

Before the Independent Hearing Panel
Appointed by the Southland Regional Council

Under the Resource Management Act 1991 (**RMA**)

In the matter of an application by **South Port NZ Limited** to dredge parts of
the Bluff Harbour

Statement of evidence of Brent Stephenson

29 March 2022

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**anderson
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Qualifications and experience

- 1 My name is Dr Brent Mark Stephenson.
- 2 I am a Biologist/Director at Eco-Vista: Photography & Research Ltd.
- 3 I have a Masters in Ecology from Massey University (1999) and a PhD in Zoology from Massey University (2006). I have worked as a biologist conducting field surveys, bird counts, and preparing avian values statements and reports for more than 20 years.
- 4 I am a member of Birds New Zealand (formerly the Ornithological Society of New Zealand) since approximately 1987.
- 5 I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2014. This evidence has been prepared in accordance with it and I agree to comply with it. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

Scope of evidence

- 6 I have been asked to prepare evidence of the avian values relating to the Bluff Harbour Capital Dredging Project. I prepared the report 'Survey and Assessment of Avian Values: Bluff Harbour Capital Dredging Project' included in the application, and this as part of my evidence. Primarily, but not exclusively, my evidence has been in relation to the rock-breaking, drilling and blasting regime being proposed. Considerations of avian values with regards to other aspects of the Capital dredging works has also been undertaken. This includes:
 - (a) Desktop assessment of Avian values of Bluff Harbour;
 - (b) Observation survey of Bluff Harbour and Awarua Bay in February 2021;
 - (c) Assessment of species of importance with regards to the capital dredging works;
 - (d) Assessment of effects from the capital dredging works and risks associated to birds;
 - (e) Potential effects of rock-breaking, drilling and blasting regime on bird species during the capital dredging works; and
 - (f) Risk reduction and mitigation techniques for minimising impacts to birds.

Executive summary

- 7 A list of 155 species was compiled during a desktop assessment of avian values for Bluff Harbour. Of this a short-list of 10 species which have a threat status and which overlap with the proposed Capital dredging works area were determined as priority species for which mitigation may be required.
- 8 An observation survey carried out in February 2021 found 60 species present in the area at that time, all of which had already been identified during the desktop assessment. This survey allowed observation of the coastal habitats, including the Bluff Port and environs, and allowed an understanding of the potential impacts from the proposed works on the species present at the site.
- 9 Of the ten species identified as priority species, five are gulls/terns, four are shags/cormorants, and the little penguin.
- 10 Potential effects of the proposed Capital dredging works on birds are mainly due to disturbance from above and below water noise affecting the breeding, feeding or roosting of birds nearby. Decreased food availability due to sediment plumes, temporary reduction in available feeding habitat due to removal of substrate and increased disturbance, are also explored. Through this, most bird species are deemed to be unaffected by these potential impacts, and although dredging, rock-breaking, drilling and blasting will all increase levels of above water and below water noise, these effects are deemed minor at best. This noise may have an impact on the behaviours of these birds and their ability to forage nearby, but as the area in which these effects will occur are small parts of all species potential foraging areas, this is deemed minor. Elevated noise both above and below water may have impacts on breeding little penguins, and could deter little penguins from starting breeding at burrows too close to these works. However, the levels of noise seem unlikely to create this response, based on the fact that the environment they currently breed in is already a place where elevated noise levels occur and close to an already busy Port. If disturbance at the early stages of the breeding season were to occur, there are safe alternative breeding sites nearby for little penguins to create new burrows. The timing of this would be outside of the key breeding period of October to December when chicks are being raised.
- 11 However, both rock-breaking and blasting could injure or kill birds (both little penguins and other priority species) that are too close to the activity. The distance at which a permanent threshold shift in the hearing would likely

occur in birds in or under the water is within approximately 11m for rock-breaking, and 107m for blasting.

- 12 Several risk reduction and mitigation strategies are to be employed to minimise the chances of disturbance, injury or death. The key measure for little penguins, which are considered more vulnerable during the key breeding period (October to December), is to limit rock-breaking, drilling and blasting to outside of this time. Thus, these works will only be carried out from February to September. As well as this, these activities will only be carried out during daylight hours, outside of the normally crepuscular timing of transit of penguins to and from their nesting burrows. A marine fauna observer (MFO) protocol has been created and will allow observation of little penguins and other priority species, and if within the designated zone of work activities, a cease to works will be made. Lastly a number of other strategies, including a soft-start to blasts, and the use of an acoustic deterrent device during all work activities will lower the risk to little penguins and other species to less than minor.

Desktop assessment of avian values of Bluff Harbour

- 13 The Bluff Harbour area has high avian values. A total of 155 bird species were identified in my report as being present within the vicinity of Invercargill and the Bluff Harbour and Awarua Bay (Appendix 1 in my report). In my report I categorised these bird species into eight main groups of waterfowl, penguins, albatross, petrels/shearwaters, cormorants/shags, shorebirds, herons, and gulls/terns. Each of these groups was discussed with regards to the various potential impacts in my report.
- 14 Although not all of these species are likely to be affected by the proposed Capital dredging works, a short list of fifty-nine bird species with a threat status (At Risk, Naturally uncommon, or higher) and forty-nine bird species without a threat status, are considered to frequent the Bluff Harbour and Awarua Bay area.
- 15 Species with a threat status are considered to be a priority with regards to mitigating effects of the proposed works, and are listed in Table 1 of my report. In that table, 20 species were in bold, as they are considered to overlap with the actual areas in which Capital dredging works will be conducted, rather than just occurring in the overall vicinity.
- 16 Taking into account the habitat requirements of each species, their actual occurrence within the Bluff Harbour area close to the sites of the proposed Capital dredging works, and their seasonal overlap with the proposed Capital dredging works, the main species of concern (in rough order of highest threat status to lowest) are black-billed gull, black-fronted tern,

Foveaux shag, Caspian tern, little penguin, red-billed gull, white-fronted tern, pied cormorant, great cormorant, and spotted shag. All of these species therefore fit into the bird groups of gulls/terns, shags/cormorants, and little penguin.

- 17 Despite both Fiordland crested and yellow-eyed penguin having been recorded near to Bluff Harbour, these two species are not considered at risk during the proposed Capital dredging works. There are no breeding sites close to the area, and they are incredibly rare visitors recorded once or twice in the last 50 years of recorded observations. As well as this, any mitigation measures for little penguins and shags/cormorants set out in the Marine Fauna Observation protocols (discussed later in my evidence) would allow these species to be detected in the very rare chance one was to venture into the area.
- 18 Although a significant number of seabird species being record in the vicinity, it is highly unlikely that any albatross, petrel, shearwater or related pelagic seabird species occurs regularly in the Bluff Harbour, or utilises the area in which the proposed Capital dredging works will be conducted for foraging in any significant way. These birds typically forage over expansive areas of off-shore pelagic ocean, with some utilising the inshore-coastal. The relatively small area that will potentially be impacted by above and below-water noise, increased sediment load (particularly around the sediment disposal site), and any increase in marine traffic are highly unlikely to impact any of these species.
- 19 Species of shorebird which have a threat status are not deemed to be at risk from any of these works due to the reasons outlined in the following sections with regards to above water noise, and/or mitigation of increased sedimentation into the inter-tidal zones where these birds feed. None of them would be affected by underwater noise levels, increased traffic associated with the proposed Capital dredging works, or the proposed rock-breaking, drilling and blasting regime.

Observation survey of Bluff Harbour and Awarua Bay in February 2021

- 20 During the period 10-14 February 2021 I visited the Bluff Harbour and Awarua Bay area to do a site visit. This was mainly to get a feel for the area with regards to the proposed works, as it is an area that I normally visit at least several times per year during birding tours, and to catch the Ferry to Stewart Island.
- 21 I spent time surveying birds in the various habitats associated with the area and documented these in my report (Natural rocky coastline with fringing vegetation, Natural rocky coastline with grass verge and public road, Man-

made rock wall, Man-made vertical concrete or steel walls (wharf areas), Shell/sandy beach with fringing vegetation, Inter-tidal zone, Channel, Inshore coastal and off-shore pelagic). A brief survey was conducted inside the Bluff Port environs to document the habitats within that location, and observe birds present in the area.

- 22 During this site visit a total of 60 bird species were recorded, all of which were already represented in the desktop assessment conducted prior to the site visit. Being able to see the site, visit the Bluff Port, and conduct observations of the bird species in the area allowed me to confirm that the key species of interest with regards to the proposed Capital dredging works are the gulls/terns, shags/cormorants and little penguin. It should be noted that no little penguins were seen during this visit, and assessment of birds being present in the area is made from past records, knowledge of their breeding habits and habitats, and local information.

Assessment of species of importance with regards to the Capital dredging works

- 23 As above the bird species of importance with regards to the Capital dredging works are black-billed gull, black-fronted tern, Foveaux shag, Caspian tern, little penguin, red-billed gull, white-fronted tern, pied cormorant, great cormorant, and spotted shag. All of these species therefore fit into the bird groups of gulls/terns, shags/cormorants, and little penguin. These are discussed below in more detail.

Gulls/terns

- (a) Five species of gulls and terns that have threat status of At Risk, Naturally uncommon or higher. These include black-billed and red-billed gulls, black-fronted, white-fronted and Caspian terns. All of these species are likely to overlap with the proposed Capital dredging works, and as such could be at risk primarily whilst feeding over the channel area during the rock-breaking, drilling and blasting operations. All of these species are highly visible, forage by surface plunge-diving from the air, and often in small to large concentrations. Therefore, they would be easily detected during the Marine Fauna Observations.

Shags/cormorants

- (b) Four species of shag/cormorant have a threat status of At Risk, Naturally uncommon or higher. This includes the Foveaux shag, pied cormorant, great cormorant, and spotted shag. Foveaux shags in particular are of significance due to their threat status of Vulnerable,

and the fact that they have a relatively small and restricted population size, and breed nearby (inside the Bluff Harbour, but well outside of the area affected by the proposed Capital dredging works). All of these species feed by swimming through the water column, sometimes to depth, and surfacing to breath and rest. They are highly visible and therefore would be easily detected during the Marine Fauna Observations.

Little penguins

- (c) Little penguins breed within the Bluff Harbour and along the neighbouring coastline, especially within the Channel area and around the Bluff Port, probably in relatively small numbers. Most of the Bluff Port has steep concrete or metal walls under the wharves, and perimeter areas of rock wall are mostly unfavourable for penguin breeding.
- (d) Little penguins breed from August to February each year, with the key part of the breeding cycle being the chick rearing period, from October through December. Breeding is then followed by an annual 'catastrophic' moult, during which penguins come ashore, generally back to their breeding burrows, and undergo a full moult of their feathers, which takes around two weeks. During this time moulting birds remain in their burrows, only going back to sea when they have finished their moult. They spend the rest of the time outside of the breeding and moulting periods, at sea mostly away from land.
- (e) Little penguins generally only transit to and from their breeding burrows around sunset and sunrise each day (often referred to as crepuscular activity). The Channel area may constitute a small part of their foraging area, but most feeding is probably done along the inshore-coastal zone, mostly outside of Bluff Harbour and up to 10km or more from their breeding sites.
- (f) When swimming, penguins are visible, and therefore should be detected during the Marine Fauna Observations (MFO). However, the fact that penguins generally transit to and from their breeding burrows outside of the rock-breaking, drilling and blasting periods adds an extra layer of mitigation, as does the Capital dredging works timeline, which has been designed to occur outside of the key penguin breeding period (timeline of Capital dredging works is 1 Feb to 30 Sept).

Assessment of impacts from the Capital dredging works and risks associated to birds

24 In my report I considered there to be five main potential ways in which the Capital dredging works could impact bird species. These are set out below, in no particular order.

Disturbance of breeding, feeding or roosting areas from elevated levels of above water noise

- (a) Modelling of above water noise for this project by the Styles Group (Nov 2020) has shown that in some locations close to the works there will be slightly elevated levels of noise. Background noise in the Bluff Harbour area is considered on average to be around 30 dB (A), and it should be remembered that this is a working port, with regular ship and boat traffic in and out of the Channel during normal operations. Bird species within this area, therefore have some tolerance for noise, and an increase in very restricted areas to less than 45 dB (A), and a few very small areas to 50-55dB (A) for relatively short time frames, is unlikely to cause anything more than minor or transitory effects on bird species, if at all. Previous studies on birds in other parts of the World (outlined in my report in Addendum added 22 June 2021) have found little to no adjustment of behaviour or response to noise at levels up to 65-70 dB(A). Although the effect of increased noise levels on breeding or moulting penguins is unknown, these birds will mostly be within their burrows during this time. This itself is likely to decrease noise levels, and due to the fact that these birds live and breed within an already 'noisy' environment, I consider that slightly elevated levels of above water noise are unlikely to have any noticeable effect on this species during the moulting process, or as the birds arrive back to initiate breeding at the start of the breeding season (Aug to Sept).

Disturbance of breeding, feeding or roosting areas from elevated levels of below water noise

- (b) During rock-breaking, drilling and blasting there will be increased levels of below water noise within the Bluff Harbour (as outlined by the Styles Group Report Nov 2020 & Consulting Advice Note 27 Aug 2021). These are discussed in a subsequent section below. During other Capital dredging works activities, for example dredging, there are also likely to be slightly elevated levels of below water noise. As with above water, I consider this to be an environment where there are already elevated levels of noise due to regular day to day operations, and that slightly elevated levels of below water noise will

have less than minor impacts on birds within this area. I discussed previous studies of underwater noise impacts on marine birds in my report, outlined on page 24 in a section entitled 'Specific comments with regards to penguins and cormorants/shags and underwater noise and blasting'. These studies showed that foraging marine birds are fairly tolerant of elevated below water noise. Any species foraging within the Channel and other marine areas adjacent to the works would have extensive foraging habitat outside of that where the noise levels are elevated by these activities, and therefore any impacts are deemed less than minor. It is not uncommon to see species of shag/cormorant, as well as gulls and terns foraging right beside the Bluff Harbour during work periods, and in the Channel as ships and ferries navigate these waters. As the affected area likely constitutes a relatively small portion of the foraging range of little penguins, any negative impacts of below water noise levels on the foraging ability of little penguins is deemed less than minor.

Decreased food availability due to sediment plumes in the swinging basin and berths in Bluff Harbour, and adjacent sediment disposal site

- (c) As outlined in my report, the issue of increased sediment in the water column due to these works is not deemed to be of concern to birds, as works considered to increase sediment load will only be conducted during an outgoing tide. Therefore, effects on the foraging habitat of shorebirds will not be impacted.
- (d) Increased sediment load in the Channel, disposal site, and offshore is likely to be of a minor nature, or less, as birds foraging in all of these locations are likely to encounter sediment in the water naturally. Species such as shags/cormorants, penguins, and terns/gulls are all adapted to feed in water that already contains sediment. As previously, with regards to below water noise, any sediment load that does impact foraging ability during relatively short periods of time within these areas, will be in an area that for all species would have access to considerable foraging areas outside of those affected. Penguins and shags/cormorants are adapted to forage at depth (in relative darkness) and within water that contains considerable sediment, and observations of shags/cormorants foraging adjacent to moving vessels stirring up sediment both in the Bluff Port area and the Ferry Terminal confirm this.

Temporary reduction in available feeding habitat due to removal of prey substrate and disturbance, and increased vessel activity in the area causing disturbance to foraging birds

- (e) As with the areas affected by potential increased sediment load above, the very limited areas that will be affected by this are unlikely to have any negative impact on the foraging of bird species within this area. Noise, sediment, and vessel activity are all things that birds in these areas are used to dealing with on a day to day timeframe. The rock areas that are to be removed by rock-breaking, drilling and blasting are also quite limited in size, and again form a very small part of the foraging zones of all birds within this area. My report therefore deems this to be negligible in effect.

Direct impacts from the underwater blasting, including injury or death

- (f) This potential impact is discussed more in depth in the next section.

Potential effects of rock-breaking, drilling and blasting regime on bird species during the Capital dredging works

- 25 With regards to potential impacts from the proposed Capital dredging works, rock-breaking, drilling and blasting are deemed to pose larger potential effects on bird species. It is important to note that rock-breaking, drilling and blasting will only be carried out during daylight hours, from 0730 to 1800 hours. This has implications for little penguins which would generally not be transiting the rock-breaking, drilling and blasting areas during these times. The impacts that the rock-breaking, drilling and blasting may have on birds are set out below.

Elevated noise levels below water

- (a) During rock-breaking the noise produced could cause injury to marine fauna. Distances have been calculated for temporary threshold shift (TTS) and permanent threshold shift (PTS) in the hearing of marine mammals, including seals (referenced in Styles Group Consulting Advice Note 27 Aug 2021). Due to the fact that there is no data available for birds in these situations, we have taken a conservative approach and consider values for seals to be appropriate for birds. Therefore, the distance for PTS in seals and birds is within 11m of the work site. The noise is also considered to interfere with the foraging of seals, and therefore perhaps birds, out to a maximum of 2020m. This will mean that birds are going to be deterred from being in the water close to the work site when rock-breaking is being carried out, but this is a relatively small area of the potential foraging range for

any of the species likely to be in the area. Rock-breaking will be a fairly constant noise, and in addition acoustic harassment devices will be used at all times, so that breaks in rock-breaking would not allow marine birds to be caught within the injury zone upon restart. Further information on PTS and the MFO protocol is contained in the section below.

- (b) During the drilling of the rock to place charges for rock blasting, there will be increased noise levels below water. Close to the drilling site, this is likely to reduce the foraging ability of marine birds, and may act to deter birds from the general vicinity. The exact distance with which this will impact marine birds below the water is unknown. However, as previously described above, I consider the likely area is a very small part of the overall foraging range for any of the species mentioned previously, including little penguins.
- (c) Previous observations (by other observers and referenced in my report) of shags/cormorants and gulls/terns around blasting during similar work at Otago Harbour showed that in particular shags/cormorants were fairly unperturbed by blasting, and continued to forage and swim nearby (cited as 50m).

Increased sediment load in the water column

- (d) As per other Capital dredging works, there is likely to be some increased sediment load introduced to the water column during rock-breaking, drilling and particularly blasting. However, as previously this is unlikely to affect marine birds foraging near these areas, as most species are capable of feeding in water with a high sediment load.

Direct impacts of blasting causing permanent hearing loss in marine birds, or injury or death

- (e) There is the potential for any birds in or on the water, too close to the blast to incur permanent hearing loss, or potentially be injured or killed by the resulting shockwave. Modelling of below water noise by the Styles Group Report Nov 2020, has allowed the establishment of zones of TTS and PTS in hearing for marine mammals. As such a marine fauna observers (MFO) protocol has been created (Childerhouse, Miller & Stephenson 2022) and will be used by observers to guide marine fauna interactions and when works need to be ceased and/or can resume. For the purposes of this MFO protocol birds are conservatively considered to be similar in likely effect to seals, as there is currently no data on this sort of thing for birds. This could include birds such as gulls/terns resting on the water

or foraging close to the blast site, or shags/cormorants and little penguins in the water near the blast site.

Risk reduction and mitigation techniques for minimising impacts to birds

- 26 The key measures for reducing and mitigating impacts on birds are in my mind comprehensive, and by carrying these out in tandem should result in less than minor impacts to birds.

Timeline for rock-breaking, drilling and blasting

- (a) The timeline for the rock-breaking, drilling and blasting part of the Capital dredging works has been aligned for the start of the program to coincide with the latter part of moulting of little penguins. Therefore, penguins that are finishing their moult and going to sea for the winter may have some elevated noise levels during this period, but as mentioned previously these birds are breeding and moulting in areas with elevated ambient noise levels, and are unlikely to be greatly affected at this time. Little penguins will then spend most of the winter at sea, away from the Bluff Harbour area during the main part of the rock-breaking, drilling and blasting program. Any birds coming in to feed in the Channel area where works are being conducted, are likely to be deterred from the area by the noise of works (including the use of an acoustic harassment device), or if not deterred, detected as part of the Marine Fauna Observations. Although little penguins will be returning to start breeding during August and September, when the rock-breaking, drilling and blasting program will be coming to an end (dependent on weather and shipping). If there is some overlap, and the works are not yet complete, then it is likely that the following measures will reduce any subsequent impact. However, if these do not, then little penguins may choose not to breed at their previous sites, and choose to breed at other sites along the shoreline nearby where noise levels are lower. This could benefit these birds, as predator trapping at the nearby Bluff Hill/Motupohue Scenic Reserve is providing a much safer area for little penguins to breed than the coastal areas along the Channel and around the Bluff Port, where predators, traffic and pet dogs and cats may be currently impacting these birds.

Daily work schedule

- (b) Rock-breaking, drilling and blasting will only be carried out during daylight hours, from 0730 to 1800 hours. This is outside of the main period when little penguins are transiting to their breeding sites (dawn and dusk). It should be noted that outside of the breeding season

(after February, following completion of moult, through to August) little penguins do not generally use their burrows, and therefore are not regularly transiting to and from their burrows. Except for a limited part of August, sunrise is before 0730 and sunset after 1800 hours. During August a slight adjustment for blasting (deemed of most impact) to only occur at least an hour after sunrise, or at least an hour before sunset will be made. This will also allow MFO protocols to be followed, which includes 60 minutes of observation time prior to the blast (see MFO protocols as outlined below). There will also only be one blast per day, as per the work program.

Warning blast and acoustic harassment device

- (c) Prior to each blast a soft-start 'warning blast' in open water of low peak pressure will be set off. This will be designed to deter any birds in the vicinity of the blast away from the area, without the impact on hearing or potential harm. In other previous studies this sort of pre-warning has proven useful in moving birds further away from areas where harm could be caused. An acoustic harassment device will also be used at all times during work hours, and this will provide a continuous deterrent to birds in the water, especially during times when other activities such as rock-breaking or drilling have halted temporarily.

Marine Fauna Observation protocols

- (d) MFO protocols (as per Childerhouse, Miller & Stephenson 2022) will be adhered to and observers in place at least one hour prior to a blast to look for and detect marine mammals, seabirds, and other notable marine life. I am confident this protocol will allow the detection of gulls/terns, shags/cormorants, and little penguins within the zones identified. Briefly, birds will be treated by observers the same as seals. This is deemed a conservative approach, based on lack of empirical data on underwater blasting and its effects on birds. During blasting the maximum distance at which seals and birds would incur PTS in hearing is 107m, and birds in or on the water within this zone would trigger a stop work. With regards to rock-breaking for seals and birds the PTS zone is very small, within 11m from the rock-breaking activity. Note that in my report I used 28m, which related to TTS not PTS. Although for penguins the target for observers to detect is small, the zones for which they are required to be seen are relatively small, and in my opinion reasonable.

Summary of key issues and conclusions

- 27 Assessment of bird species within the Bluff Harbour area detailed ten species, including a number of species of gull/tern, cormorant/shag and little penguin as species at risk from the proposed works.
- 28 The area in which the Capital dredging works are to be conducted is a relatively small part of any of these species foraging range, and only little penguin breeds close to the Bluff Harbour and is potentially affected at this time, by the works.
- 29 A combination of mitigation measures, including the timing of the works outside of the key breeding time for little penguins, the daily work schedule (essentially during daylight hours), soft-start and acoustic deterrent device use, and a MFO program all reduce the risk to little penguins and other birds to less than minor.

Response to bird related issues in section 42A report

- 30 The main concern raised by Mr Peacock relates to the MFO (originally called Marine Mammal Observer (MMO) of seabirds, and the potential for them to be missed during observation prior to a blast. However, I feel that during weather and sea conditions outlined in the MFO protocol, it should be possible for trained observers to detect little penguins and other birds to the full extent of the zones being observed. Part of this is based on the fact that detection of these species is over a relatively small area, being aligned with the zone for seals. Therefore, in blasts of varying sizes this is out to a maximum of 107m from the blast site, a distance I consider reasonable for trained observers.
- 31 Mr Peacock also raises concern of little penguins not returning to their breeding sites due to the works. If this is the case, that little penguins returning to breed at previous nest sites in August, find that the noise levels are too high, then they are highly likely to move to nearby sites where noise levels are lower. Nearby, the Bluff Hill/Motupohue Scenic Reserve is providing a much safer area for little penguins to breed than the coastal areas along the Channel and around the Bluff Port, where predators, traffic and pet dogs and cats may be currently impacting these birds. In my opinion this is likely to be a far less stressful way for little penguins to find a quieter and safer location to breed, than capturing birds from burrows and relocating them. Relocation is likely to result in some penguins repeatedly returning to their old breeding sites, requiring further capture and stress to again relocate. Little penguins were relocated at Napier Port, but this was during the complete removal of a rockwall and subsequent construction of a new wharf. So in this case the birds actual nest sites were going to be

destroyed, and therefore relocation was required. In the case of Bluff Port, it has not been proven that elevated levels of noise from the proposed works will deter birds from their original breeding sites. If in fact they are, then their moving to new safer sites could be beneficial for the individuals and population as a whole.

- 32 Mr Peacock also suggested that surveys to locate little penguin nesting sites could be considered. If this is done, and nests are located, then monitoring of these nests would be further stress and disturbance to these birds. As per my comment above, I consider the location and disturbance of nest sites of greater stress to penguins, than perhaps the risk of elevated noise levels. If a very small number of little penguins are displaced from their nesting sites in and around Bluff Port by elevated noise during the proposed works, then I consider this and their subsequent search for a new nesting site in a quieter place to be less disturbance and stress, than capture, handling, relocation, and any other follow-up work that is deemed necessary to be carried out. Especially when actual impacts of elevated noise have not been confirmed. In my opinion this disturbance by elevated noise is only likely to occur as the birds return to initiate breeding in Aug-Sept, and therefore will likely be before eggs are laid, and well before chicks are present from October on.
- 33 Other issues raised by Mr Peacock from the Department of Conservation and The Royal Forest and Bird Protection Society of NZ submissions are discussed in the relevant sections below.

Department of Conservation Submission concerns

- 34 Department of Conservation raised concerns that yellow-eyed and Fiordland crested penguins come ashore to moult in the area, and that Foveaux shags roost at the mouth of the Bluff Harbour, traversing the operational area, and foraging in the Upper Harbour and wider Awarua Bay area.
- 35 As per the report on Avian values of the Bluff Harbour, yellow-eyed and Fiordland crested penguins do not breed within the affected area, and only on very rare occasions have they been found ashore as moulting individuals. Therefore they are highly unlikely to be affected by these works in any form.
- 36 If a bird of either species was to come into the works area, they would be under the same protocols as other avian species during the rock-breaking, drilling and blasting program, and would be detected by the observer program. They are therefore not deemed to be species at risk from any of the proposed works.

- 37 Foveaux shags are known to forage within the area in which works (drilling and blasting) will be undertaken, and roost nearby. The only breeding site for this species in the Bluff Harbour area is a significant distance from the area in which the works will be conducted, and this work will mostly occur outside of the breeding season for this species.
- 38 These birds are used to foraging in and around the Port area, they are acclimated to shipping and noise, and therefore the increased traffic and noise associated with these works is unlikely to cause any negative impacts on this species indirectly.
- 39 There are a number of roosting sites used by this species around the Harbour, and traversing the works area in flight will not impact this species. The area in which the drilling and blasting will occur is a very small part of the area in which this species forages within the Bluff Harbour, and therefore loss of foraging habitat during the works is unlikely to have any negative population effects.
- 40 As with marine mammals, this species (as well as other shags/cormorants, gulls, terns, and penguins) will be monitored around the drilling and blasting sites, and a strict protocol will be followed during this time. If birds or marine mammals are within the specified distances from the blasting site prior to blasts, then works will be halted until they have departed, and soft-start procedures used to deter birds from the blast area prior to actual blasting.
- 41 With all of these procedures in place, it is considered highly unlikely that there will be any indirect or direct impacts of the drilling and blasting program on Foveaux shags.

The Royal Forest and Bird Protection Society of NZ Submission concerns

- 42 The Royal Forest and Bird Protection Society of New Zealand (F&B) raised concern that there were 59 species of birds with a threat category identified in my report, and these included three penguin species. They also noted that large numbers of shore and seabirds including the New Zealand Dotterel, were documented in my report.
- 43 The location does have a considerable list of bird species that have a threat classification, that at some stage of the year utilise the extended area for feeding or breeding. However, as per the report, there are very few species that are of legitimate concern with regards to the planned work, if the protocols designed for this work are adhered to. More importantly, the list of threatened species should not be taken out of the context of the planned works. The report outlines in full those species that are of concern with

regards to these works, and this list is restricted to just a few species. Each of these species are addressed within the context of this report.

- 44 The F&B submission also mentions seabirds and shorebirds in a general sense, and in response to this I note that the behaviour, foraging areas, or overlap with the planned works, all of which has been discussed in the report, demonstrates most of these species are expected to be at no risk with regards to this project.
- 45 The F&B submission refers to other threatened species (yellow-eyed and Fiordland crested penguins, and New Zealand dotterel). However as discussed within the report, the penguins mentioned are highly unlikely to be present at all within the direct footprint of the works, and measures put in place to minimise risk to little penguins (eg MFO and timing of works) would safeguard these species. The measures that will be put in place to prevent sediment impacting the upper estuary with regards to shorebirds will provide mitigation of effects for New Zealand dotterel.
- 46 The mentioned species are not going to be in the water, close to the drilling and blasting, so will not be directly impacted, nor have increased potential for mortality. Little penguins, shags/cormorants, and gulls/terns could potentially be directly impacted (be killed or injured) by the drilling and blasting regime. However, the observer scheme that is set up to monitor for the presence of marine mammals, will also be monitoring for the presence of these bird species. I don't think any level of mortality is acceptable, and we should be aiming for a zero level of mortality of all of these species. The presence of any birds on or in the water within the MFO zone would require a halt to blasting, and the soft start process should deter any birds not detected by observers, to move away from the blasting area.
- 47 The Royal Forest and Bird Protection Society of New Zealand also raised concern over the timeline of the proposed drilling and blasting works being not exclusively outside of the little penguin breeding season, and that there was not enough information on effects such as increased turbidity on foraging areas of little penguins.
- 48 My response to these concerns is that the works are planned to start during the late summer when little penguins will have already finished their breeding period, and are likely to be completing their post-breeding moult cycle. During the latter, they will not be entering the water, until they have finished their moult, at which time they will depart their land-based burrows and head out to sea for the winter.
- 49 The drilling and blasting works will likely extend through to the start of the next breeding season for this species (Aug-Sept). However, the daily timing

of drilling and blasting works to be outside of the key crepuscular periods that penguins are coming and going from burrows, is a key limiting strategy that is not taken into account in this submission. Drilling and blasting will be only conducted during daylight hours, which is outside of the main period that little penguins are traversing the area to and from their burrows (during dawn and dusk).

- 50 Increased turbidity is outlined in the report, and although it may have an impact on foraging within the channel area where works are being conducted, as outlined this is but a small area of any little penguins foraging range. Moreover, increased turbidity is unlikely to have any effect on the navigation of adult penguins to and from their nests, as they frequently surface to breath, and are likely to use these times to navigate accurately to their breeding sites.
- 51 The impacts of the drilling and blasting on the foraging of little penguins in the works is area is also discussed in the report, and again is considered to be within a relatively small part of the overall foraging zone of these birds (up to 10km per day).
- 52 The period of drilling and blasting will also be maintained during the early part of the breeding season as little penguins come back to start breeding at the next breeding season. However, any increased disturbance from these works is likely to cause penguins to re-evaluate their breeding sites and possibly chose a new site away from the works location, rather than start breeding and then abandon partway through the egg or chick stage. Breeding penguins are much less likely to abandon a breeding burrow once an egg is laid, and even less likely once a chick is present. And the daily works schedule will effectively remove any chance of these works causing this sort of abandonment.
- 53 I am not part of the process to obtain permits to use warning blasts and soft-start of the drilling and blasting, so cannot comment on that. But additional noise to deter any birds from the direct vicinity of the works is of little additional consequence.
- 54 Both the Department of Conservation and The Royal Forest and Bird Protection Society of New Zealand were satisfied with the above answers and subsequent meetings held with each. No further objections to impacts on birds were voiced during these meetings.

Conclusion

- 55 During a desktop assessment and observation survey, a total of 155 bird species were identified as having been found in the general area of the Bluff

Port and Awarua Bay. From these a short-list of ten species which have a threat status, and the potential to overlap with the proposed Capital dredging works has been considered. These species are black-billed gull, black-fronted tern, Foveaux shag, Caspian tern, little penguin, red-billed gull, white-fronted tern, pied cormorant, great cormorant, and spotted shag. All of these species therefore fit into the bird groups of gulls/terns, shags/cormorants, and little penguin.

- 56 All of these species except for little penguin, would be at risk only whilst feeding or travelling in or on the water. Little penguin are also at risk due to the fact they breed in low numbers in and around Bluff Harbour, and therefore the proposed works could impact their breeding attempts through disturbance by way of above water noise (at the nest site), or during their transit to and from nest sites whilst in the water (by way of below water noise).
- 57 All ten species identified above, including little penguin, have considerable alternative foraging locations away from the impacted working area. Thus, overall the foraging zones of these species are not restricted by the proposed works.
- 58 The key mitigation strategy for little penguins is the timing of the proposed works, which will not overlap with the key breeding period of little penguins. The key breeding period is designated as the time when little penguins would have established nests and potentially be raising chicks (October-December). If the proposed works were to cause disturbance with little penguins as they started their breeding season during August-September, then little penguins are likely to move to a new location where disturbance to them is less. This would potentially cause less stress and disturbance to birds, than location of nesting sites, and possible attempted relocation of breeding birds.
- 59 During most of the proposed Capital dredging works timeline (March to July), little penguins will not be breeding, will not be visiting breeding burrows, and will spend most of this time at sea away from the work area.
- 60 The proposed MFO program will allow the observation of the work area prior to blasting, and during rock-breaking activities, to determine if birds are within the MFOZ, and therefore at risk of PTS. If appropriate as per the protocols, work will cease. The PTS zone we are using for little penguins and other birds (based on data for seals), is relatively small (up to 11m during rock-breaking and 107m for blasting), and thus is able to be covered by MFO during the program.

- 61 Other mitigation measures, such as the soft-start prior to blasting, use of an acoustic deterrent device during all drilling, rock-breaking and blasting activities, and restricting work to daylight hours, will all be key in reducing any potential impact to birds during the Capital dredging works.
- 62 With the above appropriate mitigation measures in place, the project should pose a less than minor risk to birds, including the species most at risk which includes gulls/terns, cormorants/shags, and little penguins. This includes the proposed work activities of dredging, rock-breaking, drilling and blasting discussed within this evidence, and my report.

A handwritten signature in black ink on a light-colored background. The signature appears to read "Brent" followed by a stylized surname.

Dr Brent Mark Stephenson

29 March 2022