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 BRUCE BLAIK GOODCHILD

(NAVIGATION SAFETY)

24 August 2023

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INTRODUCTION

Qualifications and experience

1. My name is Bruce Blaik Goodchild.

2. I have been involved in the commercial maritime industry for 44 years, including 31 years' experience in port development research and navigation safety. I hold the following qualifications:

   (a) Master Mariner Class 1 Unlimited; and

   (b) Hydrographic Surveyor Class A.

3. I have had the role of Business and Environmental Sustainability Manager at Northport since 2019. As part of this role my responsibilities include:

   (a) Preparation and amendment of the Northport Environmental Plan and Business Sustainability Plan annually.

   (b) Completion of environmental databases on beach rubbish, sea birds and marine mammals around Northport.

   (c) Skippering on Northport workboats for navigation aid maintenance and environmental monitoring.

   (d) I have also conducted hydrographic surveying for Northport.

4. It is important to note that in my role at Northport, while I provide input and advice around issues of navigational safety, I am not primarily responsible for those matters. There are others within the organisation with this responsibility, and to whom I from time to time provide input or advice.

5. In addition to my role as an employee of Northport, I have several other responsibilities:

   (a) Since 2020 I have held the role of Deputy Harbour Master Commercial Shipping for Northland Regional Council ("NRC").

   (b) I am the Northport Manager of the Local Port Service ("LPS") which operates Whangarei Harbour Radio and provides navigation safety oversight of commercial and recreational maritime activities on Whangarei Harbour.

(c) I am the manager of the marine simulator which was installed at Northport in 2018 to facilitate port expansion, training, risk assessments and the introduction of new classes of commercial shipping into the port.

6. I am very familiar with maritime issues, including navigation safety, in the Whangarei Harbour. Examples of my experience with the Whangarei Harbour include:

(a) In 2015 I assisted Channel Infrastructure NZ Limited ("Channel Infrastructure") in relation to its channel deepening project as an independent maritime consultant and reviewed maritime safety in relation to that project.

(b) I prepared the Pilot Training Manual and Pilot Proficiency Plan for NorthTugz Limited ("NorthTugz") in 2020.

(c) I live and work on the harbour with my schooner based in Marsden Cove Marina and Taurikura Bay.

(d) I have conducted reviews for Northland Regional Council and Golden Bay Cement in relation to navigation safety matters (NRC Section 17A Review of Marine Services (2020) and GBC Review of Turning Basin Guidelines with Respect to the Portland Ship Turning Basin 2020)).

7. I am familiar with the application site and the surrounding locality. I have read the relevant parts of: the application; submissions; and the Section 42A Report.

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.

9. I have worked as an independent consultant for navigation safety with all the major stakeholders in Whangarei Harbour since 2015. I am an employee of Northport however I am also the NRC Deputy Harbourmaster working under the Regional Harbourmaster for commercial shipping in Northland. I am providing evidence as an expert based on my qualifications, my recent experience of Whangarei Harbour, and my roles in administering navigation safety across Whangarei Harbour.

SCOPE OF EVIDENCE

10. In my evidence, I

    (a) Provide an executive summary of my key conclusions;

    (b) Set out my involvement in the Project;

    (c) Summarise my assessment methodology;

    (d) Discuss navigation safety in the Whangarei Harbour;

    (e) Discuss navigation safety management at Northport, including risk control mechanisms used to manage navigation safety risk;

    (f) Respond to matters raised in the submissions;

    (g) Respond to the section 42A report; and

    (h) Comment on the proposed conditions.

EXECUTIVE SUMMARY

11. Northport proposes to expand the port footprint to the east of the current site and consented Berth 4 (the "Project"), with a focus on providing facilities for more containership traffic and car carriers. The ship sizes considered are less than 300m in length. I have reviewed the effect of the Project on navigation safety in the Whangarei Harbour.

12. Northport has a Safety Management System ("SMS") which manages navigation safety through a series of risk control mechanisms, including:

    (a) Implementation of and regular review/updating of the Dynamic Underkeel Clearance ("DUKC") system;

    (b) Use of a ship simulator;

    (c) Careful consideration of turning basin dimensions;

    (d) Operating within environmental limitations;

    (e) Appropriate use of pilots and towage;

    (f) Navigation Aids; and

(g) Local Port Service.

13. Following a comprehensive study of the Project, which included simulation studies, I concluded that the expansion will likely result in a small increase in overall shipping movements which can be managed by existing risk controls.

14. The Project will not adversely affect navigation safety, including during construction and once operational. The risk control mechanisms address the changes to shipping brought about by the Project. The existing main shipping channel has been proven to be safe for shipping vessels up to 300m, with such ships having been brought safely into Northport without materially impacting on navigation safety.

15. Recreational craft activities are considered not be materially affected by the Project with regards to navigation safety. The proposed port expansion will not negatively impact on navigation safety for commercial or recreational vessels.

16. Following review of the submissions by, and discussions and correspondence with representatives of Seafuels, BP Oil, and Channel Infrastructure, I set out a range of detailed comments in response.

17. I also set out my comments in response to the section 42A report, including to clarify that I largely concur with the recommendations made in that report and the relevant technical memo.

18. As a result of my involvement overall, including consideration of submissions and the recommendations of the Councils' officers/technical consultants, I have recommended several conditions relating to navigation safety and marine oil spill risk. I understand those recommendations have been adopted in the conditions proposed by Northport and attached to the evidence of Mr Hood. On that basis, I am satisfied that these issues are appropriately addressed, such that any potential effects around navigation safety and marine oil spill risk will be appropriately managed, and I therefore support the grant of resource consents necessary to enable the proposed port expansion.

INVOLVEMENT IN THE PROJECT

19. I have been involved in the Project since 2019 when Northport asked me to review its expansion proposal with respect to navigational safety. I prepared the Navigation Safety Report which accompanied the resource consent application.[1]

[1] Appendix 26 to the Assessment of Environmental Effects.

METHODOLOGY

20. A comprehensive study of the Project was undertaken which included simulation studies on Northport's in-house simulator. Specific navigation safety simulation studies were carried out on the Northport simulator and the Manukau Institute of Technology New Zealand Maritime School Auckland simulator between 2015 and 2022.

21. In preparing the Navigation Safety Report, the following literature on key aspects of navigation safety for the harbour was considered:

    (a) Marine Incident and Accident reports since 2000;[2]

    (b) Meteorological and hydrographic data for the harbour since 2015;

    (c) Commercial shipping data gathered by Northport since 2014;

    (d) NRC By-Laws and Harbourmaster guidance;

    (e) Northport and Portland Safety Management System;

    (f) Channel Infrastructure Port Procedures; and

    (g) NRC Whangarei Harbour Risk assessment.

22. Discussions were held with various parties including NorthTugz managers, pilots and tugmasters, the NRC Harbourmaster and Port Service Centre Staff. I also attended Harbour Safety Meetings with port operators, Maritime New Zealand and commercial shipping interests.

23. I reviewed Port Service Centre radar, automatic identification system tracked vessel data, and CCTV camera footage and have been able to draw on my own experience on the Harbour with Northport workboats, commercial ships, the Port Service Centre control station, and my own schooner, as well as my experience as Deputy Harbourmaster (Commercial).

[2] This included incident databases from Northland Regional Council, Maritime NZ, Transport Accident Incident Commission, NorthTugz and Northport Limited.

NAVIGATION SAFETY IN THE WHANGAREI HARBOUR

Existing Facilities and Channel Configuration

24. Existing facilities at Northport include three multipurpose berths with a total berth frontage of 570m, and a multipurpose jetty. These enable the handling of vessels up to 294m length overall ("LOA") and 14.2m maximum draft.[3] The Project proposes to increase the total berth length to 1090m and increase the maximum depth alongside the berths to 16m.

25. The current channel configuration between the Marsden Point and Northport fairway has a minimum depth of 14.7metres, a minimum width of 200 metres in the vicinity of Home Point and is subject to spring tidal streams of up to 3 knots. The channel has a critical turn of 40° in the vicinity of Home Point (see **Figure 1** below). For these reasons, the channel is challenging for pilotage particularly in spring ebb tides and strong winds between Home Point and buoy 16. The channel is marked by navigation buoys from the fairway buoy to the Northport berths. A PEL (Port Entry Light) Leading Light is used to define the centreline of the approach channel from fairway buoy to buoys 3 and 6. In addition there are three sets of leads located in the vicinity of Marsden Cove/One Tree Point to assist in determining cross distance off the Northport berths when approaching.

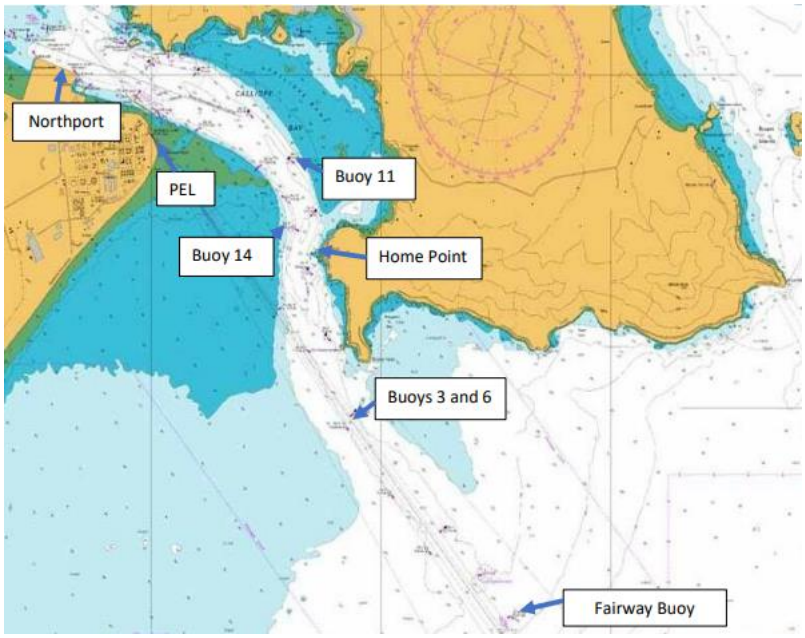

Figure 1

26. There are two recognised turning basins at Marsden Point. The first turning basin is off Channel Infrastructure Jetty 1 which has a diameter of 550m. This turning basin is

[3] See Tables 1 and 2 of the Navigation Safety Report.

sufficient for departures of ballasted Suezmax tankers of 275m LOA and drafts less than 12m. The second turning basin is east of Northport Berth 3 which has a diameter of 500m. The maximum ship length successfully swung in the Northport turning basin is 294m LOA with drafts less than 12m. The proposed port expansion to the east will reduce the effective size of this existing basin by 50m. The reduction is due to the possible presence of a ship on either Berth 4 or 5. This is not considered to materially affect navigation safety for ships up to 300m LOA.

Harbour traffic

Commercial Shipping

27. Traffic management of commercial shipping in Whangarei Harbour is currently largely managed by NorthTugz pilots (with oversight by Deputy Harbourmaster / Harbourmaster) through its Manual of Practice of Pilotage Procedures (updated 2022). There have been two vessel traffic management incidents arising from problems with passing of ships in the vicinity of Fairway Buoy ("FWB") and Pilot Boarding Ground ("PBG"). These incidents occurred while utilising a single pilot and at times during which there was a lack of available tugs. Both incidents are well documented and have resulted in improved pilot training and Harbourmaster guidelines for passing situations at the PBG.

28. Shipping numbers recorded between 2014-2022 are set out in **Table 1** below.

	2014/15	2015/16	2016/17	2017/18	2018/19	2019/2020	2020/21	2021/22
Northport	**265**	**271**	**257**	**303**	**283**	**309**	**298**	**262**
RNZ/ CI	223	221	192	202	198	220	159	146
Portland	189	185	134	62	94	60	116	114
Upper Harbour	27	23	56	19	12	12	23	12
Whangarei Harbour Total	704	700	639	586	847	952	596	534

Total movements = ship numbers x 2

Table 1

29. The current layout of the berths at Northport and Channel Infrastructure provides adequate distance between berths and sufficient ship handling space. The existing total traffic movements to Northport and Channel Infrastructure are safely handled with available tug capacity and existing operating procedures as is evidenced by a lack of reported incidents. Ship separation is achieved by time separation of planned shipping movements for Northport and Channel Infrastructure berths by North Tugz duty allocators.

30. The Project is expected to slightly increase shipping numbers. This increase is however offset against a predicted downturn in log ships of 30% and a decline in the number of tankers visiting Channel Infrastructure.[4] Therefore, there is not expected to be any significant change in the shipping numbers for Portland and Upper Harbour. Overall, there is a potential small increase in ship numbers for the next seven years for Northport.

31. Due to the reduced distance between the berths at Northport and Channel Infrastructure (i.e. resulting from the proposed reclamation) there will be a need for increased traffic management to ensure safety of navigation. Similarly, as traffic movements increase due to more available berth space at Northport, there will be a need for increased traffic management. Pilot numbers and towage capability may also need to increase to meet demands of increased traffic movements. Pilots and tugs will need to monitor the effects of any manoeuvres and respond accordingly. Effective traffic management tools are in place (LPS, Pilotage Procedures, Pilot training and proficiency programs and effective tug fleet) and will be expanded if necessary to meet future traffic management demands. While the Project is expected to result in a slight increase in future traffic, I consider that this will be appropriately managed through the traffic management tools referred to above, such that there will not be a material impact of navigational safety.

Recreational uses

32. Recreational traffic passes Northport travelling to and from Whangarei Heads but for a variety of reasons that recreational traffic generally does not anchor or stop in the vicinity of Northport. Broadly, those reasons include the presence of fishing and other recreation destinations elsewhere, deep water, significant tidal streams, and maritime security requirements (Maritime Security Act 2004 and restricted area due log fumigation from time to time). Similarly, recreational traffic avoids the area in the vicinity of the Channel Infrastructure jetties (Maritime Security Act 2004 and prohibited area due to hazardous cargo operations). Due to the presence of commercial shipping, NRC controls recreational craft movements in shipping channels through its Navigation Safety Bylaw 2017. As a risk mitigation measure, aquatic events including yachting regattas are not held in the vicinity of Northport.

33. Small craft fishing currently occurs in the commercial shipping channel and can at times represent a hazard to commercial operations using the channel. The Northport proposal will not materially change the situation here, which is predominantly managed through

[4] Refer Table 1 above and the Forme Consulting Group study into log supply, summary available here: https://www.forme.co.nz/log-supply-logistics.

the Local Port Service and Pilotage provider (both of which are discussed in more detail below).

NAVIGATION SAFETY MANAGEMENT AT NORTHPORT

34. Northport addresses navigation safety management in its Five-Year Plan. This is an internal document which allocates the budget for improvements and maintenance of key elements of the Safety Management System ("SMS"). It illustrates the high level of commitment to navigation safety by Northport. Northport work closely with NRC who have overall responsibility for navigation safety in Whangarei Harbour.

35. Northport as a port operator manages a Safety Management System and is a signatory to the NZ Port and Harbour Maritime Safety Code ("Code"). The Code is a voluntary national standard for the safe management of marine activities in ports and harbours, to support port companies, councils and Maritime New Zealand to ensure the safe management of ships navigating in New Zealand ports and harbours. NRC is also a signatory to the Code. Key elements of navigation safe management covered by the SMS and the Code include:

    (a) Pilotage and Towage;

    (b) Navigation Aids;

    (c) Hydrographic Survey and Underkeel Clearance;

    (d) Traffic Management;

    (e) Simulator; and

    (f) Review and auditing.

36. Northport has a port operator SMS which is audited annually both internally and externally.[5] The Northport SMS addresses navigation safety issues within the port operational area (being the wharves and turning basins). Navigation safety matters in the wider Whangarei Harbour (i.e. outside the port operational area) are addressed in the Northland SMS which is operated by NRC. In practice, the Northport SMS and NRC SMS are closely linked due to Northport having operational responsibility for navigation aids, traffic management, simulator, hydro survey and UKC across most of Whangarei Harbour.

[5] Navigation Safety Report, at p6.

37. Harbour Safety Meetings are held every six weeks and are attended by all the major stakeholders for navigation safety in Whangarei Harbour. These include NRC, Northport, Maritime NZ, North Tugz, Channel Infrastructure, Golden Bay Cement and Swires Shipping. Other parties can be invited to the meetings if deemed necessary (tug and barge operators, and other shipping companies).

38. The daily presence of a deputy Harbourmaster (Commercial) on site at Northport ensures both the Northport SMS and Whangarei Harbour (Northland) SMS are coordinated and meet the requirements of the New Zealand Port and Harbour Marine Safety Code.

Relevant mechanisms for assessing and managing risk

39. Management of the Whangarei Harbour has been improved over the last several years by the implementations of a LPS (Traffic Management), the establishment of an in-house simulator, ongoing and continuous risk assessments, and the presence of a Deputy Harbourmaster in the Lower Whangarei Harbour.

40. The safety management system requires a risk assessment to be undertaken to identify all significant hazards to safety of navigation. Risk assessments at Northport are presented in Hazman II, a dedicated software package. Hazman provides a cloud-based software tool for documenting navigation safety risks (hazards) and risk control measures to mitigate the risk. It is linked to an incident database to give an overall assessment for the harbour. Risks are graded by the software to facilitate adjusting control measures to keep risks as low as reasonably possible. NRC operate a spreadsheet risk assessment and incident database which is reviewed annually and is linked to the Northport Hazman II system.

41. Northport uses a range of risk control mechanisms to maintain navigation safety. I discuss each of these below.

Dynamic Underkeel Clearance System[6]

42. In 2004 Northport installed a Dynamic Underkeel Clearance ("DUKC") system, which is operated by NorthTugz. DUKC is an Aid to Navigation that manages a ship's underkeel clearance ("UKC"). UKC is the depth of water available underneath the vessel whilst it is underway, after allowing for the motions of the ship. This is particularly important in the

[6] Navigation Safety Report, at p7.

shipping channel leading into Whangarei Harbour which is a complex wave environment.[7]

43. The system at Northport includes two wave rider buoys in the vicinity of the fairway buoy and uses transmitting tide gauges so that real time measurements of tidal levels and wave data are utilised to better assess UKC for the planned transit time of the vessel.

44. Recently upgraded in 2021, the current DUKC system is Series 5. DUKC Series 5 offers greater environmental data display to the marine pilot whilst conducting the pilotage. In particular, awareness of available underkeel clearance and tidal current velocities is available on the Portable Pilotage Unit ("PPU").

45. DUKC is used to ensure that every vessel has sufficient UKC for a safe transit, considering the environmental conditions during the voyage.

Ship simulator[8]

46. In 2018 Northport installed an in-house marine simulator which is used to:

(a) Train marine pilots, tugmasters and shore vessel management operators;

(b) Undertake port design and development and provide risk assessments for navigational safety; and

(c) Review mooring line arrangements for ships berthed during periods of strong offshore winds.

47. Marine simulation is a recognised training tool by the United Nations International Maritime Organisation. The simulation software used by Northport has been benchmarked against equivalent systems operating in New Zealand and Australia which is consistent with best practice.

48. The simulator mimics the environment in which ships safely operate. Therefore, it enables thorough investigation of the response of ships to wind, wave and tidal effects making it possible to refine the procedure used by marine pilots and tug masters to effect safe movement of existing shipping in the harbour. Potential environmental issues are addressed by the simulator with the aim of preventing grounding and collision incidents from large ships.

[7] TAIC Report 3 206 2003.
[8] Navigation Safety Report, at p7-9.

49. New classes of ships to the harbour may be outside the current experience of the marine pilots and tugmasters in the harbour but are able to be modelled and tested in the simulator before they arrive. This makes it possible to develop procedures and conduct risk assessments to make safe operating conditions for these new arrivals.

Turning basin dimensions[9]

50. As discussed above at paragraph 26, there are currently two basins at Marsden Point. Simulation studies relevant to the proposed extension have been undertaken using Northport's marine simulator, as shown in **Table 2** below:

Ship Type	LOA	Beam	Draft	BASIN	Year	Status
TANKER	80	15	6	NORTHPORT	2020	Complete
CONTAINERSHIP	294	32	11	NORTHPORT	2020/21	Complete
CONTAINERSHIP	294	32	14	NORTHPORT	2022	Complete

Table 2

51. PIANC[10] sets out that the criteria for size of turning basins is 2 x LOA (length overall of the ship), which is recommended at the concept design stage for a port.[11] Experience and use of simulation prudently allows a reduction in the size of turning basins to 1.5 x LOA with tug assistance at the detailed design stage for a port.[12]

52. Northport is utilising its in house simulator and experienced consultants to determine the maximum ship size for the future turning basins based on limiting environmental conditions and towage capability. Northport used its simulator to determine that ships to 294m LOA may be safely swung in the existing basin with the existing towage capacity. Strict environmental constraints are imposed, including that ships can only enter and depart within a tidal window based around high or low water and that ships cannot transit with winders higher than 15 to 20 knots.[13] Operationally Northport is now accepting ships up to LOA 294m into Berths 2 and 3. Maximum size in the future will be determined by simulation in a similar manner and using future towage capacity and environmental limitations.

[9] Navigation Safety Report, at p5.
[10] The World Association for Waterborne Transport Infrastructure.
[11] PIANC Report No. 121-2014 pg. 97.
[12] Port Engineering Planning, Construction, Maintenance, and Security G. Tsinker pg. 714. See also https://forcetechnology.com/en/articles/turning-basin.
[13] The limits are published within the operating criteria for the port and the pilotage procedures and cannot be changed without the approval of the Harbourmaster. These limits are strictly enforced and based around risk assessments.

Environmental limitations[14]

53. Northport shipping is subject to environmental limitations of tide and wind. The greatest limitation for Northport shipping is deep ships with drafts greater than 13m. The movement of these ships is currently restricted to one hour before high tide only.

54. With regards to wind, indicative maximum wind strength for standard ship handling is 30 knots mean wide strength from any direction. For high-sided vessels indicative maximum wind strength is 20 knots wind speed from all directions.

55. The limitations of maximum wind strength and tidal limitations have been determined by simulation and practical ship experience with the existing towage capacity. The limitations are included in the standard operating procedures for North Tugz Pilotage.[15] Safeguards are included such as need for operational bow thruster and standby additional tug for the largest ships.

Pilotage and towage[16]

56. Pilot and towage services are provided by NorthTugz. Escort towage is undertaken in the main shipping channel. The current available bollard pull of the tugs has proven adequate for Northport shipping operations to date.

57. As the existing towage fleet ages there is a need to replace existing tugs. Overall towage capacity must continue to be able to safely handle the future largest and deeper ships off the berths and in the turning basins. Escort towage capability is in place now to protect the inner shipping channel.[17] Future larger deeper ships may necessitate greater escort capability of the future tugs.

58. Northport has developed a risk management strategy for navigation safety in consultation with NRC. That risk management strategy is robust and well defined through the Safety Management Systems. It has proven itself resilient and adaptive to future shipping needs as evidenced by the development of large containership movements within the Whangarei Harbour. Critical systems already exist with the SMS to ensure safety of navigation for Northport and Whangarei Harbour. Annual hydrographic survey, DUKC, Local Port Service, Navigation aids and inhouse simulation are well established.

[14] Navigation Safety Report, at 10-11.
[15] Manual of Practices for Pilotage Operations Rev 10 2022.
[16] Navigation Safety Report, at 11-13.
[17] Manual of Practices for Pilotage Operations Rev 10 2022.

RESPONSE TO SUBMISSIONS RAISED

59. Four submitters raised concerns in relation to navigation safety:

(a) Kylie Mitchel (noting these concerns are very broadly stated);[18]

(b) Seafuels Limited ("Seafuels");[19]

(c) BP Oil New Zealand Limited ("BP");[20] and

(d) Channel Infrastructure.[21]

60. Northport has engaged with the latter three submitters listed and with NorthTugz[22] to better understand, and be able to respond to, their concerns. Through this further engagement,[23] several points of clarification/questions have been identified, which I respond to below.

Point 1: *Recognise potential for sedimentation/erosion in channel/turning basin/berths and note that this will need to be addressed.*

61. As assessment of coastal processes ("Coastal Processes Assessment") has been undertaken and is attached to the Application.[24] The Coastal Processes Assessment[25] and the evidence of Mr Reinen-Hamill comment on the historical occurrences of, and potential for sedimentation/erosion to occur in future.

62. With regards to navigation safety, the procedures for monitoring and responding to erosion/accretion include annual hydrographic surveys which are undertaken through the lower harbour area, including the southern side of the harbour in the vicinity of the Channel Infrastructure jetties (noting that those structures are approximately 60 years old) and Mair Bank.[26] The latest survey information is assessed and then 'fed' into the DUKC system to verify the deepest draft permissible to allow transit of any ship. The

[18] Submission number 183.
[19] Submission number 159.
[20] Submission number 205.
[21] Submission number 207.
[22] NorthTugz also filed a submission on the Application, however I do not understand them to have raised any navigation safety issues.
[23] Including in a series of correspondence and direct discussions occurring in early-mid 2023. For further details of the consultation undertaken by Northport, please refer to the evidence of Mr Blomfield.
[24] Appendix 10 to the AEE.
[25] Sections 4 and 5.
[26] Additional surveys have been undertaken in cases where there is evidence of accretion in the channel. For example, in March 2021 (accretion 0.5m) and, more recently, following Cyclone Gabrielle in February 2023.

DUKC system takes various matters into account, including ship type, predicted wave action, stability of the ship and speed of the ship.[27]

63. Based on my personal observations, accretion has been a slow process in the vicinity of the Northport turning basin and Channel Infrastructure berths. It has been managed by controlling the nominated least depth in the DUKC system (as broadly described above) and through a maintenance dredging campaign in 2019. When it does occur, accretion has tended to occur in places where ships are following a straight-line path with tug assistance, when speed can be carefully controlled. An example is at the Whangarei Harbour bar, west of the fairway buoy. This area is subject to significant wave action and any shallowing of the bar is monitored and allowed for in the DUKC system.

Point 2: *What is the potential for changes in hydrodynamics/hydrography to impact on arrivals/departures to all three jetties (note potential eddy around Jetty 3). What work has been done or needs to be done to assess any potential effects?*

64. I acknowledge that coastal processes are dynamic and that there is the potential for changes to hydrodynamics in future. For example, ebb tidal streams are expected to be stronger due to presence of more fresh water in the harbour from rain and there is evidence of the effect of the ebb tide (springs) in deep draft arrivals at Channel Infrastructure Jetty 2.

65. Changes in hydrodynamics are discussed in the Coastal Processes Assessment[28] and in the evidence of Mr Reinen-Hamill. This analysis has informed the understanding of likely changes to hydrodynamics and resulted in an iterative assessment by commissioning new tidal stream studies for the lower and upper harbour in 2021. The marine simulator was then updated with data from these additional studies in July 2021. Preliminary work has identified the need for further hydrodynamic modelling in the vicinity of Northport and Channel Infrastructure to fully develop the tidal stream database to inform the construction of Berths 4 and 5 and the dredging program. That work has been completed and does not pose any issue for the grant of these resource consents.

66. Current procedures allow for full tidal range arrivals, however there is a process for reviewing and updating procedures through the SMS, and Harbour Safety meetings, with information being passed onto pilots. Such updates may include modifications to tugs and changes to their configurations for berthing. A similar approach will be used to respond to potential future physical changes in the harbour.

[27] It is noted that there have been no grounding incidents since the DUKC system was fully installed in 2003.
[28] Section 5.

67. Additionally, maintenance dredging and/or reinforcement of structures can be used, where necessary and appropriate, to manage future changes to hydrodynamics.

Point 3: *Is there expected to be an increase in shipping numbers over time and how does this impact shipping risk?*

68. As set out above at my paragraphs 27 - 33, there will potentially be a small increase in shipping numbers in the future, which may require increased traffic management. Risks associated with increased shipping traffic are managed through:

(a) the SMS (with annual external auditing);

(b) monitoring shipping movements via LPS and dedicated software (Transit Analyst); and

(c) maintaining an up-to-date risk assessment and incident database, whereby traffic management issues are recorded in the incident database and addressed at Harbour Safety Meetings and pilot meetings.

69. It is my considered view that any increased risk from additional shipping numbers will be safely managed by the systems in place.

Point 4: *Will there be an increase in deeper draft shipping over time and will this result in future congestion and how will this be managed?*

70. Future trends in shipping indicate the maximum draft of ships transiting Whangarei Harbour will be less than 14.5m. Northport anticipates 300m containerships will visit the port, with operational drafts of considerably less than 14.5m.

71. Since 2021 Northport has safely accepted ships to LOA 294m with drafts less than 14.0m. These have been managed through individual risk assessments (including simulation).

72. The DUKC system allows for the maximisation of the tidal window for deep draft ships, which should result in reduction of possible congestion.[29] Additionally, the SMS will be able to manage the safe transit of ships.

[29] For example, when the port reopened following Cyclone Gabrielle, the use of the DUKC system opened up the available tidal window for deep draft tankers.

Point 5: *Will there be any greater risk to Channel Infrastructure's berths due to arrivals/departures of future Northport shipping, for example due to closer proximity of Berth 5 or changes to Northport turning basin, including considering emergency scenarios*

73. Berth 5 will be physically closer to Northport's facilities than the existing port structures. The effects of this have been carefully considered and modelled, including to consider emergency management scenarios.

74. For the very largest ships in the future, the simulation has focused only on using the Northport turning basin. The larger ships are restricted to high-water arrivals and departures, with wind speeds below 15 knots steady, and using the Northport turning basin, well clear of Channel Infrastructure berths. In my opinion, these are appropriate and realistic limitations and have been tested in the Northport simulator (SimStudy 2022005 Berth 4 5 Turning Basin Swings).

75. Emergency simulations have already been undertaken (arrivals and departures) and tug escorting.

76. Safety has been a paramount consideration for Northport and any increase in the risk to Channel Infrastructure berths (including due to closer proximity of Berth 5) can be appropriately managed by increasing towage capacity and pilots, and by controlling environmental conditions. Therefore, it is considered there are no fundamental safety issues arising from the Proposal.

77. Simulations will need to be repeated at the detailed design stage, including to account for (then) current environmental and practical conditions (such as availability of tugs). Additional simulation will also be required at the final design phase using full mission simulation. In my view this is an appropriate approach to matters of detailed design and should not preclude the grant of resource consents based on known information.

Point 6: *Will there be more constraints on shipping movements to/from Channel Infrastructure jetties (e.g. due to shipping congestion, proximity constraints around Jetty 3), and noting that there could be increased demand and tighter schedules for Jetty 3 in future?*

78. The increased proximity between Northport and Channel Infrastructure facilities may require increased traffic management, including greater towage capacity and pilot numbers. However, there is not expected to be a significant increase in the number of shipping movements.

79. Northport has followed PIANC guidelines for the concept design of the maneuvering space between the proposed Berth 5 and Channel Infrastructure Jetty 3. A new vessel

into the Channel Infrastructure Jetty 3 will likely have some constraints, if it is less maneuverable or significantly larger than the existing vessel. It may require tugs more frequently (and/or increased towage capacity) to meet environmental limitations. Additional simulation (including on different simulators) to account for a new vessel will be required.[30] This is the established practice of the Safety Management Committee for testing constraints for all new vessels coming into Whangarei Harbour.

Point 7: *Will there be any congestion/constraints during construction and if so how will this be managed?*

80. I expect there will at times be practical constraints during dredging and construction of the reclamation and wharf structure for Berth 5. Any constraints will be managed through Harbour Safety Meetings, briefings, use of the SMS, a Harbour Safety Plan, and simulation during the various stages of construction.

81. Northport has previous experience managing vessel movements, including during maintenance dredging in 2019 and recent Geotech surveys with requirements for lighting and AIS. The construction phase for the extension of Berth 3 / New Berth 4 is expected to have minimal impact on Channel Infrastructure ships but will serve as a useful indicator of potential issues which have to be managed for other phases of construction.

82. If necessary, there are practical construction mitigation measures available, such as halting activity to enable tanker movements or providing temporary alternative berth arrangements at either Northport or Channel Infrastructure Jetties 1 and 2.

Point 8: *What are the strengths and weaknesses of the Northport simulator and how does it compare with alternatives?*

83. Northport's simulator is DNV GL[31] approved software, suitable for concept design phase work, pilot training and emergency response training. The simulation software[32] has been benchmarked against equivalent systems operating in New Zealand and Australia,[33] consistent with best practice. I consider it to be appropriate for the intended purpose.

84. The in-house simulator is not a full mission simulator as it has limited horizontal field of view (HFOV) vision to 200°. Northport acknowledges that additional simulation[34] using a

[30] And is considered in the Northport Five-Year Plan.
[31] The world leader in maritime risk assessment and certification.
[32] Supplied by Be-Software SRL of Italy.
[33] Including Smartships and MIT.
[34] Additional simulation has been undertaken with Seafuels and Channel Infrastructure in attendance using Northport's simulator. A first round of further simulation has been undertake on a full mission bridge simulator in Auckland in August 2023 to test ship model fidelity.

different mathematical model will be necessary at the final design phase.[35] Ideally, that simulation will be undertaken on a full mission simulator, or peer reviewed using a full mission simulator.

Point 9: *Has the modelled data used in the simulation changed since the Jetty 3 simulation was performed?*

85. Modelled data is updated as required for bathymetry, environmental effects and hydrodynamics for ships and tugs. Bathymetry is updated regularly based on an annual survey. Tidal stream data is updated approximately every two years as new tidal stream models become available. The latest tidal stream data update was in 2021, as described in paragraph 65 above.

Point 10: *Was the modelled Awanuia simulation validated by Seafuels to confirm its representative performance?*

86. The Awanuia simulation was appropriately validated by a serving pilot of Awanuia and recent ex-master of the Awanuia. Model data was provided by Seafuels. Northport gave notice of the simulation in a timely manner for Channel Infrastructure and Seafuels staff to participate.[36]

Point 11: *Previous Awanuia simulation may not be representative of future shipping to Jetty 3 (Awanuia has high level of maneuverability with azimuth thrusters, future shipping may be of a more conventional design and be of a different size)?*

87. Simulation of the Awanuia replacement can be undertaken on a range of simulators at an appropriate time, likely at the time of detailed design for Berth 5. In the meantime, Northport is unable to advance this query further unless and until model data for the Awanuia replacement is provided to it.

Point 12: *To what degree has simulation considered appropriate weather and tidal conditions, including potential changes to weather and tides over the next 20 years and changes to hydrography due to construction of the new wharves?*

88. The simulation is comprehensive in that it considers likely future changes in weather patterns, bathymetry, and hydro dynamics. For example, it is expected that ebb tides can be stronger due to the increased rain in the harbour area, and that winds will predominate more from the east. This has been evidenced by incidents and information provided by

[35] This is identified in Northport's Five-Year Plan.
[36] Minutes of Harbour Safety Meeting, dated 11/9/2020.

pilots and Harbourmaster since 2015, and is supported by existing hydrodynamic modelling.[37] There is also expected to be an increased likelihood of cyclonic activity. Specific high impact effects such as thunderstorms have been simulated. Consideration has been given to modelling tsunami for mooring line analysis and mooring line studies have been undertaken for differing weather conditions (including cyclones).

89. Simulation is carried out at spring tidal conditions always, but neap values are also available. Within the simulation it is possible to quickly change dredged depths, channel banks and navigation marks. It is also possible to modify the directions and rates of tidal streams to simulate increases/decreases in tidal velocity.

90. Tidal models have been updated since 2015 and will continue to be updated as Northport moves to a final construction phase. Bathymetry is also updated based on the latest annual hydrographic survey data, and the DUKC system has been updated in line with latest survey data.

91. Simulation data is validated against PPU information and Automatic Identification Track System track plots from the Local Port Service. Further simulation will be undertaken at the final construction stage. Northport is obtaining software to develop real track envelopes in addition to simulated envelopes for the final construction phase. Northport will acquire a current meter as part of existing environmental modelling and to verify future trends in ebb tides after heavy rain events.

Point 13: *To what degree has tug assistance been considered to support Jetty 3 ship movements due to weather, tidal or emergency situations.*

92. Tug assistance has been considered regarding Jetty 3 ship movements. A tug was available for use but was ultimately not considered necessary for these movements. The simulation report shows the size of a Damen 24/11 tug at the proposed tug jetty for purposes of scale for the available maneuvering space. It was considered that there was sufficient space for a small tug to operate in support of an 80m tanker. The space met PIANC guidelines for maneuvering space.

93. Two emergency scenarios were offered in the simulation report, and a range of tidal and wind conditions. For a concept design simulation, 15 runs were executed which meets PIANC requirements. The simulation report identified the need for further tidal information to be available for future simulation but was adequate at the concept design

[37] MetOcean Solutions Hydrodynamic Modelling Additional Output Locations April 2023 MOS PO519-13.

phase. A larger ship which is less maneuverable will require further simulation with the updated tidal stream models at the final design phase.

94. Further, appropriate tugs will have to be simulated for the final construction phase. Northport recognises the need at the detailed design/construction phase to undertake simulation on two different simulation systems, including one simulation to be done on a full mission bridge using the latest updated tidal models, updated bathymetry, latest Seafuels design ship and latest available tug models.

Point 14: *Would more tug usage be required at Jetty 3 in the future given the proximity and/or changing hydrodynamic constraints?*

95. Additional tug assistance is not expected to be required if the proposed replacement vessel meets (or exceeds) the accepted maneuverability standard of Awanuia.[38] As part of the SMS for Whangarei Harbour, any replacement vessel will need to be modelled and simulated in the existing conditions of berths.

96. It is intended that, as part of the final detailed design phase a replacement vessel will be modelled going into the proposed Northport Berth 5 and the proposed tug jetty under the latest hydrodynamic information. While not anticipated, it may be possible at that time that Northport is required to mitigate against the loss of maneuverability space. Various options exist to do so, including by reconfiguring the Berth 5 tug facility, or through supporting alternative sites for Seafuels (either at Channel Infrastructure or Northport).

Point 15: *Need to better understand any proposed mitigations (e.g. new leads to support Jetty 3 operations), and are these being proposed as conditions of consent?*

97. Potential mitigation measures (which may be incorporated into consent conditions) include new leads for Berth 3, additional tidal modelling in the area, and increased fendering. Similarly, once the Seafuels/Channel Infrastructure/BP ship design is determined, simulation in the final design phase would also form part of the mitigation.[39] This would include simulations on two different simulation systems with associated modelling and project costs.

[38] There will be a minimum acceptable standard of manoeuvrability for Northland Regional Council to accept the vessel into the harbour using Jetty 3.
[39] I note that an initial simulation has been undertaken with a Seafuels design vessel.

Point 16: *Need to better understand how any changes to the tug berth design may impact Jetty 3 operations and any current effects assessments?*

98. Northport's proposed tug berth design is at a concept level. Final design and placement will be subject to future simulation and navigation safety for Channel Infrastructure Jetty 3.

99. While I do not anticipate such an outcome, if in the final design of Berth 5, Northport is unable to achieve an acceptable tug berth design at the current proposed location, then it will proceed to examine possible alternative locations for the tug berth.

Point 17: *Are any changes to the LPS service (Vessel Traffic Service is mentioned in the Navigation Safety Report) predicted?*

100. The Northport LPS is manned and equipped by Northport. Staff have been trained to international standards[40] for an LPS. The LPS is currently overseen by me in my capacity as the NRC Deputy Harbourmaster for traffic management and shipping information services.

101. The LPS could be further extended to a Vessel Traffic Service ("VTS") if a risk assessment found that the predicted shipping movements and environmental risks warranted such action. VTS is not currently available in New Zealand, and it is not considered necessary with the predicted level of ship movements for expansion to Berth 4 and 5.[41]

Point 18: *Discuss overall risk assessment in consideration of above and the conclusion that the proposal will not negatively impact on navigational safety (has Northport considered an independent assessment of risk)?*

102. In my opinion, Northport has conducted an appropriate overall risk assessment at the concept design phase of the Project. This risk assessment was scoped appropriately given the detail available, accounted for the safeguards and mitigations proposed by Northport, and concluded that there will not be a negative impact on navigation.

103. Northport acknowledges that a final design consultation and risk assessment (including a review of towage requirements) will be required at the final design phase before any construction or dredging occurs. Further rounds of simulation on differing simulation systems will take place closer to that time. At that stage, the latest bathymetric data and

[40] International Association of Marine Aids to Navigation and Lighthouse Authorities.
[41] Northport continues to review whether VTS is necessary.

hydrodynamic data will be available, and the design ship for Seafuels/Channel Infrastructure/BP is likely to be established – enabling specific consideration of the safety case for that vessel.

104. As for current operations, Northport will continue in future to manage navigation safety under its SMS and utilising existing risk control mechanisms. Additionally, NRC manages navigation safety in the harbour through its SMS. Both Northport and NRC undertake regular risk assessments which are reviewed both internally and externally. Risks are communicated to stakeholders through the regular Harbour Safety Meetings, including identification of any new risks. These processes will be unchanged by the proposed development for which resource consents are being sought.

RESPONSE TO THE SECTION 42A REPORT

105. I have read and considered the s42A report provided by Council, including the technical memo prepared by Stantec attached as Appendix C6. While many of the issues raised are traversed earlier in my evidence, I make the following comments in response.

Navigation safety

106. It is my experience that Northport takes its various responsibilities to ensure maritime safety extremely seriously. Northport has evaluated passing ship effects on moored vessels in simulations conducted since 2018. Active monitoring of passing ships' speeds by the Local Port Service has been undertaken and continues to be audited by Northport as part of the SMS and is recorded in the Hazman incident database. There have been no incidents resulting in surges on ships' mooring lines because of passing ships at either the Northport or Channel Infrastructure berths. This is largely due to passing ships' tracks being kept well clear of berths,[42] the need for ships to decelerate prior to berthing, and pilots controlling ships' speed on departures. Pilot passage plans reflect appropriate ships' courses and speed to prevent interaction with moored ships. Northport has recently installed a transit analyst system to provide additional monitoring of passing ship speeds and actual tracks for all harbour stakeholders.

107. Northport acknowledges the requirement for management of potential recreational craft conflict with commercial shipping. Northport is an active participant in Harbour Safety meetings which are chaired by the NRC Harbourmaster. The operational management of recreational craft conflicts is managed through the NRC with support of the Harbour Safety Group. This group has been active in extending the capability of pilot boats (by

[42] Navigation aids are provided by Northport to keep shipping well clear of berths.

installing a siren on the pilot boat to help clear recreational craft from the channel) and escort craft (future)[43] to manage these conflicts. Northport participates by keeping a database of recreational craft conflicts, providing operational support to Pilot boats and future escort craft and providing the Local Port Service through Whangarei Harbour Radio to issue navigational warnings for both commercial and recreational users of the harbour.

Requirement for Full Mission Bridge Simulation (FMBS)

108. I concur with the recommendations by Stantec with respect to requirements for FMBS, and relevant independent stakeholder involvement in that simulation. Northport has acknowledged the requirement for FMBS in its Five-Year Plan for Navigation Safety (2022) prior to the construction phase of this project. Northport has already evaluated simulation systems (2016-2023) for FMBS in both Auckland and Brisbane to conduct additional simulation.

Design of tug berths

109. I support a condition that requires final design and placement of the tug pens to be subject to further simulation, including to ensure that they remain safely clear of the small tanker simulated track envelopes for Channel Infrastructure Jetty 3 and public access for the water taxi area. Northport's proposed tug berth design is at a concept level, with tug pen designs being tested in relation to Northport's Berth 3 extension. Simulations have been conducted with respect to the likely impact of the tug pens on maneuvering space for small tankers utilising Channel Infrastructure Jetty 3. Tanker designs tested cover existing ships and a proposed new design of ship. Simulation has established the track envelopes of small tankers moving into and out of the Channel Infrastructure Jetty 3. It is acknowledged that the future pens should not restrict maneuvers for the small tankers and public access to the water taxi area.

103. Results of further simulation of the proposed final design and placement of the tug pens with respect to Channel Infrastructure Jetty 3 and public access for the water taxi area will be subject to review through the established Harbour Safety meetings. Relevant stakeholders, including NRC and Channel Infrastructure, are represented at these meetings.

[43] NRC has discussed the possibility of acquiring an extra boat to be moored at Northport and manned by NRC and IWI to provide additional patrol and escort capability for the Lower Whangarei Harbour. It has achieved broad support from the Harbour Safety Group and is being actively investigated.

Marine oil spill risk

110. I concur with the recommendations by Stantec to ensure an updated marine oil spill risk assessment prior to construction. I understand a condition to address this is to be proposed by Northport, as discussed below. By way of further explanation, oil spill risk assessments are conducted every four years to update the Northland Oil Spill Response Plan. Northport is not required to have a Tier 1 response plan as it has no oil tanker facilities or bunkering facilities, however Northport actively provides support for a Tier 2 and Tier 3 oil spill. Northport currently provides regional oil responders, senior responders and a regional on scene commander (ROSC). Future port expansion will not materially affect these response plans, but they will be updated prior to any construction to reflect shipping and cargo using the existing and future berths.

COMMENT ON DRAFT PROPOSED CONDITIONS ADVANCED BY NORTHPORT

111. I have made several recommendations around conditions, as described earlier in my evidence, and my understanding is that these have been adopted by Northport. I therefore endorse the conditions proposed by Northport and attached to the evidence of Mr Hood, insofar as they relate to matters of navigation safety and oil spill risk.

Bruce Goodchild
Northport Limited

24 August 2023