BEFORE THE BOARD OF INQUIRY
TAMARIND DEVELOPMENT DRILLING APPLICATIONS

EEZ100016

IN THE MATTER	of the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012
AND	
IN THE MATTER	of a Board of Inquiry appointed under s52 of the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 to decide on Tamarind Taranaki Limited's marine consent and marine discharge consent applications

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STATEMENT OF EXPERT EVIDENCE OF DAVID RICHARD THOMPSON FOR TAMARIND TARANAKI LIMITED

Dated: 20 July 2018

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MAY IT PLEASE THE BOARD

1. Executive Summary

1.1 New Zealand supports the most diverse seabird assemblage on Earth, with 168 taxa (species and sub-species) recorded from the region. There have been no systematic and quantitative surveys of seabird distribution and abundance within the South Taranaki Bight ("**STB"**) and compiling a definitive species list of seabirds for the STB is therefore difficult. However, it is likely that 11 'threatened' taxa and a further 25 'at risk' taxa could occur in the STB.

1.2 Additionally, 73 shorebird taxa have been recorded in New Zealand, although most of these (55, or 75% of taxa) are either migrants or vagrants and do not breed in New Zealand. It is likely that six 'threatened' shorebird taxa occur along the coastline of the STB, together with a further seven 'at risk' taxa. Shorebirds are highly unlikely to occur at sea within the area of interest.

1.3 There are a number of potential temporary effects on seabirds from Tamarind's proposed activities, including as a result of: attraction to structures as a result of artificial nocturnal lighting on the drilling rig and support vessels; disturbance and physical exclusion from the space occupied by the drilling rig and support vessels; noise generated by operations on the drilling rig and support vessels; increased turbidity from the placement and removal of structures and associated activities on the seabed; and contamination from discharge of small amounts of harmful substances in offshore processing drainage via deck drains.

1.4 In my opinion, artificial nocturnal lighting present on the drilling rig, and on support vessels, represents the main risk to seabirds. All other potential effects on seabirds from the proposed activities will be insignificant.

1.5 Artificial nocturnal lighting is known to attract some seabirds, with the potential for birds to collide with structures and be injured or killed as a result. Nocturnal seabird strikes tend to occur when bright, artificial light sources are used at times of poor visibility, typically during bad weather, often angled outwards or upwards from the structure and when the structure is relatively close to large breeding aggregations of seabirds. However, Tamarind have reported that historically there have been no seabirds strikes in the Tui Field, probably reflecting the relatively large distance (approximately 80 km) to the nearest significant seabird breeding colonies. On this basis, my opinion is that artificial lighting poses a minor risk to seabirds.

1.6 Unplanned release of oil from a loss of well control, or spills of fuel or oil from support vessels (that is not a discharge to the offshore processing drainage system) could also potentially impact seabirds and shorebirds. Modelling of a loss of well control, for both summer and winter scenarios, found that coastal waters off New Plymouth and South Taranaki had a low probability of moderate oil slicks. The modelling also predicted that the South Taranaki coast was most likely to receive a high loading of oil, with only five other sections of coast predicted to receive high loadings of oil. All but one shoreline sector would receive moderate burdens of oil following a loss of well control, including the Manawatu coast (with a probability of 11% and 40% in summer and winter, respectively), which supports a diverse assemblage of shorebirds, several of high conservation status, at the Manawatu estuary.

1.7 While the potential impact severity for a loss of well control is high, the likelihood of a hydrocarbon release is extremely unlikely, and combined with Tamarind's mitigation and control measures, my opinion is that the overall impact significance for sea and shorebirds from a hydrocarbon release resulting from a loss of well control is as low as is reasonably practicable.

1.8 The spill modelling also considered a surface release scenario of diesel. No shoreline contact was predicted and the extent of high exposure extended only 4 km from the release site. Given the volatile nature of diesel and the dynamic STB environment, I consider the impact on seabirds to be minor in the unlikely event of a diesel spill.

2. Introduction

2.1 My full name is David Richard Thompson.

2.2 I hold the following qualifications:

2.2.1 A Bachelor of Science in Marine Biology from the University of Liverpool; and

2.2.2 A Doctorate in Zoology from the University of Glasgow.

2.3 I am currently employed as a seabird ecologist for the National Institute of Water and Atmospheric Research Ltd., based in Wellington, and have held that position since 1998.

2.4 I have 26 years of professional experience in marine biology, particularly seabird ecology. I have research interests and experience in seabirds as sentinels of marine ecosystems, at-sea distributions of seabirds, seabird-fishery interactions and the use of stable isotopes in marine ecology. My research has included tracking of a wide range of seabird species throughout New Zealand's Exclusive Economic Zone (EEZ) and I have a broad and extensive knowledge of seabirds across the region

2.5 I have authored 76 science journal papers, six book chapters and 43 science reports for a broad range of clients.

2.6 My role in relation to Tamarind's application has been to undertake an independent review of the IA as it relates to seabirds and shorebirds and to consider and assess the potential impacts of the proposed activities on seabirds and shorebirds, to prepare expert evidence and to respond to any questions raised by the Board, EPA and/or submitters on this topic.

2.7 I have read the following information in preparation of my evidence:

2.7.1 The Marine Consent Application and Marine Discharge Consent Application (the "Applications") and the Impact Assessment (the "IA") and Annexures, which accompanied the Applications, in particular, the sections that relate to the description of the activity and seabirds and shorebirds.

2.7.2 The statements of evidence by:

a) Mr Jason Peacock;
b) Mr Iain McCallum;
c) Dr Brian King;
d) Dr Sharon de Luca;
e) Dr Simon Childerhouse;
f) Ms Nicola Gibbs;
g) Dr Alison Lane;
h) Dr Alison MacDiarmid; and
i) Mr Fraser Colegrave.

2.7.3 Submissions.

2.7.4 Proposed consent conditions.

2.7.5 EPA Key Issues Report, dated July 2018.

2.7.6 The following independent reviews commissioned by the EPA (the "technical reviews"):

a) *Technical Review of Oil Spill Modelling*, prepared by Coffey Services (NZ) Limited, dated 26 June 2018 (the "Coffey Report");
b) *Technical Review and Analysis of Operational Activities associated with Sidetrack Development Drilling and Marine Discharge Consent - Assessment Report*, prepared by Oil and Gas Solutions Pty Limited, dated 22 May 2018 (the "OGS Report"); and
c) *Review of Marine Environmental Impact Assessment*, prepared by SEAPEN Marine Environmental Services, dated 26 May 2018 (the "SEAPEN Report").

2.7.7 Tamarind's 'Response to the Board's Request for Further Information under section 54 EEZ Act', dated July 2018 (the "RFI Response").

Code of conduct

2.8 I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court of New Zealand Practice Note 2014 and that I have complied with it when preparing my evidence. Other than when I state I am relying on the advice of another person, this evidence is entirely within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

2.9 My qualifications as an expert witness are set out above. The issues addressed in this brief relate to the application for a marine consent and marine discharge consent and are matters within my area of expertise

Scope of evidence

2.10 In this evidence, I will discuss the following:

2.10.1 The existing environment, and in particular seabird assemblage in the greater STB and the shorebirds occurring along the adjacent coastline of the North Island.

2.10.2 The potential effects on seabirds from Tamarind's proposed activities.

2.10.3 The potential effects on seabirds and shorebirds from unplanned events.

2.10.4 Response to issues raised by the EPA Key Issues Report and technical reviews, where these are relevant to my evidence.

2.10.5 Response to issues raised by submitters, where these are relevant to my evidence.

2.11 I consider that I have reviewed the best available information in assessing, and drawing conclusions about, the above matters, and in completing my statement of evidence.

3. EXISTING ENVIRONMENT

The seabird and shorebird assemblage in the South Taranaki Bight and adjacent coastline

Seabirds

3.1 As set out in the IA, New Zealand is home to a diverse range of endemic seabirds[1] and supports the most diverse seabird assemblage on Earth. There have been 168 taxa recorded in New Zealand, either breeding (99 taxa), or as regular migrants or vagrants to New Zealand waters (69 taxa) (Robertson et al. 2017). The plural term 'taxa' here refers to species and sub-species listed by Robertson et al. (2017). Of 84 breeding species, 36 (43%) are endemic (breeding is confined to New Zealand).

3.2 There have been no systematic and quantitative surveys of seabird abundance and distribution within the STB so identifying a definitive species list for the area is problematic. However, based on sightings data reported online (for example, see https://ebird.org/newzealand/home), or reported in published sources, together with tracking studies of seabirds, it is possible to draw up a list of seabird taxa that are likely to occur in the STB and therefore within the area of Tamarind's Petroleum Mining Licence PMP 38158, the area of interest ("AOI"), to some extent during the course of the year.

3.3 Appendix 1 of my statement of evidence comprises a table with conservation status classifications for those seabird taxa likely to occur in the STB, together with relative abundance scores.

3.4 Of the seabird taxa that could likely occur in the STB (Appendix 1), and within the AOI, 11 have a conservation status of 'threatened' (i.e. 'nationally critical',

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[1] Refer to the IA, Section 4.3.8

‘nationally endangered’ or ‘nationally vulnerable’) in the New Zealand threat classification system (Robertson et al. 2017):

3.4.1 Antipodean albatross (*Diomedea antipodensis antipodensis*), Gibson’s albatross (*D. a. gibsoni*), Salvin’s albatross (*Thalassarche salvini*) and black-billed gull (*Larus bulleri*) are classified as ‘nationally critical’;

3.4.2 Black-fronted tern (*Childonias albostriatus*) is classified as ‘nationally endangered’; and

3.4.3 Caspian tern (*Hydroprogne caspia*), black petrel (*Procellaria parkinsoni*), flesh-footed shearwater (*Puffinus carneipes*), Hutton’s shearwater (*P. huttoni*), grey-headed albatross (*Thalassarche chrysostoma*) and Campbell albatross (*T. impavida*) are classified as ‘nationally vulnerable’.

3.5 The ‘threatened’ categories (‘nationally critical’, ‘nationally endangered’ and ‘nationally vulnerable’) are defined in detail in Robertson et al. (2017), and combine characteristics of population size and population trajectory. Taxa with relatively small populations, and/or which have declining populations, tend to be categorised with a higher conservation status.

3.6 Criteria for ‘nationally critical’ are:

3.6.1 Very small population (natural or unnatural); or

3.6.2 Small population (natural or unnatural) with a high ongoing or predicted decline; or

3.6.3 Population (irrespective of size or number of sub-populations) with a very high ongoing or predicted decline (>70%).

3.7 Criteria for ‘nationally endangered’ are:

3.7.1 Small population (natural or unnatural) that has a low to high ongoing predicted decline; or

3.7.2 Small, stable population (unnatural); or

3.7.3 Moderate population and high ongoing or predicted decline.

3.8 Criteria for 'nationally vulnerable' are:

3.8.1 Small, increasing population (unnatural); or

3.8.2 Moderate, stable population (unnatural); or

3.8.3 Moderate population, with population trend that is declining; or

3.8.4 Moderate to large population, and moderate to high ongoing or predicted decline; or

3.8.5 Large population, and high ongoing or predicted decline.

3.9 Additionally, of the seabird taxa that could occur in the STB (Appendix 1), 25 are classified as 'at risk', with this classification containing the sub-categories: 'declining', 'recovering', 'relict' or 'naturally uncommon'.

3.10 There are three seabird taxa with a conservation status of 'threatened' that breed on islands or coastlines adjacent to the STB. These are:

3.10.1 Flesh-footed shearwater ('nationally vulnerable'), which breeds at the Trio and Titi islands in Cook Strait;

3.10.2 Caspian tern ('nationally vulnerable'), which breeds at Farewell Spit; and

3.10.3 New Zealand king shag (*Leucocarbo carunculatus*) ('nationally endangered'), which is restricted to breeding sites in the outer Marlborough Sounds, but which is highly unlikely to occur in the area of interest.

3.11 Seabird occurrence in the STB could be for several reasons:

3.11.1 Birds may choose to move into the area to forage. For example, tracking studies of sooty shearwater (*Puffinus griseus*) (Shaffer et al. 2009), white-capped albatross (*Thalassarche cauta steadi*) (Thompson unpublished data) and little penguin (*Eudyptula minor*) (Waugh 2016) revealed the STB to be a feeding destination. In the case of white-capped albatross, birds would have travelled from the Auckland Islands in the sub-Antarctic, the main breeding site for this species.

3.11.2 Additionally, birds may choose to commute through the area en route from breeding sites to foraging destinations, or may commute through the area as part of larger, migratory movements. For example, both flesh-footed and sooty shearwaters migrate out of New Zealand waters at the end of the breeding season (approximately May), to the north Pacific Ocean (Shaffer et al. 2006, Rayner et al. 2011), returning in the spring (approximately September).

3.11.3 Alternatively, seabirds could choose to rest within the STB on the sea surface. In general terms, flying seabirds spend less time on the sea surface, either feeding or resting, compared to non-flying seabirds (penguins). Those flying seabirds that capture prey by diving below the surface (diving petrels and shags) spend more time on the sea surface compared to flying seabirds that capture prey at or very near the surface. However, all seabirds can spend time resting on the sea surface, although the amount of time spent resting will be highly variable between individuals and between species, and will also vary depending on the time of year and whether a bird is breeding or not. All seabirds return to land to breed. In New Zealand this is often, but not exclusively, on offshore islands that are free of introduced mammalian predators. Again, the time spent ashore will vary considerably between individuals and species.

3.12 As noted in paragraph 3.11.1, some seabirds may choose to move into the STB to feed. Detailed information on the diet of seabirds is often lacking, but will usually consist of varying proportions of cephalopods (squids and octopuses), fish and crustaceans, with smaller seabird species taking generally small prey items compared to the larger seabird species, such as albatrosses, that can feed upon relatively large prey items. Seabird diet is highly species-specific (Marchant & Higgins 1990).

Shorebirds

3.13 A total of approximately 73 shorebird taxa have been recorded in New Zealand, although most of these (55 taxa, or 75%) are either migrants or vagrants (i.e. appearing outside of their normal breeding range) and are not resident in New Zealand (Robertson et al. 2017). A subset of these taxa have been recorded at sites along the STB coastline. For example, approximately 40 shorebird taxa have been noted at the Manawatu estuary.

3.14 Shorebird taxa likely to occur along the STB coastline have been noted in Appendix 2 of my statement of evidence, together with current conservation status classifications and relative abundance estimates. The taxa included in Appendix 2 are highly unlikely to occur at sea within the AOI and therefore will be unaffected by planned activities.

3.15 Of the shorebird taxa that could occur along the STB coastline (Appendix 2), six have a conservation status of 'threatened' (i.e. 'nationally critical', 'nationally endangered' or 'nationally vulnerable') in the New Zealand threat classification system (Robertson et al. 2017):

3.15.1 Australasian bittern (*Botarus poiciloptilus*) and New Zealand shore plover (*Thinornis novaeseelandiae*) are classified as 'nationally critical';

3.15.2 reef heron (*Egretta sacra sacra*) is classified as 'nationally endangered'; and

3.15.3 wrybill (*Anarhynchus frontalis*), lesser knot (*Calidris canutus rogersi*) and banded dotterel (*Charadrius bicinctus bicinctus*) are classified as 'nationally vulnerable'.

3.16 Of the taxa classified as 'threatened' in paragraph 3.15, New Zealand shore plover is a particularly rare species with only about 60-65 pairs in the wild. A population was established on Mana Island to the far south-east of the STB, with regular sightings of birds occurring along the coast of the lower North Island. However, this population is now thought to have been extirpated by a rat incursion to the island.

3.17 Additionally, of the taxa that could occur along the coastline of the STB (Appendix 2), seven are classified as ‘at risk’, with sub-categories of either ‘declining’, ‘recovering’, ‘relict’ or ‘naturally uncommon’.

3.18 The coast adjacent to the STB includes some very important sites for shorebirds. Notable among these is the Manawatu estuary at Foxton Beach, one of six Ramsar Convention (the Convention on Wetlands of International Importance) sites in New Zealand, at which more than 95 species of birds have been recorded. The Manawatu estuary is the largest estuary on the west coast of the southern part of the North Island, covers approximately 250 hectares, and is a mix of salt marsh, mud flats and sand dunes. The Manawatu estuary is an important site for both visiting migrant shorebirds, such as bar-tailed godwit (*Limosa lapponica baueri*) and lesser knot, as well as threatened endemic species such as wrybill.

3.19 For shorebirds, season has a strong effect on the number of birds present at a location. For example, North Island totals for banded dotterel and wrybill were found to be at least ten times higher in winter compared to summer, whereas summer totals for bar-tailed godwit and lesser knot were approximately ten and seven times greater than winter totals, respectively (Sagar et al. 1999).

3.20 Shorebirds inhabit a mix of exposed coastal sites (including beaches and rocky platforms) and estuarine sites which can extend inland from the coast for several hundreds of metres. Shorebirds generally feed in the intertidal zone during low tide, and tend to roost at preferred roosting sites at high tide. Shorebird diet is highly species-specific. Wading birds that tend to feed in the inter-tidal zone consume a range of molluscs and worms, but larger species, such as herons, can also take small fish (Higgins & Davies 1996).

4. POTENTIAL IMPACTS ON SEABIRDS FROM PROPOSED ACTIVITIES

(a) Potential Impacts from Planned Activities

4.1 Section 6 of the IA[2] describes the potential impacts on seabirds resulting from various planned activities. Effects considered are artificial lighting from the drilling rig and associated support vessels, and physical disturbance by the drilling rig and support vessels[3]. My statement of evidence will also discuss the potential effects of noise and water turbidity on seabirds. In the context of seabirds, potential effects from the proposed activities are:

4.1.1 Attraction to structures as a result of artificial nocturnal lighting on the drilling rig and support vessels;

4.1.2 Physical disturbance or exclusion from the space occupied by the drilling rig and support vessels for the duration of operations;

4.1.3 Noise generated by operations on the drilling rig and support vessels; and.

4.1.4 Increased turbidity from the placement and removal of structures, including anchor blocks, and associated activities on the seabed.

Artificial nocturnal lighting

4.2 Artificial, nocturnal lighting is known to attract some seabirds, with the potential for birds to collide with structures and be injured or killed as a result. Nocturnal seabird strikes tend to occur when bright, artificial light sources are used at times of poor visibility, typically during bad weather, often angled outwards or upwards from the structure and when the structure is relatively close to large breeding aggregations of seabirds, rather than further offshore (see for example Black 2005, and Ronconi et al. 2015 and references therein).

4.3 Section 6.5.2 of the IA notes that no bird strikes have been historically reported from the Tui Field, and very few birds have been reported from the nearby Māui platforms (see Thompson 2017), in part very likely reflecting the

[2] Refer to the IA, page 109

[3] Refer to the IA, Table 6.2, page 112

relatively large distance to the nearest concentrations of breeding seabirds (at Ngā Motu/Sugar Loaf Islands approximately 80 km to the north-east). The mitigation measures proposed will assist to minimize the effects of artificial nocturnal lighting (see sections 6.5.3 and 11 of the IA).

4.4 While there is potential for artificial nocturnal lighting on the drilling rig and associated support vessels to affect seabirds, existing structures in the STB appear to have had very minimal impact upon seabirds. I see no reason why the same would not be the case for a temporarily-deployed drilling rig and support vessels if lighting is generally consistent with standard mitigation measures, such as those set out in section 6.5.3 and 11 of the IA. I agree with the assessment in the IA (Table 6.25) that artificial nocturnal lighting will have a minor effect on seabirds.

Physical disturbance

4.5 For the duration of its operations, the drilling rig will effectively displace seabirds from the space occupied by the rig. Given the dynamic nature of seabirds, combined with the relatively small area of likely exclusion compared to the relatively large ranges exploited by seabirds, my opinion is that this will have a negligible effect on seabirds, consistent with the conclusion noted in Table 6.39 of the IA[4].

Noise

4.6 The most common response of birds to increased anthropogenic noise is avoidance (Ortega 2012), and so noise associated with the drilling rig in particular, but also associated support vessels, is likely to result in birds avoiding the immediate area. For the duration of operations, all seabirds that could use the area will likely be forced to occupy other locations, but given the relatively large ranges exploited by seabirds, I consider it unlikely that this effect would have anything other than a negligible effect on seabirds. Indeed, I am aware of anecdotal reports of birds regularly alighting on structures within the AOI, suggesting that some species at least are unaffected by noise.

[4] Refer to the IA, page 140

Increased turbidity

4.7 Operational procedures could result in increased water turbidity in the vicinity of the drilling rig, particularly the placement and removal of anchors, chains and wires on or near the seabed, as a result of ROV activities and as a result of cement disposal (section 6.3.1 of the IA). Increased water turbidity caused by these activities has the potential to reduce the foraging efficiency of diving seabirds that rely on visual foraging to capture prey from the water column (for example, penguins and shags).

4.8 However, it is my view that any temporary increase in water turbidity resulting from the activities described in the IA will have a non-existent to negligible effect on seabirds, for the following reasons:

4.8.1 The drilling rig and associated activities will be some 40 km or more from the coast. Although little penguins can travel relatively large distances to forage during the incubation period (see Waugh 2016), 40 km offshore would generally be towards the outer limit for foraging penguins and shags (Chiaradia et al. 2007);

4.8.2 Further, turbidity increases around the drilling rig would occur towards the seabed and in water approximately 120 m deep. Diving seabirds occurring in the STB tend to forage in shallower water (for example, little penguins tend to dive to 50 m or less: Chiaradia et al. 2007), and are therefore unlikely to routinely use the site of operations for foraging.

4.8.3 Additionally, any increase in localised turbidity will be temporary and short-lived (for example, when the rig anchors are placed and removed from the seabed), and so even if seabirds foraging in the area were affected, either through reduced foraging efficiency or through displacement to forage elsewhere, such effects would similarly be temporary and occur over a relatively short timeframe.

(b) Potential Impacts from Unplanned Activities

4.9 Section 7 of IA describes a range of possible unplanned events that could occur, including: accidental spills of hydrocarbons and other chemicals (that are not discharges to the rig's deck drainage system); loss of well control; dropped objects; and a marine vessel incident. Of these, accidental chemical spills, loss of well control resulting in a release of oil to the marine environment and a vessel incident resulting in the release of fuel to the marine environment, have the potential to affect seabirds and shorebirds.

4.10 Chemical spills or the release of oil or fuel could potentially affect seabirds at sea if they were to come into contact with such spills. The primary direct impacts on seabirds include external effects, such as the contamination of their feathers, and internal toxic effects, which would occur if they were to ingest any spilled material. The detrimental effects of such a spill would be dependent upon, amongst other variables, the scale of the spill, Tamarind's response to the spill, the movement of the spilled material following the spill (which will be dependent upon weather conditions at the time) and the time of year the spill occurred.

4.11 Modelling of a loss of well control[5] found that coastal waters off New Plymouth and South Taranaki had a low probability (3% and 1%, respectively) of moderate oil slicks (10-25 g m^{-2}, considered sufficient to impact seabirds), with all other coastal areas experiencing 'surface sheens', which are unlikely to result in environmental harm. Sea surface exposure results were very similar across models run for summer and for winter. The modelling also predicted that the South Taranaki coast was most likely to receive oil above the high loading (> 1000 g m^{-2}), with a probability of this occurring of 23% in summer, rising to 70% in winter. Only five other sections of coast were predicted to receive high loadings of oil, at relatively low probabilities in summer (1-6%), and at relatively elevated probabilities in winter (9-26%). Further, the modelling found that all but one shoreline sector would receive moderate burdens of oil (> 100 g m-2) following a loss of well control, including the Manawatu coast (with a probability of 11% and 40% in summer and winter, respectively), which supports a diverse assemblage of

[5] Refer to Annex F of the IA and RPS Report: Tamarind Resources Tui Field Oil Spill Modelling (June to January), 13 July 2018

shorebirds, several of high conservation status (see Appendix 2 of my statement of evidence), at the Manawatu estuary (see paragraph 3.18 of my statement of evidence).

4.12 Because, in part, some areas, including sites where threatened or at risk shorebird species may be present, could receive oil at levels above the moderate threshold, the potential impact severity for a loss of well control is considered to be high[6]. I concur with this assessment. However, I note that the likelihood of a hydrocarbon release is assessed as extremely unlikely and for this reason I concur with the IA assessment that the overall impact significance from a hydrocarbon release from a loss of well control is as low as is reasonably practicable. Further, I note Tamarind's mitigation and control measures as set out in section 7.2.1 of the IA[7] and that there would be sufficient time available to put measures in place to minimize any impacts to coasts, and hence shorebirds, from oil reaching the greater Taranaki coastline.

4.13 The spill modelling also considered a surface release scenario of diesel. No shoreline contact was predicted and the extent of high exposure (> 25 g m^{-2}) extended only 4 km from the release site (Annex F of the IA). Given the volatile nature of diesel and the dynamic STB environment, overall I consider the impact on seabirds to be minor in the unlikely event of a diesel spill.

4.14 It is possible that unplanned spills of chemicals or fuel or release of oil could impact seabirds indirectly through a reduction in food availability. However, any such effect would be temporary in nature, and seabirds can respond to any reduction in food in one area by moving to adjacent or nearby areas that are unaffected. In my opinion, the indirect effects of chemical spills, release of fuel or oil on seabirds would be minor.

(c) Potential Impacts from Deck Drain Discharges

4.15 The discharge of small amounts of harmful substances in offshore processing drainage via deck drains will be subject to rapid dispersion and

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[6] Refer to the IA, page 164

[7] Refer to the IA, page 154

dilution. For seabirds to affected by such discharges, harmful substances would have to accumulate up the food chain and be consumed to toxic levels via the prey of seabirds. This would further require seabirds to feed habitually on affected prey very close to the point of discharge. On this basis, I consider it highly unlikely that discharges from deck drains will result in anything other than a negligible effect on seabirds.

(d) Cumulative Effects

4.16 I consider that all potential effects on seabirds considered in my statement of evidence will be very minor to negligible. With the exception of a loss of well control, it is extremely unlikely that any seabird species or population would be affected by all of the potential effects. On this basis, I consider any cumulative effects similarly minor to negligible.

5. Response to EPA Key Issues Report and Technical Reviews

5.1 Paragraph 19(g) of the SEAPEN report notes that the IA does not include conservation status information, and associated information, for seabirds that are likely to occur in the AOI. My statement of evidence includes comprehensive information, at both global and national scales, on the 'value' of seabirds that are likely to occur in the AOI (Appendix 1 of my statement of evidence) in the form of conservation classifications. All seabird species in New Zealand, with a very small number of exceptions, are 'protected' under the Wildlife Act 1953.

5.2 Paragraph 25(a) of the SEAPEN report questions whether seabirds have been assigned the correct 'sensitivity' classification in the IA (see Table 5.2 of the IA), and hence whether the resulting 'residual impact' classifications (see Table 5.3 of the IA), combining 'sensitivity' and 'magnitude of impact' (see Table 5.1 of the IA) classifications, are also correct. Because the definition of 'high sensitivity' in the IA (see Table 5.2 of the IA) for ecological features (seabirds) includes 'some ecological features (seabirds) in the area are rare or endemic' and 'species are valued nationally/globally and are listed as endangered or protected' then seabirds qualify as having 'high sensitivity'. Based on the definition provided in the IA, seabirds should be classified as having 'high' sensitivity. Combining a 'high sensitivity' classification with a ‘small’ magnitude of impact classification for light on seabirds, and a ‘negligible’ magnitude of impact classification for disturbance on seabirds, results in residual impact classifications of ‘moderate’ and ‘negligible’ for light and disturbance, respectively. To this extent I agree with paragraph 25(a) of the SEAPEN report. However, accepting that the residual impact of light on seabirds could be considered ‘moderate’, the likelihood of a collision event occurring as the result of artificial nocturnal lighting is extremely small, as evidenced by the lack of bird strikes with structures within the AOI (see section 6.5.2 of the IA), and overall the impact on seabirds generally could more realistically be considered ‘minor’.

6. Response to Issues Raised by Submitters

6.1 The submission of Otaraua Hapu suggests that ‘bird life’ could be harmed by the discharge of harmful substances. I have dealt with this potential issue in paragraph 4.15 of my statement of evidence, and for the reasons outlined in that paragraph I consider the effect of harmful substances on seabirds to be negligible.

6.2 The submissions of Fred Hirst, Peter Wheeler, Catherine Cheung and Climate Justice Taranaki Incorporated raise concerns about threats to seabirds in general, or penguins in particular. In my statement of evidence, I have identified a number of potential effects on seabirds, including penguins, specifically little penguins, that could arise from planned and unplanned activities arising from this application. Considering the magnitude and likelihood of effects, combined with the temporary nature of planned activities, I consider the overall effect on seabirds to be negligible

6.3 The submission of Ben Toogood raises concerns about the effects of an oil spill on bird life. I have dealt with this issue in paragraphs 4.9 to 4.12 of my statement of evidence. While the impact of an oil spill on seabirds could be high the likelihood of a hydrocarbon release is extremely unlikely and for this reason my opinion is that the overall impact significance from a hydrocarbon release from a loss of well control is as low as is reasonably practicable.

7. Proposed conditions

7.1 I have reviewed the draft conditions for the marine consent which were proposed by Tamarind and accompanied the IA as they relate to seabirds.

7.2 Draft condition 14 provides that Tamarind will ensure that all nocturnal lighting on the drilling rig and associated support vessels is minimised as far as practicable while still meeting operational and safety requirements. I would suggest that nocturnal lighting should additionally be directed or shielded so that light spill outwards and upwards from the drilling rig and support vessels was minimised as far as is reasonably practical.

7.3 Draft condition 15 provides that Tamarind shall maintain a log of any seabird collisions with any drilling rig or support vessel, and that the log should include the following information where available:

7.3.1 Date and time of collision;
7.3.2 Weather conditions;
7.3.3 Species (where known);
7.3.4 Condition of the bird (dead, released alive and unharmed, or injured); and e. Photographs (where practicable).

7.4 Additionally, the draft condition notes that a digital copy of the log shall be provided to the Department of Conservation and the EPA by 1 December every year (or on an alternative date as otherwise agreed). I consider this condition appropriate.

7.5 Draft condition 16 notes that Tamarind shall make available to offshore personnel a New Zealand seabird species identification guide to assist in the accurate identification of species. I consider this condition appropriate.

8. Conclusions

8.1 Seabirds could potentially be affected through attraction to artificial nocturnal lighting on the drilling rig and associated vessels, resulting in collision, injury and death. However, to date no seabird collisions have been recorded from Tamarind's existing structures and it would appear that the operating procedures employed by Tamarind effectively mitigate this risk. Monitoring and reporting of bird interactions with Tamarind's structures, as set out in the draft conditions, allows for any unexpected issues to be identified and for appropriate mitigation measures to be put in place by Tamarind should they arise.

8.2 Both seabirds and shorebirds could potentially be affected by unplanned releases of hydrocarbons from a loss of well control or from support vessels. Given Tamarind's mitigation and control measures set out in the IA, I agree with the overall assessment in the IA that the likelihood of this occurring would be 'extremely unlikely'.

8.3 Overall, I consider the likely impact on seabirds and shorebirds from Tamarind's proposed activities as set out in the IA to be negligible.

DAVID RICHARD THOMPSON
20 July 2018

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APPENDIX 1

Common Name	Scientific Name	DoC Conservation Status	IUCN Red List Classification	Relative Abundance
Antipodean albatross	*Diomedea antipodensis antipodensis*	Threatened – Nationally Critical	Vulnerable	4
Gibson's albatross	*Diomedea antipodensis gibsoni*	Threatened – Nationally Critical	Vulnerable	4
Black-billed gull	*Larus bulleri*	Threatened – Nationally Critical	Endangered	5
Salvin's albatross	*Thalassarche salvini*	Threatened – Nationally Critical	Vulnerable	5
Black-fronted tern	*Childonias albostriatus*	Threatened – Nationally Endangered	Endangered	4
Caspian tern	*Hydroprogne caspia*	Threatened – Nationally Vulnerable	Least Concern	3
Black petrel	*Procellaria parkinsoni*	Threatened – Nationally Vulnerable	Vulnerable	3
Flesh-footed shearwater	*Puffinus carneipes*	Threatened – Nationally Vulnerable	Near Threatened	4
Hutton's shearwater	*Puffinus huttoni*	Threatened – Nationally Vulnerable	Endangered	6
Grey-headed albatross	*Thalassarche chrysostoma*	Threatened – Nationally Vulnerable	Endangered	4
Campbell albatross	*Thalassarche impavida*	Threatened – Nationally Vulnerable	Vulnerable	5

Blue penguin	*Eudyptula minor*	At Risk - Declining	Least Concern	4
Red-billed gull	*Larus novaehollandiae scopulinus*	At Risk - Declining	Least Concern	5
Light-mantled sooty albatross	*Phoebetria palpebrata*	At Risk - Declining	Near Threatened	4
Sooty shearwater	*Puffinus griseus*	At Risk - Declining	Near Threatened	6
White-fronted tern	*Sterna striata striata*	At Risk - Declining	Least Concern	5
White-capped albatross	*Thalassarche cauta steadi*	At Risk - Declining	Near Threatened	6
Northern giant petrel	*Macronectes halli*	At Risk – Recovering	Least Concern	3
Pied shag	*Phalacrocorax varius varius*	At Risk - Recovering	Least Concern	3
Fairy prion	*Pachyptila turtur*	At Risk - Relict	Least Concern	6
Broad-billed prion	*Pachyptila vittata*	At Risk - Relict	Least Concern	6
White-faced storm petrel	*Pelagodroma marina maoriana*	At Risk - Relict	Least Concern	6
Northern diving petrel	*Pelecanoides urinatrix urinatrix*	At Risk - Relict	Least Concern	6
Cook's petrel	*Pterodroma cookii*	At Risk - Relict	Vulnerable	6
Mottled petrel	*Pterodroma inexpectata*	At Risk - Relict	Near Threatened	6
Fluttering shearwater	*Puffinus gavia*	At Risk - Relict	Least Concern	5
Snares Cape petrel	*Daption capense australe*	At Risk – Naturally Uncommon	Least Concern	4
Southern royal albatross	*Diomedea epomophora*	At Risk – Naturally Uncommon	Vulnerable	4
Northern royal albatross	*Diomedea sanfordi*	At Risk – Naturally Uncommon	Endangered	4
Black shag	*Phalacrocorax carbo novaehollandiae*	At Risk – Naturally Uncommon	Least Concern	3
Little black shag	*Phalacrocorax sulcirostris*	At Risk – Naturally Uncommon	Least Concern	3
Grey petrel	*Procellaria cinerea*	At Risk – Naturally Uncommon	Near Threatened	6
Westland petrel	*Procellaria westlandica*	At Risk – Naturally Uncommon	Vulnerable	3
Buller's shearwater	*Puffinus bulleri*	At Risk – Naturally Uncommon	Vulnerable	6
Southern Buller's albatross	*Thalassarche bulleri bulleri*	At Risk – Naturally Uncommon	Near Threatened	4

Chatham albatross	*Thalassarche eremita*	At Risk – Naturally Uncommon	Vulnerable	4
Cape petrel	*Daption capense capense*	Migrant	Least Concern	
Wandering albatross	*Diomedea exulans*	Migrant	Vulnerable	
Southern giant petrel	*Macronectes giganteus*	Migrant	Least Concern	
Arctic skua	*Stercorarius parasiticus*	Migrant	Least Concern	
Black-browed albatross	*Thalassarche melanophris*	Coloniser	Near Threatened	1
Southern black-backed gull	*Larus dominicanus dominicanus*	Not Threatened	Least Concern	6
Australasian gannet	*Morus serrator*	Not Threatened	Least Concern	5
Little shag	*Phalacrocorax melanoleucos brevirostris*	Not Threatened	Least Concern	4
White-chinned petrel	*Procellaria aequinoctialis*	Not Threatened	Vulnerable	6
White-headed petrel	*Pterodroma lessonii*	Not Threatened	Least Concern	6
Grey-faced petrel	*Pterodroma macroptera gouldi*	Not Threatened	Least Concern	6
Spotted shag	*Stictocarbo punctatus punctatus*	Not Threatened	Least Concern	5

Appendix 1
Summary information on the conservation status and relative abundance of seabirds likely to occur in the South Taranaki Bight (STB). Taxonomy and New Zealand conservation status classification follows Robertson et al. (2017). Taxa ranked according to New Zealand conservation status. International Union for Conservation of Nature (IUCN) Red List classifications follow data at http://www.iucnredlist.org/ (accessed July 2018). Relative abundance scores reflect the New Zealand population size for each species, not an estimate of the population likely to occur within the STB region. Relative abundance scores follow Townsend et al. (2008), whereby a score of 1 = < 250 mature individuals (defined as an individual capable of reproduction and here calculated as double the best estimate of number of annual breeding pairs for each species), 2 = 250-1,000, 3 = 1,000-5,000, 4 = 5,000-20,000, 5 = 20,000-100,000 and 6 = > 100,000 mature individuals. Abundance scores are based on information available at http://nzbirdsonline.org.nz/ (accessed July 2018) and are provided for those species that breed in New Zealand.

APPENDIX 2

Common Name	Scientific Name	DoC Conservation Status	IUCN Red List Classification	Relative Abundance
Australasian bittern	*Botarus poiciloptilus*	Threatened – Nationally Critical	Endangered	2
New Zealand shore plover	*Thinornis novaeseelandiae*	Threatened – Nationally Critical	Endangered	1
Reef heron	*Egretta sacra sacra*	Threatened – Nationally Endangered	Least Concern	1
Wrybill	*Anarhynchus frontalis*	Threatened – Nationally Vulnerable	Vulnerable	3
Lesser knot	*Calidris canutus rogersi*	Threatened – Nationally Vulnerable	Near Threatened	
Banded dotterel	*Charadrius bicinctus bicinctus*	Threatened – Nationally Vulnerable	Least Concern	4
South Island pied oystercatcher	*Haematopus finschi*	At Risk - Declining	Near Threatened	5
Eastern bar-tailed godwit	*Limosa lapponica baueri*	At Risk - Declining	Near Threatened	
Northern New Zealand dotterel	*Charadrius obscurus aquilonius*	At Risk - Recovering	Near Threatened	3
Variable oystercatcher	*Haematopus unicolor*	At Risk - Recovering	Least Concern	3
New Zealand dabchick	*Poliocephalus rufopectus*	At Risk - Recovering	Near Threatened	3
Black-fronted dotterel	*Elseyornis melanops*	At Risk – Naturally Uncommon	Least Concern	2

Royal spoonbill	*Platalea regia*	At Risk – Naturally Uncommon	Least Concern	2
Turnstone	*Arenaria interpres*	Migrant	Least Concern	
Pacific golden plover	*Pluvialis fulva*	Migrant	Least Concern	
White-faced heron	*Egretta novaehollandiae*	Not Threatened	Least Concern	3
Pied stilt	*Himantopus himantopus leucocephalus*	Not Threatened	Least Concern	4
Spur-winged plover	*Vanellus miles novaehollandiae*	Not Threatened	Least Concern	4

Appendix 2
Summary information on the conservation status and relative abundance of birds likely to occur coastally, adjacent to the South Taranaki Bight (STB). Taxonomy and New Zealand conservation status classification follows Robertson et al. (2017). Taxa ranked according to New Zealand conservation status. International Union for Conservation of Nature (IUCN) Red List classifications follow data at http://www.iucnredlist.org/ (accessed July 2018). Relative abundance scores reflect the New Zealand population size for each taxon, not an estimate of the population likely to occur within the STB region. Relative abundance scores follow Townsend et al. (2008), whereby a score of 1 = < 250 mature individuals (defined as an individual capable of reproduction and here calculated as double the best estimate of number of annual breeding pairs for each species), 2 = 250-1,000, 3 = 1,000-5,000, 4 = 5,000-20,000, 5 = 20,000-100,000 and 6 = > 100,000 mature individuals. Abundance scores are based on information available at http://nzbirdsonline.org.nz/ (accessed July 2018) and are provided for those species that breed in New Zealand. Unknown = no credible population estimate.