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 Act 1991 for a port expansion project at Marsden Point
APPLICATION NO.	APP.005055.38.01 LU2200107

STATEMENT OF EVIDENCE OF CRAIG JONATHAN DAVIS

8 SEPTEMBER 2023

INTRODUCTION

Qualifications and Experience

1. My name is Craig Jonathan Davis.

2. I am the Principal Coastal Engineer of Davis Coastal Consultants, a Chartered Professional Engineer and a Member of Engineering New Zealand. I have more than 40 years' experience as an engineer with over 20 years of that being as a consulting Coastal Engineer for Davis Coastal Consultants Limited, which I founded in 2002.

3. I hold a Bachelor of Engineering from Canterbury University.

Involvement

4. I have been engaged by submitters Marsden Cove Limited (Submitter 165) and Marsden Cove Canals Management Limited (Submitter 179) to the Northport Limited port expansion application to provide assessment of the potential effects on the coastal processes of the proposal that may affect the submitters.

5. I am familiar with the application site and environs and have visited the site over low and high tide.

6. I have read Appendix 10 and the Coastal Process Assessment, Dr Christo Rautenbach's NIWA Review of the Modelling, Dr Phillip Treloar's Technical Memo-Coastal Processes, Richard Reinen-Hamill's evidence dated 24 August 2023.

Code of Conduct

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

SCOPE OF EVIDENCE

8. My evidence will address potential effects to the west of the Port, in particular in association with the proposed Bird Roost and highlight gaps in the assessment of effects in this area.
9. The proposal is set out within the Application and various other documentation and there is largely no value in reiterating it here.
10. However, the Bird Roost part of the proposal has been characterised poorly in the Application from a Coastal Process and possibly an extent of work perspectives.
11. The roost comprises placing a sand bank structure with intended side slope of 1:4 (landward) and 1:8 (seaward) in an area of seabed currently sloping at approximately 1:250.
12. It will further involve the ongoing deposition of an undefined volume of sand in perpetuity at this location.
13. It is accepted in the CPA that sediment will be transported from this location but the nature of this transport has not been assessed or defined.
14. Effectively the proposal is for a new sediment source of indeterminate volume to be placed in Marsden Cove to be reworked in a manner that has yet to be assessed.
15. In Mr Reinen-Hamill's evidence (para45) he advises that "*some mooring blocks or piles*" may be required to keep the barge at the site. If such structures are part of the proposal, or a necessary for the proposal to be feasible, these items should be detailed and assessed within the Application. I have assumed these are not within the application and therefore have not commented further.

LIMITS OF COASTAL PROCESS ASSESSMENT

16. The Coastal Process Assessment (CPA) and indeed the large majority of the modelling appears to have been undertaken without consideration of the Bird Roost Feature. The feature may have been added as a mitigation relatively late in the Application process.
17. I have not reviewed the modelling and only seen outputs presented in the CPA and NIWA Review. However, it appears from the figures within the CPA that the modelling does not include the Bird Roost.
18. This is consistent with the comments within the NIWA review of these reports (Para 6.2) which highlights that in regard to Marsden Bay "*there seems to be no wave climate and shoreline sediment transport modelling…*" and further that "*T+T and MOS do not*

appear to have thoroughly assessed the effects of the proposed bird roost on the Marsden Bay, Marina Entrance Channel and Blacksmith Creek."

19. The CPA focusses on the tidal current regime and changes to Bathymetry and large-scale sediment dynamics which is appropriate for consideration of the large-scale reclamation and dredging portions of the proposal.
20. The potential effects of the initial, and ongoing subsequent deposition, of sediment within the harbour for the Bird Roost are poorly captured by this work.
21. The wind wave climate is likely to be a primary mechanism of mobilising this sediment. While a wave climate is derived in the CPA, the effect of this on the sandbank is not assessed in any detail. Mr Reinen-Hamill (75) asserts that sand will move landward in the direction of the incident waves and I agree that this will often be the case.
22. Sediment moving landward will interact with Blacksmiths Creek and this interaction has not been assessed.
23. Potentially, the key mechanism for transport of this sediment is initial mobilisation by wind waves and then transport by the adjacent tidal currents. On flood tides, this could readily lead to transport from the sediment source directly west to both the outlet channel of Blacksmiths Creek and the Marsden Cove outlet channel.
24. There is no assessment of this combined transport mechanism.
25. The current modelling was undertaken without the Roost and it is unclear if the resolution of the current model is such that the localised effects of eddies at the western edge of the current port face would interact with the roost. The Roost is at the boundary of the model and it appears to be assumed that there are no currents across the boundary. This modelling still represents the best estimates available for currents in this area.
26. The CPA notes tidal currents of 1m/s at Marsden Point and, from Figure 3.11 B, these appear to be about 0.2m/s in the relevant location. Mr Reinen-Hamill asserts in his evidence (Para74) that the currents are 0.05-0.25 m/s. The Hjulstrom curve (Figure 1) is a basic tool for assessing sediment transport and shows that the 0.05m/s current is sufficient to transport Sand such as found east of the Port (D_{50} of 0.2mm). Current speeds as low as 0.25 m/s are sufficient to actively erode it.
27. Where sediment does move directly landward this will lead to changes of the foreshore and potential effects on the ecosystems inland of the roost which have not been assessed.
28. Sediment moving landward will tend to fill the channel of the Blacksmiths Creek and may serve to push this landward. The Creek may become blocked more often, at periods of low flow, leading to backshore inundation issues after large rainfall events.

29. From the information I have viewed, there has not been an assessment of the sediment size within the deposition area. This is very likely to be similar to the material assessed east of the Port but should be completed before defining the source. Initial testing will provide a known base line for comparison with post deposition monitoring data.

30. The source of sediment for the roost has not been defined. It is suggested that Sediment could be sourced from the dredging and/or from east of the existing Port. However, only 14% of the dredged material will be suitable and this material will require reprocessing. If this is anticipated for replenishment deposition, the nature of the reprocessing including an area for this to occur should be defined and assessed. Processing is assumed to comprise removing fines from the sand which is a task that requires a relatively large area and has a risk of fine sediment laden water being discharged unless carefully controlled.

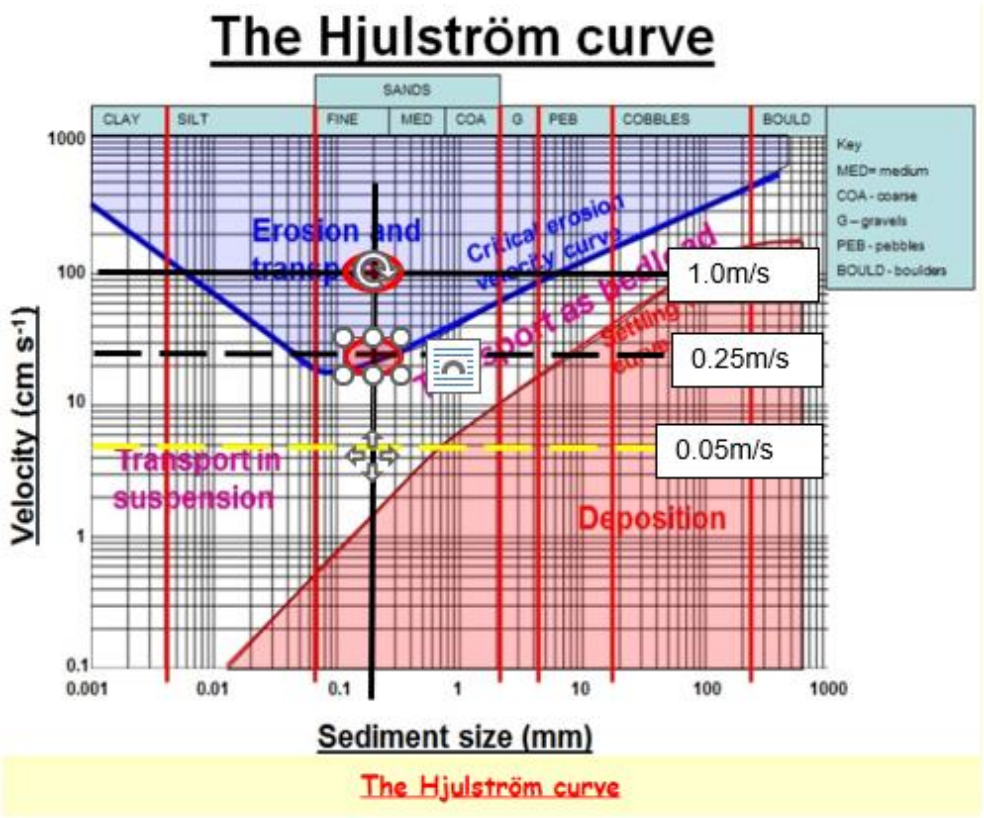

Figure1 -Hjulstorm Curve (Showing currents can erode and transport Roost)

31. While for the capital works, areas of the proposed reclamation may be available for processing dredged material this is unlikely to be the case for future dredging.

32. Material from the Reclamation area is also proposed as an option for a source. There appears to be a timing issue with this. It is proposed to building the bird Roost prior to

disturbing roosting at the reclamation. Again, this is not a source for future replenishment so a source is required.

POTENTIAL ADVERSE EFFECTS OF BIRD ROOST

33. The primary risk of placing sediment at the Bird Roost is for the sediment to move to areas where it either
    a) Impacts on local biota or
    b) Disrupts the flow or channel direction of the Marsen Cove channel or the Blacksmiths Creek.
34. The addition of sediment for the Bird Roost Bay is acknowledged within the CPA (5.3.2) to lead to sedimentation within Marsden Bay. No assessment has been made of the likely volumes or rates of transport. We recommend this is done and limits are put on the volume and frequency of replenishment of the roost. Limiting the replenishment of the roost may lead to it rapidly becoming ineffective if transport or reworking is rapid.
35. Potentially Shellfish beds could become inundated with sand, or fines if sediment used is not adequately processed. Shellfish could also be potentially affected if the sediment used carried contaminants.
36. Marsden Cove Limited are required to monitor cockle and other shellfish numbers within the Bay as a condition of their Consent. If placement of the Bird Roost leads to negative effects on shellfish in Marsden Cove it could be suggested by the Council that this is a result of activities at Marsden Cove and not the Port. Careful delineation by monitoring would be required to determine the cause of future sedimentation.
37. Diversion or filling of Blacksmiths Creek will result from sand moving inland, south, or west from the Bird Roost. Prior to the Port, Blacksmiths Creek discharged shore perpendicular (refer Figure 3.13 CPA). In recent times, following stream training works prior to 2010, the creek has tended to wander south and threaten to join the outlet of Marsden Cove Channel. This leads to deposition within the channel. Marsen Cove Limited have Consent to realign Blacksmiths Creek outlet but the requirement for this may become more frequent with ongoing deposition within the Bay.
38. Westward transport of sand mobilised by wave energy or eddies from the Port during a flood tide may directly lead to deposition within or adjacent to the Marsden Cove Channel, requiring additional dredging by Marsden Cove Limited.
39. The effects of additional structures, "*moorings and piles*" required to allow the construction and replenishment of the Roost, can not be assessed as these have not been specified.

40. As the source of sediment has not been defined the sedimentation of the Bay may lead to an increase in contaminants and the impact of these on shellfish. This would appear unlikely, however, would be more assured with a defined sediment source and needs to be considered for the monitoring.

MONITORING AND MITIGATION

41. Mitigation proposed within the CPA is comprised entirely of monitoring, no active mitigation is contemplated.
42. With regards to the Marsden Bay area, there is no definition of what will comprise negative or positive monitoring results, or possible actions if monitoring shows unacceptable outcomes.
43. The potential effects all stem from sediment moving from the Roost. The effects of this should be considered and trigger points established with resulting actions if negative effects occur. It would appear that the only actions available in the event negative effects occur is to;
    a) cease replenishing the roost an/or remove it; or
    b) armour or contain the roost.
44. If the roost is removed, or not replenished leading to its disappearance, it is questionable whether it forms a valid mitigation for the subject Consent.
45. If the roost is to be armoured then this should be assessed and Consented now. Otherwise, the remedial work for this Proposal will require a future Consent that may or may not be granted.

PROPOSALS TO ADDRESS CONCERNS

46. Analysis is required of the likely retention time of sand at the roost including assessing the rate and mechanism of dispersal into the wider Bay and the replenishment required.
47. An analysis of the performance of the Roost under combined wave and current actions.
48. A source of sediment including a grain size distribution should be confirmed including comparison to sediment within Marsden Bay.
49. Confirmation is required that no structures including mooring blocks or piles associated with constructing the roost are planned within Marsden Bay.
50. Prior to Consent being issued, assessment should be made of the potential adverse effects monitoring may reveal and actions defined that would be taken if adverse

effects occur. A monitoring plan should then be derived with trigger levels for the relevant actions.

51. It is likely that analysis will show that the deposited sand will tend to divert Blacksmiths Creek and fill the area of current cockle population. If that is the case armouring of at least the seaward edge should be considered.
52. For an armoured Bird Roost alternative locations within Marsden Cove should be considered. In particular a roost between the Marsden Cove Channel and Blacksmiths Creek outlet channel would also address issues with the wander of the Blacksmith's Creek outlet. This would need investigation to ascertain the efficacy.

DRAFT CONDITIONS OF CONSENT

53. I have reviewed the recommended conditions of consent dated 25 August 2023.
54. The proposed monitoring conditions should include remedial actions that will be required if trigger levels are met. Some assessment of trigger levels should be made.
55. Mitigation measures to address the potential filling of Blacksmith Creek and/or Marsden Cove outlet Channel should be defined.
56. Mitigation measures to address the potential diversion of Blacksmith Creek should be defined.
57. Mitigation measures to address the potential inundation of shellfish beds should be defined.
58. The source of sediment for the initial filling and periodic replenishment should be defined.

CONCLUSION

59. The Bird Roost appears to have been added into the proposal at a latter stage of the Consent process. It is therefore, not included in the Current or Morphology modelling and is not thoroughly considered by the Application.
60. Unlike the main part of the proposal, smaller wind wave and boundary effects processes will be critical to this structure.
61. I have defined potential adverse effects associated with sediment transport causing filling or diversion of Blacksmiths Creek and/or the Marsden Cove outlet channel and sediment inundation or contamination of shellfish. These potential adverse effects need to be addressed in the Application.

62. The Application proposes monitoring but does not assess the effects that the monitoring may detect and what actions will be taken if the monitoring captures adverse effects.

Craig Davis
September 2023