BEFORE THE WHANGAREI DISTRICT COUNCIL AND NORTHLAND REGIONAL COUNCIL

IN THE MATTER	of the Resource Management Act 1991
AND	
IN THE MATTER	of a resource consent application by Northport Limited under section 88 of the Resource Management 1991 for a port expansion project at Marsden Point
APPLICATION NO.	APP.005055.38.01 LU 2200107

STATEMENT OF EVIDENCE OF ANDREW FERGUSON CURTIS

(AIR QUALITY)

24 August 2023

Counsel instructed:
Kitt Littlejohn
Quay Chambers
Level 7
2 Commerce Street
Auckland 1010

Solicitors acting:
CH Simmons / SJ Mutch
ChanceryGreen
223 Ponsonby Road
Auckland 1011

INTRODUCTION

Qualifications and experience

1. My name is Andrew Ferguson Curtis.

2. I am Technical Director Air Quality at Pattle Delamore Partners Limited (PDP). I am a Chemical Engineer with over 35 years' experience. I have specialised for over 25 years in air quality, providing advice to clients in New Zealand, Australia and overseas.

3. I have a Bachelors Degree in Chemical and Materials Engineering from Auckland University, a Post Graduate Certificate in Sustainable Management from the Open Polytechnic and a Post Graduate Diploma in Toxicology from RMIT University. I am a Certified Air Quality Professional and an approved Hearing Commissioner.

4. I have extensive experience in dealing with the assessment of effects associated with discharges to air, including dust from earthworks and other activities. Some examples of my relevant work experience are as follows:

   (a) I was responsible for preparing the air quality assessment for the reclamation of land for the construction of the cycleway from Ngā Ūranga to Pito-One.

   (b) I was responsible for preparing the air quality assessment for the proposed reclamation and extension of the Wellington Airport runway.

   (c) I have been responsible for obtaining air discharge consents for a large number of projects that involve bulk handling activities including both the Pekapeka to Ōtaki and Ōtaki to North Levin sections of the Wellington Expressway.

5. I am familiar with the application site and the surrounding locality, and visited the Port specifically in July 2020. I also visited the Ralph Trimmer Drive carpark and the beach adjacent to it in May 2021.

6. I was the Project Director for, and primary author of PDP's air quality report (Appendix 21 of the Application) and am familiar with all aspects of the project.

7. I have read the relevant parts of: the application; submissions; and the Section 42A Report including appendix C10 which contains the specialist air quality memo.

Code of Conduct

8. I confirm that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note (2023) and I agree to comply with it. In that regard, I confirm that this evidence is written within my expertise, except where I state that I am relying on the evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

SCOPE OF EVIDENCE

9. In my evidence, I:

   (a) Provide a summary of the key points of my assessment;

   (b) Outline the relevant matters of clarification addressed in the Council's s92 request for further information;

   (c) Respond to matters raised in the submissions;

   (d) Respond to matters raised in the s42A Report;

   (e) Comment on proposed conditions advanced by Northport; and

   (f) Set out my conclusions.

EXECUTIVE SUMMARY

10. I have undertaken a qualitative assessment of the potential air quality effects associated with the reclamation. This assessment which focused on nuisance dust, considered:

   (a) what types of activities were being undertaken;

   (b) where sensitive receptors were located that could be affected by dust;

   (c) what meteorological conditions could lead to an effect occurring; and

   (d) what mitigation could be implemented to minimise potential effects.

11. Taking all of the above into account I have concluded that as long as appropriate mitigation is implemented there is little potential for off-site dust nuisance effects.

12. I have also considered whether there is potential for combined off-site effects from the reclamation process and existing on-site activities such as cargo handling, and in my opinion, there is little potential for cumulative dust effects.

13. I have looked at the concerns raised in submissions and consider that most of the concerns that have been raised appear to be related to ship unloading activities that are not part of this process, but which I consider are appropriately controlled by existing port procedures.

14. I have also considered two concerns raised by the Patuharakeke Te Iwi Trust Board, which fall outside the current RMA process. These concerns focused on emissions from motor vehicles and ships accessing the port. I undertook quantitative screening assessments of both of these emissions sources using recognised assessment methodologies and determined that the emissions would not result in significant changes in ambient air quality, with predicted concentrations remaining below all relevant assessment standards and guidelines.

15. Finally, I have considered the consent conditions that have been proposed by Northport, and I consider that these provide an appropriate basis for granting consent.

AIR QUALITY ASSESSMENT

16. The methodology and detail of my assessment is set out in my Air Quality Assessment (**AQA**),[1] and therefore I will not reiterate that material here other than highlighting some aspects that are important from an air quality point of view.

Receiving Environment

17. The current and proposed port operations are bordered by commercial activities to the south and the Channel Infrastructure Import Terminal to the southeast which I consider has a moderate to low sensitivity to any potential impacts from air discharges from Northport. The remainder of the port is bordered by the Whangarei Harbour.

18. The proposed port expansion[2] is to the east of current port operations with the nearest residential dwellings to the proposed port expansion located approximately 1,000 metres to the north at Reotahi and 1,200 metres to the west in Marsden Bay/One Tree Point. The closest non-residential locations I consider sensitive to air quality impacts are the Ralph Trimmer Drive carpark and the beach to the east of the port noting that these are only considered sensitive when they are in use by members of the public.

[1] Appendix 21 to the Application.
[2] In order to avoid confusion with the other consented but not implemented reclamation I have on occasions used the term Berth 5 reclamation to describe the expansion in my evidence.

19. Based on my experience, dust effects typically occur within 100 metres of an unmitigated source, with potential, in very strong wind conditions (greater than 10 m/s) for dust effects to be experienced out to 300 to 400 metres. This guidance is consistent with guidance provided by the Ministry for the Environment (MfE)[3] and the Institute of Air Quality Management (IAQM).[4]

20. Based on this guidance, I consider the potential users of the Ralph Trimmer Drive carpark and the beach to the east of the port as the only potentially impacted locations in terms of air quality effects from the proposal.

Background Air Quality

21. Apart from PM_{10} monitoring undertaken by the Northland Regional Council (NRC) at Bream Bay College approximately 5 km south of Northport, which indicates that concentrations are relatively low (less than 30 µg/m³ as a 24 hour average) there is no other publicly available monitoring data for particulate in close proximity to the Northport site. However, based on recognised sources of background data such as Auckland Council and Waka Kotahi NZ Transport Agency, the concentrations for $PM_{2.5}$ and NO_2[5] would also be considered low.

22. Historically, due to the operation of the Marsden Point refinery, SO_2 concentrations in the area have been elevated. As improvements to the oil refining process were implemented, concentrations reduced significantly over time. Now, with refining no longer occurring on the site[6] and the requirement for ships to burn low sulphur fuels as part of the MARPOL Annex V, concentrations are expected to reduce further to levels that can be considered low.

23. In my opinion, the proposed port expansion will result in an insignificant increase in the amount of combustion emissions,[7] and therefore will not result in any noticeable off-site changes in ambient air quality.

24. There is no recent monitoring for Total Suspended Particulate (TSP) or nuisance dust, which I consider has the greatest potential to result in off-site effects from the proposed expansion. Given that nuisance dust effects are fairly localised, apart from the naturally generated particulates from the marine environment, there are few other nearby sources

[3] Ministry for the Environment (MfE) Good Practice Guide for the Management of Dust, 2016.
[4] Institute of Air Quality Management (IAQM) Guidance on the Assessment of Mineral Dust Impacts for Planning.
[5] Nitrogen Dioxide.
[6] Following the decommissioning of the refinery and transition to import and distribution terminal in mid-2022.
[7] I go on to more specifically consider discharges from vessels frequenting the port, and port-related traffic below, in response to submissions received.

that would contribute to nuisance dust other than bulk handling currently undertaken at Northport or the occasional operation (i.e. abrasive blasting) that might occur at the adjacent Channel Infrastructure Import Terminal ("Import Terminal") that might result in cumulative effects (which I address below).

Wind Effects

25. The other important consideration in assessing the potential for air quality effects especially those associated with dust is local meteorological conditions.

26. Northport has a number of meteorological monitoring stations. These are located very high on port structures or near buildings. I consider that these monitoring sites are not appropriate for assessing the potential wind conditions at ground level at the proposed port expansion. This is because data from these sites would either over represent high wind speeds, due to the height in which they measure and/or the potential interference from the nearby structures.

27. To provide wind data which I consider to be more representative, the AQA extracted data for the proposed port expansion using the same CALMET dataset that was used by the Import Terminal in its recent reconsenting application.

28. This data was presented in Table 1 and Figure 2 of the AQA, but in summary, strong winds (>5 m/s) capable of transporting dust in the directions of sensitive locations occur between 1.3 and 2.2 percent of the time in the direction of the beach and 0.9 and 3.4 percent of the time in the direction of the carpark at Ralph Trimmer Drive.

Dust Generating Activities

29. From an air quality perspective, there are the two key activities that can generate effects: the reclamation and construction of the wharf and hardstand area, and once established, the operation of these new facilities.

30. Given that Berth 5 is intended to be primarily used for container handling and storage, I consider that there is a low potential for dust generation. Air quality emissions from container handling activity will be relatively minor and primarily associated with combustion gases (PM_{10}, $PM_{2.5}$, NO_2 and CO) produced by vehicles used to move the containers – noting that Northport is committed[8] to reducing carbon emissions at the port with some steps already being made towards electrification of its vehicle fleet.

[8] See Assessment of Environmental Effects, Section 5.16.4 page 9.

31. The greatest potential for off-site air quality effects is associated with the potential nuisance dust (particles typically larger than 30 μm in size) associated with the construction and reclamation of the new wharf. Therefore, this was the focus of my AQA and this evidence.

32. I consider the key operational dust generating activities, in order of the amount of dust discharged, to be:

(a) Vehicle movements, especially on un-consolidated dry surfaces;

(b) Placement and contouring of dry material; and

(c) Stockpiled materials.

Dust Suppression

33. The key strategy for dust suppression will be the application of water to the surfaces which have the potential to generate large amounts of dust.

34. During the reclamation process marine sediments will be dredged and pumped into the reclamation. While the reclamation remains below sea level there is no potential for dust generation from this activity. Once the reclamation is above sea level there is potential for dust generation if the material dries out and is disturbed.

35. Northport has several sources of water for the use of dust suppression. The primary source of water will be from the existing onsite stormwater/dewatering ponds. In dry weather when there is no water available from the stormwater ponds, Northport is also connected to the local reticulated water supply which can also be used for dust suppression. If both sources are unavailable, then Northport has access to seawater for use in dust suppression.

36. Based on the above, I consider that there will be sufficient water available to enable effective dust suppression for the reclamation process.

37. In addition to the use of the water for dust suppression, Northport is also proposing to adopt additional methods for dust suppression. This includes:

(a) limiting vehicle speed to 20 km/hr and maintaining roadways;

(b) keeping drop heights of dust generating material to a minimum;

(c) keeping stockpiles to height no greater than 5 metres; and

(d) not undertaking dust generating work in unfavourable weather conditions.

38. In the case of not undertaking dust generating work in unfavourable wind conditions, I consider these to be when wind speeds are greater than 5 m/s at ground level and winds are blowing in the directions of the Ralph Trimmer Drive Carpark and the beach to the east of the port expansion.

39. In the AQA I have suggested that Northport utilises wind triggers to help avoid off-site dust effects. These triggers should be implemented in a two-tiered system. The first trigger would be when winds blowing from the west to the northwest are greater than 4 m/s at ground level, at which point Northport staff should review on-site activities and if required implement mitigation measures to minimise the potential for dust. The second trigger would be when winds are from the same directions, but conditions are dry and wind speeds exceed 5 m/s at ground level. During these conditions, any dust generating activities within 400 metres of a sensitive location should cease if there is the potential for dust generation.

40. I have found this tiered approach works well for controlling off-site dust effects, especially when the meteorological monitoring equipment is set up to send out alerts using text messages and emails. Northport has recently set up a webpage[9] with live weather feed for port operations, and this could be modified or duplicated to provide appropriate alerts and data during the construction process.

Assessment of Effects

41. I assessed the impact of dust emissions from the proposed port expansion using the qualitative FIDOL tool which considered the size and type of the dust generating activities, proposed mitigation measures, meteorological conditions, sensitivity of the surrounding environment and the distances to these receptors. This assessment methodology is consistent with guidance prepared by the MfE.[10]

42. Given the distance between the proposed activities and the beach and carpark at Ralph Trimmer Drive there is the potential for dust nuisance effects if no mitigation was implemented. Through wind monitoring and the implementation of the triggers and mitigation I discussed earlier, the potential for effects on the nearby sensitive locations will be further reduced.

[9] https://northport.co.nz/weatherfeed
[10] Ministry for the Environment, Good Practice Guide for Assessing and Managing Dust, 2016.

43. In any case, based on my analysis of the meteorological data, winds that could generate dust or transport it to potentially sensitive locations are considered infrequent.

44. Once the reclamation is complete and the wharf has a final deck and becomes operational there will be very little emissions to air other than combustion gases from vehicles operating in the area. Given that there will be relatively few vehicles operating on the site, the potential off-site air quality effects will be negligible.

45. Overall, I consider there is little potential for any nuisance dust to be generated by the proposed activities, and further that the mitigation measures proposed will adequately manage those infrequently occurring off-site effects. There may be some increase in ambient dust concentrations, however, these increases will not be at levels that could result in offensive or objectionable off-site effects.

Cumulative Effects

46. I have also undertaken an assessment of potential cumulative dust effects[11] between the construction activities and existing onsite activities.

47. I have conservatively assumed that if there was no mitigation in place, dust effects could be experienced up to 400 metres from the source. Therefore, for a location to experience cumulative effects both the current operations and the proposed expansion need to be within 400 metres of this location and downwind of both activities.

48. I have reproduced Figure 5 in the AQA as Figure 1 and this shows my conservative assumption of the potential dust effects from both the current site (shown in yellow) and the proposed expansion (shown in blue) if no mitigation is undertaken. This image illustrates that, if unmitigated, cumulative effects (shown in green) could occur at the Ralph Trimmer Drive carpark and a small section of the remaining beach.

49. The only area of the existing port operations that would result in a cumulative effect on the beach or the carpark is the currently consented but not reclaimed Berth 4 area (currently where the tug berths) and therefore there is little possibility of dust to be generated.

50. Even if unmitigated dust was to be generated by work being undertaken at the Berth 4 reclamation at the same time as dust was being generated by work on the Berth 5 reclamation, winds would need to be coming from either the north or northwest to affect

[11] See section 5.3 of the AQA.

the nearby sensitive locations. Based on the wind data, strong winds from the north to northwest quarter are infrequent and therefore the potential for dust to carry from this direction is low.

51. Based on this I consider that the potential for any appreciable cumulative air quality effects is low.

52. Once Berth 5 becomes operational, this area will be used for container handling operations which will generate little dust and a small quantity of vehicle related combustion emissions. Given that there will only be a small quantity of vehicles operating in this area and consequently a small quantity of combustion emissions any discharges from additional vehicles operating in this area will be insignificant and would not result in any noticeable cumulative effects.

MATTERS OF CLARIFICATION IN RESPONSE TO SECTION 92 REQUEST

53. The Councils issued a s92 request for additional information which included two specific questions relating to air quality. I provided a response to these questions in a letter dated 8 February 2022. I briefly summarise my response in the following paragraphs.

54. The first question asked for an assessment of dust nuisance effects from the construction of a bird roosting area that Northport is proposing. I undertook a FIDOL assessment of construction dust which concluded that there was a less than minor potential for dust nuisance effects on nearby sensitive locations during the construction period, and a negligible potential for such effects to occur post construction.

55. The second question related to which of the on-site meteorological stations should be used for air quality management. My response was that the most appropriate monitor for the reclamation was the one associated with the Tug Jetty as this is located closer to ground level and therefore provides more representative data than the other sites. My expectation is that when the Tug Jetty is relocated to the east to allow for the Berth 5 reclamation, a new meteorological station will be established at that location which will monitor (at a minimum) wind speed and direction as well as rainfall.

56. For monitoring dust effects during work on the bird roost, I recommended in the s92 response using one of the existing monitors at either Berth 2 or Portland. It should be acknowledged that using these monitoring locations will provide conservative data and will likely overpredict the high windspeeds, meaning that work might be more restricted than might otherwise be the case.

57. Since completing this work, I have considered this issue further and consider that another option for controlling work on the bird roost would be to install a temporary weather station on the western boundary of the port.

58. Figure 2, attached to my evidence indicates the approximate locations of the existing weather stations as well as indicative locations for the two new weather stations I have proposed.

RESPONSE TO SUBMISSIONS

59. I have reviewed those submissions on the application which raise air quality related concerns and have the following comments by way of response.

M & M Pellegrom[12]

60. The Pellegrom's, who live directly across the harbour from Northport, have identified that dust can be observed at times leaving the Port. Given the Pellegrom's location at 37 Darch Point Road I consider that this visible dust is most likely associated with the unloading and handling of bulk solid materials such as animal feed. Any potential effects associated with these emissions should be appropriately controlled by the mitigation measures contained in Northport's COP -13-101 Operational Conditions for Bulk Cargo which controls these activities.

61. The proposed port expansion is intended to be used for the handling of containers, which will not generate dust, and therefore there should not be any significant dust generated by this activity during operations.

62. As I have already discussed, there is potential for dust during the reclamation process, however with the mitigation measures proposed this should be minimal and will not result in nuisance effects.

K & L Wilson[13]

63. K & L Wilson who also live across the harbour from the Port at 2 Matuku Street, also identify that they occasionally observe dust from Port activities. As I have stated in relation to the previous submission, this is most likely associated with the handling of bulk solid material. The proposed reclamation will not change this.

[12] Submission number 24.
[13] Submission number 74.

Patuharakeke Te Iwi Trust Board Inc[14]

64. The Patuharakeke Te Iwi Trust Board Inc (PTB) (Appendix 2 paragraph 10[15]) has raised a concern about emissions from vessels using the port and that these could "*cause significant human and environmental health effects on both the marine and terrestrial receiving environment*".

65. As noted in the PTB submission, emissions from ships are covered by the Resource Management (Marine Pollution) Regulations 1998. Regulation 15 permits discharges of contaminants from ships, and regulation 16 prevents regional councils from setting rules in relation to relevant discharges from ships, which include emissions to air from normal operations.[16]

66. Notwithstanding this, I have prepared a screening assessment of ship emissions. The methodology and findings of this screening assessment are set out in **Appendix A**. In undertaking this screening assessment, I have conservatively assessed worst case emissions[17] from ships at berth (or hotelling) and manoeuvring to and from the wharf.

67. This assessment concludes that even when all of the berths are occupied, the predicted concentrations of PM_{10}, nitrogen dioxide (NO_2) and sulphur dioxide (SO_2) are well less than the relevant National Environmental Standard for Air Quality (NES AQ) at any sensitive receptor.

68. For vessel manoeuvring, I have presented 1 hour modelling results as vessels should take at worst in the order of an hour to leave Whangarei Harbour at 5 knots. These emissions are significantly higher than those for hotelling, as the ships are operating on their main engines, but still result in ambient concentrations which are less than the NES AQ.

69. On the above basis, and to the extent that it is relevant to this application, I consider that emission from vessels have no more than minor effects on ambient air quality.

70. The PTB submission also (Appendix 2 paragraph 11) raises concerns about traffic movements on State Highway 15 associated with the increased traffic movements once the port expansion is complete. At the outset I note that vehicle emissions are permitted

[14] Submission number 181.
[15] I note that these references are to the now withdrawn Western reclamation however as in paragraph 13 it states "*We make the same comments in regard this report as in para's .8 -.10*[sic] *above"* I have referenced the paragraphs with the questions.
[16] As listed in Schedule 4 to the Regulations, and noting that "contaminant" has the same definition as in the Resource Management Act 1991.
[17] In terms of the size of the vessels and the emissions from them.

under the proposed Northland Regional Plan (Rule C.7.2.7) and therefore are not subject to this resource consent process.

71. Nevertheless, Northport has asked me to undertake a screening assessment of the traffic movements. My assessment is set out in **Appendix B**. In summary my assessment indicates that emissions from an increase in traffic associated with port expansion will make a very small contribution to ambient air quality near State Highway 15, with predicted concentrations well below the relevant health effects assessment criteria.[18] This means that it is unlikely that changes in the traffic volumes will result in any adverse health effects for people who live in the area. On this basis, and to the extent that it is relevant to this application, I consider that the effects on air quality from traffic movements are unlikely to be perceptible.

RESPONSE TO THE SECTION 42A REPORT

Section 42A Report

72. I have reviewed the air quality section (section 10.4.14) of the Section 42A report, and Appendix C10 to that report, which contains the Technical Memo that the reporting officers rely on.

73. Overall, the officers agree with my assessment and conclude that (paragraph 391):

> *Based on the specialist advice of Mr Noonan and Mr Curtis, subject to conditions, I consider actual or potential air quality effects will be less than minor and suitably mitigated.*

74. In paragraph 390 the officers make three comments that I respond to in the following paragraphs.

75. Firstly, with respect to whether all my recommended mitigation measures should be incorporated into consent conditions. It is my opinion that it is not necessary for the consent to exhaustively specify all the mitigation measures, as long as the consent contains the standard that implementing the mitigation must meet. In this case the dust standard is set out in the proposed conditions. I consider that it is appropriate for the consent to set out a framework for identifying mitigation and implementing it, which is included in the proposed conditions in relation to dust. I note that this the approach that

[18] The Waka Kotahi air quality screening tool compares the 24 hour average PM_{10} concentrations to the NES AQ and the annual NO_2 concentrations to the Ministry for the Environment's New Zealand Ambient Air Quality Guidelines.

was adopted by the Environment Court when it granted the original air discharge consent for Berths 1 and 2.

76. The second comment is in relation to dust control for the high tide bird roost. As with the Berth 5 reclamation, much of this work will be undertaken below the waterline or with wet material, and therefore is unlikely to generate dust.

77. However, as with the Berth 5 reclamation, some of the work will occur above the waterline, and mitigation measures will be required to minimise the potential for dust effects if the material is dry and it is windy when the work is occurring. As the mitigation measures that would be required to control any dust from this activity are the same as those required for the main works, I do not consider that additional specific mitigation measures need to be provided here.

78. The final question is whether stockpiling will occur on Berth 5. I assume this question relates to the post construction period, as during the reclamation there will be stockpiles of fill material on the site, as this is an integral (and unavoidable) part of the construction process. This question was raised as I understand it, because in the application Northport sought to have consistent land use planning rules across the entire site.

79. When I prepared my original assessment, I understood that once operational, Berth 5 would be used as a container terminal. I now understand that while the primary purpose of the reclamation is as container terminal there may be rare occasions when stockpiles need to be located on the reclamation, for example when it is necessary to unload a bulk solid onto the wharf because it cannot be unloaded and dispatched using hoppers. These transitory stockpiles would be expected to be removed within a couple of days. I understand that there is no intention to use the area for more permanent stockpiles such as woodchip. I do not consider that these transitory stockpiles should result in off-site effects provided they are managed in accordance with Northport's bulk cargo handling procedure[19] (COP-13-101).

80. If for some reason it was decided in the future that it was necessary to establish some longer-term stockpiles, then there would potentially need to be some specific mitigation measures in place to ensure that the stockpiled material did not give rise to an off-site dust nuisance effect. These mitigation measures would generally be the same as those used to control dust from stockpiles on Berths 1-3, which are contained in the COP-13-101, and which appear to be successful at controlling dust nuisance effects from the

[19] Northport, COP-13-101 Rev 4 Operational Conditions for the Loading / Discharge of Bulk Cargoes at Northport.

current handling of bulk cargo. While it is not appropriate (or feasible) to make recommendations at this time, additional mitigation/control measures to manage potential dust effects associated with stockpiling on Berth 5 could include real-time downwind particulate monitoring or minimum setback distances from the boundary. The need for, and detail of, such measures would need to be determined following an assessment at some point in the future by a suitably qualified person, and would depend on factors including the location, duration, and nature of materials to be stockpiled.

Appendix C10 Technical Memo

81. As indicated above, Mr Noonan largely agrees with my assessment and therefore I have only limited comments on his Technical Memo.

82. On page 11 Mr Noonan discusses the potential for construction health effects. It was not something I considered in my assessment due to the low potential for there to be significant concentrations of PM_{10} or $PM_{2.5}$ that could give rise to any form of health effects.

83. Consequently, I agree with Mr Noonan that the potential for there to be any health effects from construction activities to be extremely low with any concentrations well below the New Zealand Ambient Air Quality Guidelines or National Environmental Standards for Air Quality.

84. On page 12 Mr Noonan discusses operational air emissions, and agrees that the potential for off-site effects from port vehicles is small, and in any case is to likely to be compliant with the PRP Permitted Activity Rule C.7.2.8 (1).

85. He also agrees that as long as the reclamation is used as a container terminal there is little potential for off-site fugitive dust effects.

86. Finally on page 12 Mr Noonan comments that there are some differences between the mitigation I proposed in my Assessment and draft Air Quality Management Plan and what was included in the draft Construction Environmental Management Plan (DCEMP) and subsequently Mr Noonan concluded that:

> *…there are gaps in the proposed DCEMP. We recommend that resource consent conditions require the DCEMP dust management procedures to be independently certified by an appropriately qualified professional.*

87. I have subsequently talked with Mr Pettersson, the primary author of the DCEMP, and it appears that some of the mitigation I proposed was inadvertently left out of the DCEMP

when it was prepared. This material will be included when an updated CEMP is prepared. Given that DCEMP is currently in draft, and subject to a certification process by Council, I do not see this as a significant issue.

88. I agree with Mr Noonan that it is appropriate to have the final CEMP reviewed and certified by an appropriately qualified person. I understand that Northport's proposed suite of conditions require this to occur.

COMMENT ON DRAFT PROPOSED CONDITIONS ADVANCED BY NORTHPORT

89. I have reviewed the consent conditions that have been proposed by Northport. There are a number of conditions that relate specifically to air quality, and I comment on them in the following discus them below.

90. The proposed conditions set the standard that must be met by the reclamation works. This is consistent with the conditions on other similar consents and the standard in Rule C.7.2.5 of the proposed Northland Regional Plan for permitted activities.

91. The proposed conditions also require the consent holder to review its activities and management methods if the construction activity gives rise to any form of nuisance effect. I consider that this is an appropriate mechanism for ensuring that nuisance effects are controlled and minimised as far as reasonably practicable.

92. The proposed conditions require Northport to develop a Construction and Environmental Management Plan (CEMP) which it must operate under, and set out the contents to be covered by the CEMP, including dust control. Requiring an activity such as this to have an overarching CEMP which includes specific areas of control, as either subsections or standalone documents, is good practice and consistent with other infrastructure projects that I have been involved in.

93. The CEMP is required to be prepared by a suitable qualified and experienced person with advice from the relevant technical experts. I consider that this represents good practice.

94. The Council is required to certify that the CEMP meets the requirements of the consent is appropriate and is consistent with the process adopted by other Reginal Councils. This is also true of the requirement to undertake the activities in accordance with the certified CEMP.

95. The proposed conditions set out the matters that the dust section of the CEMP should cover. These areas are consistent with the MfE guidance for managing dust,[20] taking into account that it is not proposed to have a standalone dust management plan, and consequently areas such as handling complaints or staff responsibility are dealt with in other sections of the CEMP. I consider that the broad categories identified cover all of the necessary areas of dust management.

96. Overall, I consider that the draft proposed conditions relating to air quality to be appropriate and comprehensive, and suitable for an infrastructure project of the nature and scale proposed by Northport.

CONCLUSIONS

97. I have undertaken an assessment of the potential air quality effects associated with the proposed reclamation. Based on my assessment the main potential air quality effects that could be generated are dust nuisance effects.

98. It is my opinion that through the use of appropriate mitigation any potential for nuisance effects can be minimised such that the site should not result in offensive or objectional dust nuisance.

99. I do not consider that there is potential for there to be any off-site effects caused by vehicles involved in the construction process, but recommend that appropriate maintenance and operational practice is used to minimise any emissions.

100. Once the reclamation is complete and Berth 5 is an operational container terminal there is little potential for dust nuisance effects. Even if there were to be some temporary stockpiles on Berth 5, I consider there is little potential for nuisance effects as long as appropriate mitigation is used.

101. I consider that the consent conditions that have been proposed by Northport are appropriate and form an appropriate basis for granting consent.

Andrew Ferguson Curtis
Pattle Delamore Partners Limited

24 August 2023

[20] Ministry for the Environment, Good Practice Guide for Assessing and Managing Dust, 2016.

Figures

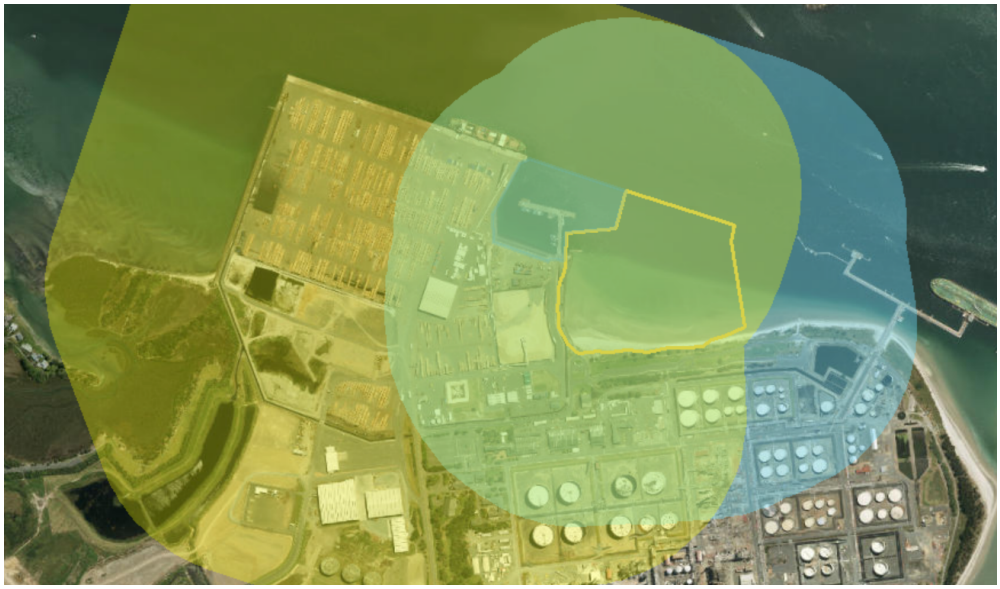

Figure 1: Area of Potential Dust Effects from Unmitigated Dust Emissions

In this figure the yellow highlight shows the potential area of effects associated with the existing port activities and the blue highlight the potential area of effects associated with the reclamation. The area of green highlight shows the area of potential cumulative effects.

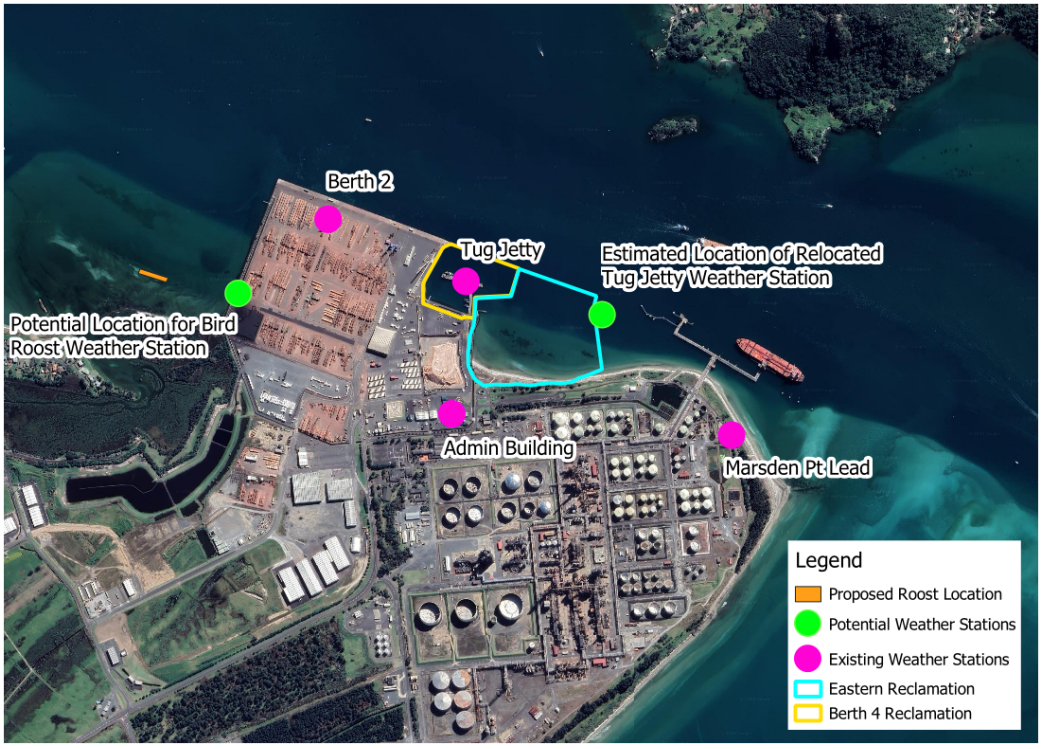

Figure 2: Indicative locations of existing and proposed weather stations

Appendix A Screening Assessment of Ship Emissions

Assessment Methodology

The atmospheric dispersion modelling assessment was carried out using CALPUFF (Version 7), which has been extensively used in New Zealand and Australia and is a recommended model in the MfE GPG ADM[21] particularly for sites surrounded by complex terrain and/or in complex settings. The CALPUFF model was set up in accordance with the guidance contained in the MfE GPG ADM.

CALPUFF contains modules for complex terrain effects, overwater transport, coastal interaction effects, building downwash, wet and dry removal, and simple chemical transformation. In other words, the model can simulate the effects of time and space varying meteorological conditions on contaminant transport, transformation, and removal.

Meteorological Data

The CALMET meteorological data required by CALPUFF was developed by Tonkin + Taylor for Channel Infrastructure NZ (formerly Refining NZ). The CALMET dataset covered the period 1 January 2011 to 31 December 2012.

Model Configuration

CALPUFF models were configured to predict concentrations of four air pollutants over a 30 x 30 km domain with a met grid spacing of 0.25 km, and a receptor spacing of 0.5 km. The air pollutants were:

- Nitrogen oxides (NOx);
- Particulate matter less than 10 micrometres (µm) in diameter (PM_{10});
- Particulate matter less than 2.5 µm in diameter ($PM_{2.5}$); and
- Sulphur dioxide (SO_2).

As health effects are associated with NO_2rather than NOx I have assumed that 5% of the NOx emissions[22] from large ships are NO_2.

Model Conservatism

Two CALPUFF models were run to estimate the emissions from ships. The first of these assumed four ships hotelling at the dock, which is the maximum number of large ships that can be docked at any one time once the expansion has been completed. The model has taken a conservative approach and assumed that four large container ships with a length overall (LOA) of approximately 180 m are continuously docked and are in a hotelling state where the ships auxiliary engines are operating to provide power to the vessel. These assumptions result in a conservative emission profile for this activity as it is very unlikely that there will be four ships hotelling very often, let alone 4 large container ships.

The second model which estimates emissions from ship movements in and out of the port has also been run with a similarly conservative approach. It has been assumed that a large coastal container ship is continuously manoeuvring in and out of the port. In other words, it is assumed that a ship is exiting or arriving at the port for every hour and day of the year. In reality, this is highly conservative: data from

[21] Ministry for the Environment, *Good Practice Guide for Atmospheric Dispersion Modelling,* June 2004.
[22] Centre for Energy, Newcastle University, *Emissions from Ships Reduction*, n.d.

Northport indicates that a total of 255 ships entered the port during 2022, and it has projected a similar number out into the future. Assuming on average it takes a ship one hour to enter and one hour to exit the port, and multiple ships did not enter or exit at the same time, there were approximately 510 hours in 2022 when there was a ship manoeuvring into or out of the harbour. 510 hours equates to 5.8% of the total hours in 2022. The model is therefore extremely conservative, in that it will significantly overrepresent discharges from vessels frequenting Northport.

Emission Rates and Parameters

Emission rates for NOx, PM_{10}, $PM_{2.5}$, and SO_2 have been estimated based on specific ship data provided by Northport using a calculation methodology from the US EPA Ports Emissions Inventory Guidance[23] and the International Transport Forum Shipping Emissions in Ports[24] documents. $PM_{2.5}$ concentrations have been assumed to be 100% of PM_{10} concentrations and as such, the emission rates are the same in Table A1. To estimate the emission rates, it was assumed that all ships (i) operate using fuel with a sulphur content of 0.5%[25] and (ii) manoeuvre in and out of the port at 2.5 knots using their main engine for propulsion (a conservative assumption considering emission rates are higher at lower speeds). Other parameters including emission factors have been adopted from the US EPA Ports Emissions Inventory Guidance document.

Table A1 details the parameters used to run the CALPUFF models.

TableA1: Discharge Modelling Parameters

Parameter	Unit	Hotelling	Manoeuvring
Stack height	(m)	25	25
Exhaust exit velocity	(m/s)	15	15
Internal stack diameter	(m)	1.0	1.0
Exit gas temperature	(K)	741	741
NOx emission rate	(g/s)	4.4	111
PM_{10} emission rate	(g/s)	0.12	2.2
$PM_{2.5}$ emission rate	(g/s)	0.12	2.2
SO_2 emission rate	(g/s)	0.67	12

Results

Table A2 presents the predicted 99.9th percentile 1-hour average concentration results[26] from both the hotelling and manoeuvring models for each of the pollutants. Table A3 presents the maximum 24-hour average concentrations for hotelling. I have not presented 24-hour average concentrations for

[23] US Environmental Protection Agency, *Ports Emissions Inventory Guidance: Methodologies for Estimating Port-Related and Goods Movement Mobile Source Emissions,* April 2022.
[24] International Transport Forum, *Shipping Emissions in Ports*, December 2014.
[25] The maximum allowable under Maritime New Zealand. Guide for Marine Protection Rules part 199: Prevention of air pollution from ships April 2023.
[26] The use of 99.9 percentile values rather than 100 percentile values is in accordance with good atmospheric dispersion modelling practice practise as stated in the MfE Good Practice Guide for Atmospheric Dispersion Modelling.

manoeuvring as this is not relevant. The PM_{10} and $PM_{2.5}$ pollutants have been excluded from Table A2 as there are no 1-hour average guideline values.

Estimates of total concentrations (predicted plus background concentrations[27]) have been included in brackets in the tables.

Table A2: Maximum 99.9th Percentile 1-hour Average Concentration Discharge Modelling Results

Pollutant	Hotelling	Manoeuvring	Guideline
	µg/m³		
NO_2	6.2 (43)	81 (118)	200
SO_2	19 (44)	180 (205)	350

Notes:

1. PM_{10} and $PM_{2.5}$ values have been excluded from this table due to there currently being no guideline values for 1-hour average concentrations for either PM_{10} or $PM_{2.5}$.

Table A3: Maximum 24-hour Concentration Discharge Modelling Results

Pollutant	Hotelling	Guideline
	µg/m³	
NO_2	2.6 (26)	100
PM_{10}	1.4 (31)	50
$PM_{2.5}$	1.4 (12)_	25
SO_2	7.9 (15)	120

The highest 99.9th percentile 1-hour, and maximum 24-hour average concentrations at any sensitive receptor around the port for hotelling emissions have been presented in Table A4.

Table A4: Highest Concentrations at any Sensitive Receptor in the Hotelling Model

Pollutant	99.9th Percentile 1-hour Concentration	Maximum 24-hour Concentration
	µg/m³	
NO_2	4.6 (42)	2.6 (26)
PM_{10}	-	1.4 (31)
$PM_{2.5}$	-	1.4 (12)
SO_2	14 (39)	7.9 (15)

Based on these results it is extremely unlikely that there will be any form of adverse effects on residents associated with emissions from ships berthed at Northport.

It is not possible to determine exact exposure to emissions from ships to other vessels within the harbour as it will depend on location. However, on the extremely conservative assumption that a

[27] Background values taken from Tonkin +Taylor's, 2019 air quality assessment for the Marsden Point Oil Refinery (now Channel Infrastructure).

private boat was downwind of a ship for a full hour, and was obeying Maritime New Zealand's rules and maintaining a 200 metres separation from a manoeuvring ship, concentrations would typically be between 10 and 20 percent lower than the 99.9 percentile 1 hour average values presented in Table A2. In reality from my observations of ship transits exposure at worst might be 5 to 10 minutes.

Overall, the predicted values are less than the relevant health effect guidelines and are extremely unlikely to result in any form of health effects.

Appendix B: Screening Assessment of Traffic Emissions

Traffic Assessment

I have used Waka Kotahi's Air Quality Screening Model (AQSM)[28] to undertake a Stage 2 assessment[29] of vehicle emissions. The screening model has been used to assess potential air quality effects from the increased vehicle movement along State Highway 15 (SH 15) resulting from the proposed expansion, based on daily traffic data provided by WSP (Appendix 27)[30] for the SH 15 / Rama Road Intersection.

The AQSM predicts concentrations of the two main vehicle related air pollutants (NO_2 and PM_{10}). I have used the AQSM to predict annual NO_2 and 24-hour PM_{10} concentrations from the vehicle emission in 2018, 2033 and 2040. As the AQSM model is currently only configured to assess up to 2030, the 2033 and 2040 assessments were both undertaken with the tool set to assessment year 2030. Given that vehicle emissions are generally reducing over time, using the 2030 configuration is conservative. The average daily traffic count (ADT) from WSP is provided in Table B1. A conservative estimate of 20% heavy vehicles and the vehicle speed of 80 km/hr has been used for all three years.

Table B1: SH15 Traffic Counts

Direction	2018	2033	2040
Port Marsden Highway (ADT)North	4,363	10,944	13,666
North northeast	3.8	1.7	0.1

I have used background concentration data developed by Waka Kotahi,[31] with the 24-hour PM_{10} concentration being 25.3 µg/m^3 in the Marsden Point – Ruakaka census area and the annual NO_2 concentration for the same area is 3.0 µg/m^3. This data is used as an is input into the screening model to determine the overall impact.

I have calculated the concentrations for a receptor located 5 metres from the road edge and summarised the AQSM outputs in Table B2.

I have assessed the values against the relevant New Zealand air quality standard[32] for PM_{10} and guideline[33] for NO_2.

[28] https://www.nzta.govt.nz/roads-and-rail/highways-information-portal/technical-disciplines/environment-and-sustainability-in-our-operations/environmental-technical-areas/air-quality/air-quality-screening-model/
[29] Waka Kotahi New Zealand Transport Agency, Guide to assessing air quality impacts from state highway projects, Version 2.3, October 2019.
[30] WSP, Traffic Impact Assessment Northport Development in Whangārei, August 2022.
[31] https://www.nzta.govt.nz/roads-and-rail/highways-information-portal/technical-disciplines/environment-and-sustainability-in-our-operations/environmental-technical-areas/air-quality/background-air-quality/
[32] https://www.legislation.govt.nz/regulation/public/2004/0309/latest/DLM286835.html
[33] https://environment.govt.nz/publications/ambient-air-quality-guidelines-2002-update/

Table B2: AQSM Model Outputs (µg/m^3)				
Pollutant		**2018**	**2033**	2040
24 hour PM_{10}	Road Contribution	0.6	1.0	1.3
	Background Contribution	25.3	25.3	25.3
	Cumulative Concentration	25.9	23.3	26.6
	Assessment Criteria	50	50	50
	Percentage of Guideline	**51.8**	**52.6**	**53.2**
Annual NO_2	Road Contribution	1.2	3.0	3.7
	Background Contribution	3.0	3.0	3.0
	Cumulative Concentration	4.2	6.0	6.7
	Assessment Criteria	40	40	40
	Percentage of Guideline	**10.5**	**15.0**	**16.8**

Overall, the AQSM indicates that an increase in vehicle traffic as a result of the proposed expansion will, as expected, lead to a small increase in discharges of particulates and NO_2. However those increases are of a level, even when combined with background, that remain well within guideline levels and are in my view unlikely to result in any discernible change in ambient air quality. The 24-hour PM_{10} concentration is less than 55% of the air quality standard for the 3 years assessed, and the annual NO_2 concentration is less than 20% of the guideline value with minor increases in between current (2018) and future (2040) concentrations.