

TECHNICAL MEMO – Coastal Avifauna

To: Stacey Sharp & Blair Masefield, Beca (consultant planners)

From: Claire Webb, Senior Associate - Ecology, Beca (consultant ecologist)

Date: 27/07/2023

APPLICATION DESCRIPTION

Applicant's Name: Northport Limited (Northport)

Activity type: **Land Use (s9), Coastal Permit (s12), Water Permit (s14), Discharge Permit (s15)**

Purpose description:

Northport seek to construct, operate, and maintain an expansion of the existing port facility to increase freight storage and handling capacity, and transition into a high-density container terminal.

Application references:

Northland Regional Council: APP.005055.38.01
Whangārei District Council: LU2200107

Site address:

Ralph Trimmer Drive, Marsden Point, Whangārei

SITE AND PROPOSAL DESCRIPTION

Existing Environment

A description of the subject site and surrounding environment was provided in the following application documents:

1. Section 4.0 of the Assessment of Environmental Effects (AEE) entitled: *Application for resource consents for the expansion of Northport*, prepared by Reyburn & Bryant, dated 6 October 2021.
2. Section 3.0 of the Coastal Avifauna Assessment by Boffa Miskell, October 2022.

Having undertaken a site visit on 23rd June 2021, I concur with that description of the site and surrounding environment and adopt that description for the purpose of this assessment.

Proposal

A full description of the proposal, as it relates to coastal avifauna effects, is provided in the following application documents which have been considered in the preparation of this memo:

1. Assessment of Environmental Effects entitled: *Application for resource consents for the expansion of Northport*, prepared by Reyburn & Bryant, dated 6 October 2021 (henceforth referred to as AEE)
2. Design Drawings entitled: *Northport – Proposed Reclamation and Dredging*, prepared by WSP, sheets C01 – C04, plan set dated 18 August 2022
3. *Northport Eastern Expansion Coastal Avifauna Assessment*, prepared by Boffa Miskell, dated 3 October, revision / version G (Appendix 13 of application documents).
4. *Peer Review of Assessment of Ecological Effects* prepared by Cawthron, dated 5th October 2022.
5. *Vision for Growth Port Development: Coastal Process Assessment* prepared by Tonkin & Taylor, September 2022 (Appendix 10 of application documents)
6. *Northport Expansion Project, Assessment of Marine Ecological Effects* prepared by Coast and Catchment, September 2022 (Appendix 11 of application documents).
7. *Supplementary information under S92 of the RMA – Northport Coastal Avifauna* prepared by BlueGreen Ecology Ltd, 11 July 2023.

This memorandum is limited to matters relating to ecological effects on coastal avifauna and note the following key elements of the proposal described in Section 5.0 of the Coastal Avifauna Assessment:

1. Proposed expansion of the eastern end of the existing port as follows:
2. Reclamation within the CMA and earthworks to the immediate east of the existing reclamation to expand Northport's footprint by approximately 13.7 ha with 6.6ha above and 5.1ha below chart datum. The ecological effects of reclamation below chart datum are addressed in the Marine Ecology Technical Memo prepared by Drew Lohrer.
3. Capital and associated maintenance dredging to enlarge and deepen the existing swing basin and to enable construction of the new wharf.
4. A 520m long wharf (including the consented but not yet constructed 270 m long Berth 4) constructed on the northern (seaward) face of the proposed reclamation.
5. Sheet piling and rock revetment structures on the eastern edge of the proposed reclamation.
6. Treatment of operational stormwater via the existing pond-based stormwater system.
7. Port-related activities on the proposed expansion and wharves.
8. Construction of a new tug jetty.
9. Replacement of the existing floating pontoon, public access, and public facilities.
10. Re-creation of a historic sandbank to function as a high tide roost on the western side of Northport prior to construction.

REASON FOR CONSENT

Reasons for Consent

A list of resource consents sought (as per the application documents as lodged) are summarised in Sections 1.5 – 1.7 of the AEE and are as amended by the s92 Response.

Overall Activity Status

Overall, the resource consent is considered as a **Discretionary Activity**.

TECHNICAL ASSESSMENT OF APPLICATION AND EFFECTS

Applicant's Methodology

Field data for species composition, abundance and habitat use.

Individual species presence and abundance was informed by desktop review of species records and avifauna surveys undertaken as part of the project. Avifauna surveys were conducted within coastal survey compartments spanning the entire length of Marsden Bay. Compartments E1-E3 are located within the eastern reclamation footprint. Intertidal macroinvertebrate surveys and community composition analysis determined the quality of food resources.

The field survey and data analysis for both avifauna and intertidal invertebrates were completed using standard survey protocols. Bird count and macroinvertebrate surveys gathered sufficient data to provide a high-level of confidence in the results and analyses presented in the report.

Habitat use and importance was informed by bird count data taken at different tidal phases. High-tide counts generally denote roosting/resting behaviour while low-mid counts generally suggest foraging behaviour with some resting behaviour depending on the species. In addition to these data, a literature review of roost use and coastal bird distribution and habitat use was undertaken to provide supplementary evidence on habitat use. This information is important in determining the nature of adverse effects on individual avifauna species and has been appropriately used to determine values and population level effects. The use of falling tide vs high tide counts to determine habitat utilisation of species also provides a good basis for assessing magnitude of effect on a single species.

Population level effects are challenging to determine and are heavily dependent on availability of data. In this instance, coastal wader census data, site-specific bird counts, and existing publications provide sufficient information to determine population level effects.

Zone of Influence

The Avifauna Assessment identifies the Whangarei Harbour as the Zone of Influence (ZOI) for coastal avifauna. This defines what constitutes a 'species population' in context of the project. This is agreed in principle given that shorebirds present in the project footprint are found throughout the Harbour, however noted that shorebird distribution in the Harbour is likely to be clustered with higher densities of birds found at locations that provide suitable high-tide roosts close to favoured foraging grounds (Folmer et al., 2010; Zharikov & Milton, 2009). Marsden (Bay) Point is such a location and is identified as one of several shorebird roost locations (Beauchamp & Parrish, 2007) supporting the Harbour populations. Marsden Bay is one of the smaller roost sites (2ha) within the harbour with 19 of 37 coastal avifauna species present in various abundances.

In addition to the ZOI, a disturbance zone has been calculated using flight initiation distances

published in literature for those species present in the project area. The disturbance zone enables the derivation of indirect habitat loss resulting from construction and operational disturbance and is defined as the construction footprint plus a 45m radius from the footprint.

Effects Assessment

The Avifauna Assessment assessed effects using a species-led approach in accordance with Ecological Impact Assessment guidelines (Roper-Lindsay et al., 2018). The nature and level of effects on species populations were determined as a combination of ecological value based on the conservation status of individual species, in conjunction with habitat use and behaviour. The EIANZ Guidelines use a five-point scale (Negligible to Very High) to describe the magnitude of effect.

The Avifauna Assessment further defines this scale by assigning a population proportion (%) to each description as follows:

- Very High: >50% of the population affected.
- High: 20-50% of the population affected.
- Moderate: 10-20% of the population affected.
- Low: 1-10% of the population affected.
- Negligible: <1% of the population affected.

Although this an arbitrary categorisation, it improves consistency of interpretation regarding population level effects. It is also accepted that professional judgement was used to further interpret population effects with adequate supporting evidence as set out in Section 6.1.1. (pertaining to NZ dotterel foraging).

The effects assessment method is consistent with the current industry practice (Roper-Lindsay et al., 2018) but can inadvertently lead to a lack of recognition of the habitat values and ecosystem services for a range of species including migratory and non-threatened species. This arises from the species-led approach which focuses on species of conservation concern over the full range of species present.

Cumulative effects method

The Avifauna Assessment uses recently granted / lodged coastal development consents to form the basis of the cumulative effects assessment. The degree of overlap between shorebird effects identified in these applications and the eastern reclamation was used to determine the level of cumulative effects arising from the project. The accuracy of these assessments is not discussed however it is assumed that given the consents were granted that the related effects assessments were peer-reviewed, and findings accepted and as such can be relied upon.

There is limited guidance on how to best assess cumulative ecological effects under the RMA however, The EIANZ Guidelines along with international good practice guidance states that all *past, existing and reasonably foreseeable actions* [activities] beyond the specific project should be included in cumulative effects assessment (Roper-Lindsay et al., 2018; Blakley & Russell, 2019; IAIA, 2023).

These projects provide an extremely limited basis for the cumulative effects assessment and are not specific / relevant to the species or habitats affected by the Northport eastern reclamation.

The cumulative effects assessment requires a broader review of past and existing activities (in addition to coastal development consents) that influence shorebird populations to meet industry practice. The review could include:

1. Identification of key issues causing population decline in the Whangarei Harbour (ZOI)¹.
2. Identification of activities and related ecological effects that contribute to the key avifauna issues in ZOI.
3. Identify Northport eastern reclamation construction and operations activities that contribute to these effects (if any).
4. Assess the level of cumulative effect arising from the eastern reclamation.

These attributes would provide ecological context and help better identify the key cumulative effects, at the Harbour scale. The applicant's report does include a brief overview of roost habitat use and trends in Section 3 of the report and supplemented by further discussion in the S92 response (11th July 2023) which provides useful context and weighting to roost and foraging area cumulative effects.

Applicant's Methodology Conclusion

The methodology used by the applicant provides a sound evidence base for the assessment of avifauna values and effects that may arise from the expansion of Northport other than cumulative effects.

ECOLOGICAL EFFECTS ASSESSMENT

Coastal Avifauna Values

A wide range of coastal birds utilise the beach and intertidal area adjacent to and within the footprint of the project for both foraging and roosting during the study period (2017-2020). Of these species, several Threatened or At-Risk species (TAR) species are present within Marsden Bay and more specifically within the eastern reclamation area (survey compartments E1 & E2) and immediately eastwards of the proposed reclamation (E3).

A species-specific ecological value is assigned to all species in the Avifauna Assessment and ranges from Moderate to Very High ecological value. This valuation is well supported by the data and information and is based on individual species conservation status within the project footprint. Furthermore, this is consistent with the EIANZ Guideline methodology.

Identification of ecological effects

The nature of adverse effects on avifauna is underpinned by habitat use and behaviour of the species present within the project footprint. Observations during bird counts (2017-2020) provide a robust analysis of habitat use for all species present. Habitat utilisation by avifauna at the site includes foraging for benthic invertebrates on the intertidal areas at low tide; fishing at high tide and along low-tide channels; roosting on beaches, grassed areas and structures as well as nesting at various locations within the project footprint.

The actual and potential ecological effects identified from these observations are:

1. Temporary and permanent loss of foraging habitat.

¹ Some of these issues may not fall within the remit of the RMA e.g., animal pest threats, however, will provide context and reasoning for the inclusion or exclusion of activities and related effects for the purposes of a cumulative effects assessment.

2. Temporary and permanent loss of high-tide roost habitat.
3. Temporary and permanent loss of nesting habitat.
4. Potential injury / mortality of avifauna.
5. Loss / degradation of food supply and foraging ability.
6. Disturbance/displacement: effective foraging and roosting habitat loss.

The effects identified appropriately capture the nature and extent of avifauna ecological effects.

Magnitude and overall level of ecological effects

The Avifauna Assessment appropriately identified three species that are subject to adverse effects that meet the threshold for effects management (moderate and above) because of either their conservation status and/or proportion of population affected. These are Northern New Zealand dotterel, variable oystercatcher and kororā.

The magnitude of adverse effects on the remainder of avifauna species is deemed Low to Negligible where abundance equates to <10% of total population. Notably, this does not mean that there are no adverse effects on the species present but rather that the magnitude (severity) of those effects will not result in a substantive change in population abundance or distribution at the Harbour scale (assumed).

The level of ecological effects is discussed in more detail below.

EFFECTS ARISING FROM CONSTRUCTION

The construction effects, and overall unmitigated level of effect include:

1. Permanent loss foraging habitat of NZ dotterel and VOC (Very Low to Low).
2. Permanent loss of foraging habitat: creation of high-tide roost (Very Low).
3. Permanent loss of high-tide roost habitat for NZ dotterels and VOC (Moderate).
4. Temporary loss of foraging/roosting habitat of NZ dotterel, kororā and VOC (Moderate).
5. Potential injury / mortality of kororā and VOC (Very Low – mitigated²).
6. Loss / quality degradation of food supply and foraging ability for coastal avifauna (Very Low).

Habitat Loss for NZ dotterel and variable oystercatcher (permanent and temporary effects)

High-tide roosting effects

Coastal avifauna mostly use the Northport eastern survey compartments for high-tide roosting (resting/sleeping) based on a study by Bioreserches (2017) as cited in the Avifauna Assessment. The primary coastal avifauna effect is therefore identified as loss of high-tide roost area. The level of unmitigated effect is appropriately assessed as ‘moderate’ for NZ dotterels and VOC. Although NZ dotterels are present in proportionally low numbers, their conservation status makes them vulnerable while VOC are present in larger numbers and as such, make greater use of the Site than other species of equal conservation status.

Notably, several other species roost within the eastern reclamation footprint and of those, several species such as red-billed gulls, wrybills, Caspian and white-fronted terns preferentially use the site in comparison to other areas within Marsden Bay (Marsden Point-One Tree Point).

Foraging habitat effects

The Avifauna Assessment identifies both direct and indirect loss of foraging habitat from reclamation, dredging, construction of new bird roost and disturbance activities. Dredging and disturbance effects are also identified during both the construction and operational phases of the project.

For reclamation, negligible to low levels of effect are due to the low proportion of species populations (1-10%) present, small scale of habitat loss (<1%) in context of the wider, available foraging habitat. Similarly, low effects levels are reported for loss of foraging habitat occurring from the creation of the new bird roost. These assessments are consistent with the EclA guidelines and are well supported by the information and data provided in the application.

For dredging, it is assumed that sediment controls will be in place as part of construction management. The report, however, states that elevated suspended solids are expected to occur “periodically” and that dredging methods will influence the magnitude of this effect. Furthermore, no discussion about maintenance dredging and the impacts thereof, is included in the

² Level of effect includes and is reliant on mitigation proposed as described in the Avifauna Assessment.

assessment. Effects arising from maintenance dredging campaigns are likely to re-mobilise sediment in a similar manner to construction during those campaigns. The low levels of ecological effect are therefore uncertain and is highly dependent on the implementation of a suitable methodology.

There is good reasoning and evidence to support the conclusions drawn in the Avifauna Assessment on foraging habitat effects. It should be noted however, that when considered as a collective rather than in isolation, these effects may result in a greater magnitude of effect on shorebird populations, particularly within Marsden Bay.

In summary, foraging habitat loss/disruption includes:

- ~ 6.6ha of direct loss due to reclamation.
- 0.46ha lost due to the creation of a new roost area and
- 3.73ha indirect loss due to construction and operational disturbance.

This equates to a total accrued foraging habitat loss of between 8ha-10.8ha within Marsden Bay which is approximately 13% of available foraging habitat between Marsden Point to One-Tree Point and 1.6% of the Outer Harbour and Entrance ecological zone above chart datum (Coast & Catchment, 2022).

An important mitigating factor for loss of foraging habitat, is the availability of wider foraging habitat within the harbour and as part of the S92 request, further information was sought on displacement effects on alternative roosting and foraging sites.

Displacement and increased pressure on alternative roosting and foraging sites

Low levels of effects were generally underpinned by the assumption that coastal waders will disperse to other, accessible intertidal areas but does not address the potential increase in pressure on both foraging and high tide roosting of these alternative areas.

Supplementary information (S92 response, 11th July 2023) provided an assessment on shorebird displacement effects based on a study of high tide roost usage in the Whangarei Harbour and Ruakaka Estuary (Beauchamp & Parrish, 2007). The study concludes that NZ dotterel and VOC populations are well dispersed and make use of several roosts throughout the harbour. It is inferred from this information that alternative roost sites can accommodate the small number of displaced birds because populations routinely disperse widely and make use of several sites. A similar conclusion is drawn for displacement effects on foraging habitat based on the same reasoning.

The S92 response provides no reasoning or evidence to support this conclusion beyond the fact that there are alternative sites available with suitable characteristics for shorebirds. The capacity to accommodate displaced birds is based on the small number of VOC and NZ dotterels present on average. From the data provided in the Assessment, it appears that in total ~250 birds are likely to be displaced (Table 19: mean no. of birds in E1 & E2). In all likelihood, this number of birds will disperse across the other sites however, there are residual questions regarding the cumulative effects of foraging and roost habitat loss that should be addressed e.g. is habitat loss and disturbance a key issue for shorebirds in the Whangarei Harbour and are alternative locations stable, secure with adequate carrying capacity.

Injury/mortality of coastal birds

The potential for injury/mortality of coastal birds is limited to those likely to be nesting within the eastern reclamation area. This is due to the mobile nature of the species present, including kororā as well as the few nesting birds have been discovered supporting a conclusion that the eastern reclamation site does not provide important nesting habitat for avifauna. The overall level of effect is however dependent on pre-construction nest surveys to minimise the likelihood that nesting birds could be injured as proposed in the application.

As all species are protected under the Wildlife Act, harming of animals is wholly unacceptable and should be avoided as stated in the Avifauna Assessment. Construction protocols to avoid and minimise the likelihood of harm are proposed and are discussed later in this memo.

EFFECTS ARISING FROM OPERATION

Operational effects and level of effects identified include the following:

- 1. Injuries / mortality of chicks and eggs during operations (Very Low-Low)
- 2. Disturbance: Artificial lighting (no effect)
- 3. Disturbance/displacement: effective foraging and roosting habitat loss (Very Low-Low)
- 4. Degradation of foraging resource/toxicity effects: Pollution (Very Low-Low)

Injury/mortality of chicks and eggs during day-to-day operations

Pied stilts, variable oystercatchers and NZ dotterel have all been observed nesting within the operational port. It is acknowledged that identifying nests and putting in place controls in a timely way is challenging however, all efforts to avoid nests should be undertaken wherever they become known e.g., demarcation of nests.

Given that these birds have been able to successfully raise chicks in the absence of controls in the past and the few breeding pairs present, it is accepted that any unintended injury/mortality of chicks or eggs will have very low population level effects.

Disturbance effects from artificial lighting

No records or suitable habitat for species susceptible to lighting-related injuries or mortalities are known to be present at Northport. Along with existing level of background lighting already present, the level of effects is appropriately assessed as very low to low on all potentially affected species.

Indirect foraging and roosting habitat loss

Operational effects on remaining intertidal foraging area and high tide roost relate to coastal compartment E3 located to the east of the proposed reclamation immediately adjacent the Channel Infrastructure site.

Few birds and a less diverse cohort of species currently make use of E3, due to existing disturbance as well as an overall small area of available intertidal foraging and high-tide roost area.

As such, the anticipated level of disturbance effects from the expanded port are Very Low to Low. This is an accurate assessment given the low proportion of the population and small area of suitable habitat affected as well as the propensity for coastal birds to habituate to “non-threatening” disturbance. It does however further contribute to the overall disturbance / effective habitat loss within Marsden Bay and the report does not address the increased pressure on the western intertidal area or other nearby areas from displaced birds from E1, E2 and E3.

Degradation of foraging resource from operational discharges (water quality and degradation of marine habitats)

The port expansion includes stormwater treatment design features (pond-based treatment system) that will minimise discharge effects on water quality resulting in very low to low adverse effects on foraging resources. Furthermore, the existing environment includes a background

level of discharge that will result in an increase in stormwater discharge volumes, however, this is not expected to substantively impact water quality as a result of the expansion. No further comment is made on the efficacy of the water quality treatment design as it is out of scope but should be addressed in marine ecology assessment and peer review.

CUMULATIVE EFFECTS

The Avifauna Assessment determined that the proposal would result in Very Low to Low cumulative effects. It is not clear how the type or level of effect was determined or how these relate to the effects arising from the Northport proposal other than a cursory assessment of the overlap in activities and species.

The limited assessment provided does not meet industry practice as discussed in the review of the methodology provided in this memo. Given that the primary shorebird effects are the loss and disturbance of roost and foraging habitat, it is expected that the starting point for a cumulative effects review would be to discuss the key contributing activities in the wider Harbour that affect foraging and roosting and to whether the Northport eastern expansion includes activities that will add to or exacerbate these matters over time or in combination.

Effects Management

Re-creation of high-tide roost

The proposal includes the creation of a high-tide roost west of Northport, to offset the loss of roost habitat. This involves raising the current level of sandflats above MHWS by depositing and shaping sand to form the roost. The sandbank is expected to erode over time due to natural coastal processes, and that a top up of sand will be required every five years.

This will theoretically offset the loss of roost area for years and possibly decades (App 10: Coastal Processes Assessment) and provide sheltering and sand budget benefits to the eroding barrier beach. Furthermore, mangrove wetlands are expected to increase their seaward extent due to sheltering caused by the newly created roost. This will further reduce intertidal sandflat foraging habitat within the western area. The relative benefits to avifauna from the creation of this roost is deemed to outweigh the impacts providing an overall net positive effect.

The longevity of the created roost under active coastal processes is however uncertain especially when considering the increase in storm surges and sea level rise over that time. This aspect requires a review by a coastal processes expert, the outcome of which will help inform whether the proposed offset will appropriately address avifauna effects.

It is understood from the Avifauna Assessment that alternative high-tide roost creation or enhancement within Marsden Bay is difficult due to the existing and possibly, increasing recreational pressures. Although, the creation of high-tide roost area in proximity to the impact site is an appropriate offset in principle, it may not result in the long-term benefits to shorebirds and the enhancement of roost sites elsewhere in the should be explored by the applicant.

Sediment controls during dredging

The level of adverse effects on food supply and foraging ability during construction and operational dredging is dependent on the implementation of low-impact methodology as well as

good sediment plume controls. These aspects must be implemented as part of construction methodology and within a wider construction or environmental management plan to adequately address the avifauna effects.

Avifauna Management Plan

The purpose of the proposed Avifauna Management Plan is to set out construction protocols that avoid injuries/mortalities and to minimise disturbance. This includes pre-works nesting surveys for variable oystercatcher and NZ dotterel within Northport, E1 and E2 high tide survey compartments. Construction protocols for kororā regarding underwater noise thresholds and / or piling methods should also be included in the AMP.

The AMP, as proposed, does not include operational avifauna management measures. It would be beneficial to include these in the AMP given that shorebirds currently nest within the operational Northport site and are highly likely to continue to do so.

Conclusion

The Avifauna Assessment provides a sound assessment for coastal avifauna effects resulting from the eastern reclamation at Northport. Subject to conditions, the actual and potential adverse effects of injury/mortality, and construction and operational disturbance can be managed to low levels.

There is however uncertainty regarding the level of cumulative effects of habitat loss and displacement of shorebirds within Marsden Bay (in context of the Harbour) that should be addressed by the applicant before the conclusions drawn can be supported. It is recommended that additional compensation options to enhance roosts elsewhere in the Harbour should be explored as the long-term stability of the new high-tide roost is questionable alongside the adverse impacts on foraging habitat west of Northport. This is especially important as birds displaced from the eastern reclamation are likely to shift to this area.

TECHNICAL RESPONSE TO MATTERS RAISED IN SUBMISSIONS

Adverse effects on coastal avifauna and proposed mitigation measures

Relevant submissions:

- 1, 32, 89, 112, 114, 118, 132, 139, 145, 164, 165, 158, 174, 178, 179, 184

Technical response:

Key matters raised in submissions include the level of adverse effects on avifauna habitat, the cumulative impacts on foraging habitat, monitoring and compliance of avifauna impacts, and concerns regarding the feasibility and need for high-tide roost creation.

These matters are similarly raised in this technical assessment with emphasis on a lack of fulsome cumulative effects assessment and concerns regarding the success of the high-tide roost creation as matters that require addressing by applicant.

STATUTORY CONSIDERATIONS

Resource Management Act 1991

Relevant statutory considerations under the RMA include:

- New Zealand Coastal Policy Statement
- Regional Policy Statement for Northland
- Proposed Regional Plan for Northland (Appeals Version)
- Operative Regional Coastal Plan

Other Statutory Documents

Other relevant statutory considerations include:

- Wildlife Act 1953

RECOMMENDATION

Adequacy of information

The above assessment is based on the information submitted as part of the application. It is considered that the information submitted is sufficient to enable the consideration of the above matters on an informed basis.

Recommendation

The assessment in this memo identifies potential adverse effects that haven't not been fully assessed as part of the application. This includes cumulative effects of direct and indirect habitat loss, displacement of coastal shorebirds and certainty of offset outcomes.

Adverse effects pertaining to the injury/mortality and operational disturbance and degradation of foraging resource can be managed to low levels subject to the suggested matters for consent condition below.

Recommended matters for inclusion as consent conditions.

Should consents be granted, the following conditions and advice notes are recommended to avoid, mitigate, or remedy environmental effects of the proposal and to implement mitigation proffered by the Applicant.

1. Bird roost restoration and management plan:
 - a. The plan should be submitted for certification prior to construction.

- b. The Plan should include but not limited to:
 - i. Minimum roost size performance standards
 - ii. Construction methodology
 - iii. Maintenance monitoring, methods, and schedule
 - iv. Outcome monitoring of coastal bird use.
 - v. Adaptative management and monitoring methods.
 - vi. Compliance reporting
- 2. Avifauna Management Plan
 - a. The plan should be submitted for certification prior to construction.
 - b. The Plan should include but not limited to:
 - i. Construction protocols to avoid injury/mortality of coastal avifauna including kororā.
 - ii. Operational protocols to avoid injury/mortality of coastal avifauna.
 - iii. Operational noise and lighting recommendations to minimise disturbance.
- 3. Construction Methodology Requirements for avifauna protection
 - a. These recommendations must be included in Construction and Environmental Plan.
 - i. Low impact sediment controls and dredging methodology as specified in the Coastal Avifauna Assessment.
 - ii. Piling methodology for protection of Kororā as specified in the Coastal Avifauna Assessment.

Memo prepared by:

Claire Webb, Senior Ecologist, Beca

Date:

25 July 2023

Memo reviewed and approved for release by:

Blair Masefield, Technical Director Beca Limited

On behalf of the Whangārei District Council and Northland Regional Council

Date:

2 August 2023