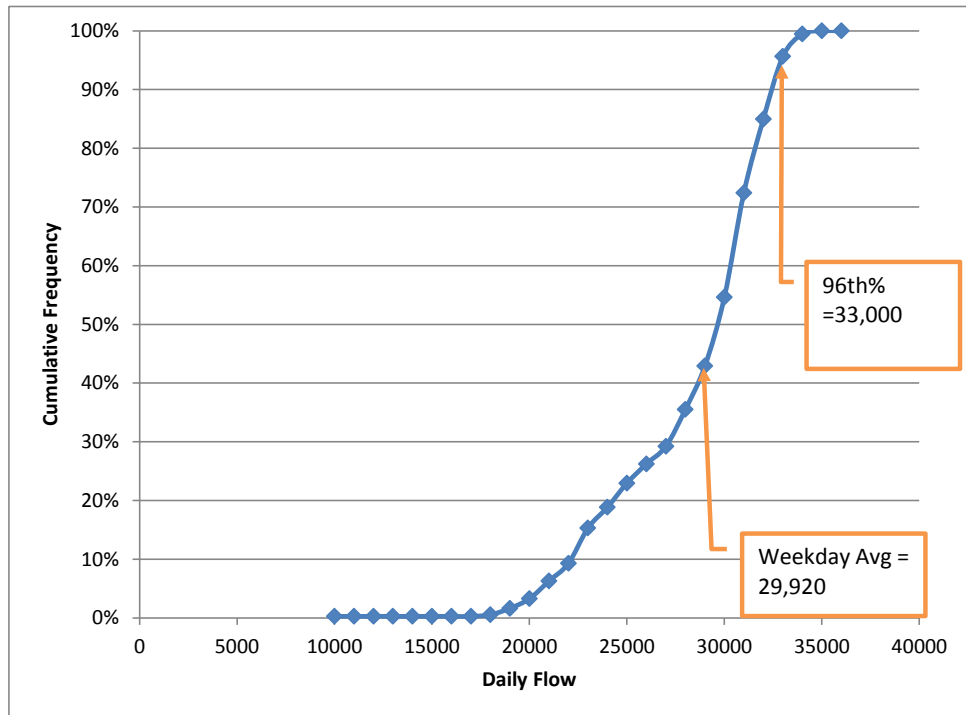
⁸⁶ Section 42A Air Quality Report, paragraph 88.

⁸⁷ Ibid, paragraph 86.

⁸⁸ **There is no formal definition of 'high traffic' conditions, however we have assessed the 90th percentile flow level as being broadly representative of such conditions. This means that traffic flows were higher than this level on only 10% of weekdays.**

of the network average as peaks at one location do not always coincide with peaks elsewhere.

- 7 This analysis found that the 'high traffic' flows ranged between 7% and 11% more than the weekday average, depending on the location selected and how the 'high traffic' period was defined. However, it was found that these high flow days did not fall on the same days across all sites, with the composite site being only some 5%-6% higher than the average. Therefore for use in a network-wide assessment, I would recommended that flows on 'high traffic' days be estimated as some 6% higher than the weekday averages that were modelled.
- 8 This variation is demonstrated in the following Figure, which shows the cumulative frequency of traffic flows from one of the specific sites where data was collected.⁸⁹ This shows that the difference between the weekday average value and the 96th%ile value is some 10%.



- 9 Assessing the variation in speeds is more difficult as there is insufficient survey data to identify the relationship between high traffic and average days. However, as the speeds used in the emission analysis came from the traffic models, I undertook a simple test by increasing the traffic flows in the model by 10%.
- 10 The results of these tests are presented in **Table 1** below, which shows the average speed for the three peak periods in the study

⁸⁹ SH16 at Te Atatu.

area. I accept that the change in speed with extra traffic will vary across parts of the network, however I understand that the emission rates are based on average drive cycles through the network, and not spot speeds at isolated locations. Therefore, I consider use of average network speed as a useful and appropriate test to gauge the magnitude of effect of higher flows.

Scenario	AM Peak Speed	Interpeak Speed	PM Peak Speed	Average Daily Speed
No Project Base Flow	42.5	48.6	43.3	46.7
No Project +10 % Traffic	44.8	49.4	45.9	48.0
Change	-2.2	-0.8	-2.6	-1.3
With Project Base Flow	47.6	53.9	49.5	52.1
With Project +10% Traffic	49.9	54.4	51.2	53.1
Change	-2.4	-0.6	-1.7	-1.1

- 11 From this test I found that with 10% more traffic, the average network speeds increased by some 1.3km/hr without the Project, or 1.1km/hr with the Project. As the flow is expected to only be some 6% higher than the average, the actual change in average speed would be less than indicated here.
- 12 In summary, I conclude the following:
 - 12.1 **I expect that 'high' traffic days would have flows typically 6% higher than the weekday average, when considered as a network-wide value;**
 - 12.2 The average network speed would only decrease by some 1-2 km/hr with the high traffic flows; and
 - 12.3 The reduction in speed would be greater without the Project than with the Project.
- 13 I understand that the implications of these values will be discussed in the rebuttal evidence of Gavin Fisher.

Magnitude of Induced Traffic

- 14 The Section 42A Air Quality Report also expresses concerns about the level of induced traffic used in the emissions analysis, particularly stating:

We are extremely concerned that the assessment is underpinned by an assumption that induced traffic amounts to an increase in vehicle trips of just 0.06% (2400 trips per day). This does not seem realistic.⁹⁰

and

The Auckland Regional Public Health Service submission (submission 91) discusses this issue in some detail. Their submission refers to a recent American meta-analysis which has estimated that for every 1% increase in road capacity that nearly three quarters of that increase is absorbed by induced traffic.⁹¹

- 15 I stand by the predicted level of induced traffic for the Project, on the following basis:

- 15.1 As explained in my EIC,⁹² induced traffic includes changes in the pattern of origin-destination movements (and excludes vehicles simply changing their route through the network). This includes trips that have changed mode, changed time of travel or changed their destination of travel, and not just newly generated trips as suggested in the Air Quality Report.⁹³ This means that a trip that changes its destination to now use the improved road **will add to 'induced' traffic in the corridor**, but will not add to the total regional trips.
- 15.2 Induced traffic is obviously greatest in the location of the improved capacity with lesser effects across the wider network. This means that induced traffic can be measured many different ways. This is described in Technical Report G.25 Traffic Modelling Report,⁹⁴ where I indicate that the volume of induced traffic on the Waterview tunnel itself is expected to be 6%. I note that the Air Quality Report did not choose to quote this more meaningful value contained in my EIC.
- 15.3 Similarly, in the SH16 corridor there is expected to be both induced traffic and traffic diverted from other routes. The modelling predicts a net increase in traffic on SH16

⁹⁰ Section 42A Air Quality Report, paragraph 9.

⁹¹ Ibid, paragraph 163.

⁹² Paragraph 39 of my EIC.

⁹³ Air Quality Report, paragraph 161.

⁹⁴ Technical Report G.25, Section 6.9.

(Rosebank to Te Atatu) of 15,700 vehicles per day,⁹⁵ and the model indicates that this would be 6,300 vpd less if induced traffic effects were ignored. This suggests that some 40% of the increased flow on this section of SH16 is due to induced traffic.

- 15.4 Also, the models predict that the amount of vehicle travel (vehicle-km) will increase by 563,927 km in the study area, which equates to some 7.5% of travel in that same area.⁹⁶ This value includes both diverted and induced traffic effects but demonstrates that the induced traffic effect is significant in the local context. Across the whole of the Auckland Region, the Project is expected to increase the amount of vehicle travel by 438,260 vehicle-km per day, 59% of which is due to induced traffic, and 40% from rerouting.
- 15.5 I also note that the level of induced traffic is based on modelled predictions, and not an assumption as suggested. That prediction is based on the ART3 model developed by the Auckland Regional Council (now incorporated as the Auckland Council), and internationally peer-reviewed as appropriate for forecasting this kind of effect.
- 15.6 Finally, I undertook sensitivity testing using simple elasticity⁹⁷ values to validate the level of induced traffic predicted in the ART3 model. This resulted in traffic flows within 4% of those predicted by the ART3 model on SH16 and within 5% of those predicted on SH20 Waterview.
- 15.7 I also note that the model predictions are not inconsistent with the principle of induced traffic taking up available capacity as referred to in the Air Quality Report. This can be seen in my EIC where traffic flows are predicted to increase on SH16 by up 15% at a daily level and up to 36% during the peaks,⁹⁸ following a capacity increase of some 33% (based on an increase from 6 to 8 lanes⁹⁹).
- 16 Therefore, I consider that the predicted level of induced traffic is realistic and appropriate.
- 17 This issue was also discussed at the caucusing of traffic experts, where agreement was reached that the forecasts were appropriate.

⁹⁵ Technical Report G.25, Table 6.1.

⁹⁶ Based on Table 6.18 of Technical Report G.25 and the daily expansion factors on page 32 of that Report.

⁹⁷ An elasticity of -0.4 was used in the peaks and -0.7 in the off peak.

⁹⁸ My EIC, paragraph 42.

⁹⁹ I note that the capacity of SH16 is also a function of the on and off-ramps and not just the number of motorway lanes. However I have used this simpler measure for the purposes of illustration.