

Chapter 21

Part G

VOLUME 2

Air Quality

Overview

The primary potential air discharge from the construction of the Project will be dust. This will require mitigation in some areas to reduce the potential for nuisance effects.

Generally properties located within 100m of construction activities could be affected, and mitigation will be required to address those effects.

The primary mitigation measures proposed are speed restrictions on construction vehicles operating near sensitive receptors, defining an area around construction activities where there is the potential to create dust and putting in place mitigation to minimise dust effects in that area, the use of water tankers to dampen surfaces that have the potential to create dust and hydroseeding/mulch cover over finished cut batters. The management of air quality during construction is set out in the draft CAQMP.

The potential effects from vehicle exhaust pollutants once the Project is operational have also been assessed. The ambient concentration of nitrogen dioxide (NO₂), carbon monoxide (CO) and particulate (PM₁₀) were assessed for the nominal opening year (2021) and the design year (2031). The assessment indicates there will generally be an improvement in air quality in the Project area as a result of improved vehicle technologies, and improved traffic flows which corresponds to reduced travel emissions.

21 Air Quality

21.1 Introduction

This Chapter summarises the construction and operation effects of the Project on air quality.

The full report detailing the effects of the Project on air quality is:

- Peka Peka to Ōtaki Expressway: Assessment of Air Quality Effects (Technical Report 13).

This technical report is included in Volume 3 of this AEE report.

Technical Report 13 has been prepared in accordance with the following:

- Tier 3 detailed assessment methodology contained in the draft NZTA Standard for Producing Air Quality Assessments for State Highway Projects; and
- Ministry for the Environment's Good Practice Guide for Assessing Discharges to Air from Land Transport.

21.2 Existing Environment

The Project primarily runs parallel to the existing SH1 through land which is zoned rural and residential. The main township of Ōtaki and the settlement of Te Horo are located between the coast, approximately 4 km to the west, and the Tararua Ranges which are 3km to the east. The rural land is mainly used for beef and sheep farming as well as market gardening activities.

The NIMT follows the alignment of SH1 from Peka Peka to North Ōtaki. The railway line is mainly used to transport freight, with a passenger service currently using the railway line twice a day.

21.3 Sensitive Receptors

A 'sensitive receptor' is defined as a location where people or surroundings may be particularly sensitive to the effects of air pollution. This type of receptor includes residential houses, hospitals, schools, early childhood education centres, childcare facilities, rest homes, residential properties, temporary accommodation, open space used for recreation, the conservation estate, marae and other similar cultural facilities. Orchards and market gardens can be considered sensitive to construction dust as it has the potential to reduce produce quality.

There are a number of residential properties, churches and schools located near to the Project at Ōtaki, Ōtaki South and Te Horo that have the potential to be sensitive to air pollution effects.

During preliminary stages of the assessment, areas were identified where there was the potential for air quality effects and a number of representative worst-case sensitive receptors selected in each of those areas. Effects on other sensitive receptors are likely to be less than at the selected locations. The modelling results also considered all other residential properties within 200m of the proposed alignment.

21.4 Meteorology

A meteorological station was installed at Te Horo, approximately halfway between Peka Peka and Ōtaki. In addition to the data collected from the Te Horo weather station, meteorological data collected at Levin and Paraparaumu was reviewed and assessed. The predominant wind direction measured at Te Horo for the monitoring period was from the easterly quadrant, with the strongest winds being from the northwest.

21.5 Ambient Air Quality Monitoring

The NZTA commenced measurement of short-term NO₂ concentrations in Ōtaki at the corner of SH1 and Mill Road in 2010. Based on the results of the monitoring data to date, negligible adverse effects are expected from NO₂ concentrations arising from the Project at this location as the annual average of 20 µg/m³ is considerably below the WHO annual average guideline of 40µg/m³.⁴⁰

A further air quality monitoring study was undertaken between July 2011 and January 2012 to assist with determining background concentrations. Monitoring of NO₂ was completed at three locations, Rahui Road in Ōtaki (to give an approximation of emissions in Ōtaki), Gear Road in Te Horo (to give an approximation of emissions in Te Horo) and at the M2PP Project monitoring station on Raumati Road in Paraparaumu.

Continuous PM₁₀ and CO monitors were also installed at Rahui Road to provide additional information on the other air pollutants of concern.

The Rahui Road and Te Horo monitoring locations produced very similar results. Given the correlation in concentrations between the locations, the value of 8µg/m³ has been conservatively used as the annual background concentration of NO₂ for both Ōtaki and Te Horo.

The average measured CO concentration at Rahui Road was 0.4mg/m³, which compares with the average concentration measured at the Paraparaumu monitoring station for the same period of 0.2 mg/m³.

The average 24-hr PM₁₀ concentration for the period was 14µg/m³, which compares with the average concentration measured at the Paraparaumu monitoring station for the same period of 12µg/m³.

⁴⁰ World Health Organisation Air Quality Guidelines Global Update, 2005.

The results of monitoring at Ōtaki, Te Horo and Paraparaumu were used to estimate typical background concentrations within the broader Project area. Results of monitoring indicate that background concentrations are typical of a semi-rural environment.

21.6 Assessment of Effects on Air Quality

21.6.1 Construction of the Project

Construction Dust

Construction activities required as part of the Project have the potential to result in the generation of dust if not appropriately controlled. Receptors more than 300m away are unlikely to experience any nuisance effects from construction dust, and are only considered where there is potential for dust to travel further than normal. Receptors within 100 m of construction activities have a greater potential to experience nuisance effects and mitigation measures will be required for these receptors.

In the North Ōtaki to Ōtaki River Bridge section of the Project, the activities likely to generate dust requiring mitigation are the earthworks through the sand dunes, the haul road and placement of fill for the Rahui Road over-bridge. Most receptors are more than 100 m from construction activities, but fine dust might reach these without mitigation.

Construction activities will occur within 20m of the former Rahui Milk Treatment Station and Social Hall. Specific measures will be contained in a CAQMP⁴¹ to ensure that these properties are not adversely affected by dust during the construction process.

In the Ōtaki River Bridge to Old Hautere Road section of the Project, the activities that might generate dust include the large cut at the southern approach to the Ōtaki River Bridge and use of the haul road. Most receptors are more than 100m from construction activities. Areas to the west of the existing SH1 are unlikely to be affected due to their distance. Some areas of crops particularly close to Old Gorge Road and in the general area between Old Gorge Road and Old Hautere Road, to the east of the existing SH1, may be more sensitive to dust at some times of the year. It is unlikely with the mitigation measures proposed, that dust will result in significant or noticeable reductions in crop yields but some crops may be down graded where they are grown close to the construction activities. Mitigation measures to deal with these localised effects will be developed in consultation with affected landowners and incorporated into the CAQMP.

From Old Hautere Road to Te Horo there are no receptors that are considered especially sensitive to dust, close to the alignment, which require specific mitigation over and above the standard mitigation measures being used throughout the Project.

From Te Horo to Peka Peka the main sources of dust will be the significant areas of fill required. There are a number of residences around Te Horo, primarily along School Road and between Mary Crest and Te Hapua Road that will be relatively close to the construction process. The use of standard mitigation measures will address any potential nuisance effects.

Emissions from Construction Vehicles

The construction of the Expressway will require a number of vehicles to operate along the length of the Project for the duration of the works. Based on the information provided in the Construction Methodology report, construction vehicles will make a contribution equivalent to between 32 and 131 additional vehicles per day, travelling in the area. Given

⁴¹ The draft CAQMP will be finalised prior to construction commencing as outlined in chapter 8, Part D, Volume 2 of this AEE report.

that the annual traffic volumes are in the order of 16,000 AADT, this increase, while resulting in a small increase in the level of combustion emissions in areas adjacent to where the works are occurring, will not give rise to ambient concentrations of pollutants that exceed the values set in the National Environmental Standards for Air Quality (NESAQ).

Odour

No specific odour sources have been identified in the Project area to date. However, potential does exist for localised odour effects associated with sources such as septic tanks or offal pits encountered during the construction process. Therefore, the CAQMP contains mitigation measures in the event that those odour sources are encountered.

Construction Yards

There will be a number of construction yards associated with the Project, with the main yard proposed to be located near the Ōtaki River. These yards will be in the order of a hectare in size, and are likely to be metalled. Depending on the activity being undertaken in them, there is potential for dust to be generated. When the main construction yard is used for activities, such as aggregate processing or construction of pre-cast concrete components, additional mitigation measures will be implemented. These measures are described in the CAQMP (see section 4.1.4 of the CAQMP).

21.7 Operation of the Project

21.7.1 Modelling

Road traffic dispersion modelling has been completed for four sections of the Project:

- Section 1: North Ōtaki to South Ōtaki;
- Section 2: South Ōtaki to Te Horo;
- Section 3: Te Horo; and
- Section 4: Te Horo to Peka Peka.

The model predicts future levels of air pollutants in the Project area for the following future scenarios:

- 2010 base year;
- 2021 with Project – representative of the nominal year of opening of the Project;
- 2021 without Project – for comparison with the 2021 with Project scenario;
- 2031 with Project – representative of the opening year plus ten; and
- 2031 without Project – for comparison with the 2031 with Project scenario.

Modelling input data included existing traffic counts and future projected traffic flows, fleet profile, vehicle speeds, fuel properties, locomotive traffic and existing air quality and meteorology.

Further information about the dispersion modelling completed for this assessment including the input data, assumptions and limitations is contained in the Air Quality Technical Report 13 in Volume 3 of this AEE report.

21.7.2 Results

The detailed results of the dispersion modelling completed for this assessment are contained in Technical Report 13. A summary is provided below.

Overall, years modelled show a slight improvement in air quality in Ōtaki township and Te Horo and an "insignificant"⁴² increase in concentrations in the South Ōtaki to Te Horo section compared with the 2021 and 2031 "without project" results.

The results of road traffic pollution dispersion modelling for the township of Ōtaki show that reductions in the concentration of vehicle air pollutants can be expected along the existing SH1 and around the existing SH1/Mill Road intersection. An increase in concentrations can generally be expected in areas located within 200m of the Project. However, due to location of the Project, which takes vehicle traffic to the east and away from the township of Ōtaki, this is expected to be negligible and likely to only be experienced by a small number of receptors. The modelling shows that these increases will not result in exceedances of relevant air quality assessment criteria or NESAQ.

The results of dispersion modelling of the South Ōtaki interchange demonstrate that there are negligible changes in NO₂ concentrations, and no exceedances of relevant air quality assessment criteria or NESAQ, "with Project" scenarios in this area.

The results of dispersion modelling for the settlement of Te Horo predict improvements in air quality, especially at locations on the western side of the main arterial road. A small increase in concentrations is expected in areas adjacent to the eastern side of the Project. However, when compared to the overall improvements associated with the construction of the Project, this increase is expected to be minor.

The predictions of NO₂ concentrations at the section between Te Horo and Peka Peka indicate that NO₂ concentrations in areas close to the Project will be well below the levels set by the NESAQ (200 µg/m³).

Overall, the Expressway will improve air quality in the Project area as a result of improved vehicle technologies, and improved traffic flows which correspond to reduced travel emissions.

21.8 Measures to Mitigate Actual and Potential Adverse Effects from Construction

21.8.1 General Activities

A draft CAQMP (a sub-plan of the CEMP) has been prepared, and describes the air quality mitigation measures proposed during construction activities. These measures are detailed in Technical Report 13 in Volume 3 of this AEE report. A summary of the main mitigation measures is provided below.

Mitigation measures to be used on the entire Project include:

- Where practical, defining an area around construction activities where there is the potential to create dust effects and putting in place appropriate mitigation to minimise dust effects in that area;
- Locating specific speed limits on haul roads to minimise dust emissions close to sensitive locations;
- Having a community liaison person who is available to deal with any concerns or complaints;
- Having a comprehensive complaints and response procedure;
- House cleaning service available for properties that are affected by dust;

⁴² As defined by Ministry for the Environment, Good Practice Guide for Assessing Discharges to Air from Land Transport, May 2008.

- In the unlikely event that this occurs (given the other measures proposed) temporary relocation of the residents of any severely affected properties; and
- Having a team dedicated to monitoring environmental effects.

21.8.2 Earthworks

Measures to be used on earthworks to control dust emissions include:

- The removal and stockpiling of topsoil during windy conditions in areas away from sensitive receptors;
- Guidelines to guide the operation of construction vehicles (with specially reduced speed limits applying) in areas close to sensitive receptors;
- Strict protocols around the removal of potentially dusty cut or placement of fill material, such as sand and silts at locations close to sensitive receptors;
- All finished cut batters will be quickly vegetated or covered with hydro seed or mulch; and
- Water carts will be used to control dust, with water supply available along the length of the construction.