BEFORE THE KAIPARA DISTRICT COUNCIL'S HEARING PANEL

IN THE MATTER OF	the Resource Management Act 1991 (**the Act**)
AND	
IN THE MATTER	An application for Private Plan Change 85 (**PC85**) - **MANGAWHAI EAST** by Foundry Group Limited (formerly Cabra Mangawhai Limited) and Pro Land Matters Company to rezone approximately 94 hectares of land at Black Swamp and Raymond Bull Roads, Mangawhai

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STATEMENT OF EVIDENCE OF CRAIG DAVIS ON BEHALF OF THE APPLICANTS

(Coastal Hazards)

16 December 2025

Jeremy Brabant

Barrister

Level 7, 50 Albert Street, Auckland Central

PO Box 1502, Shortland St, Auckland 1140

M: 021 494 506

E: jeremy@brabant.co.nz

INTRODUCTION

1. My full name is Craig Jonathan Davis.

2. I have a Bachelor of Civil Engineering Degree from the University of Canterbury (1984).

3. I am a Chartered Member of Engineers New Zealand (CMEngNZ) and registered as a Chartered Professional Engineer (CPEng) under the Chartered Professional Engineers of New Zealand Act 2002. I am on the New Zealand register of the International Professional Engineers (IntPE(NZ)) and I am a member of the New Zealand Coastal Society.

4. My previous work experience includes 35 years post graduate experience in civil, structural and coastal engineering.

5. I am currently employed as Principal Coastal Engineer with Davis Coastal Consultants, a specialist coastal engineering and planning practice founded in 2002.

6. I have assessed coastal processes, designed, obtained Resource Consent and monitored construction of coastal projects for the last 23 years.

7. I have previously appeared in Resource Consent Hearings and the Environment Court to provide expert evidence.

EXPERT WITNESS CODE OF CONDUCT

8. Although this is not a hearing before the Environment Court, I record that I have read and agree to and abide by the Environment Court's Code of Conduct for Expert Witnesses as specified in the Environment Court's Practice Note 2023. This evidence is within my area of expertise, except where I state that I rely upon the evidence of other expert witnesses as presented to this hearing. I have not omitted to consider any material facts known to me that might alter or detract from the opinions expressed.

PROJECT INVOLVEMENT

9. I have provided professional advice as to the impacts , if any, of coastal processes on the land; the susceptability of the land to coastal hazards and provided inputs to

determine an appropriate zoning pattern with respect to the mapped extent of coastal hazards as shown on the Northland Regional Council hazard maps.

10. Our report, prepared to inform the plan change proposal, included recommendations for a coastal inundation overlay and a coastal erosion overlay, but otherwise concluded that the land could be developed as per the proposed zoning pattern in a manner that would enable avoidance of coastal hazard risk.

SCOPE OF EVIDENCE

11. My evidence provides an assessment of the coastal processes and coastal hazards aspects of the Plan Change Area (**PCA**).

12. My Evidence should be read in conjunction with the report titled Coastal Processes and Hazard Assessment, Revision C Reference number24022 dated June 2025 (The Coastal Report). This report was part of the plan change documentation notified by Kaipara District Council.

13. The Coastal Report sets out the processes and coastal context of the site and I will not repeat this in my evidence. I include a summary of the most salient points below.

SITE DESCRIPTION

14. The PCA is on the southern shoreline of the Mangawhai Estuary at the confluence of the southern tributary with the wider channel of the northern tributary (Tara Creek), immediately upstream of the Isley Street causeway.

15. The site is approximately 5km from the estuary mouth within a relatively low energy sheltered environment and can be considered remote from any open ocean processes other than tidal flows.

16. Because of the proximity to the causeway, the PCA is subject to the fluvial action of the river and ebb flows of the catchment above the cause way, discharging through the confined outlet at the cause way.

17. Morphologically the site can be considered as two flat terraces, separated from a moderately steep hillside at the south by Black Swamp Creek.

18. The first low lying terrace, adjacent to the shoreline on the northern side of the PCA, is comprised of Holocene river deposits that rise from the Estuary to levels at or below

RL2.0. Inland of this is the second terrace of higher Pleistocene deposits forming a more elevated plateau at approximately RL 4.

19. The raised hillside forms the southern part of the PCA and ground level rises to approximately RL50.

20. The shoreline of the PCA has been formed on a bend of the original water course and can be considered in two parts: a north or north-westerly facing coastline to the northern part of the PCA, and a south-westerly facing coastline to the western side of the PCA.

21. The southwestern shoreline now forms the outside of a sharp bend in the river channel flow due to the fixing of the river channel by the Isley Street causeway.

22. The northern shoreline is comprised of an anthropogenically formed discontinuous bund, approximately 1.5-1.8m high fringed to the seaward by mangroves, with extensive wetland landward. The wetlands graduate into pasture.

23. The southwestern shoreline has been armoured primarily with rock riprap and a timber wall at the camp ground.

COASTAL PARAMETERS

Tide:

24. The Tidal parameters are provided in the Coastal Report and summarised (to 1 decimal place) in the Table 1 below

Description	**Level (NZVD2016)**
MHWS	0.7
HAT	0.9
1%AEP (NIWA 2016)	1.5 (Adopted)
1%AEP (Tand T 2021)	1.6

Table 1. Tidal Parameters

25. As set out in Table 1, two values were available for the 1%AEP; that of a NIWA model study in 2016, and within a later coastal flood assessment report for Northland Regional Council (**NRC**) prepared by Tonkin and Taylor in 2021.

26. The values differ by 0.1m and this may be partially due to rounding and is likely to be within the statistical accuracy of the estimates and certainly within the practical accuracy.

27. The output locations for the two data points also vary. The NIWA model being for a point directly offshore from the PCA and the T + T being approximately 3km downstream .

28. The NIWA estimate was derived from modelling work they undertook for the Auckland Council which included the Mangawhai Harbour.

29. The T + T estimate is based on open coast tidal modelling by NIWA and extreme value modelling of discrete Port tide gauges, also prepared by NIWA. This information was then used to interpolate and derive model output values for the Northland coast including Mangawhai. Subsequently, further work was undertaken by Northland to model more accurate values for their harbours but not the Mangawhai Harbour.

30. On the basis that the model output location is closer to site and that the model result is directly from a model covering this area the NIWA value has been adopted as being the more reliable statistic.

Wave Climate:

31. Locally generated wind waves act upon the north western coast line. There will be a negligible wave climate to the southwestern coastline.

32. The Coastal Report derives significant wave heights based on local wind parameters as set out in Table 2 below:

Event	**Wave Height (m)**	**Period (s)**
Regular Wave	0.2-0.3m	2

20%AEP	0.5-0.6	2-3
1%AEP	0.6-0.7	3

Table 2 Wave Parameters

33. The waves that form will tend to be attenuated by the shallow water of the tidal flat in front of the PCA. The growth of mangroves seaward of the manmade bund indicates a minimal energy environment. It would be extremely rare to have a wave height over 200-300mm acting on the shoreline.

Sea Level Rise:

34. Relative sea level rise is the combination of both the rising level of the sea SLR and any fall (or rise) in ground level. Vertical Land Movement. It can be expressed as equation 1 below:

$$SLR + VLM = RSLR \quad (1)$$

35. The Ministry for the Environment provides guidance for sea level rise ("Coastal Hazards and Climate Change Guidance 2024). The guidance assumes a number of differing scenarios called Socio-Economic Pathways and looks at a statistical range of outcomes based on those scenarios. It expresses a p50 probability as the average likely outcome and a p83 such that 83% of predictions for that scenario are less than that level.

36. As a green field site it is appropriate to use conservative and precautionary values for Sea Level rise over the next 100 years. The Coastal Report uses the most conservative assumptions recommended in the Ministry for the Environment guidance ("Coastal Hazards and Climate Change Guidance 2024); and is set out below:

	p50 (m)	p83(H+)(m)
SSP-8.5	1.25	1.71

VLM	0.32	0.52
SSP-8.5 +VLM	1.57	2.23

Table 3 Sea Level Rise

Coastal Inundation:

37. Combination of the 1%AEP storm tide and a value for future RSLR using the worst case scenario that will not be exceeded by 83% of values provides a precautionary maximum inundation value. As set out in Table 4 below this defines a 100-year inundation level of RL3.7 (NZVD 2016).

1% AEP Storm Tide	RL1.5
RSLR SSP8.5 (p83)	2.2m
100-Year Inundation Level (NZVD2016)	**RL3.7**

Table 4 Inundation Level

38. For comparison, the Northland Regional Council coastal flood hazard assessment (T+T 2021) defines four Coastal Flood Hazard Zones (**CFHZ**) for the Northland Region. The most extreme of these (CFH3) is RL3.5.

    The Coastal Inundation Level was mapped on the PCA to provide delineation of the extent of the potential Hazard.

39. The "bathtub" mapping of the area influenced by inundation can be a coarse measure of the extent of hazard. The mapping merely delineates any area defined by the topographical mapping as being below the specified level.

40. This is clearly subject to the accuracy of the topographical mapping but also does not define any degree of hazard. An area 4mm below the specified level is defined as at risk to the same extent as an area 4m below the specified level.

41. Filling of the inundation area will address the hazard. With coastal inundation, filling within the hazard area does not exacerbate flooding or impacts on adjacent sites

because the inundation is caused directly by the ocean. The ocean has effectively infinite volume so that inundation of adjacent sites and elsewhere in the immediate catchment will include all land below inundation level irrespective of whether there is filling or excavation in that catchment.

42. Assuming that filling to 200mm above Inundation Level mitigates the hazard the depth of fill required to mitigate inundation was mapped within the PCA.

43. Upstream of the Black Swamp Road causeway a minimum fill level of 500mm or less was found to address the hazard for all areas except right at the margins of the Estuarine area.

44. Conversely the north-western part of the site was clearly divided into the upper terrace above the inundation area and the lower terrace that required 1.5-2.5m of filling to address the mapped coastal inundation hazard.

Sand Dune Inundation:

45. The Consent Authority sought information, under Section 92 of the RMA, on the risk of migration of the coastal dunes causing sand inundation of the site.

46. Based on thirty years of aerial photography there was no measurable movement of the dune toe towards the site. The maximum measured isolated area of dune movement observed within that time averaged to 7m per year. Based on this rate, it would take nearly 250 years for the dune to migrate the 1.7km to the closest point of the PCA. Dune sand migration and site inundation is not considered a credible hazard.

Coastal Erosion:

47. Coastal erosion to the northern coastline due to the limited wave climate is anticipated to be minimal. Erosion of the southwestern shoreline is more associated with the fluvial and ebb tide channel effects. Again the extent of erosion is likely to be limited and it is noted that relatively low quality simple armouring to this coastline appears to be effectively managing this erosion.

48. In addition to the loss of the shoreline due to coastal erosion on steep sites the erosion can be associated with causing slope failure and therefore affecting land considerably further inland than that actually scoured. However, ground levels of the coastal margin in the PCA are low and this is not an issue.

49. The extent of historic erosion at the site was investigated by comparing historic aerials. However, due to the slow rate of erosion and history of anthropogenic change this failed to provide any meaningful quantification. It was consistent with very slow historic erosion rates.

50. The NRC study (Coastal Erosion Hazard Assessment for Selected Sites 2019-2020) quantifies parameters for erosion within the Mangawhai Estuary for the residential area from Molesworth estuary causeway and north to the estuary mouth.

51. This area is exposed to similar processes as the PCA and the rates of erosion of 0.15m/yr for the coastline immediately north and facing the site has been adopted as representative for the exposed coast of the site.

52. Erosion is also possible up the length of the Black Swamp Creek and a lesser value has been adopted for that shoreline.

53. It is likely that erosion will increase with rising sea levels as the tide will be in contact with the shore line for greater periods of time.

54. The Coastal Erosion Risk should be managed by ensuring development is set back sufficiently from the coastline.

55. The following offsets from MHWS have been specified, to allow for coastline susceptible to Future Coastal Erosion Hazard:

    a. 30m offset from MHWS for all shoreline within the PCA, except upstream of the Black Swamp Road causeway.

    b. 10m offset from MHWS for all shoreline within the PCA upstream of the Black Swamp Road causeway.

56. On the northern shoreline this area is within esplanade and the wetland and so remote from development. On the South-western coast line Black Swamp Road, and to the north, the existing esplanade reserve, provide a buffer to the developable land. This buffer in combination with yard requirements will keep all development outside the area potentially affected by the erosion hazard.

S42A REPORT

Peer Review

57. The Consent Authority has obtained a review of the Coastal Report by an independent Civil and Environmental Engineer, Mr Blackburn from Hawthorn Geddes.

58. Mr Blackburn generally accepts the findings of the Coastal Report.

59. With regards to the two levels of Storm Tide level (Paragraphs 14-20 above) Mr Blackburn states that "it is evident that the referenced storm tide level of 1.51 … … is the most appropriate data for the subject site…"

60. However, he then recommends adoption of the alternate figure of 1.6m NZVD this is on the basis it is "appropriately conservative" and "it will ensure regionally consistent application of inundation risk, and one that is suited to the undefined timeline for detailed development on the subject land".

61. I maintain my view that the adopted storm tide level of 1.5m is the most appropriate, which Mr Blackburn agrees with.

62. The appropriate level of conservatism in deriving the inundation level is set out by national guidance and factored in at each stage of developing the inundation level. The greatest risk to the level is sea level rise. Accordingly, the most conservative scenario has been chosen to address this risk. The level of sea level rise chosen is described (MfE 2024 Guidance) as being suitable for stress testing and likely to be attained possibly in future centuries. It is unlikely to be reached in the next 100 years.

63. Similarly 1%AEP tides storm tides are derived and used additively to 100 year RSLR even though they will only be relevant in 80-100 years time. If the 1%AEP tides occur any time in the next (say) 80 years, the inundation levels will not be close to the 100 year levels specified. It is only in, say, 80 years time there will be a risk from a 100-year event. For example, this risk is considerably less than a 1%AEP seismic event which could occur any time the next 100 years, not just the last 20 years..

64. In addition, any Coastal inundation event will only occur over a limited duration of 2-3 hours (over a high tide). The hazard we are addressing therefore is in some aspects less severe than other natural hazards and additional levels of conservatism are not warranted.

65. There is a risk if the best statistic derived through detailed modelling is not accepted and instead a notionally higher value adopted. In future hazard assessments, when site specific work is done, and is being assessed, the Consent Authority may find it difficult to adopt a more accurate but lower assessment of inundation level because at Plan Change time the Authority ignored the agreed best fit data and used another more conservative value in its stead. It is unclear how much additional conservatism to add to the best practice derived statistics to meet the required level.

66. The conservatism should be provided, as per the guidance, through the assessment process using appropriate values to represent the aspects of inundation. Additional, undefined levels of conservatism are difficult to justify and make for inconsistent consideration of the risk using the best science available.

67. With regard to "Regional consistency" the inundation level varies throughout both the Auckland and Northland Regions, and indeed at every site. The inundation level is defined at each location. Consistency can be more readily be kept by adopting the best data available st each site and not adding varying levels of additional notional conservatism.

68. As the science and knowledge around sea level rise and national guidance on addressing the same has changed, the provisions have frequently altered and are likely to continue to. It is important that as far as possible best practice is followed.

SUBMISSIONS

69. Coastal aspects are not directly the subject of any submissions except for NRC.

70. NRC stresses the policy requirements to avoid inappropriate development within coastal hazard areas.

71. A Coastal Inundation Overlay has been mapped, and forms part of the proposed planning maps, to highlight areas within the PC where further assessment will be required in relation to future development and coastal hazard risk. Subject to the recommendations of the Coastal report and the planning provisions contained within the proposed Mangawhai East Development Area provisions, I consider the development proposed by the Plan Change to be appropriate for the area from a coastal processes perspective.

72. A number of submitters have referred to additional flooding but as referred to in Paragraph 32 filling in a coastal inundation area does not exacerbate flooding. There is nothing associated with the Plan Change therefore from a Coastal Processes or Engineering perspective that will cause or worsen flooding.

CONCLUSION

73. I have assessed the processes at the site and the proposed activities proposed within the Plan Change.

74. The coastal erosion will be relatively minor and readily managed by providing a small erosion management zone.

75. Ideally, the best way to manage the erosion especially to the northern shoreline is to ensure development is sufficiently setback as it will be given the existing esplanade reserve and the setback provisions proposed within the Mangawhai East Development Area provisions.

76. If erosion along the currently armoured section of the shoreline was problematic this could be readily addressed by simple enhancement or upgrade of that armouring.

77. Inundation will not be an issue to the majority of the site except the low terrace area on the northern side that is identified by the proposed Coastal Inundation Overlay. Within that low area more significant levels of fill would be required to address inundation and this will be subject to needing resource consent within the Development Area provisions, and potentially Regional Plan provisions.

78. Coastal processes and the wider physical coastal environment will not be adversely affected by the Plan Change in any measurable way.

79. On the basis of the proposed Coastal Inundation Overlay and the associated provisions set out in the proposed Development Area provisions I concur with the reporting planner, and Mr Blackburn that there are no coastal hazard issues with respect to the proposed zoning and associated future land uses.

Craig Davis

16 December 2025