Before the Expert Fast-track Panel

FTAA-2511-1150

Under	the Fast-track Approvals Act 2024 (**FTAA**)
And	
In the Matter	of an application for approvals by **MCCALLUM BROTHERS LIMITED** for the Te Ākau Bream Bay Sand Extraction Project located at Te Ākau Bream Bay, Northland

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Evidence of Lawrence McIlrath on behalf of McCallum Brothers Limited in Response to Invited Comments

(Economics)

Dated 12 August 2026

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Introduction

1. My name is Lawrence Ryan McIlrath. I am a Director of Market Economics Ltd, an independent economics consultancy. My qualifications and experience are presented in my evidence relating to Minute 4, Request for Information 1 (**RFI 1**).

2. This evidence is provided as part of McCallum Brothers Limited's (**MBL**) response to comments on the application from invited parties. This evidence covers the economic matters in the received comments.

3. I prepared the following material lodged in support of MBL's application:

    a. Report titled Te Ākau Bream Bay Sand Extraction – Economic Assessment dated 14 August 2025 included as Attachment 18 to the MBL Assessment of Environmental Effects.

    b. My response to Minute 4 (RfI 1), 14 May 2026.

    c. My response to Minute 5 (RfI 2), 22 May 2026.

Scope of Evidence

4. My evidence responds to the comments raised by the invited parties. I focus on the economic matters raised and cover:

    a. BECA Report: Final Executive Summary of Alternative Sand Sources. Prepared for Bream Bay Guardians (3 October 2025). Only the Executive Summary accompanies the Bream Bay Guardian submission. The full report is not attached.

    b. Cognitus (Dr Meade) report titled: Te Akau Bream Bay Fast Track. Report prepared for the Patuharakeke Te Iwi Trust Board. The report is dated 25 May 2026 and is attached to the Patuharakeke Te Iwi Trust's comment as Appendix 9.

c. Axiom Economics (Mr Green) report titled: Bream Bay sand mining: assessment of purported economic effects. A report for the Bream Bay Guardians Society. 23 February 2026.

d. The manufactured sand issue.

e. Refer to the other comments that oppose, are neutral or supportive of the Application.

Code of Conduct

5. Although this is not a hearing before the Environment Court, I confirm that:

   a. I have read and am familiar with the Environment Court's Code of Conduct for Expert Witnesses as specified in the Environment Court's Practice Note 2023 (**Code**); and

6. The report referred to above authored by me:

   a. Are within my area of expertise (except where I state that I rely upon the technical reports of other expert witnesses provided in support of the application);

   b. Have been prepared in accordance with the Code; and

   c. I have not omitted to consider any material facts known to me that might alter or detract from the opinions expressed.

Comments on BECA's review of alternative sand sources

7. Both Dr Meade and Mr Green refer to the BECA report regarding the availability of alternative sources of sand. It appears that they are referring to different versions of the report:

   a. Mr Green refers to a 14 July 2025 report; and

   b. Dr Meade refers to a 3 October 2025 version.

8. Only the Executive Summary of the 3 October 2025 report accompanies the Bream Bay Guardians comments. I have a copy of the July 2025 report but not

the October version. This limits my ability to consider the veracity of the full report and of Dr Meade's use of it.

9. Both Dr Meade and Mr Green reference the BECA reports to form their positions about the sufficiency of sand supply to Auckland. They use the BECA reports to indicate that:

    a. demand for Bream Bay sand is less than asserted in the Economic Assessment;[1]

    b. there are suitable alternative sand sources.[2]

10. Due to the importance that Dr Meade and Mr Green assign to the BECA reports, I offer my review of that report and the critical gaps in it.

11. The BECA report[3] offers a list of sand sources and classifies them as:

    c. Probable/already in use;

    d. Possible;

    e. Unlikely, and

    f. Not a viable option.

12. Both Mr Green and Dr Meade draw on the *probable*[4] sources as listed in the BECA report.

13. As the name suggests, sources in the 'probable/already in use' category indicates that a source could already be in use. This distinction is important because if a source is already in use, then only the difference between the current annual production and the consented maximum (annual values) is available to accommodate future growth. It would be inappropriate to count the consented maximum as available to accommodate growth.

[1] Dr Meade: para 84.1.

[2] Dr Meade: para 84.2.

[3] The July version.

[4] Dr Meade: para 85.2.

14. The list includes some questionable sources. For example, sand associated with dredging the navigation channel at Marsden Point[5] [6] is included as a potential source of sand. However, there are several aspects that undermine the realistic availability of this source for the Auckland (or Northland) sand market, including:

    a. The consent conditions would need to be varied. According to Mr Elstob[7] the consent conditions state that none of the sand can be taken out of the Bream Bay embayment. There is limited incentive for Channel Infrastructure to embark on a potentially costly process to enable such use.

    b. The availability of the sand is subject to actual dredging proceeding. The timing of the dredging activity is unknown[8] making it difficult to provide any firm indication of when the sand will be available. This means that, even if the consent conditions were varied, the resource is not available on an 'on-demand basis' and therefore its role as sand supply cannot be linked to sand demand patterns.

    c. BECA suggests that stockpiling facilities would assist in balancing supply and demand if this resource was used. However no additional supporting information is provided i.e., cost, location, logistics and other operational considerations, infrastructure and consent conditions.

    d. In terms of characteristics, BECA indicates the dredged sand is of the same sand body as Te Akau Bream Bay. However, it is important to note that it is not a case of 100% of the dredged sediment being available as concrete sand (as BECA asserts). Only a portion of the dredged sediment is classified sand. Based on the Consent Application, a portion (see Appendix 1) of the dredged sediment is

[5] BECA Executive Summary. Page 4.

[6] Dr Meade: para 85.3

[7] Mr Elstob. Response to RfI2: para 25.

[8] As indicated by Mr Elstob (RfI 2: para 26), dredging is potentially unlikely due to the change in the use of the refinery.

classified as: clays, silt and gravels (shells). The volume associated with these sediments must be excluded from the analysis to provide an accurate picture, including:

i. Total volume

    1. BECA report[9] 3,700,000m^3

    2. AEE volume:

        a. Design level 3,162,400m^3,

        b. Including over-dredge 3,620,000m^3.

    3. Variation +1.7%

ii. The share of total volume associated with clays, silt and gravels is 16% and must be excluded from the analysis.

iii. By not adjusting for these factors, BECA overstates the volume of sand that might be available to the concrete market by around 17.7%.

iv. The remaining sand is reported as a mix of:

    1. Fine sand (12%),

    2. Medium sand (62%),

    3. Coarse sand (9%).

v. The degree to which each of these parts could be used in concrete manufacturing is not assessed by BECA. However, the AEE classifies coarse sand as having a size of 2mm. Mr Donaghue reports[10] that natural sand after screening typically ranges from 2mm downward with most of the

[9] This number is a rounded value and is also presented in the AEE. However, considering that the unrounded value is provided in the AEE, I consider using the unrounded value as more appropriate when expressing the potential size of the sand resource.

[10] Mr Donoghue's response to comments. Table 1.

material within the 0.15mm to 1.18mm range. This sizing means that the coarse sand (9% of the total) must be excluded from the calculation to show the true quantum of sand that is available to the concrete market via the dredged material. BECA does not make such an adjustment.

15. To use the BECA reports in the Te Akau Bream Bay context, additional information is needed to address critical gaps.

    a. The economic implications associated with the transport function for the different sand sources must be evaluated;

    b. A time dimension must be added, that is the temporal implications around future ability to legally access the resources based on consents must be incorporated;

    c. The consented volumes must be expressed on a consistent basis by applying appropriate adjustments and conversions to capture relationship between sand volumes (m^3) and usage rates (weight in tonnes), as well as differences between extracted volumes and usable volumes[11];

    d. Reflecting existing and future demand and use patterns.

16. I discuss these gaps below.

Transport costs

17. Apart from commenting on distances between source and where the sand could be used, the BECA reports are silent on these costs. Neither Dr Meade nor Mr Green undertake their own evaluation of the transport costs associated with sourcing sand from the probable alternatives (relative to Kaipara or Te Akau Bream Bay).

[11] This is to allow for losses when processing (washing and screening) sand as is often the case with Waikato sands where silt and other contaminants are removed when producing concrete sand.

18. This is a critical shortcoming because distance influences the delivered price of sand. Distance also determines the wider costs, such as emissions and social (accident) costs. In my opinion, simply referring to the BECA reports and listing potential and probable sources without interrogating those sources' attributes and locations is inadequate.

19. Referencing the potential sources without analysing the cost implications of using those sources compared to Te Akau Bream Bay means that any conclusions are based on incomplete and partial analysis. Consequently, any conclusions that are based on the partial analysis are not robust or reliable.

Temporal considerations and future availability

20. The BECA report[12] lists a range of sources and includes the consent expiry dates.[13] However, apart from stating that new consents are 'expected to be sought', and indicating that some sources still need consents, there is no analysis or commentary regarding the supply of sand over time. Consequently, care is needed when using the report because:

    a. The sand sources are presented based on currently consented volumes (m^3) and this is then compared against the concrete sand demand. There is no analysis of how sand demand or supply will change over time.

    b. The report shows a snapshot of the quantum of sand that is potentially available. There is no representation or indication of how sand availability might change over time as consents expire, and/or as sand resources are consumed. That is, how much sand is legally (consented) available to the concrete market over time based on known expiry dates.

    c. Unconsented proposals and capital dredging projects are included. There is little certainty around the ability to access these sources.

[12] July 2025 version of the BECA report.

[13] Appendix A in the BECA report. Column heading "Consents". Most sources are covered.

d. The yield of sand available to make concrete from the different sources is (implied) reported as 100% of the consented volume. However, this is not the case and there is no consideration of the yields associated with different sources e.g., Waikato sand must be processed (screened and washed) before it can be used in concrete production.

21. BECA mentions rail transport as a potential option. However, this is not explored in any detail.

22. The North Auckland Line (NAL) runs past Helensville in the vicinity of the Mt Rex Shipping Ltd location. One rail option could be to use a mix of rail, road transport and transfer activities – with rail to a depot (subject to space availability) in Wiri from where the sand is then delivered to concrete plants and users via road.

23. Rail transport adds more steps to the logistics chain, including:

    a. Loading sand into containers at the sand depot,

    b. Rail transport costs (train movements to Wiri),

    c. Shifting containers to a sand stockpile site,

    d. Unloading from containers into a stockpile and storage,

    e. Returning containers to the depot,

    f. Loading sand onto trucks, and

    g. Distributing to the end users.

24. The cost implications of such a logistics network are not discussed by BECA. During the Pakiri Environment Court hearing, I considered the practical considerations and cost implications of using a rail-road modal mix to transport sand from Helensville to a depot in Wiri, and then to concrete plants[14]. That

[14] McIlrath L. Pakiri Sand. Statement of Evidence in the McCallum Bros Limited. Para 108 – 114 (23 December 2022).

analysis revealed that a rail transport option had significant cost disadvantages, infrastructure constraints, and capacity limits (on the rail line) which undermined this as a workable option.

Adjusting units from cubic metres to tonnes

25. There is little evidence in the BECA reports to suggest that the volume (m^3) of sand as consented has been adjusted to reflect the sand attributes. The BECA report[15] states that values are reported in cubic metres because "this is the unit that is often used for consents". The demand and supply quantities are also reported in cubic meters for ease of comparison. Seeking to maintain ease of comparison is understandable.

26. The issue is that there can be considerable differences between consented volume and how much of that volume can be used for different purposes. Simply reporting the consented volumes in cubic meter-terms (or tonnes) does not show how much of the resource is truly usable by concrete producers.

27. For example, there is variation between quarries in terms of how much sand is available for different uses (e.g., pit sand, concrete sand or fill sand). It is not the case that 100% of the sand that is extracted from a land-based resource is available for the concrete sand market. Using data from MBL's quarry in the Waikato shows the scale of the adjustment that must be made to account for the attributes of the sand source:

    a. $1m^3$ of raw quarried sand converts to between 1.8 and 2.2 tonne of (raw and unprocessed) sand.

    b. $1m^3$ of processed sand converts to 1.3 tonne.

    c. Yield from raw product to processed sand is between 60% and 70%.

28. This means that the consented volumes as reported by BECA must be adjusted by applying relevant processing and conversion ratios to derive the relevant (usable, for the concrete market) sand volumes. If these adjustments are not

[15] Footnote 1 in the October version.

made, then the quantum of sand that is available to the market is misrepresented.

29. The BECA report describes the density ratio (to convert between volume and weight). It is unclear if the conversion from raw sand to processed sand has been performed. In addition, I do not see any evidence that either Mr Green or Dr Meade have allowed for these factors.

Reflecting existing demand and use patterns.

30. Sand is a widely used natural resource, and it is sourced locally and in ways that minimise transport costs. The BECA report[16] puts Auckland's concrete sand demand at between 310,000m^3 and 610,000m^3. BECA attributes some of the underlying ratios it uses to convert ready-mix concrete to sand to Market Economics (M.E). However, the upper parameter that is quoted[17] appears to be based on an incorrect application of the M.E ratio (incorrect per capita ratio).

31. Expressing the demand range as reported by BECA and translating these to a tonnage basis reveals BECA's estimated demand. It is between 826,700 and 1.6m tonnes. The upper estimate seems unusually high.

32. Using the other data points reported by BECA is insightful. The Kaipara sand production volume is reported as 308,000m^3 and quoted as being 60% of the sand industry. Using BECA's information, converting from cubic meters to tonnes and allowing for non-concrete sand uses, suggests that Auckland's total sand demand was in the order of 811,850t – 913,300t (2024). If my calculations using the BECA parameters are correct (and after accounting for the incorrect per capita ratio), then BECA's demand estimates[18] align with mine.

33. The BECA demand snapshot is for Auckland, it does not extend across the Waikato and Northland. However, the supply position includes several Waikato sources, including:

[16] BECA July report: page 3

[17] The correct range is 0.4t/m^3 to 0.45t/m^3.

[18] Economic Assessment: para 63. I estimate the range as 872,775t to 944,025t.

a. Tūākau;

b. Mercer;

c. Revital (a MBL' owned sand quarry);

d. Monavale; and

e. Tamahere.

34. Before classifying the Waikato sources as potential sources for the Auckland sand market, the local demand situation (in the Waikato and Northland) must be considered to ensure that a consistent spatial market is analysed. Including Waikato sources (supply) in an analysis of Auckland's sand sufficiency position without capturing Waikato demand is inappropriate.

35. The Waikato has recorded significant growth and has a positive outlook. The region has its own sand supply pressures with sand extraction consents expiring, sand resources depleting and local growth requiring inputs.

36. An analysis[19] of the Waikato sand market suggests that the region's internal sand demand is likely to exceed its supply around 2030 to 2032. Waikato sand is already exported to the Bay of Plenty and Coromandel due to supply constraints there (see Appendix 2). BECA does not make an explicit link between the sources and the markets they service. Instead, the market is presented in broad terms such as "servicing the Waikato and Bay of Plenty".

37. Apart from spatial markets, the relationship between business units also influences supply/distribution patterns. Sand produced at a quarry owned by a vertically integrated concrete manufacturer is not necessarily available to third parties or to a different regional market, particularly if the company's own plants have first call on supply.

38. The BECA report suggests sand from the Waikato sources could be redirected to supply Auckland if market conditions required it.

[19] RS Sand Limited. 77 Newcombe Road, Cambridge.

39. Focusing solely on the Waikato supply situation and excluding the regional demand side does not present a reliable picture of the availability of Waikato sand for the Auckland market. Regional (Waikato) demand considerations are not reflected meaning that the available spare capacity, after meeting Waikato commitments, is not calculated or reported.

40. The temporal considerations are not reflected in the BECA analysis of Waikato sources. While there might be an ability to accommodate a portion of Auckland's sand demand over the short term, redirecting Waikato sand to Auckland would exacerbate the anticipated deficit in the Waikato market (medium term) that would need to be filled from elsewhere. BECA treats supply as mutually interchangeable across regions without examining the market structures, cost implications arising from mineralogical issues or transportation.

41. Mr Green and Dr Meade adopt the BECA report and use its figures and sources. Dr Meade lifts several paragraphs directly from the report.[20] Neither question the underlying assumptions about consents expiring, resource depletion, existing supply arrangements or the flow-on effects and implications that repurposing Waikato sand for Auckland would generate in the Waikato.

42. Dr Meade and Mr Green rely on the BECA information in slightly different ways and I comment on their reports separately.

Response to Dr Meade from Cognitus

43. Cognitus (Dr Meade) provides an economic assessment that accompanied the December 2025 Impact Assessment Report[21] of Patuharakeke. The Cognitus report was attached as Appendix E to their CIA. I have responded to Dr Meade's report in Section 5[22] of my Economic Assessment. In turn, Dr Meade provided additional information in the May 2026 report[23].

[20] Dr Meade: para 67-68.

[21] *Cultural Impact Assessment: Te Ākau Bream Bay Sand Extraction Project*. Whetū Consultancy Group. Prepared for Patuharakeke Te Iwi Trust and McCallum Brothers Limited. December 2025.

[22] Paragraphs 183 to 215 in the Economic Assessment.

[23] Te Akau Bream Bay Fast Track. Report prepared for the Patuharakeke Te Iwi Trust Board. 25 May 2026 and attached to the Patuharakeke Te Iwi Trust's comment as Appendix 9.

44. For the most part, the May report covers the same ground as his earlier report, but Dr Meade provides supplementary information. Many of the points Dr Meade raises have been covered in my Economic Assessment and I do not repeat my response. Instead, I highlight the key matters and reply to the new points he raised.

45. My reply is structured under the following headings:

    a. The need for a full Cost Benefit Analysis (CBA);

    b. Growth outlook and the importance of concrete;

    c. Discount rates;

    d. GDP as a benchmark of significance;

    e. Distance of origin vs destination;

    f. Partial and selective analysis, and

    g. Other points.

The need for a full CBA

46. Dr Meade asserts[24] that any assessment to determine the significance of a project's regional or national benefits requires a Cost-Benefit Analysis (CBA). In his view, the net position must be estimated[25] and he interprets this as the test to apply in the Fast-track Approval Act context.

47. Dr Meade draws on the New Zealand Treasury's Guide to Social Cost Benefit Analysis[26] to support his position.

48. I am familiar with the Guide, and have applied it across many projects for local and central governments. However, the guide is directed at public sector investment decisions, i.e., how government should allocate taxpayer funds between competing programmes, projects or policies. It is aimed at neither

[24] Dr Meade: Para 21.

[25] Dr Meade: Para 21.1

[26] Dr Meade: Footnote 12

private sector investments, nor economic assessments associated with consent applications such as those associated with the FTAA.

49. In my opinion, the FTAA does not require a CBA and instead requires an assessment of the regional or national benefits, and their significance. The net position that Dr Meade proposes goes to the proportionality of benefits relative to adverse effects. I consider it inappropriate for an economic assessment to attempt to size/quantify all the effects and to then seek to express these in monetary terms. While it might be appropriate to undertake such an assessment with inputs from relevant specialists in a policy context, this is not a policy-type assessment.

50. The position Dr Meade presents here is consistent with the view he offered in the Waihi North Fast-track Project. That is, that a complete CBA must be provided. In that project, the Panel disagreed and did not accept that the adverse environmental impacts must be monetised and factored directly into the assessment.

51. My review of the approved FTAA applications revealed that only two projects used a CBA-type structure. Even then only a partial CBA was undertaken[27], and the assessments relied on other economic tools to estimate the benefit position. The transport cost assessment (avoided costs[28]) such as the approach I have used is common as is Economic Impact Assessments.

52. Dr Meade presents the Total Economic Value (**TEV**) tool and suggests that this must be used to complete the CBA. Again, I am familiar with the suggested tool. The TEV framework is useful in understanding the range of values people hold for environmental resources[29] and it can be used to guide a CBA.

[27] In one completed by BERL, the avoided costs associated with disruptions, prevented damage and costs that would be incurred are compared and expressed as a cost-benefit ratio. A full CBA is not completed. Instead, the economic impacts (multiplier analysis) augments that assessment to show the benefit position.

[28] Using the NZTA framework (as I have applied).

[29] Ministry for the Environment. *Resource Economics Report*. Wellington: Ministry for the Environment, 2022.

However, as a CBA is not required, any advantages that drawing on a tool such as the TEV would bring to the assessment, is negated.

53. Dr Meade applies parts of the TEV to expand the cost-side of this analysis. In his view, resource use such as benthic biota and cultural matters must be integrated in the economic assessment. I have deep reservations about such an approach. As mentioned, it might be appropriate to integrate these types of matters when considering a policy change. However, in the FTAA context it is unlikely to be helpful because this assessment strays into the domain of other experts. Further, the parameters required to undertake a TEV (e.g., Willingness to Pay values) are unavailable.

54. I acknowledge that Dr Meade has attempted to fill in some of the supposed gaps in my analysis using the TEV and CBA structures. I address these elsewhere to illustrate the challenges associated with assessing these matters in a robust way. Regardless, I consider Dr Meade's additional analysis as unnecessary and not credible (refer to para 127).

55. Overall, I disagree with Dr Meade's position that a CBA is the appropriate tool to use in this assessment.

Growth outlook and the importance of concrete

56. With reference to the growth outlook part of my analysis, it appears that the main difference between Dr Meade and myself is the concrete intensity (per capita levels) underpinning my analysis. That is the BAU bias as he refers to it. To be clear, I derive sand demand from official[30] ready-mix concrete data and consider non-concrete uses.

57. Dr Meade adds to his earlier discussion with a qualitative outline of the potential matters that could change concrete intensity. Unfortunately, he does not offer any data points or quantitative estimates of the degree to which he expects Auckland's concrete intensity to change. He indicates that it is possible for concrete use to continue to increase in absolute terms but at a slower rate

[30] StatsNZ data. Referenced in the Economic Assessment at footnote 47.

than historically.[31] Unfortunately, he does not offer any analysis of what such change would mean for sand demand patterns going forward.

58. I would add that none of the factors[32] he lists are new. These factors have been part of the construction industry in some shape or form over the medium term. These factors include:

    a. Increasing housing density;

    b. Building technology; and

    c. Emission reduction policies.

59. With reference to the housing density factor, in the Economic Assessment I suggested[33] that Plan Change 120 (**PC120**) will enable higher density dwellings and Dr Meade counters[34] that medium density typologies (terrace/townhouses) will also play a significant role. However, the medium density typologies were already enabled under the Auckland Unitary Plan (AUP), and the Medium Density Residential Standards (**MDRS**)[35] also enabled more medium density developments.

60. Figure 1 shows the trend in dwelling consents, by typology in Auckland over the past 20 years. This data illustrates that the medium density developments that Dr Meade refers to are already occurring.

61. The medium density dwellings that Dr Meade is pointing to are already a large portion of the residential development landscape. Therefore, the shift in concrete demand he points to as a driver is already reflected in the concrete data that underpin my analysis.

[31] Dr Meade: Para 92.

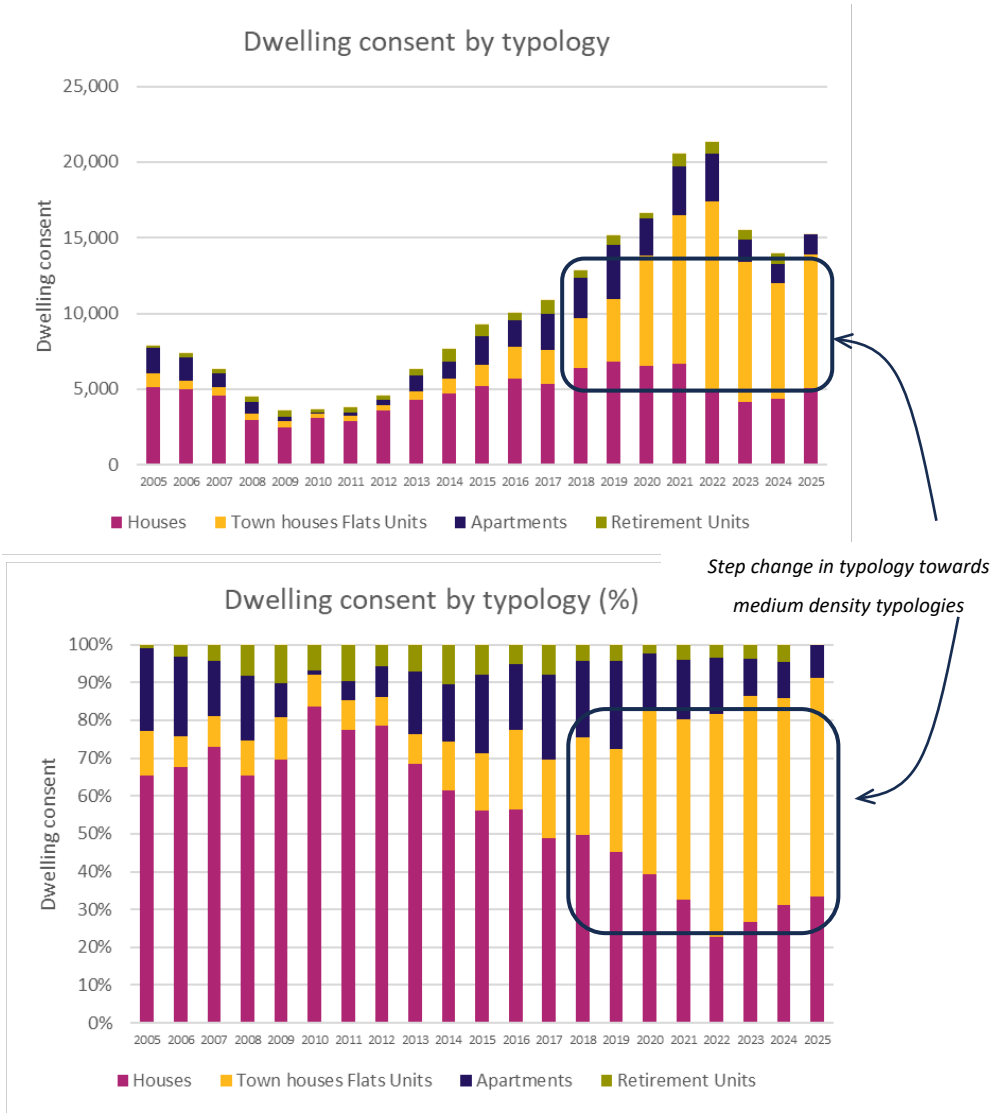
[32] Dr Meade: Para 14.

[33] Economic Assessment: para 188(a)

[34] Dr Meade: para 94.1.

[35] Acknowledging that the spatial extent/locations where intensification is enabled is being revisited.

Figure 1: Trends in consents by typology.



Source: StatsNZ (data purchased by M.E)

62. With reference to the shift in the number of dwellings enabled by PC120, the minimum housing capacity has been reduced from 2m to 1.4m. Dr Meade interprets this as meaning that overall concrete demand growth will be lower[36] (30% by his estimates). Importantly, the housing capacity (1.4m) referred to here is not dwelling growth or additional houses that will be developed. It is

[36] Dr Meade para 94.3.

the theoretical maximum dwelling, or Plan Enabled Capacity (PEC) that is required to be enabled by Auckland's planning provisions to ensure compliance with the National Policy Statement on Urban Development. It is incorrect to use the Plan Enabled Capacity as a measure/indicator of residential developments and building.

63. Large infrastructure projects are part of construction, a sector that is project-based in nature. It would be inappropriate to ignore the role of infrastructure projects in future concrete demand. In fact, high strength concrete is an essential input into large infrastructure projects. I discuss the infrastructure investment pipeline in Section 2.1[37] and Auckland's infrastructure pipeline.

64. Dr Meade asserts that alternative technologies[38], such as relining existing pipes instead of replacing them, are already playing an increasing role. The fact that these technologies are, as he indicates, already at play means that their effects/impacts are already embedded in official data about concrete use. Dr Meade does not discuss the degree to which concrete will be displaced/substituted by the alternative technologies.

65. Dr Meade offers one example (relining concrete pipes using linings) without any detail about transition or uptake rates, or explaining which part and how much of concrete demand will be substituted.

66. Regardless, relining does not increase network capacity it merely preserves (at best) existing capacity while lowering replacement costs. Auckland is growing and existing capacity is needed to manage storm and wastewater. The limited capacity is the reason for undertaking large investments such as the Central Interceptor. Auckland's three waters infrastructure investment programme will see a material lift in capacity investment, not merely maintenance spending.

67. To put Dr Meade's relining example into context, the WaterCare example reflects a $45m renewal programme which equals 0.3% of WaterCare's $13.8bn capital investment plan. In addition, the relining technology is not

[37] Economic Assessment: para 23 to 39.

[38] Dr Meade para 95.1

new, and the referenced example is not the first time WaterCare has used it. It has been used in Beachlands, Maraetai as well as addressing issues in College Hill. Again, the relevance of this example and its applicability to illustrating a material shift away from concrete is not clear.

68. The point is that the technology is not new, so some of its use is already captured in the data used to calculate sand demand.

69. It is also worth noting that WaterCare's spending on renewals and replacing ageing infrastructure is increasing with the 18 months (starting July 2025) being 44% higher than the preceding 18 months[39]. This spending lift is on top of historic levels, and aimed at replacing ageing infrastructure. Therefore, even if the spending uses alternative technologies, it is in addition to historic spending and does not reflect a transition away from concrete.

70. Dr Meade references WaterCare's Material Supply Standard but I am unsure what its relevance is. The document, first released in 2016, outlines the standards and minimum requirements for the supply of material to be used in the construction of assets to be vested with Watercare. Interpreting the specifications in the document is beyond my expertise. But it appears to show that a mix of technologies can be used depending on the application. It does not appear to show or mandate a substitution of concrete pipes with relining.

71. With reference to Dr Meade's argument about the change in concrete intensity associated with roading investment[40], he agrees with my observation that the passage he references does not reflect concrete. The concrete-specific claim is Dr Meade's own inference and is not something the Infrastructure Commission (IC) stated or implied.

[39] Watercare Services Limited. 2025. *Watercare announces record $500m investment in renewals to tackle Auckland's problem pipes*. 1 September 2025. Available at: Watercare website (accessed 31 May 2026).

[40] Dr Meade: para 96

72. It appears that Dr Meade is inferring lower concrete intensity because the Infrastructure Commission's[41] **scenarios** (emphasis added) shows that the total roading investment as a share of GDP tracks lower. I note the following:

    a. While roading investment as a share of GDP is projected to trend down (under the Infrastructure Commission scenarios), it does not mean that concrete intensity (use per capita) will trend down. For Dr Meade to make that claim, he needs to first express the concrete intensity on a per capita basis, and then account for shifts in GDP per capita. Without these adjustments he is not comparing on a like-for-like basis.

    b. It is unclear how Dr Meade accounts for mode shift that the Infrastructure Commission highlights. This mode shift to rail and public transport will require investment in stations, tunnels, light rail corridors and applications that tend to be concrete intensive.

    c. Dr Meade ignores the investment requirements across the rest of the economy[42] and focuses solely on roading infrastructure. The narrow focus ignores increases in investment in other parts of the economy that see demand for concrete increase relative to the size of the economy.

73. The referenced Infrastructure Commission report shows that it is based on the range of parameters across the entire economy. Total infrastructure investment demand is estimated at between 4.9% and 7.0% of GDP. Interpreting the Infrastructure Commissions figure (copied in Appendix 3) shows that a decrease in infrastructure investment as a portion of GDP is not expected.

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[41] Te Waihanga – New Zealand Infrastructure Commission. INA Model Technical Report for Draft Plan. Available at: INA Model Technical Report for Draft Plan PDF.

[42] Appendix A: Sector by sector investment forecasts. Rail Investment, Electricity and gas investment, Telecommunication investment, Education (primary and secondary investment), Education (tertiary investment), Hospital investment, Public administration and safety investment, Other public investment

74. I remain of the view that the Infrastructure Commission's report referenced by Dr Meade cannot be used as evidence of a drop in concrete intensity. Dr Meade's inference might be correct when looking at only one segment in isolation, but I consider it insufficient to look at roading alone while ignoring other crucial parts of the infrastructure sector. The total sector must be considered.

75. Dr Meade offers additional points in support of his position that using historic concrete per capita rates introduces BAU bias. He provides information about the potential transition toward other building technologies, such as engineered timber. Unfortunately, he does not offer any specific datapoints that can be used to justify his position or that can be used to adjust the concrete intensity. Unfortunately, he does not offer any sense of the scale of market uptake of the building technology, and concrete substitution. No quantitative data is provided to show any transition is occurring.

76. Research for BRANZ[43] into the use of engineered wood products (EWP) reveal that:

    a. The EWP could be a substitute[44] for some material, and the associated materials are: steel (60%), concrete (25%) or conventional framing (45%).

    b. The report states that:

        i. "Several respondents noted that they use only EWPs or mostly EWPs and only substitute when absolutely necessary".

        ii. "In general, it appears that steel is the primary product being used currently that can be substituted with EWPs."

[43] Carradine, D., Lockyer, O. and Knight, A. (2024). Usage and Uptake of Engineered Wood Products in New Zealand: Results from Survey 2 – 2024 BRANZ Report QC14365-2:2024. Judgeford, New Zealand: BRANZ Ltd.

[44] Answers based on the open-ended question: "What do you currently use instead of EWPs?" (Question 11).

c. EWPs have advantages and disadvantages just like any other building materials. Concrete and steel were repeatedly mentioned as competitive materials.

77. The BRANZ work acknowledges that there are barriers limiting the uptake of EWP options. The barriers, real or perceived, are presented as themes covering:

a. Costs (increased cost is noted as a concern);

b. Market competition (cost competitiveness of mass timber EWPs);

c. Acceptable solutions/design methods; and

d. Information and education.

78. Dr Meade's assertion about engineered timber, and its potential to lead to large scale product substitution away from concrete appears to be speculative and unsupported by real life observations.

79. Dr Meade makes several statements about why he suggests concrete intensity will decrease. For example,[45] he lists several points about engineered timber. I note that he references:

a. An article from 2012;[46]

b. A timber company's corporate website, and

c. A methodology that is a reference framework for voluntary embodied carbon assessments.

80. With reference to international experiences with engineered timber that Dr Meade lists, there is an error in the link[47]. Consequently, I cannot verify this point.

[45] Dr Meade: para 99.2.1-4

[46] *ArchitectureNow*. "Seismic design: engineering wood." Retrieved from Article. Sourced from Progressive Building June 2012 (Issue 93).

[47] Footnote 92 in Dr Meade's report.

81. While Dr Meade offers a high-level narrative around alternatives to concrete use, he does not provide any quantitative assessment or analysis based on this information. He simply asserts that 'future concrete demand[48] assumed in the analysis is overstated'. In my view, without any quantitative assessment or analysis, there is little substance to back up Dr Meade's assertions that the demand situation is overstated.

82. Another point Dr Meade presents as evidence of BAU bias relates to the interplays between the housing enabled (and delivered) under the Auckland Unitary Plan (**AUP**) and concrete demand arising from large infrastructure projects. Infrastructure projects are a constant feature of the construction landscape even if there are boom-bust cycles. While the shift towards medium density dwellings could have altered the total demand for concrete, isolating the associated effects of the residential component is not possible.

83. Regardless, my analysis takes a long-term view thereby mitigating the risk of taking an overly optimistic position for the analysis. The per capita rate (demand for sand) aligns with the long-term observations (>20years) and is below the rates seen in the period implied by Dr Meade (circa 2016 onwards). It is also worth noting that the assessment period considered and evaluated concrete use rates going back to the early 2000s – a period that saw high demand for apartment dwelling developments as well as the downturn in construction after the Global Financial Crisis. My assessment is balanced because it considers a long period with multiple business cycles with strong and weak growth.

84. Overall, it appears that Dr Meade wants an assessment of all concrete use-groups, an analysis of their historic concrete use rates (intensities), a projection of their likely future concrete use (scale and rates) and then use that information to reflect future concrete, and sand demand. I do not agree. Apart from being limited by a dearth of information to undertake such an analysis, it is unlikely to deliver any robust insights.

[48] As a minor point, my analysis projects demand for sand based on historic concrete poured patterns. I do not first estimate concrete demand and then derive sand demand. However, if this approach was taken, I would expect the resulting demand estimates to be similar.

85. There is no solid basis for reflecting the type of changes that Dr Meade says is needed.

86. Using economy-wide totals is entirely sufficient and appropriate for understanding the anticipated levels of demand[49]. Adding the implied resolution (assumptions) to the projections will only widen the uncertainty bounds of the results and increase the range of potential outcomes without adding further insight into the market.

87. Setting aside the issue of BAU bias, my analysis and the per capita ratio take a conservative posture. In an assessment such as this one, I consider it prudent to be conservative to limit the risks associated with optimism bias.

Discount Rates

88. The Economic Assessment acknowledges the multi-year nature of the project, and the economic flows and effects (avoided costs) are expressed in present value terms using Discounted Cash Flow Analysis via a discounting process.[50] The discount rates are drawn from NZTA and NZ Treasury guidance.

89. Dr Meade presents a further discussion[51] about the discount rate in response to my comments in the Economic Assessment[52] where I raised the following two points:

    a. For the 8% rate to apply, the proposal needs to be one where central government is considering the merits of investing public money into a commercial venture. That is, the project must compete with the private sector and commercialise risk.

    b. With reference to the lower rate (2%), I highlight that the avoided transport cost is a function of vehicle operation costs and travel time, as well as transport distance. These costs represent real

[49] Economic Assessment: para 66-69.

[50] Para 151.

[51] Dr Meade: Para 105 – 115.

[52] Para 192-196 in the Economic Assessment.

resource costs to society, and the social rate of time preference applies.

90. Dr Meade indicates that the first point is correct.[53] He goes on to acknowledge that using Treasury's discount rates is a clear way to get a broadly satisfactory understanding of present value[54].

91. Despite acknowledging the correct application of the rates, he indicates that being correct about the reasoning underpinning the discount rate does not invalidate the higher discount rate. He explains his point using the Air New Zealand/freight company example[55] stating that any business that reduces its transport costs might equally claim this is a benefit to society – but that does not in any way diminish the fact that the benefit is inherently commercial. He uses this distinction as reason for suggesting that the 8% rate is appropriate.

92. Crucially, I consider that Dr Meade's example misses an important point: why are the transport costs reduced and what is being assessed? Is it due to internal business activities/investment (e.g., fleet renewals) or due to a new transport link (e.g. a bridge) that is built.

93. If it's the former (internal business change), then I would expect the freight company to use a commercial rate to assess its internal return and risk profile (across the business) and to reflect is own capital allocation processes. I doubt the business would even consider transport savings accruing to the overall community as part of the investment evaluation process.

94. However, if the transport cost savings are due to a new bridge, then those savings are not due to actions of the freight company, and the potential benefits are available to other freight companies (and other users) using that route. The decision to proceed with the bridge investment reflects the savings across the supply chain and need to reflect the social benefits even if all the freight companies/users derive a company-specific benefit.

[53] Dr Meade: Para 109.

[54] Dr Meade: Para 109.1.

[55] Dr Meade: Para 110.2.

95. Enabling Bream Bay aligns with the second category (bridge example). The transport cost savings do not arise from any internal efficiency improvement by the Applicant. They arise because:

    a. A new sand source is made available to the market,

    b. This resource enables a more efficient transport/supply network.

96. The potential cost savings are available to the concrete market (especially those in central and southern Auckland) and enable competition in the market. Ultimately, the competition and lower prices benefit society via parties whose construction costs are influenced by sand prices.

97. Essentially, the transport saving is due to the opening up of a resource that is effectively 'closer' to the market due to improved logistics. It is the efficiency that delivers the savings, not private capital efficiency. A concrete manufacturer in Auckland that sources from Bream Bay rather than Kaipara can potentially capture the per-tonne saving regardless of their own operational efficiency or investments.

98. The saving exists independently of any individual firm's capital allocation decision, and it represents an improvement in the economy's resource allocation. Therefore, the discounting process should use the 2% rate.

99. Further, the Bream Bay project is about a private applicant seeking a consent. The project is not asking the Crown to invest public money, so this is not a proposal about Government funding to be applied in a commercial context. Therefore the 8% discount rate is not appropriate.

100. With reference to my second point (para 89.b), Dr Meade agrees in part.[56] He states that just because transport cost savings are a saving to society, it does not mean that they are social benefits that ought to be discounted at Treasury's social rate.

[56] Dr Meade: Para 110.

101. In his view, the transport cost savings (i.e., the benefits) will accrue to the Applicant[57].

102. In my opinion, Dr Meade is conflating the financial incidence of a benefit with its economic character. The incidence of transport cost savings and the appropriate discount rate are separate analytical matters. The avoided cost (saving) constitutes a real social benefit even where it initially accrues to private actors and therefore the 2% discount rate is appropriate.

103. The assessment focuses on the transport cost and avoiding truck kilometres means less fuel burned, lower wear on truck (engine hours), less maintenance spending, less hours worked, less road wear, and so forth. Avoiding the use of these resources is a social benefit: society has more of those resources available for other uses than it would have had without the project. Avoiding this consumption generates genuine savings regardless of who captures them financially.

104. Any transport project that changes transport costs and associated consumption patterns will see those changes occur at an individual and business level – that is simply where effects manifest. The manifestation point does not determine the economic character of the benefit. The savings are in aggregate across all users and the values are across society.

105. In my mind, the question is not the degree to which the Applicant retains the savings, or passes them through to concrete manufacturers and the degree to which those manufacturers pass them to builders and ultimately to homebuyers. Ultimately, competition will determine where the avoided costs are felt. Adding Bream Bay as a resource to service the sand market creates competition, thereby lowering the cost across the supply network.

106. However, there is an essential point to emphasise. The transport costs are already in the sand supply chain – Bream Bay sand is not currently available to the market. The total cost of delivering sand to the market is already being incurred by society. There are opportunity costs associated with not enabling

[57] Dr Meade: Para 111

Bream Bay (i.e., the transport costs and the consumption of transport resources are already being incurred).

107. Enabling Bream Bay to service the sand market will reduce the resources used to deliver sand from the principal alternative, sand from the Kaipara. If the Kaipara consents are not renewed, then the avoided costs would be even greater than those I report as the sand will need to come from further away to service the Auckland market.

GDP as a benchmark of significance

108. Dr Meade introduces Auckland and New Zealand's GDP as a benchmark against which to measure the Te Akau Bream Bay project's significance[58]. He derives the annualised benefits from my modelling, then he compares the annual benefit against Auckland's, and New Zealand's annual GDP.

109. The issue is that using the entire Auckland economy as a benchmark sets an impossible bar. By way of example, using the information in the Business Case for the City Rail Link's annual benefits, suggests that at the time of preparing it 2015), the annual benefits of that city-shaping project would have been 0.3% of Auckland's GDP. Even a large project such as the City Rail Link will return small numbers when expressed against the entire economy.

110. In addition, Dr Meade then expresses the annual avoided cost on a per household basis[59]. This approach takes a narrow view of the potential benefits and excludes the qualitative benefits that enabling Te Akau Bream Bay will deliver, especially the supply chain effects that will be felt by the construction sector, including concrete manufacturers, and entities engaged in infrastructure investment. I describe the benefits of enabling sand extraction from Te Akau Bream Bay in the context of the investment pipeline,[60] the supply chain considerations[61], and the essentiality of sand.[62]

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[58] Dr Meade: papa 26.1.

[59] Dr Meade: para 2.9.3.1.

[60] Economic Assessment: para 23-39.

[61] Economic Assessment: para 46-48.

[62] Economic Assessment: para 117.

111. The comparison that Dr Meade provides appears to take a position that a higher cost arising from sourcing sand from alternative sources is acceptable. This is in direct contrast with economic efficiency, and the proposition that society is better off (receives benefits) when scarce resources are allocated in a way that reduces costs. He does not consider the role of sand in supporting the construction sector, infrastructure investment programme and the benefits associated with ensuring a sufficient supply network – this is where the true benefits are.

112. Again, it is important to highlight that the Kaipara resource is used as the principal alternative. If the Kaipara consents are not renewed, then the avoided costs associated with Te Akau Bream Bay as assessed will be even greater than reported.

Distance of origin vs destination

113. The location of a sand resource relative to where it is used is an essential consideration. Distance influences costs. Neither BECA, Mr Green nor Dr Meade dispute this important point.

114. Dr Meade critiques[63] my reporting of the Commerce Commission's Determination[64] when I state that the effective transport/distance limit for sand is 50km. The three Commerce Commission paragraphs[65] he quotes relate to the importance of distance as an economic constraint and highlight the effect that transportation has on a supplier's ability to compete. Essentially, as distance increases, the ability to compete diminishes because the prices go up to account for transport costs.

115. While distance is not an absolute or technical barrier to transporting sand, costs increase with distance. Care is needed to not confuse technical feasibility, with economic considerations. A source that is technically accessible but economically uncompetitive does not constitute a genuine alternative.

[63] Dr Meade: para 74 – para 77.

[64] Fletcher Building Limited and Waikato Aggregates Limited [2019] NZCC 2. para 50, 51 and 60.

[65] See Appendix 2.

116. If I understand Dr Meade's proposition regarding the competitive landscape[66] for sand correctly, then this supports my views about the need for enabling Te Akau Bream Bay (it will have lower transport costs). Dr Meade states that if access to one sand source should cease, then that will change the travel distance over which rivals can competitively supply the market. I agree, this is how a competitive market operates. The key point is that entities that demand sand will need to pay more to cover the increased transport costs.

117. I concur with Dr Meade that the Commerce Commission's 50km finding is Waikato-specific. The distances are illustrative of the anticipated transport distance that applies. The relevant Commerce Commission paragraphs are copied in Appendix 4 and clearly shows the influence and role of distance, and that distance should not be ignored.

118. Dr Meade does not present any Auckland-specific distances, thresholds or an analysis regarding why a different transport distance should apply in the Auckland context.

119. Dr Meade summarises the probable sources[67] but he omits any analysis of distance and transport costs. Essentially, the approach is to simply summarise (list) alternative sands as probable sources[68] and then draw conclusions about future sand availability without any consideration of distance.

120. I acknowledge that the distances are not absolutes, but this offers insight into existing patterns in Auckland. For context, the average distance[69] from the Mt Rex depot near Helensville to concrete plants that use Kaipara sand is 45km.

121. Work by the Infrastructure Commission[70] shows that the cost of transporting aggregate can be a major factor in the cost of some infrastructure projects. The Infrastructure Commission reports that the cost of aggregate (rock) doubles every 37km. While this example is for aggregate, not sand, the key

[66] Dr Meade: para 77 – 78.

[67] Dr Meade: Table 3, para 79

[68] As sourced from BECA.

[69] Response to RFI 2: para 12.

[70] New Zealand Infrastructure Commission Te Waihanga. (2021). *Infrastructure resources study*. Link. Page 21. Footnote 34.

principle remains i.e., the transport function is a key driver of cost and it influences infrastructure budgets.

The distance from concrete plants to sand sources in Auckland appears to hit a threshold at around 60-70km (see Appendix 5) for most plants. Across Auckland's concrete plants, the existing transport distances indicate two natural breaks in the profile:

a. More than 70% of plants source sand from sources located closer than 50-60km.

b. The upper limit for the practical market access appears to be around 60-70km. Less than 10% of concrete plants access sand located further than this threshold.

122. At the upper limit, two plants (Bridgeman Avondale and Bridgeman East Tamaki) are sourcing sand from more distant sources (near Tomorata). Historically, these two plants relied on Pakiri sand but have had to shift to Tomorata sand even if it is further than the Kaipara resource[71].

123. The reason for this appears to be linked to the competitive nature of the concrete market. Bridgeman Concrete Limited (BCL) competes against Altas Concrete Limited and Mt Rex Shipping is controlled by the owners of Altas Concrete Limited. Mr Bridgeman indicated that there are strategic and supply chain risks associated with obtaining a critical input from a party that is related to his competitor[72]. In addition, historical developments means that BCL had to secure sand from an alternative when security of supply issues emerged in December 2023 (when Mt Rex Shipping cut Bridgemans' sand supply when it ran out of sand)[73].

124. In the Economic Assessment, I use the Kaipara resource and then estimate the additional costs associated with servicing the market from this resource (assuming it remains legally accessible into the future).

[71] Mr Walters Evidence in Response to Section 53 Submissions: para 16.

[72] Mr Bridgeman's Affidavit in support of the MBL Pakiri Environment Court case (para 9 -12).

[73] Mr Walters Evidence in Response to Section 53 Submissions: para 16a.

125. I remain of the view that it is inappropriate to consider sources as far away as Hamilton-Cambridge and Papamoa as credible alternatives as Dr Meade does in his analysis.

Partial and selective analysis

126. Dr Meade asserts that because the assessment includes environmental and social avoided costs, all other environmental and social (and cultural) effects must also be included[74]. The Economic Assessment uses standard methodological approaches to quantify the avoided costs. The point about including the other effects is, in effect, the same as requiring a full CBA. As indicated earlier, I disagree[75] with Dr Meade regarding such a requirement.

127. As mentioned earlier, Dr Meade invokes Total Economic Valuation (**TEV**) specifically to expand the cost side of the ledger to include:

    a. Cultural values;

    b. Amenity impacts associated with existence; and

    c. Bequest and option values.

128. Crucially, if a TEV structure is applied (which I do not believe is necessary), then the same must be done for the benefits of the enabled activities i.e., the sand market in Auckland infrastructure investment landscape, and how the project (relative to other sand options) reflect the TEV components. Dr Meade does not do this. A full TEV would need to show:

    a. Option values for securing Auckland's future concrete sand supply,

    b. Existence value of knowing the city's construction sector has supply resilience,

    c. Bequest value of infrastructure built using locally sourced materials.

    d. The cost (adverse effects) associated with the alternatives.

[74] Dr Meade: para 104.

[75] Discussed above starting at para 23.

129. Dr Meade draws on the TEV tool to highlight potential environmental and cultural costs, but he does not do the same for the benefit side. To be consistent when applying the TEV tool, he needs to also reflect Te Akau Bream Bay's other values, such as the positive use and option values relative to alternatives. Table 1 provides examples of the matters to consider if a TEV tool was used.

Table 1: TEV type considerations

Value	Comment
Direct use values:	Need to reflect that value of having access to a critical construction input that can support a 28% to 36% of Auckland sand demand (Dr Meade's figures re high strength concrete). The direct use value can be estimated by illustrating the Dollar-value of sand sold in Auckland. Over 35-years, this use value is estimated at between $1.1bn and $1.2bn (present value at 2%)
	Supporting Auckland's construction sector that accounts for a material share of the city's GDP. The specific share varies depending on the business cycle (YE-March 2025) – the sector generated $10bn of GDP.
	Supporting the operation and functioning of the sand market
	The cost of accessing sand for alternative options (transport costs, cost of resource, infrastructure etc. as reflected in the Economic Assessment)
Option value	Value of having geographically diverse sand supply – capture the Dollar-value of having different sources, including the competitive effects.
	Values associated with having multiple sources (risk and resilience benefits) – estimating the potential value of avoiding the costs arising from disruptions and resilience.
Indirect values	The avoided cost of project delays, substitution towards inferior materials, or deferral of infrastructure investment that compounds over time.
	Having the option of accessing sand from different, entirely unrelated supply locations.
	The value of not relying on one large source for a material portion of Auckland marine sand leading up to (and beyond) the Kaipara sand consent deadlines.
Existence and bequest Value	There is existence value (to Aucklanders) in knowing that the material inputs for their city's housing, hospitals, schools, and transport infrastructure are sourced at competitive cost rather than imported or substituted at higher environmental cost.
	Future generations have an interest in inheriting infrastructure built to adequate standards using materials that were economically and logistically accessible during the construction period.

130. Applying the TEV framework and valuing the different aspects can be controversial because there are areas where valuing (monetising) the values will be subjective and difficult to measure. In addition to valuing the Bream Bay opportunity, a TEV assessment would need to be replicated for the alternative(s) to generate a sense of the comparative position, and how the community views the different options. As indicated in my RFI 2 (para 62), a Contingent Valuation (CV) assessment would be very difficult to design and implement. It would need to deal with different spatial scales and communities. I consider that using contingent valuation (CV) is likely to introduce even more uncertainty into the assessment.

131. For a TEV framework to be applied in a consistent manner, it needs to reflect the costs and benefits. Dr Meade presents examples, but these only relate to additional costs.

132. Dr Meade seeks to monetise some of the effects but there are conceptual and methodological issues in his examples[76]. He offers the following examples:

    a. Benthic[77] and fishing values;[78]

    b. Cultural values;[79]

    c. Amenity value;[80] and

    d. Risk of a marine accident.

Benthic and fishing values

133. Dr Meade uses the scallop fishery as an example of these values[81]. However, he assumes that a full recovery of the Bream Bay area will happen without the project. The timing of such a recovery or how realistic it is to obtain a 50t yield is not explained.

134. I have revisited the data[82] Dr Meade draws on shows that the average annual greenweight tonnage (**GWT**) of scallops landed in Whangarei between 1983 and 2025 has been 168t (slightly higher than Dr Meade's calculated average of 146t).[83] To put this value into context, since 2007/2008, the *median* annual GWT landed at Whangarei has been 4.5t. The 2016/17 to 2021/2022 period when the fishery was open saw the average landed GWT recorded at 47.8t. This relates to all scallop catch landed at Whangarei and does not represent

[76] Dr Meade: para 61.1.

[77] Dr Meade: para 131.

[78] Dr Meade: para 128.

[79] Dr Meade: para 130.

[80] Dr Meade: para 136.

[81] Dr Meade: para 132.

[82] Fisheries New Zealand. 2025. *Fisheries Assessment Plenary November 2025 – Introduction – Scallops Northland (SCA 1).* Ministry for Primary Industries, Wellington. Link

[83] Dr Meade: para 132.1.

the scallops sourced from the Bream Bay proposal area. In my view, using the values from more than 40 years ago, and applying the total landed catch from the entire quota area, does not portray the true scale of the opportunity cost.

135. I appreciate that Dr Meade is attempting to illustrate the potential opportunity cost. However, such an illustration must be based on realistic assumptions about the recovery profile and the anticipated yield. The assumed recovery and potential yields are highly speculative. SCA1 is closed for commercial and recreational fishing, and it cannot be legally accessed.

136. Mr Boyd discusses this uncertainty and the factors that influences it in RFI 1. He notes that:

    a. The future state of the scallop population is uncertain even if the Te Akau Bream Bay consent does not proceed and an increase in scallop numbers is not guaranteed[84]; and

    b. The areas where scallops are in high abundance are slightly inshore and west of the application area[85][86].

137. I consider the 50t volume that Dr Meade applies is not supported by historic patterns and unrealistic because that volume is unrelated to the application area.

138. Similarly, with the foregone customary take[87] the example assumes that take cannot continue in the presence of Bream Bay sand extraction. However, the scallop concentrations appear to be mostly outside the application area. Therefore, the opportunity costs that Dr Meade points to are not convincing.

Cultural values

139. Dr Meade discusses the cultural impacts of the proposal and uses several techniques to monetise some effects. While cultural impact assessments are

[84] Mr Boyd. Rfl 1. para 11.

[85] Mr Boyd. Rfl 1. para 9.

[86] Mr West. Rfl 1. para 56.

[87] Dr Meade: para 132.4.1.

beyond my expertise, I comment on the economic tools and techniques as applied by Dr Meade.

140. Dr Meade uses equity control premium (ECP) [88] to illustrate the potential value lost (loss of rangatiratanga) due to the proposal. He indicates that data limitations restrict his ability to use this approach. ECP uses profits as basis for estimating the value of having a controlling stake in a business venture. However, the ability to access the sand is a pre-requisite for generating any sales and therefore profit. In this context, the ECP is subject to consent being granted and without consent, the ECP is effectively zero. Dr Meade's suggested approach is subject to the outcome he is opposing.

141. It is unclear if Dr Meade is presenting the ECP approach as a 'Willingness to Accept' type measure or how he wishes to apply it in the current context. In my opinion, I would caution against using a financial metric such as ECPs to equate cultural values in monetary terms.

142. On the same basis, in the Economic Assessment,[89] the cultural contribution is presented. Care is taken to highlight that the contribution is intended to recognise the cultural relationship of iwi with the moana and sand resource. It is not used as measure to value cultural impacts. Dr Meade questioned the economic justification for the level or composition of the contribution and requests an explanation of how it adequately addresses the project's adverse cultural impacts. As indicated in the Economic Assessment, the contribution is offered on an *augier* basis – that the applicant is offering an undertaking and it is not derived at via an economic assessment attempting to value adverse cultural impacts and then offer compensation.

143. Dr Meade uses an alternative approach to put a Dollar-value on the cultural impacts[90]. As indicated in the Economic Assessment[91] the basis for the 1% parameter is not indicated. I note that Dr Meade does not present any foundation or basis for the other variables in the calculation:

[88] Dr Meade: para 53-56.

[89] Economic Assessment: para 212-213.

[90] Dr Meade: para 57-61.

[91] Economic Assessment: para 211.

a. the rationale for, and appropriateness of, using the cost of a minor injury associated with a car accident,

b. If any adjustments were made to the population (number of people) used in the calculation,

c. why the impact is assumed to be felt annually for the duration of the consent, and why it is not treated as a one-off impact. The parameter Dr Meade applies reflect the impacts already reflect temporal effects.

144. I understand Dr Meade's logic and I acknowledge that he labels it as 'illustrative'.[92] However, the assessment is highly speculative and not grounded in robust values or supporting evidence.

145. Further, it is unclear if, or how, Dr Meade reflected the findings outlined in the Cultural Impact Assessment prepared for Te Pouwhenua o Tiakiriri Kokupa Trust t/a Te Parawhau ki Tai,[93] including the mutually beneficial arrangements, scholarships, training environmental funding and partnership agreements[94]. A balanced assessment would need to also include these arrangements.

Amenity values

146. With reference to monetising residents' amenity value, specifically residents' knowledge of extraction, Dr Meade draws on a paper that used a hedonic price model to estimate the price impacts of different attributes on house prices. He then applies the "attractive immediate surrounds" factor in that paper and applies it to houses in Te Akau Bream Bay.

[92] Dr Meade: para 60.

[93] Cultural Impact Assessment. Attachment 22 accompanying the Substantive Application. Prepared for: Te Pouwhenua o Tiakiriri KOkupa Trust t/a Te Parawhau ki Tai. 14 January 2026. Link.

[94] Cultural Impact Assessment. Attachment 22 accompanying the Substantive Application. Link. Page 110.

147. As indicated in the Economic Assessment[95], none of the variables in the paper can be used in the current context and the parameters are not transferable. The study considers three variables to reflect aesthetic externalities:

    a. Water view;

    b. Appearance of nearby improvements; and

    c. Quality of landscaping in the environment.

148. He dismisses my concerns regarding the appropriateness and suitability of transferring the values in the cited study to the Te Akau Bream Bay case[96] by indicating that the parameters are from a "peer-reviewed study". He adds that the parameters he applied are associated with the "attractive nearby neighbourhood"-variable (not the water view-variable).

149. This variable captures "the quality of the structures in the immediate vicinity of the property". The study refers to "structures" and is not associated with marine activity. Two aspects are important: "structures" and immediate vicinity. Neither are defined.

150. I interpret structures as implying buildings or built dwellings. The study does not define the spatial extent of *immediate* vicinity. It is worth nothing that the MBL activities would be at least 4.7km from Ruakākā beach, 6.3km from Waipu Cove and approximately 6.9km from Lang beach.[97]

151. Further, the proposed activity must be considered in the context of the time, duration of activity as well as other activities in the embayment such as commercial shipping. There are difference sources for the number of vessels operating in/moving through the proposed area.

[95] Economic Assessment: para 208.

[96] Dr Meade: para 136.

[97] McCallum Brothers Limited. (2026, January). *Te Ākau Bream Bay Sand Extraction Project: Resource consent and wildlife approval applications and assessment of effects under the Fast-track Approvals Act 2024*. Fast-track Approvals. Para 1.4.

a. According to the Ministry for Transport[98], in 2025, there were 243 vessels that visited NorthPort[99], down from the peak of 379 in 2020.

b. The Navigational Safety Effects assessment[100] by Mr Goodchild reports data for commercial vessels through the Bream Bay area for the past decade. Mr Goodchild reports that there were 443 ship movements through the Bream Bay area in 2023/24.

152. The two sources cover different ship movements and periods but both show that there is existing maritime activity that forms the background activity. The *William Fraser* will operate for a maximum of 3.5-hours, for a maximum of 5 days per week. The consent will operate against a background of existing vessel movements and anchorage times near Northport. Consequently, I find it difficult to reconcile Dr Meade's use of immediate vicinity and the values he applies in his assessment to the current context.

153. I remain of the view that drawing on the referenced study is inappropriate because it does not reflect the potential impacts of Te Akau Bream Bay. In terms of using the parameters to reflect the 'knowledge of' matter, I do not consider the use of the metric as robust or appropriate.

Risk of a marine accident

154. The final component in Dr Meade's examples to populate a TEV structure further highlights challenges with this tool. While we agree that there are risks of a marine accident, expressing the risk in monetary terms is challenging. In my view, Dr Meade's calculation is highly unreliable.

[98] Sourced from Ministry of Transport's Freight Information Gathering System. The data can be accessed from: Link.

[99] The data relates to the movements associated with NorthPort and excludes movements associated with marine activity towards the upper harbour e.g., Port Nikau Marina and Port Whangarei Marine Centre as well as recreational vessels. In addition, the data excludes domestic ships and fishing vessels.

[100] Goodchild, B. *Assessment of navigational safety effects* (Version 1.4). New Zealand Fast-track Approvals. Link. Date accessed: 27/07/2026.

155. Dr Meade[101] uses the *MW Rena* as basis for calculating the potential clean-up cost of a marine accident associated with the *William Fraser*. I appreciate that Dr Meade notes that his estimates portray a 'worst case scenario' but the estimates appear unreliable and not representative for several reasons.

156. He assumes that the clean-up cost could be in order of 10% of that associated with the *MW Rena.* The foundation for the 10% assumption is unclear. The following points are relevant when evaluating the 10% assumption:

    a. Fuel is a major contributor to the clean-up costs with fuel type and volume playing a role. The *MW Rena* used heavy oil[102] and the William Fraser uses diesel. The *William Fraser'*s working capacity is less than 2% of the MW Rena's fuel capacity.

    b. The volume and nature of the cargo can influence the size of a clean-up effort. The *William Fraser's* capacity is 40TEUs[103] compared to the *MW Rena's* 3,351 TEUs. For scale, the *William Fraser's* cargo capacity is 1.2% that of the *MW Rena.* In the Bream Bay instance, the cargo will be marine sand so the potential impacts from a cargo perspective is likely to be limited.

    c. In terms of Gross Tonnage (GT) the *William Fraser* is 0.4% that of the *MW Rena.*

157. Consequently, there is little reason to believe that the 10% limit that Dr Meade uses in his calculation is realistic.

158. In terms of the annual probability of an accident, Dr Meade uses the age of the *Aratere* as basis for calculating the annual risk that ships face. The Transport Accident Investigation Commission's (TIAC) report into the grounding did not find any relationship between the *Aratere's* grounding and her age. The TIAC

[101] Dr Meade: para 140.

[102] The *MW Rena's* fuel is mostly 88% heavy oil.

[103] Information received from MBL.

found no evidence[104] that a mechanical failure contributed to the accident. I acknowledge that Dr Meade estimates the implied risk and that he scales this down by half (to 2%) in his calculation. However, this ratio remains improbable and there is no credible basis for the way he uses it.

159. Over a three-week period (ending 03/06/2026), fifty unique vessels visited Ports of Auckland. Applying Dr Meade's 2% rate suggests that at least one of these vessels will have an accident this year (at least one every year for this sample).

160. I could not find specific risk-profile data for barges such as the *William Fraser*. However, by combining data from international reports,[105] [106] I estimate that at a global level, the risk of a vessel[107] being involved in an accident is 0.01%. This is materially different to the value (2%) put forward by Dr Meade. For context, MBL has a clean accident record and has never run aground or caused on oil spill in over 80 years of operation[108].

161. Apart from issues around the data appropriateness, Dr Meade is combining two different metrics. The MW Rena was a complete loss, and the *Aratere* was a grounding. It is inappropriate to combine the risk profile of a grounding to the cost associated with a loss.

162. In terms of his comparison, there is a calculation error. When he estimates the annual value, he divides the discounted value by 35-years to get an annual value. Best practise is to use undiscounted values. Using the discounted value reduces the annual value.

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[104] Transport Accident Investigation Commission. (2026). *Passenger and freight ferry Aratere grounding, Titoki Bay, Picton, 21 June 2024 (Inquiry MO-2024-204)*. Wellington, New Zealand: Transport Accident Investigation Commission. Link. Para 4.1.

[105] DNV. (2025). *Maritime safety trends 2014–2024: Preparing for future risks*.

[106] Allianz Commercial. (2025). *Safety and Shipping Review 2025: An annual review of trends and developments in shipping losses and safety.* Allianz Global Corporate & Specialty SE. Published May 2025. Munich, Germany.

[107] Including vessels with >100GT, so including the *William Fraser.*

[108] Mr McCallum. Evidence in Chief. Pakiri Offshore Consent Application. Para 55.

163. The above points highlight the material weakness in Dr Meade's calculations. While I acknowledge that he presents the estimates as indicative, the values are too speculative to be relied upon in the FTAA context.

Other points

164. In the Economic Assessment[109] I comment about the scope of Dr Meade's assessment, [110] specifically that the scope does not reflect the purpose of the Act relating to facilitating the delivery of infrastructure and development projects with significant regional and national benefits.

165. In the Economic Assessment, I incorrectly refer to the purpose of the Act as facilitating 'investment', and not infrastructure as is the case. Despite this misstatement, my review of Dr Meade's assessment is in fact based on the purpose of the Act, i.e., about facilitating infrastructure and development projects.

166. I remain of the view that Dr Meade's scope of work, and his review of the Economic Assessment, does not engage with the key question: i.e., will enabling Te Akau Bream Bay sand extraction support (or facilitate) infrastructure or development projects with significant regional or national benefits. Instead, Dr Meade critiques the analysis and the size of the benefits. He also questions the importance of concrete.

Response to Mr Green from Axion Economics

167. Mr Green provides an economic report in support of Bream Bay Guardians. Mr Green notes that he has limited experience in the concrete and sand markets.[111] He states that due to time limitations, he did not examine my approach regarding the demand assessment and the per capita sand demand approach in detail.[112]

[109] Economic Assessment: para 186.

[110] This relates to his earlier report (see para 43).

[111] Mr Green: page 2.

[112] Mr Green: page 4.

168. My review of his report did not reveal any quantitative analysis or assessment of the sand market in Auckland. Consequently, it is difficult to put weight on the specific observations he makes about:

    a. The market;

    b. The anticipated growth outlook;

    c. Underlying dynamics; or

    d. Potential shifts.

169. I respond to Mr Green's comments and observations under the following headings:

    a. Demand projections;

    b. Availability of alternatives;

    c. Transparency and information availability;

    d. Transport cost savings approach;

    e. Private vs public costs;

    f. Emissions Trading Scheme;

    g. Traffic risks (social costs), and

    h. Other points.

Demand projections

170. Despite not reviewing the demand projections in detail, Mr Green makes several assertions about the projections, including:

    a. that the relationship between population and per capita sand consumption has not been tested;

    b. that the underlying data are not fully disclosed, and

    c. that future construction practices might change.

171. Mr Green lists his concerns, but he does not offer his own analysis of these matters to indicate the magnitude of any difference between us.

172. Mr Green asserts that: "Over long periods, total construction activity may well tend to scale with population once cyclical booms and downturns are averaged out".

173. I list the sources I used for ready mix concrete [113] and I outline the approach followed to estimate the per capita ratio. I report several timeframes over the past 25 years[114] to illustrate the spread and variation in demand patterns to illustrate how use patterns have varied over time and remained rangebound. I accept that uncertainty is a function of any forward-looking statement or projection, but this situation is not unique in the current situation. The information I presented in the Economic Assessment is provided with the aim of illustrating the uncertainty and potential spread of outcomes under different scenarios. A scenario approach is an accepted way to deal with uncertainty.

174. I agree that it is important to look through the effects of boom-bust movements. My evaluation of the historic concrete poured information does exactly as Mr Green suggests. This point is addressed in the Economic Assessment, where I report the average observations across different:

    a. 5-year periods;

    b. 10-year periods;

    c. 20-year periods;

    d. Median over 20 years (excluding the Covid disruptions).

175. If I understand Mr Green's comment about the need to look through the boom-bust periods correctly, then my methodology is consistent with his suggested approach. I report the observed concrete use rates over different years, and for different timespans to look through boom-bust cycles.

[113] Economic Assessment: footnote 47.

[114] Economic Assessment: para 58 – 63.

176. In terms of the demand outlook, Mr Green argues that the amount of concrete (and therefore sand) that is used on a per person basis could decline going forward[115]. However, he does not provide any specific analysis in support of his position or an indication of the size of such a change. I take a conservative position based on actual, observed patterns – not a hypothetical position. For example, increased infrastructure spending, ad hoc post-weather event spending as well as a step change in spending associated with improving resilience to natural hazards could in fact increase concrete and sand demand above historic patterns. I take a conservative position and do not capture these additional demand drivers in my demand projections even if the required lift is signalled in work by the Infrastructure Commission. Capturing such changes would require a degree of unwarranted speculation.

177. I acknowledge that there is a degree of uncertainty and I use a scenario approach to illustrate the potential spread of outcomes. The scenarios combine different variables:

    a. Two population growth projects, and

    b. Two sand per capita ratios.[116]

178. While Mr Green does not present his own demand projections, he references the BECA report.[117] He adopts the demand position without any forward-looking adjustment to account for growth and/or other modifications to reflect his view about declining (or shifting) sand per capita demand projections.

179. As reported (para 32 above) my demand estimates are broadly consistent with the information in the BECA report. Therefore, despite critiquing the demand projections in the Economic Assessment, the base values are consisted with those in the BECA report that he relies on. Of course, BECA does not include a temporal assessment.

[115] Mr Green: page 5.

[116] Economic Assessment: para 58 and para 61.

[117] The July 2025 version.

Availability of alternatives

180. The second part of Mr Green's comments relate to the supply situation, specifically the availability of alternatives. He asserts that it is flawed to equate supply with consented volumes.[118] He asserts that it is wrong to assume that if a sand extraction consent expires, then it would no longer be available to the market. In addition, he indicates that other operations might enter the market[119].

181. He uses the Kaipara sand resource as an example to explain his position and makes several material statements. He states that:

    a. The Kaipara resource is strategically important (presumably due to its scale);

    b. If the Kaipara consent renewals are declined due to the environmental or cultural effects, then those same 'broad categories' of adverse effects would apply to the Bream Bay application.

182. He questions why any forecasting approach would assume zero probability of the availability of a strategically import resource such as the Kaipara.

183. Mr Green's proposition is that unconsented sand volumes must be included in the analysis. Essentially, this would entail evaluating a hypothetical future supply situation that depends on regulatory decisions that have not been made. There is no guarantee that the Kaipara resource, or any unconsented source, would obtain the necessary approval(s) to legally operate. Mr Green is for asking for a highly speculative analysis of future outcomes regarding matters such as:

    a. Whether an application will be made;

    b. The environmental and cultural assessment of that specific application;

[118] Mr Green: page 5.

[119] Mr Green: page 6.

c. The views of affected parties, including local communities, iwi and hapū;

d. The regulatory and political environment at the time of assessment;

e. The specific conditions any consenting authority might impose, and

f. Whether those conditions can be met commercially.

184. I consider it inappropriate to include unconsented sources in the economic assessment. This is not a methodological preference. It influences the economic assessment. The assessment must reflect the relativity of the activity against the sand market as it legally exists, not some hypothetical situation.

185. Including the hypothetical scenario based on unconsented sources introduces circular arguments. If unconsented supply can be counted as part of the supply, then the same logic can be used in other cases. Every sand extraction application in the Auckland region would face a counterfactual populated by every other unconsented possibility. Under this approach there would never be any necessity or significance because there would always be another unconsented possibility.

186. In another resource consent application[120] in the Waikato, Mr Green pointed to the Bream Bay FTAA as a "likely" source for concrete sand (for Auckland) as part of his opposition to that consent application. In addition, in that case, Mr Green discounted Waikato sources as potential options for Auckland due to the transport distance and costs but it is unclear if he still holds that view in the current context[121].

[120] RS Sand Limited. 77 Newcombe Road, Cambridge.

[121] To be fair to Mr Green, his comments were on one of the scenarios that I modelled for that resource consent application. In that scenario, I illustrated the implications on the Waikato sand market if a portion of Auckland's sand deficit is supplied using Waikato sand and the additional pressure that will be placed on the Waikato sand market. In that scenario, I do highlight the important cost implications and considerations, as well as the distance considerations. The scenario uses 131,000t of sand.

187. With reference to Mr Green's proposition regarding the Kaipara sand consent renewal, he states that the probability of the Kaipara consents being renewed is presumably very high[122]. Further, he states that:

> "It is difficult to conceive of a plausible scenario in which renewal of a strategically important resource such as Kaipara would be refused because the sand is no longer required"[123]

188. Apart from his assertions, Mr Green does not offer any quantitative analysis or assessment in support of his position. I assume that his view is based on the size of the resource and its supply patterns to Auckland. For context, at the time of renewing the Pakiri consents, that resource accounted for 38% of Auckland's sand sales. However, even at this level the renewal consents for Pakiri were declined.

189. Mr Green suggests that if the Kaipara consents were to be declined based on environmental or cultural grounds, then the same issues would apply in the Te Akau Bream Bay matter, and if this was the case, then Te Akau Bream Bay could not proceed based on environmental or cultural grounds. It is unclear why Mr Green doesn't apply the same logic between the Pakiri and Kaipara consents because there is also commonality between those two resources (e.g., fairy terns) and cultural considerations that would mean that the Kaipara consents have to be declined. While the environmental and cultural matters are beyond my expertise, I consider Mr Green's inference as misplaced – each consent is assessed on its own merits, and it is not appropriate to hypothesize the outcome of one consent based on the transfer of the attributes from another consent.

190. Mr Green presents his views about the market patterns in the aftermath of the Pakiri consents not being renewed.[124] He states that he has not seen any reports that the exit of Pakiri has resulted in acute sand shortages. He makes a factually incorrect statement when he asserts that MBL has not supplied any sand to the Auckland market for six months. In fact, MBL has continued to

[122] Mr Green: footnote 14.

[123] M Green: page 7.

[124] Mr Green: page 8, section 2.2.2.

supply Pakiri sand to clients from stockpiled sand, but the stockpile has now been exhausted (as of June this year). The sand supply challenges facing concrete producers in the face of security of supply issues are outlined by Mr Walters[125] and Mr Sawyer[126].

191. Regardless, the currently suppressed construction and building sector is masking potential supply issues. These will only become evident as the market shifts towards an upward growth trajectory.

192. Even in 2022, the quarry industry[127] warned that Auckland is facing an 'almost immediate crises' due to the potential loss of the Pakiri consents. The challenges and shortages[128] manifested in December 2023[129] when the market was busier than it currently is. Sand demand is currently below benchmark levels due to low construction activity which is masking sand supply constraints. Current ready-mix activity levels are between 15% and 20% down on the highs recorded circa 2021/22 in the post-Covid period when there was pent-up demand.

193. In terms of the market response that could be expected if a deficit in sand emerges, Mr Green sees market entry as one way the market could respond. The Te Akau Bream Bay application is a clear example of the type of market behaviour he envisages.

194. In terms of the available alternatives, Mr Green draws on the BECA report[130] by merely referencing the sources. He does not evaluate the options in terms of economic costs, location, timing/future availability, volumes or market attributes.

[125] Mr Walters' Evidence in Response to the Section 53 submissions: para 16 and para 22.

[126] Mr Sawyer's Evidence in Response to the Section 53 submissions: para 16.

[127] Aggregate & Quarry Association. (2022, May 8). *Auckland heading into a crisis with sand decision* [Media release]. Link

[128] Mr Sawyer's Evidence in Response to the Section 53 submissions: para 16.

[129] Mr Walters' Evidence in Response to the Section 53 submissions: para 16.

[130] MR Green: page 10.

Transparency and information availability

195. Mr Green's comments about transparency are broadly consistent with the position he expressed in an earlier report[131]. I have addressed these points in the Economic Assessment for the substantive application by:

    a. adding additional data and information;

    b. being more explicit about the methodology;[132]

    c. listing the sources (e.g. the New Zealand Transport Authority models and datasets)[133].

196. However, Mr Green's comments remain. I note that the NZTA sources and model are opensource but you must register to receive the necessary passwords.

197. Despite having access to the public information and parameters, details about the concrete plants that will be (assumed to be) serviced[134] and the sand quantum, Mr Green does not attempt to test the result or even undertake a 'back of the envelope' assessment. Such a test would have either confirmed or undermined my analysis even if only shedding light on the order of magnitude difference (i.e., by how much our estimates vary). Unfortunately, he does not present such a position.

198. Notwithstanding Mr Green's reservation about the methodology and data, the methodology is consistent with other (approved) consents, including Brookby Stage 3[135], Kings Quarry[136], as well as the Drury Sutton Block [137].

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[131] Green, H. (2025, February 12). *Bream Bay sand extraction: Assessment of economic effects* [Report]. Axiom Economics.

[132] In Mr Green's earlier report, he misinterpreted the methodology but the way I have calculated the effects are consistent with how he suggested they should be.

[133] Economic Assessment: para 123(a) and 123(b) and para 124.

[134] Economic Assessment: para 132.

[135] Assessed under the Covid-19 Recovery (Fast-track Consenting) Act 2020.

[136] Assessed under the Fast-track Approvals Act (2024).

[137] Assessed under the Fast-track Approvals Act (2024).

Transport cost savings approach

199. The methodology followed in the Economic Assessment regarding the transport cost savings is discussed. According to Mr Green, the issue is not that the transport cost savings are inconceivable.[138] Instead he indicates that the method used to estimate these costs does not meet basic standards of economic analysis.

200. I am unsure what he uses as basis for this view because my methodology draws on, and is consistent with, NZTA methodologies and approaches.

201. Mr Green presents his view about the structure an assessment of transport costs should take, covering:

    a. The logistics chain;

    b. The destinations and volumes;

    c. Origin-destination matrix;

    d. Unit cost assumptions;

    e. Time and variability, and

    f. Disclose working and sensitivities.

202. I can confirm that the assessment aligns with Mr Green's structure, but I note some parts are, in my view, presentational and not part of the calculation steps.

203. The following points are noteworthy:

    a. The full logistics chain is considered but only the direct transport costs associated with the road freight component is assessed. This ensures that the 'net difference' is considered.

    b. The destinations are based on the assumptions outlined in the Economic Assessment. Mr Green suggests that existing offtake

[138] Mr Green: page 13.

arrangements could be used to model the transport costs. No such arrangements currently exist because access to the sand is unconsented. However, the distribution patterns are based on MBL's historic supply arrangements with the relevant plants. These arrangements can not be disclosed because of confidentiality[139].

c. The origin-destination matrix underpins the calculation. The origins are seen as the depot at Ports of Auckland[140], and the Mt Rex depot near Helensville. The distances to the plants are straight forward to calculate using opensource tools such as Google Earth,[141] or tools such as GIS (or R). The analysis is based on the distance to the individual plants (from Port of Auckland or Mt Rex for the principal alternative). The analysis is not, as Mr Green implies[142], based on one single average value.

204. I do not consider Mr Green's last three points (as per para 199) as necessary in the current context. These points add complexity that will only widen the uncertainty bounds without enriching the insights into the benefits that the proposal will deliver.

205. With reference to the unit cost assumptions, only the transport function is considered because the other parts that Mr Green suggests are unnecessary since these are the broadly same for the different options. For example, the cost to load sand onto a truck using a digger is similar regardless of where it occurs.

206. For cost change over time, no inflationary changes are included. Using constant prices and ignoring inflationary increases mean that a conservative posture is maintained. The transport costs are not adjusted for aspects such

[139] Such disclosure is market sensitive and would enable competing concrete plants to derive insights around volumes, market shares and production activities by reverse engineering the data. Further, the data is commercial in confidence.

[140] Economic Assessment: para 132-136.

[141] The Economic Assessment used QGIS and Google Earth to estimate the road distance.

[142] Mr Green: page 13.

as fleet changes (e.g., shifts to electric vehicles) or fuel/diesel price changes[143]. Electric trucks account for less than 1% of the truck fleet[144]. Work completed for the Ministry of Transport[145] shows that the uptake of electric truck vs diesel trucks is expected to remain slow until the cost of low emission vehicles (trucks) aligns with diesel trucks. But it is expected to remain relatively low. Regardless, the emission factors[146] used to estimate the value of emissions captures the effects of vehicle technology over time (i.e., emissions reducing).

207. However, for the transport cost, fleet changes are unlikely to change the cost per kilometre because it is doubtful that fixed costs (labour, capital as well as aspects such Road User Charges) will come down over time.

Private vs Public benefits

208. In Section 3.3, Mr Green outlines his views regarding the transport costs and indicated that in his view these are merely a saving to the supplier. He states that whether that saving becomes an economic benefit depends on what happens to it once it arises. Put differently, the issue relates to whether those savings are passed through. Mr Green outlines the mechanism through which the cost saving translates into benefits i.e., if the cost savings are passed on/passed through.

209. He states that there is no reason why such pass through should occur and indicates that one outcome could be that suppliers simply hold on to the savings. The degree to which pass through occurs is a function of the market structure and competitive landscape. The nature of the sand market influences the degree to which pass through can be expected. As mentioned, only the direct transport cost change is estimated. Concrete sand has specific technical specifications (based on the anticipated use) and concrete producers are not passive commercial entities. Concrete producers have strong

[143] These changes apply equally across all options.

[144] New Zealand Ministry of Transport. (2025, May 8). *Road user charges exemption for heavy electric vehicles* (OC250412). Link.

[145] Ipsos New Zealand. (2024, July 31). *Heavy vehicle operator understanding report*. Prepared for the New Zealand Ministry of Transport. Link.

[146] Published by NZTA.

incentives to minimise input costs and negotiate accordingly. Mr Green does not offer any evidence about why a high level of cost pass through would not manifest. However, Te Akau Bream Bay would add another marine sand source to the market to compete against existing marine sand suppliers.

210. However, the Economic Analysis[147] makes it clear that direct transport costs relate specifically to the transport costs and compares the Te Akau Bream Bay option with the Taporapora source.

211. As mentioned, sand is a low value, high volume good and transporting it is expensive. The issue is not whether MBL passes the cost savings on. Supplying the market via Te Akau Bream Bay is more efficient than the alternative. By enabling the proposal, Auckland's sand market can access sand at lower total delivered cost than counterfactual sand from Kaipara.

212. The cost saving reflects real resource savings based on a smaller overall transport function with less:

    a. Kilometres travelled;

    b. Fuel consumed;

    c. Vehicle wear; and

    d. Infrastructure use.

213. The Dollar-value of the transport saving captures the value associated with these factors.

Emissions Trading Scheme

214. Mr Green suggests that the emissions costs saving that I have modelled are incomplete because the reallocation of emissions due to freeing up carbon units is not included[148]. Essentially, Mr Green's position appears to be that the Emission Trading Scheme (ETS) covers emissions and therefore emissions cost

[147] Economic Assessment: section 4.2, para 121 and 122.

[148] Mr Green: page 21.

should be excluded from the assessment, or at least the national redistribution of emissions due to the ETS should be modelled.

215. The ETS is one of many government policies and instruments aimed at reducing emissions to meet climate targets. However, New Zealand Units (NZU[149]) is the 'cost of emitting' and does not reflect the externalities of emissions (e.g., health costs).

216. As part of my analysis, I estimate the transport emissions, and I express the value of those emissions in Dollar-terms by capturing the wider associated effects. The emissions calculations are based on the standard methodology and parameters as published by the New Zealand Transport Agency Waka Kotahi, and data published by the Ministry of Transport and New Zealand Treasury.

217. Focusing solely on the ETS excludes transport-related air pollution impacts on human health, with effects ranging from respiratory irritation, wheezing, and coughing through to more serious respiratory and cardiac conditions leading to increased hospitalisations and premature death. The emissions cost in my assessment covers these matters.

218. In my view, understanding the value of these effects is critical when considering the economic effects of a proposal. It would be remiss and inappropriate to ignore these costs.

219. Mr Green indicates that my calculated emissions savings falls short from his approach. He asserts that the assessment should not only consider the situation of Bream Bay vs Kaipara, but also the all the consequent adjustment across the entire New Zealand economy in response to the 'saved' emissions[150]. He goes on to say that the effect of the Bream Bay application (vs Kaipara) depends on where the saved emissions are then used. If those saved emissions are then used by another emitter with a higher overall emissions profile than the Bream Bay use, then the environmental effects could even be negative.

[149] This is the price unit to emit one tonne of carbon dioxide equivalent (CO_2-e).

[150] Mr Green: page 22-23.

220. Accepting Mr Green's position means that it is agreed that there are conceptual flaws in the standard NZTA methodology and that no transport project can be assessed using it. Further, it would mean that any project that results in saved/avoided emissions would need to be evaluated at a national level with the future/alternative allocation of NZUs considered.

221. In my opinion, such an evaluation envelope is unnecessarily wide and diverts attention away from the options analysis (comparing alternatives at a project option level) to speculating about NZU allocation across sectors in the overall economy. Further, I am not aware of any assessment that has attempted to assess such re-allocation.

222. Mr Green raises a fair point about the health effects of emissions and that these are influenced by the area through which the truck travels.[151] The health effects assessment, specifically the incidence rates used to estimate the health costs differentiate between urban and rural areas. Consequently, the type of differentiations that Mr Green is referring to are captured. Mr Green's assertion that the Economic Assessment does not engage with this issue[152] is incorrect.

Traffic risks (Social costs)

223. Mr Green takes a similar position about the calculation of social costs as he does with the emissions costs. He makes several statements[153] about the routes, commenting about the number of other users, road traffic volumes and intersections to consider as part of the social cost calculation. He expects that this urban environment would present a higher accident risk than routes through less congested areas, even if those routes involve longer distances.

224. Mr Green considers the routes from Ports of Auckland to concrete plants and then indicates that the likely transport routes could instead increase accident risk and associated harm. I am unclear what this is based on, and what alternative sand source he is using. However, other factors such as speed, and

[151] Mr Green: page 22.

[152] Mr Green: page 22.

[153] Mr Green: page 25.

road design also play a role. The roads around Auckland Port have been designed to accommodate heavy traffic, and the Pakiri sand was delivered to concrete plants from the Port. If the Kaipara sand is the alternative, then the sand will need to travel on SH16 through West and Central Auckland to the concrete plants in central and southern Auckland.

225. I am unaware of specific metrics and parameters that differentiate the risk factors between urban and rural environments. For context, the risk incidences for the different impacts (fatalities, serious injuries or minor injuries) are expressed on events per 100 million kilometres travelled.

Other points

226. Mr Green highlights a discrepancy in my reporting of the environmental costs that are avoided.[154] In the Economic Assessment I provide a breakdown of the avoided costs, reporting the environmental cost savings as $104m consisting of:

    a. Shadow price of carbon $34.4m, and

    b. Health related costs $78.2m.

227. These two items sum to $112.7m (the values are rounded so do not sum exactly). The total avoided costs of $383.1m remains unchanged.

Comments regarding manufactured sand

228. Manufactured sand is often held up as a substitute for marine sand when producing concrete. Manufactured/engineered sand is included in the BECA Executive Summary[155] and the manufactured sand operation at Brookby Quarry is held up. BECA reports the production capacity as 210,000m^3 per year. In addition, the potential to expand to 420,000m^3 is also noted[156].

[154] Mr Green: footnote 27.

[155] BECA Executive Summary: page 4.

[156] BECA does not reference the sources used. Public information on Brookby Quarries Ltd's website reports the production capacity using a different unit, i.e., tonnes per annum. The reported values

229. I have reviewed the values on Brookby Quarries' website. Using the weight (tonne) and conversion ratios/data[157] on Brookby Quarries' website suggest that the correct figures should be:

    a. 300,000t converts to 176,470m^3

    b. 500,000t[158] converts to 294,117m$^{3.}$

230. It is unclear how the 210,000m^3 and 420,000m^3 reported by BECA has been derived but I acknowledge that there are several different references to Brookby Quarries' capacity with some quoting a 600,000t production capacity –which converts to 352,941m^3. Using higher values inflates how much manufactured sand is available to the market. In addition, the manufactured sand that is available to the natural sand market (as a substitute) must also be adjusted to ensure that a comparison does not inappropriately assume direct substitutability across different inputs. In other words, natural sand relates to a specific portion of the fines component and it is not necessarily the case that manufactured sand replaces the natural sand component. It can also relate to/substitute the PAP7 component[159].

231. BECA notes that pressure on the construction industry to reduce emissions and increase resource efficiency could drive increased awareness and use of manufactured sands. While I agree with the pressures regarding emissions, the entire supply chain is normally considered, not just one part. Apart from highlighting the statement, BECA does not outline the implications or how it relates to the marine sand vs manufactured sand context. In my view, when considering the potential effects of manufactured sand against marine sand, the overall supply chain and energy use must be considered. This includes all

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are: current capacity is 300,000t and Stage 2 will be able to produce 500,000t. Link (date accessed: 23/06/2026). Another article states that the expansion capacity is 600,000t (Link, date accessed: 23/06/2026).

[157] 1.7tonne per m^3.

[158] Some sources quote the potential capacity as 600,000t. Brookby's website (link) states that that it can expand sales volumes to 500,000t (date accessed: 6/07/2026).

[159] Discussed further in para 237.

steps, such as screening, crushing, washing as well as distribution and any waste streams.

232. Mr Green and Dr Meade both draw on the BECA report's reference to manufactured sand.

233. Apart from referencing Brookby Quarries' manufactured sand, Mr Green does not present any additional information or discussion on this topic.

234. In contrast, Dr Meade presents a calculation[160] to illustrate that the scope for manufactured sand to substitute marine sand is much greater than my analysis suggests. Dr Meade appears to use the PAP7 component of a concrete mix and bases his calculation on this part.

235. I draw on Mr Donoghue's information for the percentage shares that Dr Meade uses. PAP7 should not be confused with the fines portion associated with natural sand.[161] It appears that Dr Meade is erroneously[162] equating natural sand to PAP7.

236. Dr Meade's calculation assumes that because an engineered manufactured sand can replace the PAP7, and PAP7 constitutes 21% of a 30MPa concrete mix by volume, that 21% of the finer aggregate demand in high-strength concrete is therefore substitutable by manufactured sand. Importantly, the finer aggregate portion relates to PAP7 and not natural sand. Natural sand accounts for 17%.

237. PAP7 and natural sand are separate inputs into concrete manufacturing. Substituting an engineered manufactured sand for PAP7 will have only a limited effect on the overall natural sand requirement. As Mr Donoghue[163] indicates, engineered manufactured sand is not a complete replacement for natural sand[164]. As indicated in the Economic Assessment, manufactured sand

[160] Dr Meade: para 33-35.

[161] Economic Assessment: para 92.

[162] Pointed out in the Economic Assessment: para 200.

[163] This point is confirmed by Mr Sawyer in his response to Section 53 submissions: para 9.

[164] Mr Donoghue's response to Section 53 submissions: Para 17 and Para 21.

is already used in concrete as the PAP7 component. Dr Meade's calculation[165] does not reflect the appropriate portions of the concrete mix i.e., the natural sand component. Dr Meade focuses on the PAP7 component where manufactured sand is already used and not the relevant natural sand component.

238. In terms of the substitutability of marine sand with manufactured sand, Dr Meade does not appear to question the quality advantage that marine sand enjoys or the market preference for it. Instead, he minimises the (concrete) industry risks that would materialise in the absence of sufficient or disrupted natural sand supply.

239. In my view, this line of reasoning is unhelpful because it does not offer any insight regarding the significant benefits that enabling Te Akau Bream Bay will deliver. Dr Meade's reasoning simply suggests that manufactured sand could be used as a substitute. He does not illustrate the scale of benefits (if any), or the risks, that such an approach would deliver relative to the Te Akau Bream Bay application.

240. A more minor point, Dr Meade records Brookby Quarry in the Northland table[166] and he references the BECA report. I do not have the most recent BECA report, only the Executive Summary where Brookby Quarry is shown to be in Auckland[167].

241. In the Economic Assessment, I considered a speculative scenario that uses a blend of manufactured and natural sand[168]. This scenario shows that using manufactured sand adds costs to the concrete supply chain, that is, reduces the efficiency of the concrete production market relative to the Te Akau Bream Bay supply. This is because the transport costs using a blending of Brookby Quarry manufactured sand and natural sand from the Kaipara Harbour are

[165] In the Economic Assessment (para 200), I highlighted this issue in response to his earlier work. However, he did not adjust his calculation.

[166] Dr Meade: para 79.2 and Table 3.

[167] There are other spatial mischaracterisations in Dr Meade's statement. Tamahere Quarry is near Hamilton and not in the Bay of Plenty. Ausperl is also the Waikato.

[168] Economic Assessment: para 155 – 160.

greater than using sand sourced from Te Akau Bream Bay. Other factors are also key:

a. The costs associated with additional admixture to address pumpability issues,[169]

b. The costs associated with increased cement demand to achieve the required compressive strengths.[170]

242. In addition to the above, neither Mr Green nor Dr Meade engage with the economic effects of displacing aggregate (rock) for manufactured sand on Auckland's aggregate market. That is, where the rock used to manufacture sand will come from and what other users/uses will be displaced.

243. Auckland is in an aggregate deficit/shortage position, it imports rock from other regions. This shortage of locally available aggregate formed a central plank of the economic assessments under the Fast-track Approvals Act, including:

a. Drury Quarry Expansion – Sutton Block; [171] and

b. King's Quarry – Stages 2 and 3[172] [173].

244. The economic assessments for these two FTAA applications considered the aggregate market and did not evaluate the potential role of using the aggregate for manufactured sand.

245. I am currently engaged in economic assessments for other aggregate quarries around Auckland and I can confirm that:

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[169] Mr Walters Evidence in response to Section 53 submissions: para 25.

[170] Mr Walters Evidence in response to Section 53 submissions: para 26.

[171] Expert Panel. (29/01/2026). *Drury Quarry Expansion – Sutton Block: Decision report and conditions of consent (amended following minor corrections)* (FTAA-2503-1037). Environmental Protection Authority / Fast-track Approvals Act 2024. Link. Date accessed: 24/06/2026. Para 146.

[172] Expert Panel. (2025, 26 September). *King's Quarry extension project: Decision report and conditions of consent* (FTAA-2503-1031). Environmental Protection Authority, Fast-track Approvals Act 2024. Link. Date Accessed: 24/06/2026. Para 155.

[173] Market Economics Limited. (2025, October 16). *Kings Quarry – Stage 2: Assessment of Economic Effects*. Prepared for Kings Quarry Limited. Link. Date accessed: 24/06/2026. Page 20-22.

a. Auckland's aggregate market remains in a deficit position despite the approval of the Brookby, Sutton Block and King's Quarries;

b. The deficit is projected to grow over the next decade, reaching between -2.6m tonnes and -3.6m tonnes (based on the scenarios) and continues to increase into the future;

c. The deficit is expected to more than double by 2055 – reaching -6.5m tonnes to -9.2m tonnes by 2055.

246. Like sand, aggregate is a low value-high volume commodity and transport distance is a key determinant of price. Auckland is importing aggregate[174] from the Waikato and Northland. If a portion of Auckland's (locally produced) aggregate is used to manufacture sand, then that portion is displaced from aggregate use. Essentially, this means that the equivalent portion then needs to be imported from the Waikato or Northland. Interregional imports add transport costs as well as emissions and social costs.

247. Finally, manufacturing sand requires processing of raw material and crushing it into the required sizes and shapes. There are costs associated with such processing. Establishing the processing capacity/infrastructure requires a financial investment and a return on that investment that is recovered through product pricing. According to the AQA[175], the infrastructure requirement could add 20-30% to the cost of sand on top of any additional transport costs. The AQA notes that there might be downstream savings due to the quality of manufactured sand compared to river sourced sand. Importantly, the savings are relative to river sourced sand, not marine sand.

248. Brookby Quarries lists the price of manufactured sand as $60/t[176]. This is ex-quarry, meaning that the transport costs to where the aggregate is required must be added to the price. As indicated in the Economic Assessment[177], the price of sand (delivered) to Penrose is between $35/tonne and $45/tonne. This

[174] Economic Assessment: para 155-157.

[175] Aggregate & Quarry Association of New Zealand (AQA). (n.d.). *Manufactured sand*. Link. Date accessed: 24/06/2026.

[176] Brookby Price List: Link Date accessed: 27/07/2026.

[177] Economic Assessment: para 129.

highlights the comparative price position of natural sand against manufactured sand.

Comments on other Invited Parties' responses

249. The Panel extended invitations to comment to several other parties and I comment on the ones that are within my area of expertise, including:

    a. Infrastructure Commission Te Waihanga;

    b. Aggregate and Quarry Association, and

    c. Concrete New Zealand.

Infrastructure Commission Te Waihanga

250. The Infrastructure Commission[178] notes that it does not ordinarily comment on consent applications. The Infrastructure Commission offers three pieces of information:

    a. Infrastructure Priorities Programme,

    b. National Infrastructure Pipeline,

    c. Insights and research (referencing a report by GNS regarding aggregate opportunities in New Zealand).

251. Points b and c are relevant to the Economic Assessment. The National Infrastructure Pipeline dataset that the Commission references provide a forward-looking view of planned infrastructure projects. The projects in the pipeline are summarised in the Economic Assessment[179] showing the Dollar-value and the scale of the investment task (of the projects). While the Economic Assessment draws on these important sources, it is not the only source that is replied upon. Other sources are used to present a more complete picture of the construction pipeline, including MBIE's National Construction Pipeline Report.[180]

[178] Email from Pippa Player. 05/05/2026.

[179] Economic Assessment: para 28.

[180] Economic Assessment: para 28.

252. In addition to the pipeline report mentioned by the Infrastructure Commission, Dr Meade referenced another report by the Commission.[181] That report presents forecasts of infrastructure needs. This report, and Dr Meade's use of it, are discussed above (para 72 to 74).

253. With reference to the Aggregate Opportunity Modelling report by GNS, I am familiar with this workstream. In fact, I have considered the Aggregate Opportunity Modelling for Auckland as part of the Economic Assessment. The modelling supports key parts of the Economic Assessment, especially that transport distance is a critical consideration. Further, the opportunity modelling does not identify any appropriate land-based opportunities that are nearer to Auckland than the Kaipara resource (the main alternative used in the Economic Assessment).

Aggregate and Quarry Association

254. The Aggregate and Quarry Association (AQA) commented on the application. I highlight the following points that are relevant from an economic perspective:

    a. The demand levels align broadly with my assessment albeit slightly higher;

    b. The market proportions correspond broadly with those used in the Economic Assessment;

    c. The importance of sand to the construction sector is acknowledged;

    d. The need for maintenance spending, and additional spending in response to growth as well as addressing the infrastructure deficit is articulated;

    e. The need for a responsive supply chain (in response to catastrophic events) is emphasised.

[181] New Zealand Infrastructure Commission. (2025). The Infrastructure Needs Analysis Forecast: Results and Modelling Technical Report. Wellington: New Zealand Infrastructure Commission Te Waihanga.

255. The AQA points to the need to ensure continuity of supply and that it is important to diversify sources to ensure that the market can function to ensure competitive prices even when demand levels vary.

256. The AQA's views line up with key messages from the Economic Assessment.

Concrete NZ

257. In my view, the relevant (economic) points raised by Concrete NZ's comments are consistent with the Economic Assessment, especially the need to provide multiple sources to avoid concentration risk.[182] The essentiality of sand is acknowledged by referencing the Critical Minerals List.

258. Concrete NZ highlights infrastructure pressures and deficits and the role of sand in supporting infrastructure and housing construction.

259. The commentary provides useful information about the uptake of manufactured sand in the Auckland market. Concrete NZ states that only one plant (Allied Concrete Limited) uses manufactured sand as its predominant sand source[183]. Concrete NZ reports that manufactured sand accounts for 93% of all sand consumed at the Penrose facility (the balance being marine sand). This aligns with Mr Donoghue's observation[184] but he indicates that Counties Concrete is using manufactured sand in some of its concrete mixes

260. Two plants using manufactured sand suggests an 8% adoption rate (by firm count). There are limited concrete-sector specific technology adoption curves against which to consider the uptake rates. Theory[185] suggests the transition from early adopters[186] to the mainstream market occurs at approximately 16% market penetration, at this point the technology begins to achieve broader market acceptance.

261. While manufactured sand is being used, its uptake remains below levels that would see it classified as a mainstream technology.

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[182] Economic Assessment: Section 2.3.

[183] Concrete NZ comment: page 5.

[184] Mr Donoghue – Response to Comments received: para 26.

[185] Everett M. Rogers. (2003). *Diffusion of Innovations* (5th ed.). Free Press. Chapter 7.

[186] A useful summary of the key concepts can be found here.

262. With reference to the emissions profile information that Concrete NZ presents (i.e., the emissions factors for Global Warming Potential (GWP)), this refined information does not impact the Economic Assessment. It does however highlight important boundary issues. The emissions associated with the GWP ratios as presented relate to Scope 1 and Scope 2 emissions (Appendix 6). However, the emissions associated with transporting materials to concrete batching plants (e.g., manufactured or marine sand) is counted as Scope 3 emissions.

263. In the speculative scenario[187] with 150,000t of manufactured sand used to support concrete manufacturing, the Te Akau Bream Bay option will generate comparatively less emissions . Such a market configuration that generates comparatively lower emissions is consistent with Concrete NZ's ambitions of decarbonisation but it takes a wider view. The Concrete NZ's Roadmap focuses on Scope 1 and Scope 2 emissions, and it acknowledges the indirect (Scope 3) emissions. Scope 3 emissions were found to account for around 40% of total emissions of concrete over its full life, but these are excluded from the industry's primary decarbonisation targets. These are excluded on the basis that they fall outside the industry's control. Regardless, enabling Te Akau Bream Bay will make a positive contribution towards limiting the growth of overall (Scope 3) emissions. In the context of reducing emissions, I interpret such a position as consistent with the ambitions as articulated in the Concrete NZ Roadmap.

Other Comments

264. In addition to the above, I respond to two other comments:

    a. Langs Cove Resident Association;

    b. Mr Cook's comments prepared on behalf of Waipu Cove Reserve Board.

[187] Economic Assessment: para 157.

Langs Cove Residents Association

265. The Langs Cove Resident Association (**Association**) notes that its submission is presented from a layperson's perspective. The submission includes an economic analysis (attached as Appendix C) that was commissioned but it is not clear who prepared the assessment or what that person(s) credentials are. I have considered the economic part of the assessment and there are several critical themes, including unsubstantiated assumptions and incorrect attribution.

266. The economic analysis states that the central research question is whether the financial benefits outweigh the economic risks of the proposal. This interpretation is inconsistent with the FTAA which does not require such analysis. Consequently, the framing of the economic analysis is misdirected.

267. The economic risk of enabling Te Akau Bream Bay sand extraction is framed using a scenario approach to reflect assumed reductions[188] in 'Beach Amenity Impact'. Beach Amenity Impact is not defined and the mechanisms through these supposed impacts propagate through the visitor economy, and the wider economy are equally not described.

268. While a scenario approach is appropriate to use in a case such as this, the structure of the analysis and assumptions are unsupported. The Association expresses the economic loss using three impact levels (scenarios) on visitor numbers (via the Beach Amenity Impact) ranging from 10% to >40% . The basis for this is not clear with no explanation of the drivers or how the effect was estimated.

269. The Association's scenarios are structured around the amenity losses associated with the beach. Importantly, the Tonkin and Taylor report[189] found

[188] Lang Cove Residents Association Inc. (2025). *Submission on the Northland Expressway Fast-track application* (Redacted submission, Fast-track Approvals Act 2024 process). Fast-track Approvals. Link.

[189] Tonkin & Taylor Ltd. (2025). *Assessment of coastal process effects (Sections 1–3)*. Prepared for McCallum Bros Ltd as part of the Bream Bay Sand Extraction Project substantive application under the Fast-track Approvals Act 2024. Fast-track Approvals. Link.

that the effects of the proposed Te Akau Bream Bay extraction will have negligible impact on the beach and landforms.

270. The scenarios' lost visitor activity is then applied to the tourism spending across the entire Northland. According to the Association, there were 1.7m guest nights in Northland. Applying the scenario parameters to the guest nights suggest that between 170,000 and 680,000 guest nights will be lost from the region if Te Akau Bream Bay is enabled. I do not consider this credible.

271. For example, Northland's tourism sector includes spending by international cruise ship passengers that visit Russell and Opua. The Te Akau Bream Bay proposal is unlikely to change cruise ship itineraries and cruise passenger behaviour in the Bay of Islands. The way the Association estimates the impacts means that Bay of Island's visitor economy is also impacted. Similarly, the example can be extended to the Rākaumangamanga: Cape Brett Track – it is difficult to see how the Te Akau Bream Bay proposal would impact tourism spending associated cruise ships in the Bay of Island, or with a walking track in the Far North.

272. The scenarios (percentage reduction) are applied to visitor expenditure. However, this assumes that the changes are 'lost' to Northland entirely from Northland. In this context, a more appropriate way to assess the economic loss to Northland (if one was to materialise) would be to identify the size of the local industry, quantify the potential loss after accounting for displacement (visitors going elsewhere in the district) and then estimating the lost visitor spending.

273. However, such a loss can only be attributed to the Te Akau Bream Bay proposal if the impacts on the beach are directly due to the proposal, and the change in visitor numbers are due to the changes in the beach amenity as used by the Association.

274. To put the scale of the Association's scenarios into context, in 2025 the Bream Bay location hosted 0.8% of the Whangarei District's tourism jobs[190]. It is

[190] Own calculations based on StatsNZ data and M.E regional economic database.

difficult to see how this comparatively small portion of the local (Whangarei) visitor economy, could translated into a 10% to 40% loss at a regional level.

275. The association cites international case studies. These case studies are not transferrable to the current case because they are materially different than the proposal:

a. Moroccan example: the sand industry in Morrocco is characterised by high levels of corruption and unlawful activity. According to the Institute for Security Studies[191], half of the sand used in Morrocco's construction industry is illegally mined from the coast.

b. Caribbean case study is not referenced and I could not find a source confirming the Association's assertions. However, there are sources[192] that confirm the issue. Importantly, the sand mining issues referred to in the Caribbean relate to:

i. Illegal mining

ii. Beach mining, back dune mining and inland and river bed mining.

iii. The potential impacts of climate change[193]

c. The South Korea example relates to a project that will create a 5m-10m valley, which is not the case in the Te Akau Bream Bay project. The study used a choice experiment to estimate the willingness to pay additional annual tax per household to avoid four environmental impacts. It found that the per household cost is:

i. Increase in coastal erosion – KRW 100 (NZ$ 0.18);

[191] Abderrahmane, A. (2021, May 24). *Illegal sand mining threatens Morocco's coastline and tourism*. Institute for Security Studies. Link. Date accessed: 07/08/2026.

[192] United Nations. (n.d.). *Beach sand mining*. In *UN Atlas of the Oceans: Coastal development and habitat loss*. Link

[193] Spencer, N., Strobl, E., & Campbell, A. (2022). Sea level rise under climate change: Implications for beach tourism in the Caribbean. *Ocean & Coastal Management, 225*, 106207. Link.

ii. Decrease in benthic organisms (marine organisms living on/in the seabed) – KRW 76 (NZ$ 0.14);

iii. Decrease in fish populations - KRW 152 (NZ$ 0.03);

iv. Deterioration of seawater quality – KRW 123 (NZ$ 0.22).

Crucially, these are Korean public preferences and are not transferable directly to New Zealand. The values reflect Korean perceptions, fisheries context, and the specific scale/location of extraction.

a. The Belgium/North Sea case study reflects the changes in benthic biomass and the Association uses this to indicate that the recreational fishing sector will be impacted by the proposal via lower catch rates. In turn, this will impact the visitor economy. However, the view that the proposal will reduce the biomass is inconsistent with the analysis completed by Mr Boyd that the impacts on both fishing populations and fishing activities will be low to negligible if they occur at all.

276. Overall, I find the Association's claim that the proposed Te Akau Bream Bay extraction will put the $1.2bn regional tourism economy at risk as implausible.

Waipu Cove Reserve Board

277. Mr Cook commented on the substantive application on behalf of the Waipu Cove Reserve Board (the "Board"). He provides basic information regarding the Reserve's performance (turnover of $2.2m in 2025).[194] Mr Cook references the Herald's Best Beach articles are evidence of the beach's premier status. However, Herald's articles are not scientific or representative surveys. That are essentially reader votes (self-selected online polls). The process is closer to a popularity contest than a statistically designed survey. While this type of information might be useful from a qualitative perspective, it does not portray regional significance.

[194] Mr Cook's statement: para 4.4.

278. Mr Cook does not quantify or analyse the Waipu Cove Campground's economic contribution, its share of the district or regional visitor economy or any visitor economy metrics. Instead, he opined that the Campground plays a significant local and regional role without any supporting analysis.

279. Using Mr Cook's data shows that the Campground[195] accounts for 0.4% and 0.2% of district, and region's tourism GDP.

280. Like the Lang Cover Residents Association, it appears that Mr Cooks economic argument assumes that enabling the proposal to proceed will undermine the existing regional economic activity. Based on the findings of the Tonkin & Taylor report, I consider Mr Cook's position as unfounded.

Conclusion

281. The additional analysis and information provided by the commentors does not change my position. I remain of the view that enabling Te Akau Bream Bay will contribute positively to the Auckland sand market, support Auckland's concrete production supply chain and facilitate infrastructure investment and deliver regionally significant benefits.

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Lawrence McIlrath

12 August 2026

[195] This relates to the Campground itself and not any facilitated spending.

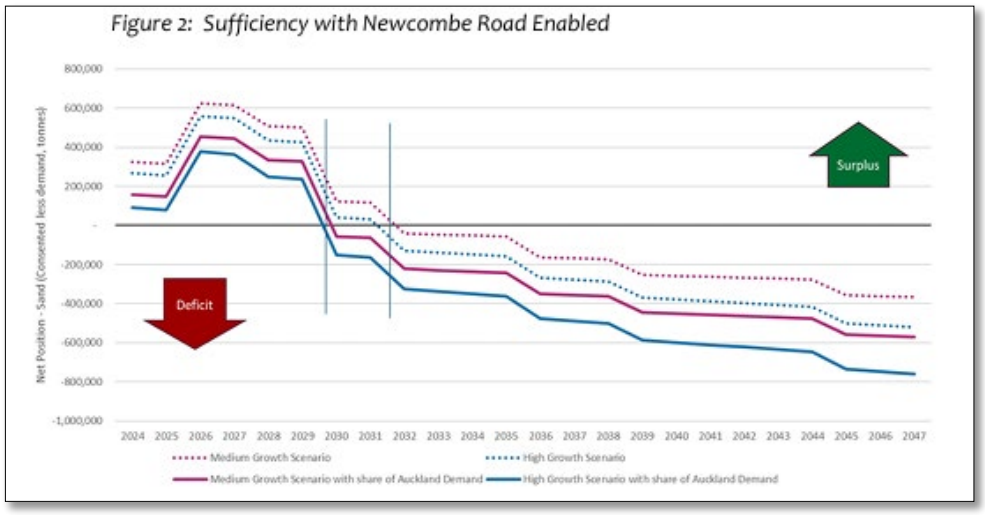
Appendix 1: Dredge sediment classification

Location	Clays	Silt	Fine Sand	Medium Sand	Coarse Sand	Gravels (shells)	Total
Berth pocket	200	3,000	8,000	49,000	3,000	8,000	**81,200**
Inner channel	4,900	24,000	78,000	274,000	29,000	75,000	**484,900**
Mid channel	200	2,000	9,000	64,000	10,000	15,000	**100,200**
Outer channel (3.5 to 5.5 km)	3,100	17,000	36,000	643,000	185,000	144,000	**1,028,100**
Outer channel (5.5 km to end)	1,900	56,000	327,000	1,227,000	104,000	227,000	**1,942,900**
Total	**10,300**	**102,000**	**468,000**	**2,257,000**	**331,000**	**469,000**	**3,637,300**

Source: New Zealand Refining Company Limited. (2017). *Crude Shipping Project: Proposed deepening and realigning of the Whangarei Harbour entrance and approaches. Volume Three: Assessment of Environmental Effects (AEE), Part 1*. Link

Table 2.1.6.1.1 on page 69.

Appendix 2: Waikato sand market outlook



Source:

McIlrath, L. R. (2025, March 18). *Statement of primary evidence of Lawrence McIlrath on behalf of RS Sand Ltd: Economics*. Independent Hearing Commissioners, 77 Newcombe Road, Cambridge resource consent hearing. Waipā District Council.

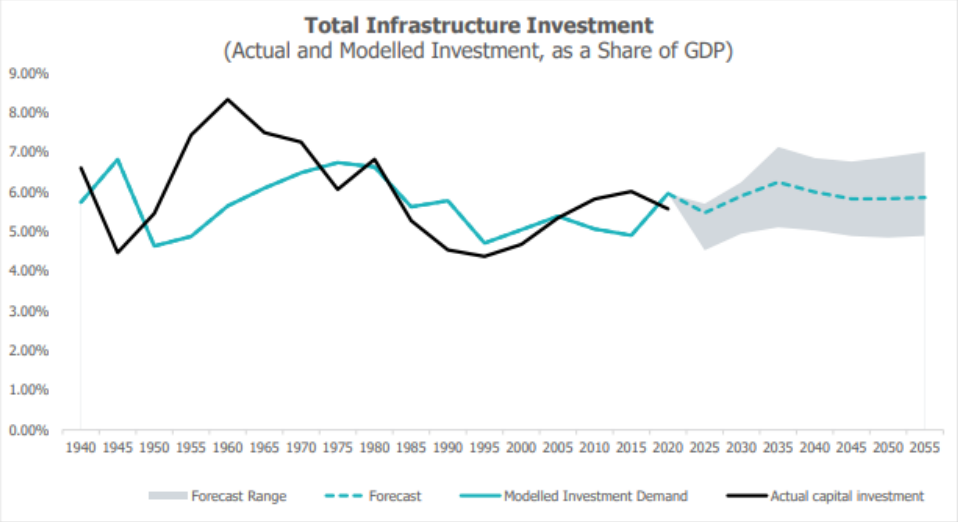
(figure 2, near para 3.34).

The grta

Link to evidence

Appendix 3: Total infrastructure demand (Infrastructure Commission)

Figure 11: Total infrastructure investment demand: scenario testing of projection to various parameters



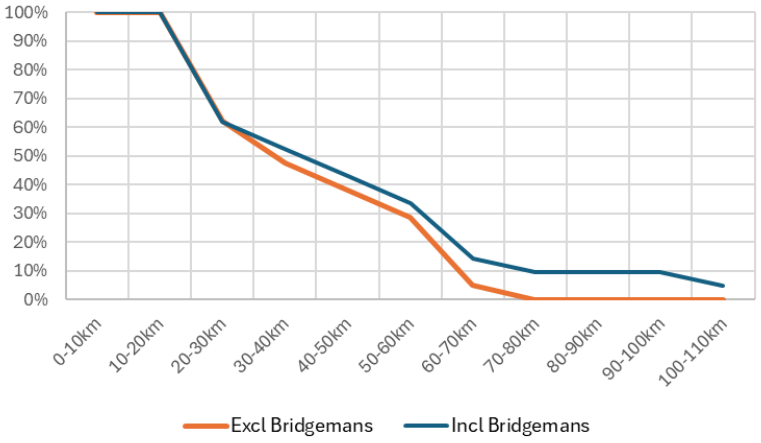
"Although there appear to be no technical barriers to the transportation of concrete sand over large distances, the cost of the transportation affects a supplier's ability to price competitively to get concrete sand delivered to a customer's plant."

"A concrete sand supplier's ability to compete for a customer will diminish as the distance between the customer and it increases, relative to another concrete sand supplier."

"Based on the marginal transport costs, we consider that it is unlikely that concrete sand supplied from more than 50km from a ready-mix plant would be competitive in Waikato. In BOP, concrete sand quarries from further away appear to be competitive because of the lack of sand resource in the region."

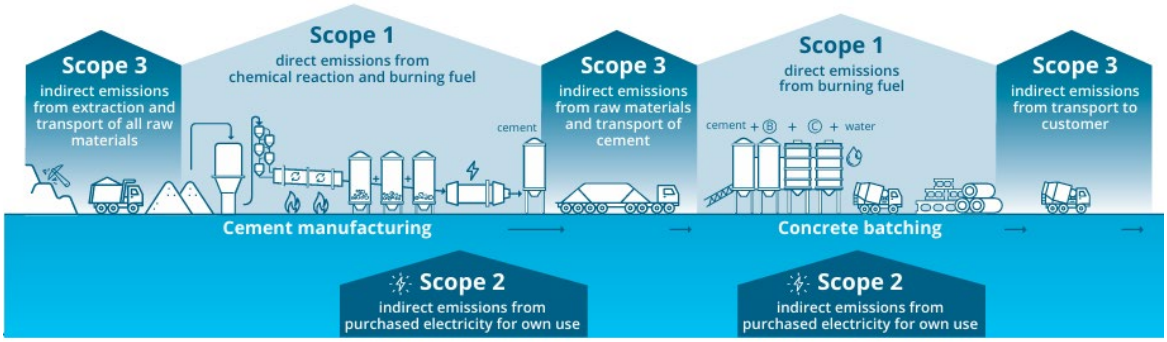
Fletcher Building Limited and Waikato Aggregates Limited [2019] NZCC 2. para 50, 51 and 60

Appendix 5: Distance to Plants (sand source accessed)



Appendix 6: Scope 1, 2 and 3 Emissions for producing cement and concrete.

Figure 5. Scope 1,2 and 3 emissions from producing cement and concrete



Source: Concrete New Zealand. (2023). *A net-zero carbon concrete industry for Aotearoa New Zealand: Roadmap to 2050*. Concrete New Zealand. Link