BEFORE THE NORTHLAND REGIONAL COUNCIL HEARINGS COMMISSIONER

IN THE MATTER	of an application under section 88 of the Resource Management Act 1991 (Act)
AND IN THE MATTER	an application by Doug's Opua Boatyard for resource consents relating to the redevelopment of the boatyard located at 1 Richardson Street, Opua.

STATEMENT OF EVIDENCE OF PETER WARWICK STACEY ON BEHALF OF DOUG'S OPUA BOATYARD (DOBY)

Dated this 20th day of July 2020

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INTRODUCTION

Qualifications

1. My full name is Peter Warwick Stacey. My qualifications are a Bachelor of Science from The University of Auckland and a Graduate Diploma in Business from Auckland University of Technology.

2. I am a Member of the Clean Air Society of Australia and New Zealand and a Certified Air Quality Professional.

Experience

3. I am a Technical Director at GHD Limited (GHD) based in their Auckland office. I have over 17 years' experience in the field of air quality.

4. I have extensive experience with the assessment of dust, odour and spray painting emissions from a variety of activities. My most recent work experience relevant to this application includes:

   a) Air quality assessment for Winstone Aggregates, Dry Creek Replacement Cleanfill (November 2012). This project involved the assessment of fugitive dust.

   b) Air quality assessment for the consenting of New Zealand Defence Force's Ohakea Air Force Base (2012-2013). Discharges from the site included paint fume from hanger spray painting booths.

   c) Air quality assessment to support the application to expand the Brookby Quarry where fugitive dust emissions were the primary pollutant of concern (2013-2014).

   d) Air quality assessment of emissions from Ballance Agri-Nutrients fertiliser manufacturing plant in Mount Maunganui. This project required a detailed study of emissions using atmospheric dispersion modelling and empirical analysis of monitoring results (2015-2019).

e) Air quality assessment for the Golden Bay Cement manufacturing plant (2018). For this project, a large scale atmospheric dispersion model was setup and used to assess a wide variety of plant emissions.

f) I have also been responsible for obtaining air discharge consents for a large number of industrial manufacturing sites within New Zealand (2010-2020).

Background

5. I was first engaged by Mr Schmuck in 2018 when he was planning the proposals now part of the current application. In particular I was required to assess the effects of the discharges to air from boatyard activities on land and in the Coastal Marine Area. My involvement continued through the Environment Court appeal against the decision to decline the existing discharge consents, to the current consent application.

6. Specifically, my involvement with the site has included:

a) Undertaking site visits on 12 June 2018; 02 April 2019 and 14 May 2019;

b) Installation of two Total Suspended Particulate (TSP) ambient monitors to measure particulate generated over an eight day period from boatyard activities;

c) Assessment of and reporting on the effects, including recommended conditions: Doug's Opua Boat Yard – Air Quality Assessment, 9 July 2018;

d) Reviewing the s42A addendum Report (Doug's Opua Boat Yard - Air Quality Assessment - Review of S42A addendum Report and Northland Regional Council (NRC) Peer Review, dated 13 August 2018);

e) Attendance at an Environment Court hearing on 10 April 2019 in relation to an appeal of NRC's decision to decline the renewal of the current discharge consents. This involved preparing and presenting evidence on the potential effects associated with air discharges from the boatyard;

f) Assessment of and reporting on the effects, including recommended conditions as part of the 'Doug's Opua Boatyard – Air Quality Assessment – Slipway Reconstruction', dated 7 October 2019 (2019 Air Quality Assessment). A copy of this report can be found in Appendix 15 of the Resource Consent Application; and,

g) Update and revision of the atmospheric dispersion modelling that was presented as part of the 2019 Air Quality Assessment in order to incorporate recently collected onsite meteorological data, as discussed in detail later in this evidence.

CODE OF CONDUCT

7. I have read the Environment Court's Code of Conduct for Expert Witnesses as specified in the Environment Court's Practice Note 2014 and agree to be bound by its requirements. Any opinions expressed in this evidence are my own and are not influenced by the client or their agents. This evidence is within my area of expertise, except where I state that I am relying on the evidence of another. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

SCOPE AND STRUCTURE OF EVIDENCE

8. My brief was to identify the various air discharges from boatyard activities, assess the potential for these to cause some form of effect beyond the site boundary, and suggest measures to mitigate those effects.

9. A detailed description of the boatyard activities is provided in the Application and the evidence of the planner, Mr Hood. Mr Hood's evidence also covers the amenity effects on recreational use of the walkway and adjoining reserve. My evidence focuses on the air quality effects of boatyard activities on the surrounding land and Coastal Marine Area.

10. Therefore, my evidence is structured as follows:

    a) Existing air quality environment;

    b) Potential for discharges to air and mitigation measures to minimise any effects;

    c) Identification of appropriate assessment criteria and an assessment of the potential effects;

    d) Comments on the Council Officer's Report; and

    e) Summary and Conclusions

EXISTING AIR QUALITY ENVIRONMENT

11. I am unaware of any publicly available information on the existing air quality in the area near Doug's Opua Boatyard (DOBY). I have surmised that, given the lack of any significant anthropogenic (human-generated) discharges such as industrial emissions or significant vehicle emissions near to the site, the existing air quality can be categorised as excellent.

12. To check my assumption, on 12 June 2018 I installed two Met One Instruments Inc. E-BAM particulate monitors to assist in determining the quality of the existing environment. The monitors were positioned either side of the slipway and operated during the hours of boatyard operation over an eight day period.

13. The monitoring indicated that, excluding periods where significant boatyard activity was occurring, measured TSP concentrations were typically between 15 μg/m³ and 18 μg/m³ as a calculated 24-hour average. In my experience, these values are typical of background concentrations in areas where there are no significant anthropogenic particulate discharges, such as Opua.

14. Similarly, given the lack of significant nearby air discharges, the concentration of other air pollutants such as volatile organic compounds (VOCs) or combustion emissions will also be at low levels. For the purposes of my assessment, I have assumed background concentrations of these pollutants to be negligible.

Existing Meteorology

15. The local meteorological conditions can affect the amount of material discharged, and where it is dispersed.

16. Local meteorological data from the National Institute of Water and Atmospheric Research (NIWA) weather station located at Russell[1] indicated that the prevailing winds were from the northeast and showed 36% calm conditions. However, aerial photography showed the station appearing to be located within a north-south orientated valley and surrounded by trees.

17. In my opinion, given the differences between the location of DOBY and of the NIWA station, the NIWA data could not be relied on to approximate conditions at DOBY.

18. I therefore installed a meteorological monitoring station adjacent to the slipway at DOBY, which measured wind speed and direction. The station was installed on 15 May 2019 and was operated for the period of a year before being decommissioned on 15 May 2020. A wind rose of data extracted for the site is presented in **Appendix A, Figure 1** of my evidence and includes data from all the hours over the monitoring period. **Appendix A, Figure 2** presents the wind data for only the periods of time that boatyard activities take place, namely from 8 am to 6 pm during Spring to Mid-Autumn (1 September to 15 May).

19. The data collected from the site shows that the boatyard is sheltered from winds, particularly those that are from the north, west and south. As a consequence the prevailing winds are from the east, blowing up the slipway. These winds are typically low in strength with the vast majority of winds less than 5 m/s. The windrose presenting the data for operational hours has been overlaid on a site map in **Appendix A Figure 3** of my evidence to show the prevailing winds with respect to the surrounding environment.

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1 Meteorological Station located at 35°16'06.1"S 174°08'09.6"E

20. I note that at the time of preparing the 2019 Air Quality Assessment I did not have a complete year of meteorological data for the site and therefore relied on data developed using the meteorological model CALMET[2] to determine and assess the effects of air discharges. I consequently consider that the wind data presented in this evidence is more representative than the data presented in the 2019 Air Quality Assessment and therefore provides for a more representative assessment of the potential for effects.

POTENTIAL AIR DISCHARGES AND OVERVIEW OF MITIGATION MEASURES THAT ARE USED

21. From my site visits, I have identified the activities that have the potential to generate air discharges. These are: sanding and grinding; water blasting and the application of antifouling and painting of vessels.

22. The air quality effects associated with these activities are discussed in the following sections of my evidence along with the mitigation measures that I have proposed to control the potential for effects from them.

23. I have also considered the Operational Management Plan (OMP) for the boatyard included as part of the application, which provides additional information on the measures used to control discharges.

24. The OMP contains a range of mitigation measures that are currently undertaken at DOBY to minimise the potential for effects from air discharges associated with boatyard activities.

25. In addition to the mitigation measures currently used, I have made a number of recommendations within my 2019 Air Quality Assessment. I note these have been incorporated into the proposed conditions of consent by NRC's Reporting Officer, to further reduce the effects from air discharges.

26. A broad summary of the proposed mitigation measures include:

    a) For scraping, sanding, grinding: using vacuum attachments

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[2] CALMET is the meteorological model that is used by the atmospheric dispersion model CALPUFF which I have used in my assessment to determine the effects of antifouling and paint emissions.

to capture particulate matter and only undertaking these tasks during suitable meteorological conditions.

b) For water blasting: a screen shall be deployed at the bottom of the slipway adjacent to the walking track. I note that a deployable screen was installed in April 2018.

c) For the application of antifouling and paints: placing signs around vessels being painted to warn members of the public and only undertaking this activity during suitable meteorological conditions.

27. My assessment has been made on the basis that all of these mitigation measures are implemented and the potential effects are based on any residual discharges.

ASSESSMENT OF EFFECTS

Key Features of the Site

28. A description of the site and existing facilities is contained in the evidence of Mr Hood with which I agree. However, from an air quality perspective, the key feature of the site is its sheltered location. The boatyard and slipway are surrounded to the north, west and south of the site by bush/rainforest. This will have the effect of reducing the speed and re-orientating prevailing wind flows. **Appendix A, Figure 4** attached to my evidence is a photograph of the boatyard looking towards the north, and shows how the site is surrounded on the landward side by steep sloping topography.

29. Overall, these topographical features provide a benefit as they will reduce the migration of air discharges, primarily particulate matter, beyond the working areas of the subject site. This is evident when looking at the wind rose presented in **Appendix A, Figure 3** attached to my evidence.

Location of Activities

30. Water blasting of vessels is primarily undertaken in the area identified in the plan attached to the existing resource consent (FNDC RC2000812) (Plan 3231b) as "Area A". **Appendix A, Figure 5** of my evidence shows a photograph of a vessel located within Area A. After a boat is cleaned with the water blaster, it is pulled further up the slipway so that the majority of the boat is within the boatyard. It is at this location that scraping, sanding, grinding and the application of antifouling and paint activities are undertaken. For larger vessels, the stern of the boat will extend over the boundary between DOBY and the reserve into Area A.

Effect of Changes to the Slipway on Air Quality

31. The reconstruction of the slipway will lower the working areas to between 0.5 and 1.5 m below the height of the reserve and surrounding areas. From an air quality perspective, this change will influence how air discharges are dispersed in the local area as the retaining walls will essentially act as a screen reducing the potential for emissions to travel beyond the slipway.

32. In addition to the proposed retaining walls, the deployable containment screen located adjacent to the walking track will ensure the effects of water spray drifting onto the walkway are minimised.

33. The reconstruction of the slipway will allow paint preparation and painting activities to be undertaken further up the slipway closer to the boat shed than was previously possible. This will provide a greater level of separation between these activities and people using the reserve or walkway.

34. Overall, I consider that the changes proposed to the slipway can be expected to have a positive impact on the local air quality. However determining the level of improvement over what currently exists is difficult to quantify. My assessment therefore does not take into account the potential benefits on local air quality, apart from the use of the screen to prevent water spray migrating onto the walking track.

Particulate Emissions from Sanding and Grinding Activities

35. Based on my observations, the greatest potential for particulate discharges comes from the sanding and grinding of the vessels to remove antifouling.

36. These activities remove the top surface of the antifouling coating and during this process particulate matter is released to the air. The particulate matter will primarily consist of the antifouling material and contain containments such as zinc and copper.

37. During low wind speed conditions, the bulk of the material removed will fall into the bunded impermeable area in the immediate vicinity of the boat cradle and within the confines of the slipway. **Appendix A, Figure 6** attached to my evidence shows a picture of the keel being prepared during calm conditions for painting. I note however that as the wind speed increases, there is increased potential for particulate to travel further.

38. To better understand the potential for these activities to generate dust and cause effects, I installed two particulate monitors either side of the slipway to measure ambient particulate matter. A picture of the instruments in operation is shown in **Appendix A, Figure 7**.

39. The dust assessment methodology is set out in Section 5 of my 2019 Air Quality Assessment Report.

40. The Applicant kept a log of activities undertaken within the boatyard during the monitoring period (12-19 June 2018). The Applicant informed me that he considered the eight-day period of activity represented approximately 10% of the total amount of works undertaken at the boat yard in any given year.

41. I compared the measured concentrations against the suggested trigger levels for TSP provided by the Ministry for the Environment (MfE) in its Good Practice Guide (GPG) for Managing Dust[3].

42. The GPG for managing dust provides a range of trigger levels for TSP for different receiving environment sensitivities; see Table 1

[3] Ministry for the Environment, Good Practice Guide for Assessing and Managing Dust, November 2016

below. For the purposes of this assessment I have classified the receiving environment to be 'high'.

Table 1: MfE Suggested Trigger Levels for TSP

Trigger	Sensitivity of the Receiving Environment		
	High	Moderate	Low
Short Term (1 hour)	200 µg/m³	250 µg/m³	n/a
Daily (24 hours)	60 µg/m³	80 µg/m³	100 µg/m³

43. Given the close proximity of the particulate monitors to the source, which were placed approximately 3 m from the discharge point, I consider the results of the monitoring to provide a worst-case assessment of potential air discharges from the site as there is limited opportunity for the particulate to disperse before reaching the monitor.

44. I therefore consider that it is reasonable to assume the particulate concentrations that will be experienced at residential locations will be much less than the values measured by the particulate monitor, as they are located at least 35 m from dust generating activities.

45. The primary purpose of the 1-hour trigger levels in Table 1 is to inform the consent holder that if this value is exceeded for long periods of time, then there is the potential for the 24-hour average trigger to be exceeded. A one off exceedance of this value is unlikely to cause a trigger of the 24-hour value, unless it is a gross exceedance many times higher than the trigger value.

46. The 24-hour average trigger level therefore provides a better indication of chronic nuisance effects, as it is the ongoing cumulative effect of particulate discharges which typically creates nuisance effects.

47. As the monitors were only operated during the hours of boatyard activities, typically 8 am to 6 pm, I have inferred 24-hour concentrations by assuming that the background concentrations during periods outside operational hours to be 20 µg/m³. I consider

this value to be conservative[4] as the average concentration measured by Monitors 1 and 2 while activities were not being undertaken, was 15 µg/m³ and 18 µg/m³, respectively.

48. The results of monitoring over the eight days are presented in Table 2. Concentrations of particulate matter measured during periods where scraping, sanding and grinding activities occurred were below the 1-hour and 24-hour trigger levels, with the exception of one exceedance of the 1-hour trigger level on 19 June 2018. The Applicant informed me that during this time period significant grinding and sanding was occurring and he considered that this would be representative of a worst-case event. A time plot of the particulate measured on this day is presented in **Appendix A, Figure 8**.

49. I note that on the second day of monitoring, Monitor 1 did not provide any data as it was not powered on correctly. While the data collected on this day would have been useful, based on all of the data collected, the two monitors produced similar results. It is therefore unlikely that concentrations at the location of Monitor 1 would have been significantly higher than those reported by Monitor 2 on that day.

[4] In the context of this report, conservative means that I have adopted a higher background value as this provides a greater level of protection to neighbouring activities.

Table 2: Total Suspended Particulate Monitoring Results

Day	Activities undertaken	Wind Direction[5]	Average Wind Speed (m/s)	Wind Gust (m/s)	Maximum 1-hour Average TSP Concentration (µg/m³)			Inferred Average TSP 24-hour Concentration (µg/m³)		
					MfE Trigger Level	Monitor 1	Monitor 2	MfE Trigger Level	Monitor 1	Monitor 2
1 (12 June 2018)	Scraping and Grinding	N	0.5	3.1	**200**	43	123	**60**	18	22
2 (13 June 2018)	Spray Painting Antifouling	NW	0.3	4.3		No Result[6]	51		No Result[6]	18
3 (14 June 2018)	Water blasting	NE moving thought to W	0.2	2.4		9	8		16	15
4 (15 June 2018)	Sanding and hand painting antifouling	ENE	0.4	1.9		6	13		17	16
5 (16 June 2018)	Water blasting, antifouling and topside repairs	ENE	1.7	4.5		7	5		16	16
6 (17 June 2018)	Sanding and Polishing topsides	NE	0.2	0.9		11	9		17	16
7 (18 June 2018)	Water blasting and cleaning	ENE	1.1	3.6		1	12		18	18
8 (19 June 2018)	Scraping and Grinding	ENE	0.2	2.1		392	313		32	38

50. Based on the results of monitoring, I consider that grinding and sanding activities have the potential on occasions to cause an exceedance of the 1-hour trigger level at locations close to where the vessels are being worked on.

51. I therefore conclude that if these activities occurred for long periods of time there would be potential for there to be an exceedance of the 24-hour trigger level and potentially cause nuisance dust effects, particularly on the reserve due to its close proximity.

52. However, the Applicant has advised that it is unlikely that grinding and sanding activities will be undertaken for a period of more than two hours in any 24-hour period. On that basis, and given that the inferred 24-hour concentrations are all below the trigger level, it is unlikely these activities will cause significant dust nuisance.

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[5] The wind data was collected from a portable weather station that was used during the period of monitoring.
[6] The Instrument was not turned on.

53. To reduce the likelihood of dust nuisance occurring I recommend that scraping, grinding and sanding of boats should only be undertaken during periods where the wind speed is less than 5 m/s, as a 60 second average. Based on the low frequency of high wind speeds measured by the onsite meteorological station, this recommendation should not unduly hinder boatyard operations.

54. To further minimise the potential for nuisance dust effects on the reserve and walkway, I also recommend that sanders and grinders be required to be fitted with vacuum attachments.

55. Given the short duration of these activities, and providing that the mitigation measures that I have recommended are implemented, I consider that there should be limited potential for this activity to cause dust nuisance on the reserve and walkway. In addition, there is almost no potential for nuisance at the nearest residential property, which is located approximately 35 m to the north and at a higher elevation.

56. Overall, I consider that providing the mitigation measures I have recommended are implemented, dust nuisance effects beyond the boundary will be less than minor.

The potential for adverse effects from PM_{10}

57. The National Environmental Standards for Air Quality (NES) sets a limit of 50 µg/m³ as a 24 hour average for PM_{10} (particulate matter with an aerodynamic diameter of less than 10 µm). Prolonged exposure to this pollutant can cause adverse health effects. Based on the conservative assumption that all of the TSP measured at the subject site is equivalent to PM_{10}, the highest 24-hour concentration was 38 µg/m³, which is below this standard.

58. I therefore consider there to be limited potential for this activity to cause particulate related health effects, and any potential would be further reduced with the mitigation measures proposed.

59. Overall, I consider that providing the mitigation measures I have recommended are implemented, health effects associated with particulate emissions beyond the boundary will be less than minor.

Water Blasting Activities

60. Water blasting of vessels can generate particulate emissions as material such as sediments, barnacles and other sea crustaceans are removed from the underside of the vessels. It is my understanding that this activity can occur two to three times per week and typically takes up to an hour to complete. **Appendix A, Figure 9** attached to my evidence shows a vessel being water blasted on the day of my 12 June 2018 site visit.

61. I consider water blasting is inherently self-mitigating in terms of controlling particulate discharges, as the majority of any particulate matter generated will be encapsulated in water droplets that then fall out of the air due to the size and density of the droplets. Considering these factors, I expect negligible amounts of particulate matter to travel beyond "Area A".

62. Based on my observations on the day of the site visit, the angle of the water blaster was typically such that the majority of the material removed from the hull was directed downwards towards the slipway.

63. However, when the nozzle is angled above horizontal, the water blaster has the potential to create significant water spray which could travel some distance beyond the slipway/working area. To ensure that this practice is minimised as far as practicable, a requirement for all personnel to be suitably trained in the correct use of the water blaster should be incorporated into the OMP.

64. In addition to solid particulates and water droplets containing particulate, the water blaster generates a very fine water spray that has the potential to travel beyond the working area.

65. To demonstrate that the water used for water blasting is free of contaminants, the Applicant collected and sent a sample of the water to R.J.Hill Laboratories for testing where it was found to comply with the New Zealand drinking-water standard[7]. Given that the water supply complies with the New Zealand drinking water

[7] Refer to Appendix C of the 2019 Air Quality Assessment.

standard, I consider that any water droplets that travel beyond the working area are unlikely to contain any significant traces of contaminants that could cause health or nuisance effects.

66. In terms of controlling the movement of water spray, a removable screen has been installed and will be employed between the slipway and walking track when water blasting is in progress.

67. Based on my observations of the screen being used, I consider that while the screen will not completely prevent water spray from travelling onto the walkway, it will reduce the amount of spray migration, particularly when the water blaster nozzle is focussing on the lower sections of the keel, as shown in **Appendix A, Figure 9** of my evidence.

68. I consider that in combination with the screens, the practice of raising the water blaster nozzle above horizontal should be minimised where practicable. If the topsides of the vessel need to be cleaned, this should be done by taking into consideration the prevailing wind conditions at the time of undertaking the activity to minimise the potential for users of the walking track and reserve from being affected by water spray.

Application of Antifouling and Paint

69. The application of antifouling and paint to vessels has the potential to generate air emissions that could cause adverse effects if they are present at concentrations above health effect assessment criteria. These emissions include a range of VOCs[8] which are present in the solvent portion of the paint.

70. To assess the potential for these emissions to cause effects beyond the working areas, I set up and configured an atmospheric dispersion model called CALPUFF to determine off-site concentrations for a range of VOCs. I then compared the results with prescribed air quality assessment criteria, using the hierarchy presented in the Good Practice Guide for Assessing Discharges to Air from Industry (GPG ID)[9].

[8] A list of the VOCs found in the paint is provided in Table 3
[9] Ministry for the Environment, Good Practice Guide for Assessing Discharges to Air from Industry, 2008

71. The methodology that I have followed in my modelling assessment is essentially the same as provided in Section 7 of my 2019 Air Quality Assessment Report, 2019, however as noted in paragraph 21, I have re-run CALMET incorporating onsite meteorological data. I have also adjusted the periods of time where discharges can occur, as described in detail in later in my evidence in paragraphs 75 and 76, to provide a more representative assessment of the potential for effects.

72. The Applicant has advised that approximately 30 to 35 vessels per year are painted with antifouling and that the boatyard uses either Altex or Awlcraft antifouling paint. These paints consist of copper and zinc (20-50% of the total paint component) in a solvent base.

73. In addition to the application of antifouling, vessels are also painted with primers, undercoat and linear polyurethane and enamel top coat paints, typically manufactured by Altex. This occurs on average four times per year with approximately 6 L to 7.5 L of paint used per vessel. This equates to a maximum of 30 L of paint per year for all types of paints, including paint containing diisocyanate.

74. I have only compared predicted concentrations of the various VOCs against the 1-hour average assessment criteria, as I have been advised by Mr Schmuck that antifouling and painting typically occurs for a maximum of 2 hours in any given day. Given the short duration of this activity, I do not consider a long-term average criterion such as a 24-hour average to be appropriate.

75. The Applicant has advised that painting will occur only between 1st September and mid-May and while the boatyard is operational between 8 am and 6 pm, the application of antifouling and paints only occurs between the hours of 10:00 am and 6:00 pm[10] due to the presence of dew in the early morning. To address this, the dispersion model was configured such that painting emissions only occurred during these time periods.

[10] Modelling undertaken as part of the2019 Air Quality Assessment was based on operating hours of 8 am to 6 pm and assumed painting would occur all year round, however the Applicant has recently advised it is not feasible to paint boats prior to 10 am.

76. To mitigate the potential for effects from the use of antifouling and painting activities, I recommend that painting is limited to periods where the wind is blowing up the slipway (northeast through to a south southeast direction) and the wind speed is above 0.5 m/s, so that paint emissions are travelling away from the reserve. To incorporate this recommendation, the dispersion model was configured so that painting emissions only occurred during these wind conditions.

Buffer Zone

77. The Environmental Protection Agency[11] has outlined a number of control measures to minimise the effects from antifouling application. These include the requirement to place signs, set back a distance of 10 m, around vessels when they are being painted.

78. I have not been able to identify the extent of a suitable buffer zone from NRC and FNDC documents. However, I note that the controls set out in the Auckland Unitary Plan (AUP)[12] Standard (E14.6.1.4), for paints containing diisocyanates includes a requirement to prevent public access within 15 m of the activity.

79. The AUP Standard also requires the activity to be at least 30 m from sensitive receptors such as residential dwellings, with no more than 18 L per day of paint containing diisocyanates or organic plasticisers applied in a continuous application at a single location.

80. I note that the nearest residential dwelling[13] is approximately 35 m from the area used to paint vessels and the amount of paint used per day has been estimated to be less than 7.5 L. The activity would therefore comply with the requirements of the AUP Standard.

81. To determine the potential effects that could occur for people occupying the reserve, the model includes a receptor within the reserve setback 15 m from the area where vessels are painted. I have also included the nearby residential dwellings as receptors in the model.

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[11] Environmental Protection Agency. Decision on the Application for reassessment of Antifouling Paints (APP201051). 26 June 2013.
[12] Auckland Unitary Plan – Operative in Part, 15 November 2016.
[13] 3 Richardson Street, Opua

Modelling Results

82. The predicted ground level ambient VOC concentrations are presented in Table 3 and indicate that concentrations within the reserve and at the nearest residence are below the relevant assessment criteria.

83. Predicted off-site concentrations in this revised assessment are lower than what was presented as part of the 2019 Air Quality Assessment. This is primarily due to the use of on-site data instead of using modelled/synthetic meteorology and reducing operating hours to exclude late autumn and winter months. In addition paint emissions have been configured in the model to only occur during periods where the wind is blowing up the slipway.

84. Based on these refinements I consider the results of modelling to be representative of the residual effects, post mitigation measures being implemented.

Table 3 Predicted VOC Concentrations

Pollutant	Threshold Concentration (µg/m³)	99.9 %ile 1-hour Average Predicted Concentration (µg/m³)	
		Nearest Residence	Within the Reserve
1,2,4-trimethyl benzene	4,400	189	51
1,3,5-trimethylbenzene	4,400	47	13
2,4,6-tris[(dimethylamino)methyl]phenol	420	33	9
2,4-pentanedione	830	62	17
aspartic acid, N,N'-(methylenedicyclohexanediyl)bis-,ester	350	24	6
bis(1,2,2,6,6-pentamethyl-4-piperidyl)sebacate	100	1.5	0.5
C18 fatty acid dimers/ polyethylenepolyamine polyamides	1,000	33	9
diethyl fumarate	400	0.51	0.12
ethyl acetate	3,100	62	17
ethyl Benzene	2,000	77	21
ethyl-3-ethoxypropionate	270	62	17
ethylbenzene	2,000	67	18
hexamethylene diisocyanate	0.7	0.023	0.006
hexamethylene diisocyanate polymer	8.7	5.7	1.5
kerosene	1,000	64	17
methyl 1,2,2,6,6-pentamethyl-4-piperidyl sebacate	100	0.51	0.25
methyl ethyl ketone	18,000	255	69
methyl isobutyl ketone	820	104	28
naphtha petroleum, light aromatic solvent	4,400	45	12
naphtha, petroleum, hydrodesulfurised heavy	3,500	127	34
n-butanol	610	273	74
n-butyl acetate	11,000	118	32
polyethylene glycol	1,000	0.51	0.12
propylene glycol monomethyl ether acetate, alpha-isome	2,700	337	91
propylene glycol monomethyl ether acetate, beta-isomer	280	0.21	0.05
solvent naphtha (petroleum), light aromatic	4,400	472	127
Tinuvin 1130	120	1.0	0.25
Tinuvin 213	120	2.6	0.7
toluene	37,000	51	14
xylene	22,000	849	229

85. The Applicant has advised that diisocyanate based paints are seldom used, typically up to three times a year for a period of two hours on any given day. This provides an annual total diisocyanate paint usage of 15 L/year.

86. I consider the overall scale of painting activities to be small; paint usage, which is typically no more than 10 L/day, is well less than

the permitted activity threshold of 30 L/day[14]. I therefore recommend that the maximum total daily paint application rate is limited to the permitted activity value of 30 L/day, inclusive of a maximum volume of 7.5 L per day of diisocyanate paints.

87. Overall, I consider that emissions from paint application are unlikely to cause adverse health effects, especially if the use of diisocyanate paints is restricted and the activity is only undertaken while the wind is blowing up the slipway.

Potential Odour Effects from Antifouling and Painting Activities

88. In addition to the potential for health effects, I have also assessed the potential for painting activities to cause odour nuisance.

89. Whenever paints are used, there is also the potential on occasions for odours to be detected within the reserve and walkway. The potential to experience odour at these locations would depend on the type of paint used and the wind conditions at the time.

90. I consider that the potential to encounter odour within the reserve or on the walking track is very low given the following factors:

- Application of antifouling only occurs for up to 70 hours per year, with the majority of paint applied by roller which has less potential to cause odour nuisance than spray painting;
- Signs will be placed 10 m from vessels being painted to warn members of the public that vessels are in the process of being painted and that they should keep their distance;
- Application of paint only occurs up to 15 hours per year (based on 30 L of paint used per year at an application rate of 2 L/hour);
- Winds from the north or west occur infrequently; and
- Paint usage during periods where the wind is blowing towards the reserve and walking track will be limited by the consent conditions that have been recommended.

[14] Regional Air Quality Plan for Northland, Permitted Activity Rule 9.1 (d)

91. Given the above factors, I consider that the potential for painting activities to cause odour nuisance effects to be low.

Potential for Air Quality Effects on the Coastal Marine Area

92. I understand that on occasions some minor boat maintenance activities will be undertaken on the wharf. These include sanding and hand painting. Sanding is undertaken using vacuum sanders which control dust discharges to very low levels and hand painting is limited to small volumes of paint (less than 500 mL) per application with the paint free of diisocyanate compounds.

93. Given the minor nature of these activities and the existing management measures in place, I consider that the effects on the Coastal Marine Area will be negligible.

Potential for Air Quality Effects from Construction Activities

94. There is the potential for dust from the minor earthworks associated with re-profiling the slipway to cause nuisance effects if not appropriately mitigated. This activity is permitted under the Operative and Proposed Regional Air Quality Plan for Northland providing that *"The discharge shall not result in any offensive or objectionable dust deposition, or any noxious or dangerous levels of airborne particulate matter, beyond the boundary of the subject property".*

95. Given the minor nature and short duration of this activity and providing that best practice dust mitigation measures are employed, I consider that it is unlikely there will be in any adverse dust nuisance effects from this activity.

COMMENTS ON THE COUNCIL OFFICER'S REPORT

96. I have read the relevant air quality portions of the Council's s42A Report and agree with the findings of the Council Officer's assessment of the effects from air discharges associated with the boatyard.

97. The resource consent conditions that the officer has recommended have essentially covered all of the mitigation measures that I have recommended and based my assessment on. I therefore consider these conditions to be appropriate.

SUMMARY AND CONCLUSIONS

98. I have undertaken an assessment of the potential for particulate emissions from boatyard activities to cause adverse effects. Based on the results of this assessment, which included onsite ambient particulate monitoring, I consider that provided the various mitigation measures proposed by NRC are implemented, dust nuisance or adverse health effects from water blasting, sanding and grinding activities at nearby residential locations, reserve or walkway are likely to be less than minor.

99. While water blasting is unlikely to generate any particulate emissions that could result in nuisance effects such as soiling, the water spray that is generated has the potential to travel from the working area and cause amenity effects on the reserve and walkway. The use of screens will mitigate this to some extent, however further mitigation, such as including procedures in the OMP as to the appropriate method of use of the water blaster will help to further reduce the potential for water spray to drift on to the walkway.

100. In terms of discharges associated with the application of antifouling and paint to vessels, I have undertaken an atmospheric dispersion modelling assessment of VOC emissions and based on the results I have concluded that off-site effects will be minor.

101. I consider that the use of diisocyanate paints should be limited to periods where the wind is blowing up the slipway. This will reduce the potential to cause human health effects.

102. Overall, I consider that the mitigation measures proposed will ensure that the effects of the discharges to air from boatyard activities will be minor.

Peter Stacey

20 July 2020

Appendix A

Figure 1: Site Wind rose ***- All Hours 15 May 2019 to 14 May 2020***

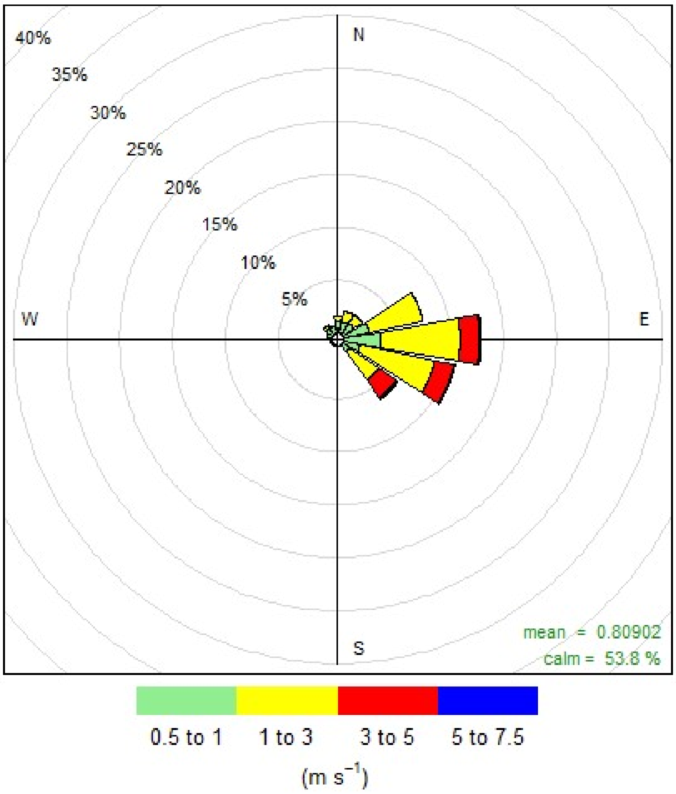

Figure 2: Site Wind rose ***- Operational Hours (1 September 2019 to 15 May 2020 – 8 am to 6 pm)***

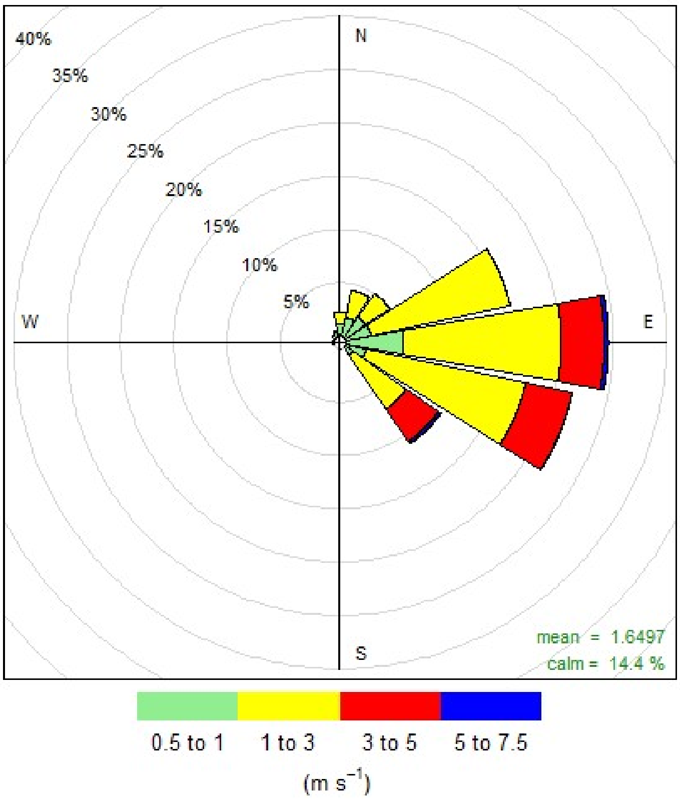

Figure 3: Site Wind rose - Operational Hours (1 September 2019 to 15 May 2020 – 8 am to 6 pm) overlaid on a site map

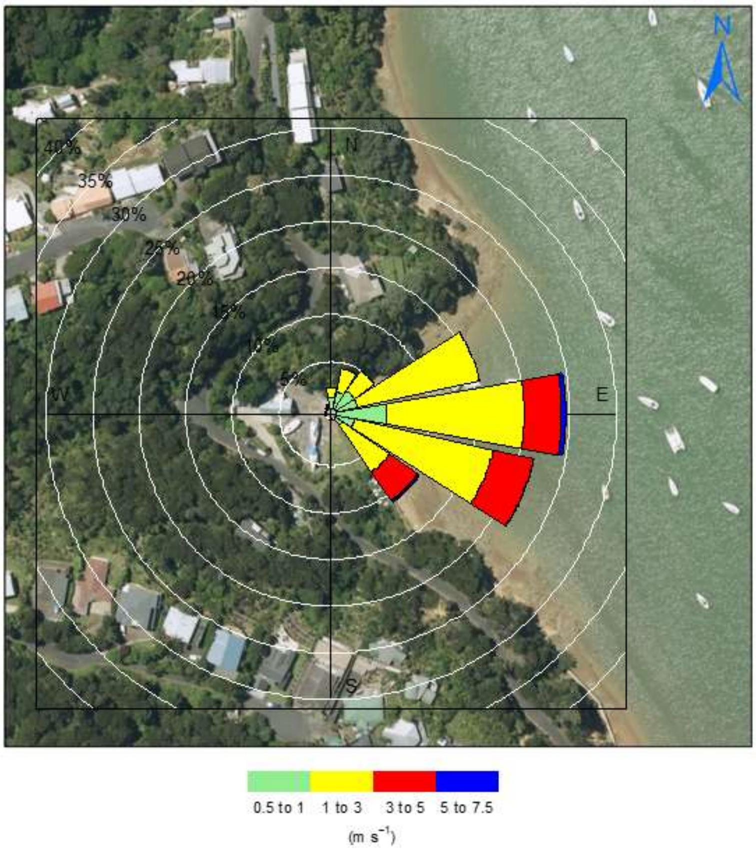

Figure 4:Photograph of DOBY showing the topography surrounding the site

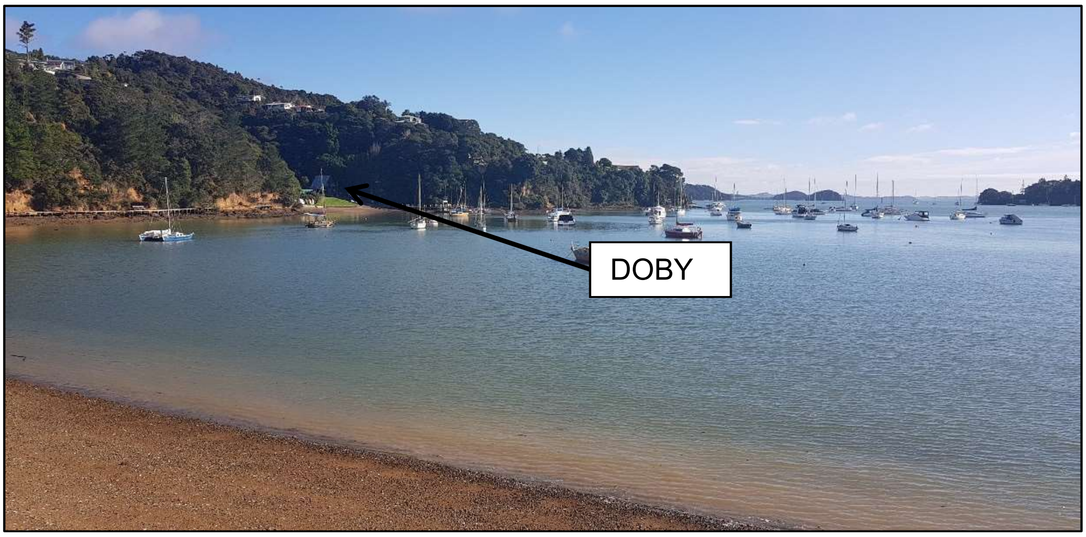

Figure 5: Photograph of Vessel position within Area A

Figure 6: Picture of a vessel being prepared for painting

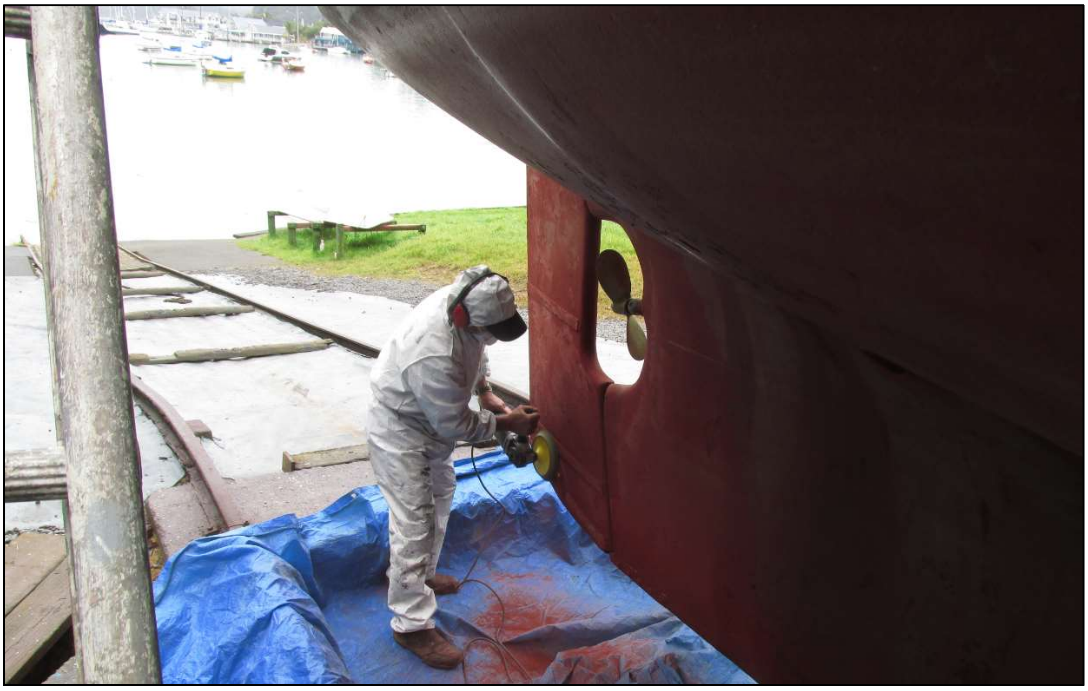

Figure 7: Particulate Monitoring Equipment (Met One Instruments Inc E-BAMs)

Figure 8: Particulate Monitoring Day 8 (19 June 2018)

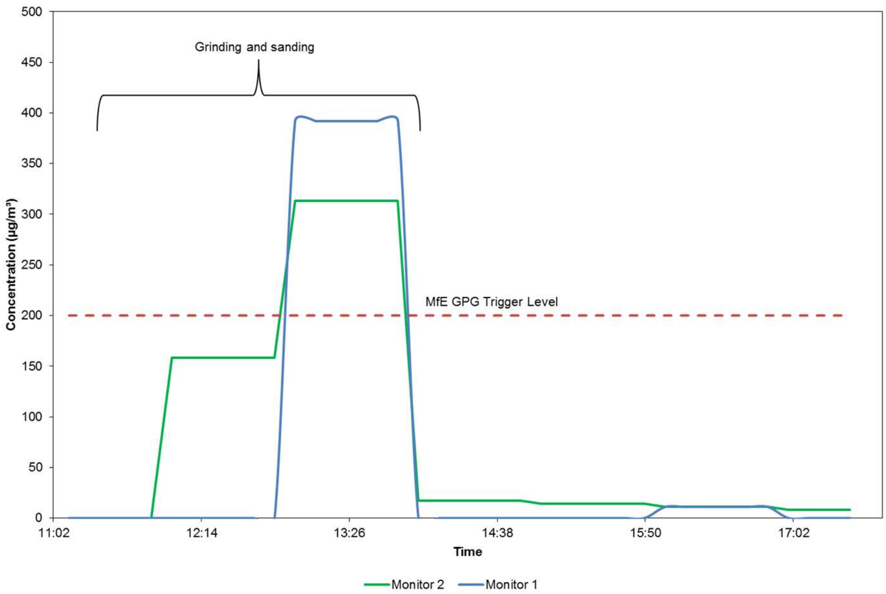

Figure 9: Photograph of water blasting undertaken on 12 June 2018