

APPENDIX 13 – ASSESSMENT OF ACOUSTIC AND AIR QUALITY
EFFECTS



27 July 2011
Project No. 42176987

Allan Planning & Research Ltd
26 Patrick Street
Petone
Lower Hutt

Attention: Sylvia Allan

Dear Sylvia,

**Subject: Peka Peka to Otaki – Assessment of alternative corridors
Acoustics and Air Quality**

1 Introduction

This letter has been prepared to provide rating inputs for the acoustics and air quality aspects of the Alternative Corridors review following the workshop of 7 June 2011.

The following corridors have been considered:

- Alternative A – Eastern Foothills
- Alternative B – Eastern Plain
- Alternative C – Western (Te Waka)
- Alternative D – Central (current Board preferred)

Their locations are shown in Appendix A.

2 General methodology

2.1 Criteria

The NZ Transport Agency (NZTA) is developing Tier 1 assessment procedures to indicate the level of risk to a project from noise and air pollution. Tier 1 assessments are suitable for inclusion in the Social and Environmental Screen (SES) portion of the PSF/13 form.

Acoustics

The acoustics risk factor for the project is determined by the AADT and the number of Protected Premises and Facilities (PPFs) within 200 metres of the alignment. Table 2-1 details the process for determining the AADT and PPF risk.

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Table 2-1 Acoustics risk factors

Individual rating	AADT	PPFs
Not Applicable	< 2000 vpd	0 PPFs
Low risk (L)	2000–10,000 vpd	< 50 PPFs
Medium risk (M)	10,000–50,000 vpd	50–200 PPFs
High risk (H)	> 50,000 vpd	> 200 PPFs

The acoustics risk is determined from the two risk factors using Table 2-2.

Table 2-2 Acoustics risk determination

Overall rating	Individual rating (AADT/PPFs)
Not Applicable	Either NA
Low risk (L)	Both L
Medium risk (M)	One M and one L or M
High risk (H)	One H and one L, M, or H

Air quality

A similar assessment procedure is being developed for air quality effects, with risk factors derived from the existing air quality (in terms of PM₁₀ and NO₂), the number of highly sensitive receptors, and the AADT. The rating criteria for the risk factors are presented in Table 2-3 and the determination of the overall risk is performed using Table 2-4.

Table 2-3 Air quality risk factors

Individual rating	Existing air quality	Number of highly sensitive receptors	AADT
Low risk (L)	No risk factors exceeded	< 10	<10,000
Medium risk (M)		10–50	10,000–50,000
High risk (H)	Project in a airshed where <ul style="list-style-type: none"> • PM₁₀ NES is exceeded; and/or • Existing annual NO₂ average exceeds 30 ug/m³ 	>50	> 50,000

Table 2-4 Air quality risk determination

Overall rating	Individual ratings
Low risk (L)	2 or more Low
Medium risk (M)	All other combinations
High risk (H)	2 or more High

2.2 Rating

The PSF/13 effect categories and definitions are listed in Table 2-5. In the case of the Tier 1 assessments, these categories only refer to adverse effects.

Table 2-5 PSF 13 risk definitions

Notation	Interpretation
H High	Permanent, serious and widespread adverse effects and/or opportunities for social and environmental improvement. Adverse effects to be avoided; opportunities to be actively pursued.
M Medium	Major, medium-term adverse effects and/or opportunities for social and environmental improvement. Where cost-effective, adverse effects to be avoided and opportunities pursued (significant mitigation may be required).
L Low	Limited, short-term adverse effects and/or opportunities for social and environmental improvement. Where cost effective, adverse effects to be avoided and opportunities pursued (mitigation may be required).
NA Irrelevant	No effect and/or opportunity. No action required.

For multi-criteria analysis of options the PP2O project has used the rating system described in Table 2-6. For acoustics and air quality the rating under this system has been determined considering the PSF/13 risk factor and a qualitative assessment, as detailed in Section 4.

Table 2-6 Project rating definition

Notation	Interpretation
++	Route option is, on average, very good in terms of this attribute
+	Route option is, on average, good in terms of this attribute
0	Route option is neutral, or neither good or problematic, on average, in terms of this attribute
-	Route option includes, on average, minor or intermediate issues or concerns in terms of this attribute
--	Route option includes, on average, major or intermediate issues or concerns in terms of this attribute

3 Assessment of corridors

3.1 Acoustics assessment

The risk factors for acoustics are listed in Table 3-1. The traffic volumes and number of PPFs are directly based on values provided by Opus for this exercise.

Table 3-1 Acoustics risk assessment

Option	AADT and risk	PPFs and risk	Overall Risk
Eastern foothills (A)	20,060 (Medium)	115 (Medium)	Medium
Eastern plains (B)	20,087 (Medium)	92 (Medium)	Medium
Western / Te Waka (C)	20,155 (Medium)	51 (Medium)	Medium
Board preferred (D)	21,137 (Medium)	164 (Medium)	Medium

3.2 Air quality assessment

3.2.1 Data sources

Airshed Exceedances of the NES

The Greater Wellington Regional Council does not currently monitor PM₁₀ levels within the Kapiti airshed, the airshed which the project is located. However, the Council has monitored PM₁₀ in other Wellington airsheds including Wairarapa, Upper Hutt, Lower Hutt, Wellington City, Karori and Porirua. URS has reviewed the concentrations measured at these locations during previous years (2007–2010) and the results of monitoring show that there were no exceedances of the NES, apart from in Masterton.

The air quality in the Kapiti airshed is likely to be better than that found in the other Wellington airsheds, when considering the general rural nature of the region, lower population density and low traffic flow compared to larger townships such as Masterton. Therefore URS considers it unlikely that there will be any exceedances of the NES within the Kapiti airshed.

Nitrogen Dioxide Monitoring

The NZTA has been monitoring monthly NO₂ concentrations in Otaki at the intersection of Mill Road and State Highway 1 since March 2010. The average monthly NO₂ concentration measured between March 2010 and June 2011 was 18 µg/m³ and the highest concentration was 27 µg/m³ recorded in May 2010. URS therefore considers that it's unlikely that NO₂ concentrations will exceed 30 µg/m³ as an annual average.

Sensitive Receptors

The number of receptors located with 200 m of each of alignment has been provided by Opus and URS has assumed that all of these properties are 'highly sensitive', as defined in the NZTA Standard for Producing Air Quality Assessments for State Highway Projects¹.

¹ Standard for producing Air Quality Assessments for State Highway Projects Version 5, 16 July 2010.

AADT

The predicted AADT for each corridor option has been provided by Opus.

3.2.2 Results

The relevant air quality related risk factors for each of the four corridor options have been summarised in Table 3-2 and an overall risk rating of 'Medium' has been given to each of the options. The Checklist and Risk Assessment for a Tier 1 Air Quality Social and Environmental Screen (SES) form has been completed for each of the corridor options and have been included in the Appendix B to this letter.

Table 3-2 Air quality risk assessment

Option	PM ₁₀ NES	NO ₂	Existing air quality Risk	Highly sensitive receptors and risk	AADT and risk	Overall Risk
Eastern foothills (A)	No	No	Low	115 (High)	20,060 (Medium)	Medium
Eastern plains (B)	No	No	Low	92 (High)	20,087 (Medium)	Medium
Western / Te Waka (C)	No	No	Low	51 (High)	20,155 (Medium)	Medium
Board preferred (D)	No	No	Low	164 (High)	21,137 (Medium)	Medium

4 Summary

4.1 Acoustics

A project rating for each corridor is presented in Table 4-1. While the Tier 1 methodology has identified the same risk rating for all alternatives, we have been able to provide some differentiation by considering the existing noise environment.

Table 4-1 Acoustics project rating

Option	Risk	Discussion	Project rating
Eastern foothills (A)	Medium	This option will introduce traffic noise into an area with minimal existing noise. No significant benefit to PPFs in Te Horo and Otaki will be obtained.	-
Eastern plains (B)	Medium	This option is similar to Option A in that properties previously unaffected by traffic are exposed to this source.	-
Western / Te Waka (C)	Medium	This option results in the least number of affected properties.	0
Board preferred (D)	Medium	The noise effects will be similar to the 'do nothing' option, however opportunities for mitigation exist. Most affected PPFs are already exposed to noise from the state highway.	0



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4.2 Air Quality


Having reviewed each of the proposed corridors, URS has determined that there are unlikely to be any significant differences in potential air quality between the options. However, the Western / Te Waka route has potentially the lowest air quality effects and the board approved route the highest, due to the difference in the number of sensitive receptors affected, with the Western / Te Waka route potentially affecting 51 receptors and the board approved route 164 receptors. A project rating for each corridor is presented in Table 4-2.

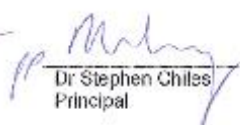
Table 4-2 Air quality project rating

Option	Risk	Discussion	Project rating
Eastern foothills (A)	Medium	Third best option.	0
Eastern plains (B)	Medium	Second best option.	0
Western / Te Waka (C)	Medium	Best of the four options as the least number of sensitive receptors are potentially affected.	+
Board preferred (D)	Medium	Worst of the four options as the most number of sensitive receptors are potentially affected.	-

Yours sincerely
URS New Zealand Limited


Michael Smith
Acoustics Engineer


Peter Stacey
Air Quality Scientist


Dr Stephen Chiles
Principal

CC: Helen Anderson (URS), Tony Coulman (Opus), David Dunlop (Opus)

Figure A-1 Location of corridors





Appendix B

Checklist and Risk Assessment for a Tier 1 Air Quality Social and Environmental Screen (SES)

As at 8 June 2011

1. Project information

Item	Value
What is the project name?	PP20 – Eastern foothills (A) Alignment
Which NZTA region ¹ is the project in?	Wellington, Kapiti Coast
What is the State highway number?	1

2. Key questions

Existing air quality	Value	Risk
Is the Project in an airshed where the PM ₁₀ NES ² is exceeded?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Does the existing annual NO ₂ average ³ exceed 30µg/m ³ in the vicinity of the Project?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Existing air quality risk: Both 'No'=Low, Any 'Yes'=High		Low
Exposure	Value	Risk
How many 'highly sensitive' receptors ⁴ are within 200 metres of any part of the road proposed by the project?	115	
Exposure risk: <10=Low, 10-50=Medium, >50=High		High
Emissions	Value	Risk
What is the likely AADT ⁵ for the project at opening year?	20,060	
Emissions Risk: <10,000=Low, 10,000-50,000=Medium, >50,000=High		Med

3. Risk assessment

Overall Tier 1 Risk Assessment	Low	Medium	High	Value
Number of individual risk factors	1	1	1	
Overall risk: 2+H=High, 2+L=Low, all other combinations=Medium				Med

Notes:

- A detailed map indicating the project area should also be included in the basic project information (see next page).
- For information on the local airshed status regarding the PM₁₀ NES, please either visit the MFE website at <http://www.mfe.govt.nz/environmental-reporting/air/air-quality/pm10/nas/index.html>, phone the local regional council, or contact the NZTA Environment and Urban Design team for advice.
- For information on annual NO₂ levels, please visit NZTA's Spatial Viewer at <https://spatialviewer.nzta.govt.nz>. In order to access it you will need a user name and password, which can be obtained from the NZTA Geospatial team. Either select the maximum NO₂ annual average recorded at the site or the maximum NO₂ annual average recorded at an adjacent site on the same state highway within 10km of the project. If in doubt, contact the NZTA Environment and Urban Design team for advice.
- A 'highly sensitive' receptor is a location where people or surroundings may be particularly sensitive to the effects of air pollution, e.g. hospitals, schools, early childhood education centres, childcare facilities, rest homes, residential areas, marae, other cultural facilities, and sensitive ecosystems as outlined in Table 6.2 of the MFE Good Practice Guide for Assessing Discharges to Air from Transport available at <http://www.mfe.govt.nz/publications/air/assessing-discharges-land-transport-jun08/>.
- AA DT is the annual average daily traffic count

Checklist and Risk Assessment for a Tier 1 Air Quality Social and Environmental Screen (SES)

As at 8 June 2011

1. Project information

Item	Value
What is the project name?	PP20 – Eastern plains (B) Alignment
Which NZTA region ¹ is the project in?	Wellington, Kapiti Coast
What is the State highway number?	1

2. Key questions

Existing air quality	Value	Risk
Is the Project in an airshed where the PM ₁₀ NES ² is exceeded?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Does the existing annual NO ₂ average ³ exceed 30µg/m ³ in the vicinity of the Project?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Existing air quality risk: Both 'No'=Low, Any 'Yes'=High		Low
Exposure	Value	Risk
How many 'highly sensitive' receptors ⁴ are within 200 metres of any part of the road proposed by the project?	92	
Exposure risk: <10=Low, 10-50=Medium, >50=High		High
Emissions	Value	Risk
What is the likely AADT ⁵ for the project at opening year?	20,087	
Emissions Risk: <10,000=Low, 10,000-50,000=Medium, >50,000=High		Med

3. Risk assessment

Overall Tier 1 Risk Assessment	Low	Medium	High	Value
Number of individual risk factors	1	1	1	
Overall risk: 2+H=High, 2+L=Low, all other combinations=Medium				Med

Notes:

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- AA DT is the annual average daily traffic count

Checklist and Risk Assessment for a Tier 1 Air Quality Social and Environmental Screen (SES)

As at 8 June 2011

1. Project information

Item	Value
What is the project name?	PP20 – Western / Te Waka (C) Alignment
Which NZTA region ¹ is the project in?	Wellington, Kapiti Coast
What is the State highway number?	1

2. Key questions

Existing air quality	Value	Risk
Is the Project in an airshed where the PM ₁₀ NES ² is exceeded?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Does the existing annual NO ₂ average ³ exceed 30µg/m ³ in the vicinity of the Project?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Existing air quality risk: Both 'No'=Low, Any 'Yes'=High		Low
Exposure	Value	Risk
How many 'highly sensitive' receptors ⁴ are within 200 metres of any part of the road proposed by the project?	51	
Exposure risk: <10=Low, 10-50=Medium, >50=High		High
Emissions	Value	Risk
What is the likely AADT ⁵ for the project at opening year?	20,155	
Emissions Risk: <10,000=Low, 10,000-50,000=Medium, >50,000=High		Med

3. Risk assessment

Overall Tier 1 Risk Assessment	Low	Medium	High	Value
Number of individual risk factors	1	1	1	
Overall risk: 2+H=High, 2+L=Low, all other combinations=Medium				Med

Notes:

- A detailed map indicating the project area should also be included in the basic project information (see next page).
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- AADT is the annual average daily traffic count

Checklist and Risk Assessment for a Tier 1 Air Quality Social and Environmental Screen (SES)

As at 8 June 2011

1. Project information

Item	Value
What is the project name?	PP20 – Board preferred (D) Alignment
Which NZTA region ¹ is the project in?	Wellington, Kapiti Coast
What is the State highway number?	1

2. Key questions

Existing air quality	Value	Risk
Is the Project in an airshed where the PM ₁₀ NES ² is exceeded?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Does the existing annual NO ₂ average ³ exceed 30µg/m ³ in the vicinity of the Project?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Existing air quality risk: Both 'No'=Low, Any 'Yes'=High		Low
Exposure	Value	Risk
How many 'highly sensitive' receptors ⁴ are within 200 metres of any part of the road proposed by the project?	164	
Exposure risk: <10=Low, 10-50=Medium, >50=High		High
Emissions	Value	Risk
What is the likely AADT ⁵ for the project at opening year?	21,137	
Emissions Risk: <10,000=Low, 10,000-50,000=Medium, >50,000=High		Med

3. Risk assessment

Overall Tier 1 Risk Assessment	Low	Medium	High	Value
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