KENNEDY POINT MARINA
WAIHEKE ISLAND

Kororā Predator Control and Monitoring Plan

For Kennedy Point Boatharbour Limited

September 2023

Compliance Monitoring Certified

Auckland Council

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REPORT INFORMATION AND QUALITY CONTROL

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1 INTRODUCTION

Kennedy Point Boatharbour Limited (KPBL) has a Resource Consent (CST60082321-B) (Consent) to construct, maintain and operate the Kennedy Point Marina (KPM) within the Coastal Marine Area (CMA) at Kennedy Point on Waiheke Island. The marina is located at the entrance to Pūtiki Bay on the southwestern side of Waiheke Island. The marina will provide permanent berthage for approximately 180 recreational vessels ranging from 10-30 m in length. Temporary berthage for smaller visiting vessels will also be available along with a range of other facilities for the public and the boating community. Additional facilities include a floating car park, laundry, cafe, office, and showers.

The breakwater at Kennedy Point is an artificial habitat for the native kororā/little blue penguin (*Eudyptula minor*). This species is protected under the Wildlife Act (1953) and have a conservation status of "at- risk declining" (Robertson *et al*., 2021).

Kororā inhabit the crevices within the rocks of the breakwater so a Little Blue Penguin Monitoring Programme (LBPMP) (required by condition 24A of the Consent) was prepared in June 2020 (4Sight Consulting, 2020) and this was later superseded by a Kororā Construction Monitoring & Management Plan (KCMMP) prepared by Dr Leigh Bull (Boffa Miskell Limited, 2021). This monitoring plan outlined the extent, methodology, frequency, and location of kororā monitoring along the breakwater during the pre-construction and construction period.

Under Consent condition 118, a separate Predator Control & Penguin Monitoring Plan is to be prepared and submitted to Council for approval prior to the completion of construction. This report contains the objectives and methodology of the Kororā Predator Control & Monitoring Plan (KPCMP) required by the Consent, provisions for predator monitoring and management, and details regarding ongoing (post-construction) monitoring of kororā including:

- The type and extent (quantity and location) of predator control measures to be employed,
- Frequency of predator control monitoring and re-setting,
- Reporting on predator control outcomes,
- The extent, nature and frequency of kororā monitoring to be undertaken and the reporting of results.

The intent of the KPCMP is that it feeds into the other operational and management plans required for the marina (as necessary), and be a technical document for other specialist reports (with 4Sight cited as an author). It is expected that these will become living documents that can be updated and improved upon over time.

The details of the Kororā Predator Control & Penguin Monitoring Plan for the Kennedy Point Marina are outlined in the sections below.

2 KORORĀ PREDATOR CONTROL, MONITORING AND MANAGEMENT

This section summarises the predator control, monitoring and management for kororā at KPM. This includes:

- The type and extent (quantity and location) of predator control measures to be employed,
- Frequency of predator control monitoring and re-setting,
- Reporting on predator control outcomes,

The Hauraki Gulf Islands provide unique opportunities and challenges for predator control (Bassett *et al*., 2016). Eradication of predators is more achievable on an island and a key part of the success of a predator free status is the continuous control, monitoring and rapid response to re-introductions (Bassett *et al*., 2016).

In addition to providing benefit to kororā and other seabirds, predator control increases the success of plantings and enhance natural regeneration opportunities for indigenous plants. Controlling pest animals will also provide benefits for indigenous fauna species such as invertebrates, birds, lizards, and bats.

2.1 Objectives

The objectives of the **predator control programme at KPM** are to:

- Protect kororā living in the vicinity of the marina from predators,
- Avoid the introduction of predator species that pose a threat to kororā through the operation of the marina,
- Align KPM's predator control with the objectives of Predator Free Hauraki Gulf[1] - a joint campaign between the Department of Conservations (DOC) and Auckland Council - being to:
  - Establish a programme to prevent stoat reinvasion to Waiheke,
  - Establish a programme to eradicate rats on Waiheke that builds on the learnings from Te Korawai o Waiheke Kennedy Point trial which was implemented from May to October 2022 (see more detail in section 2.2.1 below)[2].
- Ensure that all visitors to and users of KPM are aware of and contribute to these predator control objectives via compliance with enforceable Marina Rules and conditional rights of entry and use.

2.2 Background to target species programmes on Waiheke

There is a strong grassroots move towards a predator free Waiheke. This is predominately driven by a charity called Te Korawai o Waiheke – Towards Predator Free Waiheke which is funded by Auckland Council, Predator Free 2050[3] and Foundation North[4]. The island has no possums, stoat control has been extremely successful and there is a programme aimed at rat eradication, with a pilot area (including Kennedy Point area) currently being trialled.

2.2.1 Rat eradication trial

Te Korawai o Waiheke established a rat trap line along the Kennedy Point breakwater for four months from May to October 2022. This was a part of the Kennedy Point Trial to use a total of 499 traps to remove rats from 30 ha of the peninsula. The outcome of the trial was that the rats could not be eradicated during the trial, but baiting was an effective control tool. The trial found a reduction in rat numbers as the trial progressed, with only a small number of rats being captured towards the end of the trial.

[1] https://www.doc.govt.nz/pestfreehaurakigulf

[2] https://tekorowaiowaiheke.org/latest-news/rat-eradication-to-be-tested-on-waiheke

[3] Funded by the Department of Conservation (DOC) Predator Free 2050 is a goal to move towards predator eradication in New Zealand by 2050.

[4] https://tekorowaiowaiheke.org/funders-and-sponsors

2.2.2 Responsible pet ownership

The direct control of feral and domestic cats and dogs is not possible due to the presence of pet animals in the terrestrial catchment. An educational approach and the enforcement of dog rules are suggested to manage the threats of these animals to kororā. The breakwater has a dog control rule that requires all dogs to be under control and on lead.

This is reflected in the KPM Marina Rules for animals which state that:

"8.1 Dogs may only be in the Marina if they are under effective control, or otherwise restrained by way of chain, strap or lead. Any damage or mess caused by dogs shall be remedied by the person controlling them immediately.

8.2 Other than as permitted by Rule 8.1, no animals shall be allowed within the Marina."

These are appropriate rules and must be retained within the Marina Rules.

2.2.3 Keeping Waiheke mustelid free (biosecurity)

Several monitoring tools and trapping programmes are established on Waiheke to maintain a mustelid free island. This includes detection cameras, the use of predator control dogs, vertebrate pesticides (PAPP or Para-aminopropiophenone) and trapping. If pesticides are to be utilised, this can be only on private land and all landowners within 3km must be notified.

Mustelids have large home ranges, can swim from the mainland to Waiheke, can hitchhike on private and commercial vessels and can travel vast distances on land in one day[5]. A single individual can have a large impact on native birds, as they can consume a quarter to half their body weight daily (depending on the sex). Based on this, trapping even a single individual is worthwhile to reduce the threat to kororā.

2.3 Control methods and location

Establishing regular, ongoing predator control in the vicinity of the kororā habitat at Kennedy Point will be beneficial to kororā in the long term. Predator control is to target the trapping of mustelids (stoats, ferrets, and weasels), hedgehogs and rats.

Identified control methods, including the type of device and location/spacing where applicable for each target species are described in Table 1. Possums are currently not present on Waiheke Island and stoats are rare but present in low numbers.

The predator control area is limited to the public facilities area and the breakwater adjacent to the marina (general area shown in Appendix A). This is the same area as the kororā monitoring along the breakwater (see monitoring area in Figure 2). Rat bait stations are to be placed every 50 m on the breakwater and within the rubbish/recycling compound on the marina wharf.

The Kennedy Point Marina Maritime Trust established by KPM has as one of its purposes: "*Advancement of environmental projects designed to preserve and protect flora and fauna associated with the marine environment of Waiheke Island*". There is, therefore, an opportunity for grants to be sought and made from the trust to provide funding for wider predator control programmes on the island. This is supported.

[5] https://tekorowaiowaiheke.org/why-eradicate-stoats

Table 1: Methods for predator control at KPM.

Pest	Impacts	Recommended method(s)	Control timing
Feral and domestic cats (*Felis catus*)	Direct predators of kororā adults and chicks.	No control possible due to existing terrestrial presence of pet cats. Potential for educational programmes including leaflet for cat control given to marina visitors and residents[6]. Imposition and enforcement of rules requiring the marina to be cat-free.	All year round
Domestic dogs (*Canis familiaris* or *Canis lupus familiaris*).	Direct predators of kororā adults and chicks.	Enforcement of dog control rules/Auckland Council by-laws including requiring all dogs to be on lead and under control within the marina. If not already present and planned for educational signs about dog control on the breakwater.	All year round
Mustelids including stoat (*Mustela erminea*), ferret (*Mustela furo*) and weasels (*Mustela nivalis*).	Direct predators of kororā adults as well as chicks and eggs.	Educational programme to encourage visitors to the marina to report stoat sightings via the Te Korowai o Waiheke website[7]. Implement three DOC 200 kill traps in a double-set tunnel, baited with manufactured rabbit meat and/or eggs. Manufactured bait or eggs are preferable as they will last in situ for longer periods and require minimal maintenance. One trap to be installed near the existing Pohutukawa tree and the other two at 100 m intervals away from one another on the breakwater. Traps to be inspected every month and reset if depleted.	Year-round: Fortnightly checks during August to March, monthly thereafter.
Hedgehog (*Erinaceus europaeus*)	Omnivorous species known as a predator of kororā eggs.	The same DOC 200 kill traps used for mustelids will be used for hedgehogs.	Year-round: Fortnightly checks during August to March, monthly thereafter.
Rat (*Rattus rattus, R. norvegicus)*	Impact on kororā through predation of eggs and chicks.	Prevention through effective rubbish management. Prior to removal from site, all rubbish collected from marina users (i.e., from boats and from the public café/office area) is to be stored in the access-controlled rubbish/recycling compound on the marina wharf. All rubbish is to be removed from site regularly. Public rubbish bins will be limited to high public use areas (café and office areas) and be designed to be as vermin proof as possible. Six bait stations will be deployed with the anti-coagulant rodenticide brodifacoum. Five bait stations shall be spaced 50 m apart along the breakwater (Figure 1) and one within the rubbish/recycling compound on the marina wharf.	Pulsed control: August, November, January, and April

[6] Responsible pet ownership educational brochure - https://tekorowaiowaiheke.org/s/WISCA-RPO_leaflet_V3-no-bleed.pdf

[7] https://tekorowaiowaiheke.org/stoat-report

Pest	Impacts	Recommended method(s)	Control timing
		Bait stations will be baited in August, November, January, and April. During these months, bait will be replenished weekly as required.	

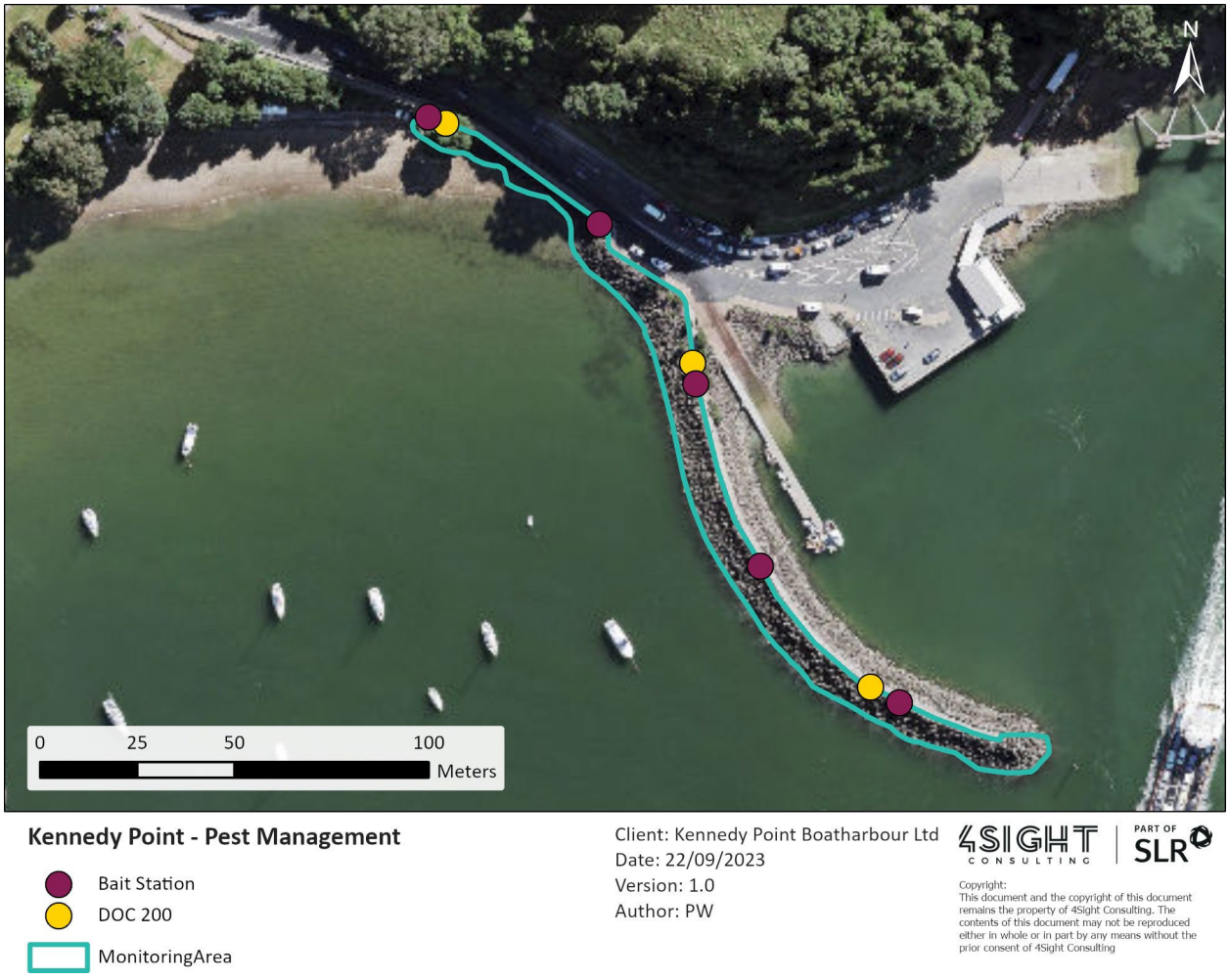


Figure 1: Approximate locations of traps to be installed within the kororā monitoring area. Note this excludes the trap placed within the rubbish/recycling compound on the marina wharf.

2.4 Timing

Pulsed control targets certain times of year to focus control which is a preferable method for rats (Table 1). Pulsed control can be more effective than all-year-round control because it targets the pests when they are most hungry at the end of winter (and lures are more attractive), just prior to the bird breeding season (for KPM this would be June), and then again going into winter to keep numbers low.

Control for mustelids is to be undertaken year-round with fortnightly checks during August to March, then monthly thereafter.

2.5 Monitoring and reporting

To assess the effectiveness of the predator control program, monitoring for predator species is to be undertaken. Monitoring for rats and stoats is to be done prior to control starting and then every six months (tracking tunnels) and annually (chew cards) thereafter. Monitoring is proposed to occur during the months August/September and

March/April. This monitoring is to be collated into a short report setting out the predator control outcomes for the prior year, and submitted to Auckland Council within one month of the annual anniversary of the commencement of control.

The purpose of the monitoring is to assess the effectiveness of the proposed predator control in relation to achieving the relevant objectives of this plan. Monitoring is to be undertaken utilising appropriate methods for the site and the controls being used, such as:

- use of tracking tunnels (twice annually) and chew cards (annually),
- use of CCTV, trail cameras and other video footage established at the site (throughout the year),
- citizen science and public observations (throughout the year),
- observations and records gathered by trained marina staff and SQEP's (throughout the year).

Monitoring reports must include the following information as a minimum:

- total number of the predator species captured and observed through the monitoring,
- information on the physical monitoring of bait (the removal of bait from traps – e.g., often peanut butter or chocolate buttons) and any other predator control maintenance activities,
- reporting on the locations of bait stations, frequency of maintenance activities and other ongoing learnings.

Efforts are to be made to align the proposed predator controls, monitoring and reporting with the existing monitoring and control programmes that have been established along the breakwater (including the Te Korowai Waiheke Kennedy Point rat eradication trial).

3 POST-CONSTRUCTION KORORĀ MONITORING PROGRAMME

This section describes the location (extent), methodology and frequency of kororā monitoring to be undertaken post construction of the KPM and the reporting of results.

3.1 Background and inputs

A "Little Blue Penguin Monitoring Programme" for KPM was prepared by 4Sight in June 2020. This was subsequently superseded by a Kororā Construction Monitoring & Management Plan (KCMMP) prepared by Dr Leigh Bull (Boffa Miskell Limited, 2021). This plan detailed construction monitoring and management protocols. One of the monitoring programmes was On-going Breakwater Monitoring (OBM) which was conducted monthly during the construction period. This equates to approximately two years of survey data (commencing from June 2021 until the opening of the marina in late 2023). Pre-construction surveys were undertaken by 4Sight Consulting in December 2020 and February 2021 using a slightly different methodology and objectives to the KCMMP, so these surveys are not included in the OBM data.

The monitoring methodology used with the OBMs is recommended to be continued into the post-construction/operational phase monitoring. However, it is recommended that the timing of monitoring coincides with the known peak period of breeding and moulting activity on the breakwater (i.e., between the months of August to February each year; Figure 7).

The monitoring location, methodology and frequency is discussed in the sections below.

3.2 Objectives

3.2.1 OBM objective

The certified KCMMP (Boffa, 2021) defined the purpose of the monthly OBM sessions to be to: "confirm the ongoing habitation of the breakwater by kororā during the construction phase of the marina. If birds cease to inhabit the breakwater, particularly during the breeding season, these changes can then be investigated relative to construction activity to determine, as far as is reasonably possible, whether marina construction activities may be the cause."

3.2.2 Post construction monitoring objective

Building on this objective, we recommend that the post construction monitoring objective is: "to confirm the ongoing habitation of the breakwater by kororā during the operational phase of the marina and to take appropriate steps to investigate and identify, as far as is reasonably possible, the cause of any cessation of use of the breakwater by kororā during the breeding and moulting season."

3.3 Definitions

The below definitions are used throughout this document and are defined as:

- **Suitably Qualified and Experienced Person (SQEP)** is defined as a person with an ecology qualification and experience working with kororā (from the KCMMP, Boffa Miskell, 2021).
- **Active burrows** are defined as a location that contains, or is suspected to contain, adult kororā with viable nest contents (egg(s) or chick(s) alone or with adult(s) or a moulting bird based on the time of year or any signs that indicate moulting).
- **Non-breeding kororā** are defined as kororā that are unlikely to be associated with a location that contains, or is suspected to contain, kororā egg(s) or chick(s) as deemed by the SQEP.
- **Non-moulting kororā** are defined as adults that have no moult feathers.
- **Monitoring area** as defined by the map in Figure 2.
- **Post construction** is the time after construction of the marina has been completed.

3.4 Limitations

The limitations for the monitoring of kororā at the site are described in this section.

3.4.1 Monitoring within a rock wall (breakwater)

Recording the exact number of kororā individuals present during a monitoring session is unlikely to be possible for all locations within the rock wall. This is also the case for exact numbers of breeding pairs, nest contents and chick fledging success. This is because the visualisation of birds and nest contents within the deep crevices of the rock wall is challenging even with an experienced person with a burrowscope and DOC-certified penguin detector dog. Accordingly, it is not always possible to definitively quantify the number of birds or their breeding or moulting status.

While the location of kororā signs (guano, smell, scratching, and feathers) is useful to form a general picture of kororā presence and activity within the monitoring area, it does not provide certainty as to the presence or absence of kororā at any specific time.

3.5 Monitoring area

The monitoring area for pre-construction and construction OBM sessions has been the marina side of the breakwater and an area of the foreshore up to the first Pohutukawa tree (refer to Figure 2**,** Penguin construction monitoring area). This monitoring extent was clarified by the Environment Court in July 2021 as required by condition 24A.

It is recommended that the monitoring extent is kept the same for the post-construction period. This will be referred to as the “monitoring area” throughout this report.

Figure 2: The monitoring area for kororā for the post-construction monitoring. Note that this is the same area as the Penguin Construction Monitoring Area (PCMA) from the KCMMP (Boffa Miskell Ltd, 2022).

3.6 Monitoring methods

The recommended monitoring methods are summarised below (Table 2). It is recommended that methods 1 and 2 are utilised as the main monitoring methods. Methods 3 and 4 are recommended as supplementary methods only and are not to be utilised in isolation from methods 1 and/or 2.

Table 2: Summary of the monitoring methods for birds including the monitoring objectives, target species and any other supporting details.

	Method	Monitoring Objective(s)	Detail
1	A specialist conservation dog for seabirds (Figure 3).	Monitor the ongoing use of the defined monitoring area by kororā.	This survey is based on the availability of a DOC-certified penguin detector dog. This method provides the highest level of certainty for identifying the presence of kororā especially in locations where visualisation of the rock wall contents is not possible.
2	Visual survey for kororā and their sign (feathers and/or fresh guano) by a SQEP (Figure 4).	Monitor the ongoing use of the defined monitoring area by kororā.	Conducted using a phone camera and/or burrowscope as with a standardised method as described in Appendix B. The monitoring method focuses on bird presence/absence and signs (guano, feathers, scratching etc) which does not rely on the birds being present at the time of the monitoring.
Supplementary methods (that can be utilised in combination with method 1 and/or 2 but are not required)			
3	CCTV or trail cameras	To provide ongoing information to support detailed monitoring (see example in Figure 5).	Used to either monitor through a live feed inside a burrow/nest box and share publicly (similar to Omaru Penguin Colony[8]). Used generally on a certain area where penguins are likely to come ashore or leave the area (dawn and dusk). The position and location of cameras will affect how successful monitoring is utilising this method.
4	Ad-hoc observations by marina staff and members of the public utilising a standardised data sheet through an app.	Incidental observations of kororā presence within the marina area would supplement other monitoring methods (Figure 6). This would use citizen science to record the location and behaviours of individuals observed within the marina and the surrounding environment. Could be used as information gathering to assist with enforcement and a reporting tool for dog rules.	Marina staff: ▪ Marina staff would record incidental observations of kororā through a standardised paper data sheet or through an app. This would be included as a table/section within a general check list for marina maintenance and operations. The information would be shared with the SQEP on a regular basis (i.e., monthly) to assist with the overall kororā monitoring programme. Public Using Citizen Science and Educational Signage: ▪ Educational signage about kororā is to be displayed at the marina. This could include a QR code that a member of the public scans that directs them to a website or app to record kororā presence and behaviours in a standardised way. Other opportunities include: ▪ Reporting and compliance of dog rules at the marina (e.g., public could report a dog that was not under control).

[8] https://www.youtube.com/watch?v=EKf2nkPvyd8

	Method	Monitoring Objective(s)	Detail
			▪ Rather than the development of a specialist app, encourage the use the citizen science app iNaturalist to record observations.

Figure 3: Examples of dog indications (above) and SQEPs undertaking a visual survey of breakwater using a phone camera or burrowscope for kororā and their sign (feathers and/or fresh guano, below) during the pre-construction and construction monitoring at Kennedy Point.

Figure 4: Examples of kororā and their sign recorded by SQEP using a phone camera or burrowscope during the OBM sessions during the construction period at Kennedy Point.

Figure 5: CCTV footage capturing two penguins (red circle) on the breakwater immediately below burrow 27 (yellow arrow), recorded on 3/5/21 at 18:37 hrs (Boffa Miskell, 2021).

Figure 6: Observations by the public (right) and by security guards (left) within the Kennedy Point breakwater during the construction period.

3.7 Monitoring frequency and timing

The OBM data collected over a two-year period has enabled the identification of peak breeding and moulting activity on the Kennedy Point Breakwater (refer to Figure 7). As such, it is recommended that monthly surveys of the monitoring area are undertaken between the months of August and February).

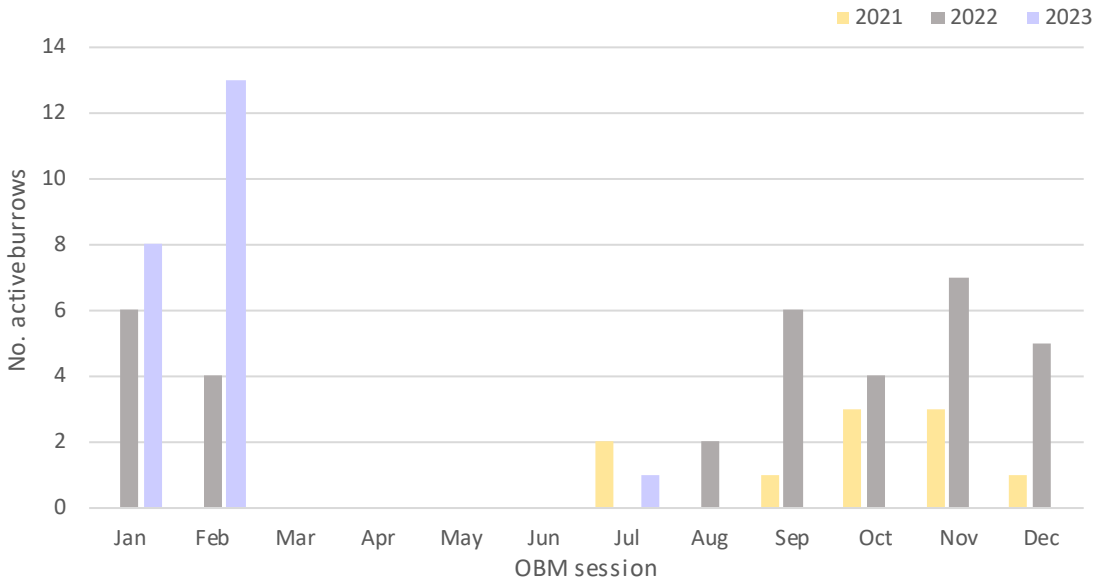


Figure 7: Number of active burrows recorded during each OBM session.

3.8 Data collection and reporting

Monitoring data will be stored in a digital monitoring database at the time of collection (e.g., geodatabase or similar), or where necessary entered subsequently in a timely manner. Each monitoring location is marked on site with a unique identifier (see example in Figure 9).

Every kororā survey undertaken by a SQEP is to be collected in ESRI's Fieldmaps or similar software following the data structure in Appendix B.

The findings of the monitoring will be summarised into an annual monitoring report to be delivered to KPM and Auckland Council within one month of the last monitoring round in the annual monitoring season. This report will include:

- The methodology used for the surveys,
- A description of signs observed including guano, smell and/or feathers at each of the surveys,
- Burrow contents at each survey, including bird(s), chick(s) and/or egg(s) with photograph evidence (if achievable),
- A summary map of the monitoring locations and the findings of the surveys. This map will have a record of the GPS survey location of the survey points for each monitoring location (even if no signs or evidence of kororā were observed). These monitoring locations are either existing on the breakwater (with a marker and unique identifier), nest boxes (Figure 9) or new locations where signs are observed. The map will use the symbology below (Figure 8) which may show but is not limited to:
  - where fresh signs of kororā activity are observed within the monitoring area (since the last annual report),
  - location of active burrows for each of the surveys (if required, as defined in section 3.3),
  - the location of existing monitoring locations but where no fresh signs of kororā activity (guano and/or feathers) were observed,
  - any new monitoring locations which are assigned a new marker (e.g. dazzle spray or similar) and unique identifier as aligned with the previous location identifiers (referred to as location ID – currently numbers 1 – 60).

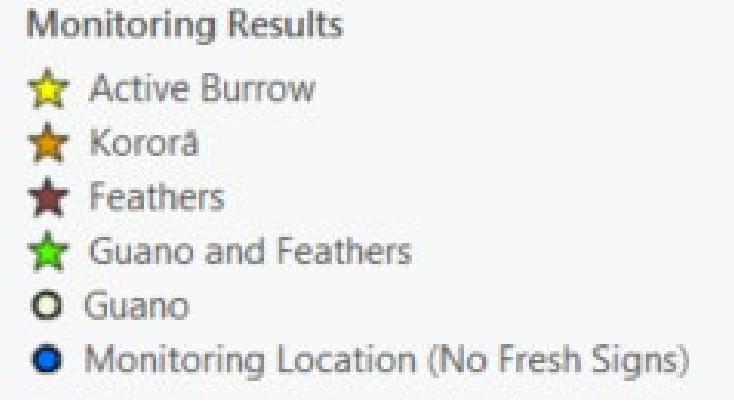
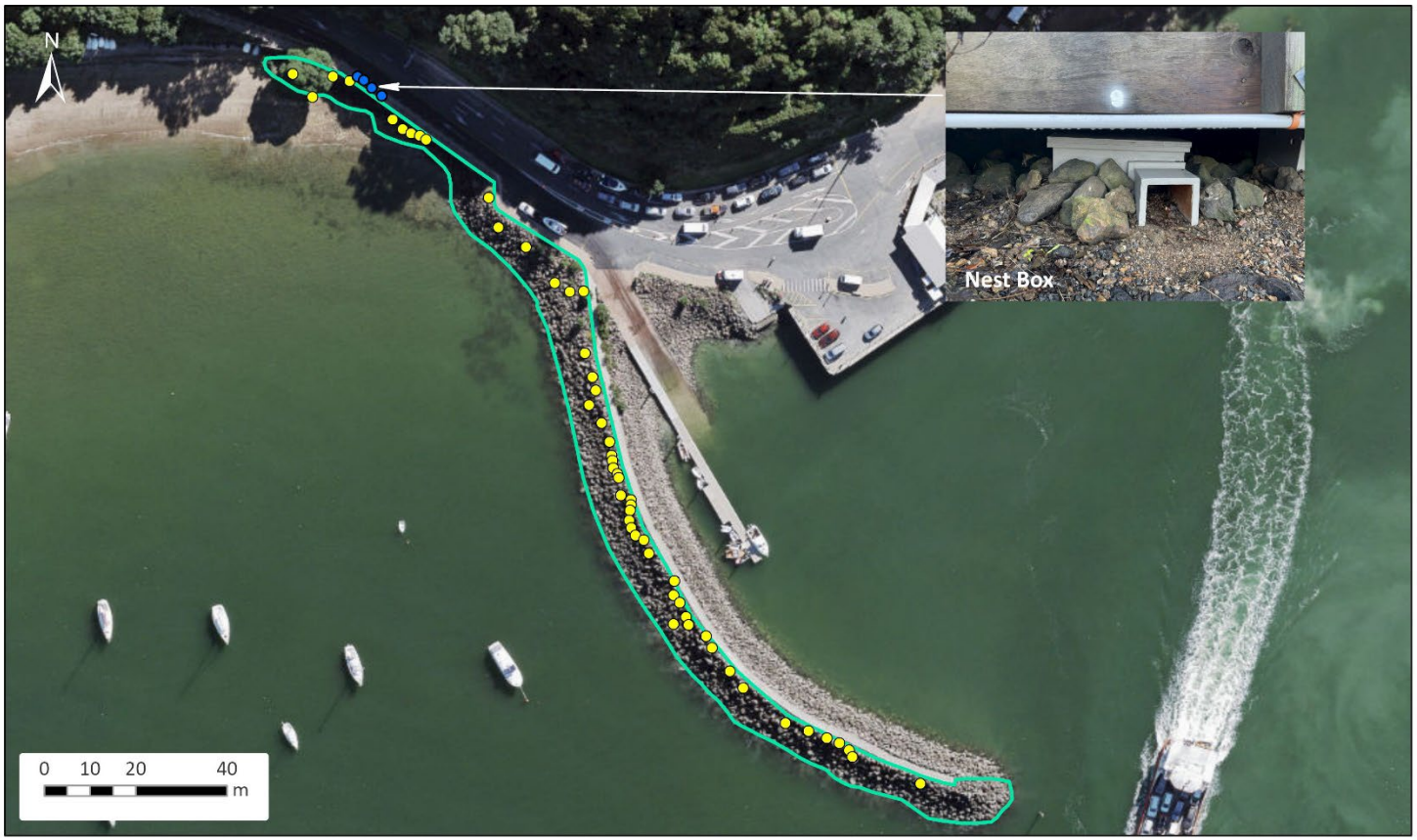


Figure 8: Post-construction monitoring results symbology for maps to remain consistent compared to the pre-construction and construction surveys.



Map Description: Kororā Monitoring Locations for the Post-Construction Period

Legend

- Nest Boxes (N1-N4)
- Monitoring Area
- Monitoring Locations

Client: Kennedy Point Boatharbour Limited
Project Code: AA1921
Date: 16/05/2023
Version: 1.0
Author: CD

Figure 9: Current monitoring and nest box locations along the Kennedy Point breakwater.

4 REFERENCES

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Appendix A

Kennedy Point Marina Public Facilities Plan (29 January 2021) – Layout of Public Facilities

SCALE 1 : 1200

01	MARINA WHARF	04	ACCESS GANGWAYS	07	BIKE STANDS	10	CARPARK PONTOONS
02	LOADING ZONE	05	KAYAK RACKS	08	PUBLIC DECK & LAUNCHING PONTOON	11	TROLLEY RACKS
03	RUBBISH COMPOND	06	SUP RACK	09	MARINA BUILDING	12	ATTENUATOR PONTOONS

11

Appendix B

Example Kororā Monitoring Table

Description	Type	Domain/Pick List	Comment
Date	Date		Required field
Initials	Text		Required field
Company	Text	4Sight, BlueGreen Ecology, Boffa Miskell, DabchickNZ, Other	Required field
Month	Text	January, February, March, April, May, June, July, August, September, October, November, December	Required field
Year	Number	2023,2024, 2025	Required field
Survey Purpose	Text	GKM, CAM, Other	Required field
Monitoring Method	Text	Phone Camera, Burrowscope, Both Methods	Required field
Survey Type	Text	Conservation dog survey, Burrowscope and Visual Check	Required field
Burrow ID	Number		Either ID is filled in
Nest Box ID	Number		
Dog Detection	Text	Yes, No	Required field
Guano Detection	Text	Yes, No	Required field
Feather Detection	Text	Yes, No	Required field
Bird Detection	Text	Yes, No	Required field
Chick Detection	Text	Yes, No	Required field
Egg Detection	Text	Yes, No	Required field
Number of Birds	Number		Leave blank if no birds or chicks are observed
Number of Chicks	Number		
Number of Eggs	Number		
State of Egg	Text	Warm and light-coloured eggs alone in nest, Eggs left alone and not viable (cold and dark), Egg(s) with parent sitting on it.	
State of Birds	Text	In moult, no moult	
State of Chicks	Text	Chick with down feathers, Chick with some adult feathers (<50%), Chick with mostly adult feathers (>50%), Chick or young juvenile, ready to fledge	
Behaviour	Text	Parent bird sitting on egg, Chick with parents, Chick alone in burrow, Fledging or young juvenile, Adult alone in burrow, Pair of Adults, Other	
Monitoring Results	Text	Active Burrow, Korora, Guano, Feathers, Dog Indication, Monitoring Location (No Sign).	Required field
Comments	Text		Comments on all the above.

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Auckland Council

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