Shorebird Monitoring: Lee Point, Darwin, Northern Territory (Winter 2025)

Defence Housing Australia

4 elements

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Revision History

Version	Purpose	Issued by	Date	Reviewer	Date
1	Final	V. Wiklund	14.08.2025	P. Tomkins	13.08.2025

4 Elements Consulting
169-171 Aumuller Street
Bungalow, QLD 4870
www.4elementsconsulting.com.au

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1.0 Introduction

Defence Housing Australia (DHA) is proposing an urban development on the outskirts of Darwin that will establish a residential, community, and commercial precinct in the suburb of Nightcliff. During the environmental approvals process, the proposal was identified as having potential to impact Darwin's migratory shorebird population through increased beach traffic at key roosting and feeding areas on the city's northern beaches. To mitigate any potential impacts to these populations, the Northern Territory Environment Protection Agency (NT EPA) provided the following recommendation in its assessment report for this project:

> *Recommendation 3*
> *That approvals for the proposal should include a condition that requires DHA to develop and implement a monitoring program to quantify impacts from the Proposal on local shorebirds. The program is to be designed in consultation with Flora and Fauna Division, Department of Environment Natural Resources, and Wildlife and Heritage Division, Department of Tourism and Culture Parks, and implemented before commencement of construction activities. Results and annual updates from the program should be made publicly available on the internet (NT EPA 2018).*

The EIS for this project included a detailed report by Dr Amanda Lilleyman (Charles Darwin University) outlining the potential impacts of increased anthropogenic disturbance on Darwin's migratory shorebirds. This monitoring program was adopted in a report published by EcOz Pty Ltd (*Shorebird Monitoring Program: Lee Point Master-planned Urban Development*) in September 2022, which was updated in August 2023 (EcoZ 2023) with a few minor adjustments. This monitoring program was reviewed by Brydie Hill from the Flora and Fauna Division (Department of the Environment, Parks and Water Security) and Dean McAdam (Parks and Wildlife Division), with their assessment concluding that the proposed methodology is adequate for detecting project-related impacts to local shorebird populations. Finally, this monitoring program was adopted by Ecology and Heritage Partners (*Shorebird Monitoring Plan: Lee Point, Darwin, Northern Territory*, 2023) with a minor adjustment to the minimum tide height (from 6.5m to 6m).

Four Elements Consulting was commissioned by Defence Housing Australia to conduct the shorebird monitoring program in accordance with the *Shorebird Monitoring Plan: Lee Point, Darwin, Northern Territory*, (Ecology and Heritage Partners 2023). Darwin's northern beaches provide habitat for up to 10,000 shorebirds comprising over 20 different species, with the majority breeding in the northern hemisphere in China, Russia and Alaska before migrating through eastern Asia to Australia and New Zealand each year. The birds begin arriving in Australia in August and stay through the austral summer before departing again in March/April. Birds that are too young to breed or adults that are not strong enough for the journey north will stay in Australia the whole year, and these birds are the focus of this study.

This report marks the commencement of Year 2 of the shorebird monitoring program and presents the findings from the winter survey, continuing the long-term effort to assess potential impacts of the Lee Point development on Darwin's migratory shorebird populations.

2.0 Methodology

2.1 Study Area

The study included five survey locations on Darwin's northern beaches – Lee Point (**Plate 1**), Sandy Creek (**Plate 2**), Nightcliff Rocks (**Plate 3**), Spot on Marine (**Plate 4**) and East Point (**Plate 5**). Lee Point and Sandy Creek, which are public beaches approximately 15km north of Darwin (**Figure 1**), provide important shorebird foraging and roosting habitat and may experience increased anthropogenic disturbance as a result of the proposal (i.e., impact sites). The remaining three sites (Nightcliff Rocks, Spot on Marine and East Point) are not expected to be impacted by the proposal but will act as controls whilst also providing a greater understanding of shorebird utilisation in the Darwin area. Nightcliff Rocks and East Point are headlands with exposed intertidal rock flats located approximately 8.5km and 6.5km north of Darwin respectively, while spot on Marine is an exposed mangrove mudflat approximately 6.5km north of Darwin.

Plate 1 Lee Point

Plate 2 Sandy Creek

Plate 3 Nightcliff Rocks

Plate 4　Spot on Marine

Plate 5　East Point

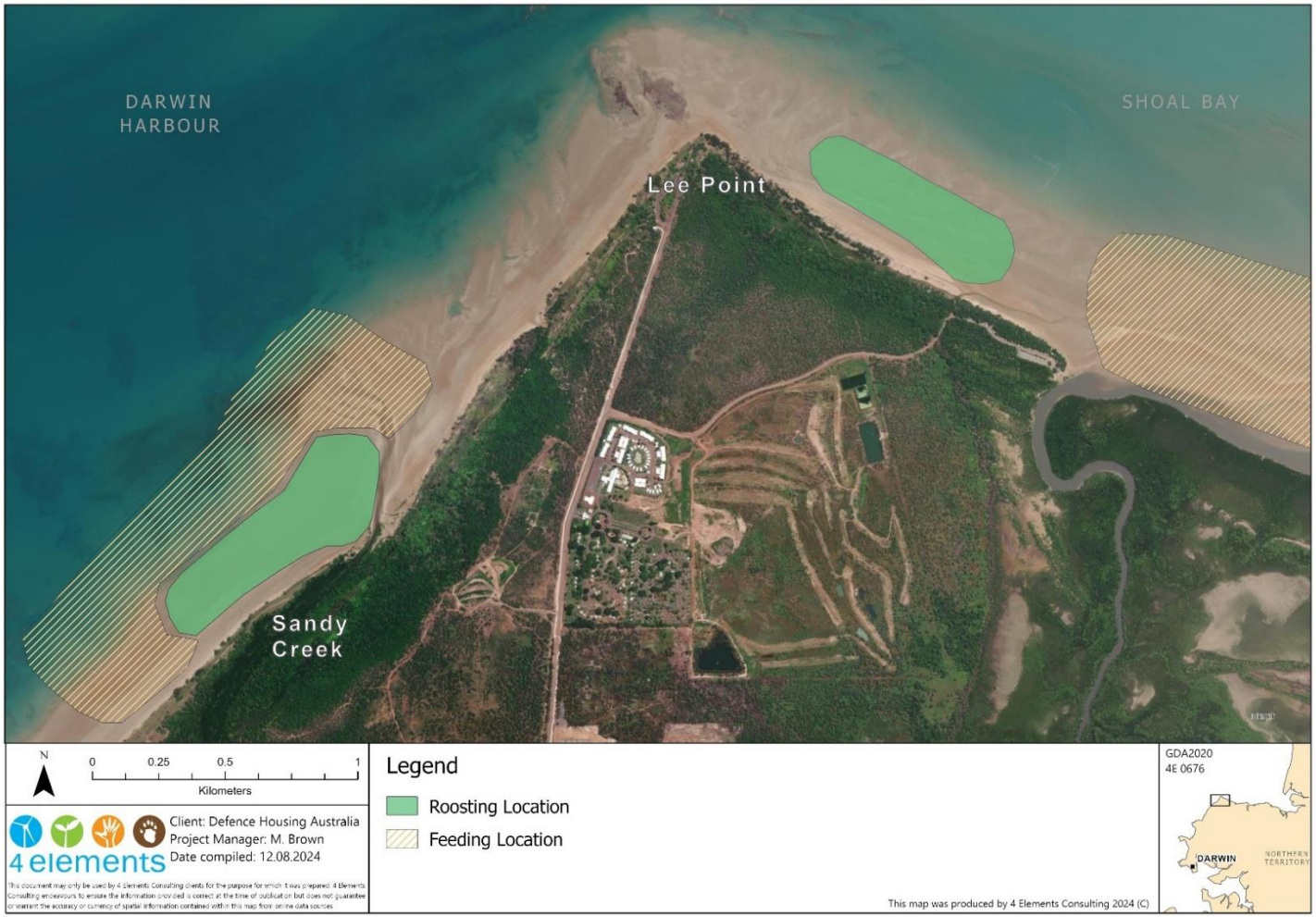

Figure 1 Lee Point and Sandy Creek Survey Locations

2.2 Field Assessments

Shorebird surveys were undertaken from July 29th-31th July 2025 by two qualified Ecologists competent in shorebird identification and counting techniques. Monitoring was conducted in accordance with the methods outlined in *Shorebird Monitoring Plan: Lee Point, Darwin, Northern Territory* (Ecology and Heritage Partners, 2023). Each of the five survey locations was surveyed once by one person for a two-hour period approximately one hour either side of the high tide (see **Table 1**). In accordance with the Shorebird Monitoring Program (Ecology and Heritage Partners, 2023), the high tides on these days exceeded 6m (see **Table 1**). Sandy Creek and Lee Point were surveyed simultaneously as shorebirds are known to move between these proximate roosts (i.e., shorebirds roosting at Lee Point one day may roost at Sandy Point the next day), thus ensuring an accurate count of birds utilising the area. Surveys were conducted at least 100m from roosts to minimise disturbance to shorebirds, with each surveyor equipped with binoculars (10 × 42) and a spotting scope (20–60× magnification). On occasion, birds moved closer than the intended survey distance, in which case surveyors maintained a passive presence and took all reasonable measures to avoid disturbance.

Table 1 Survey Periods, Tide Data and Weather Data

Date	Site	High Tide Height (m)	High Tide Time	Weather	Temperature (°C)	Rainfall (mm)	Wind Speed (km/h)/ Direction	Survey Period
29/07/2025	Lee Point	7.11	09:10	Mostly clear	27	0	6 E	09:00-11:00
29/07/2025	Sandy Creek	7.11	09:10	Mostly clear	27	0	6 E	09:00-11:00
30/07/2025	East Point	6.83	09:31	Clear	27	0	9 E	08:15-10:15
30/07/2025	Spot on Marine	6.83	09:31	Clear	27	0	9 E	08:30-10:30
31/07/2025	Nightcliff Rocks	6.49	09:49	Scattered clouds	28	0	2 ESE	08:45-10:45

All shorebirds and waterbirds seen during the survey period were identified, counted and recorded. The behaviour of all birds was recorded (i.e., roosting, foraging etc.), as were any changes to the environment, disturbances, and potential disturbances. As per the Shorebird Monitoring Program (Ecology and Heritage Partners, 2023), disturbances were defined as proximate stimuli (e.g., humans, dogs, raptors etc.), and the response of shorebirds to each disturbance was recorded (i.e., flight, walk away, no response). Distant disturbances were categorised as potential disturbances, and although these do not elicit a response from shorebirds, they provide a measure of anthropogenic disturbance on the beach. The time and type of each disturbance and potential disturbance was also recorded.

3.0 Results

Twelve species of migratory shorebird were observed during the survey period – red knot (*Calidris canutus*), great knot (*Calidris tenuirostris*), sanderling (*Calidris alba*), red-necked stint (*Calidris ruficollis*), common sandpiper (*Actitis hypoleucos*), ruddy turnstone (*Arenaria interpres*), greater sand plover (*Charadrius leschenaultia*), Siberian sand plover (*Charadrius mongolus*), eastern curlew (*Numenius madagascariensis*), grey plover (*Pluvialis squatarola*), whimbrel (*Numenius phaeopus*), and grey-tailed tattler (*Tringa brevipes*). All observations made during the survey period are detailed below.

Lee Point

Lee Point was surveyed concurrently with Sandy Creek on July 29th 2025. Nine species of migratory shorebird were recorded (**Table 2**), as well as 10 species of non-migratory waterbirds. Two disturbances and two potential disturbances were recorded during the survey period (**Table 3**).

Table 2 Bird Observations at Lee Point

Time	Species	No. Individuals	Direction from Surveyor	Distance from Observer (m)	Height (m)	Behaviour
9:17	Greater crested tern	3	N	50	10	Flyover
9:31	Common sandpiper	2	NE	100	0	Foraging
9:31	Silver gull	23	NE	100	0	Roosting
9:40	Eastern curlew	1	E	100	0	Roosting
9:40	Pied oystercatcher	3	NE	100	0	Roosting
9:40	Sooty oystercatcher	3	E	100	0	Roosting
9:40	Red-capped plover	34	S	20	0	Foraging
9:40	Red knot	10	NE	100	0	Roosting
9:40	Greater sand plover	300	NE	100	0	Roosting
9:40	Siberian sand plover	10	NE	100	0	Roosting
9:40	Sanderling	5	NE	100	0	Roosting
9:40	Red-necked stint	20	NE	100	0	Roosting
9:40	Lesser crested tern	1	NE	100	0	Roosting
9:40	Great knot	400	NE	100	0	Roosting
10:29	Black-necked stork	1	SE	100	0	Foraging
10:37	Caspian tern	2	E	100	0	Roosting
10:42	Whiskered tern	104	E	100	0	Roosting
10:42	Masked lapwing	6	E	100	0	Roosting
10:42	Grey plover	1	SE	100	0	Roosting
10:45	Caspian tern	1	E	50	15	Flyover
10:45	Greater crested tern	56	E	100	0	Roosting
10:46	Silver gull	2	E	40	20	Flyover

Table 3 Disturbance Observations at Lee Point

Time	Type	Duration (min)	Shorebird Response	Species	Number Affected	Did the Affected Birds Leave the Site?	Entry and Exit Points of Disturbance	Notes
9:19	Human + dog	3	None	NA	NA	No	Walking east along beach	Dog off-lead; person passed without causing disturbance
9:52	Helicopter	2	None	NA	NA	No	NA	Low-altitude flyover; no visible response observed **Potential disturbance**
10:52	Plane	1	None	NA	NA	No	NA	High-altitude flyover; no visible response observed **Potential disturbance**
10:56	Human	10	Minor displacement	Greater crested tern, lesser crested tern, whiskered tern, silver gull	188	No	Entered and exited from northern beach end	Photographer approached roosting birds before retreating

Sandy Creek

Sandy Creek was surveyed concurrently with Lee Point on July 29th 2025. One migratory shorebird species and one non-migratory shorebird species were recorded during the survey period (**Table 4**). No disturbance or potential disturbance events were observed.

Table 4 Bird Observations at Sandy Creek

Time	Species	No. Individuals	Direction from Surveyor	Distance from Observer (m)	Height (m)	Behaviour
09:00	Siberian sand plover	1	NW	100	0	Roosting
09:00	Silver gull	13	NW	100	0	Roosting

Nightcliff Rocks

Two species of migratory shorebird and five species of non-migratory waterbird were observed at Nightcliff Rocks during the survey period (**Table 5**). Two disturbances were recorded during the survey period (**Table 6**).

Table 5 Bird Observations at Nightcliff Rocks

Time	Species	No. Individuals	Direction from Surveyor	Distance from Observer (m)	Height (m)	Behaviour
8:45	Masked lapwing	9	W	100	0	Roosting
8:45	Silver gull	40	W	100	0	Roosting
8:45	Greater crested tern	20	W	100	0	Roosting
8:45	Whimbrel	6	W	100	0	Roosting
8:45	Common sandpiper	4	W	100	0	Roosting
8:45	Beach stone-curlew	1	SW	100	0	Roosting
8:45	Grey-tailed tattler	31	W	100	0	Roosting
8:45	Ruddy turnstone	2	W	100	0	Roosting
8:45	Pied oystercatcher	1	W	100	0	Roosting
9:20	Lesser crested tern	3	W	100	0	Roosting
9:20	Greater crested tern	2	W	100	0	Roosting
10:01	Australian tern	1	W	100	0	Roosting
10:05	Little black cormorant	1	W	100	0	Roosting

Table 6 Disturbance Observations at Nightcliff Rocks

Time	Type	Duration (min)	Shorebird Response	Species	Number Affected	Did the Affected Birds Leave the Site?	Entry and Exit Points of Disturbance	Notes
9:48	Black kite	1	Flushed	Whimbrel, ruddy turnstone, common sandpiper, grey-tailed tattler	43	Partly	Entered from east, landed on rocks, exited south	Seven birds departed; remainder resettled among roosting flock
10:20	Black kite	2	Flushed	All waders and terns	101	Yes	Entered from east, settled briefly on rocks	All affected birds flew west following disturbance

Spot on Marine

One species of migratory shorebirds and three species of non-migratory shorebird were recorded at Spot on Marine during the survey period (**Table 7**). One disturbance and two potential disturbances were recorded during the survey period (**Table 8**).

Table 7 Bird Observations at Spot on Marine

Time	Species	No. Individuals	Direction from Surveyor	Distance from Observer (m)	Height (m)	Behaviour
8:18	Beach stone-curlew	1	SE	25	0	Roosting
8:33	White ibis	5	E	200	0	Roosting
8:44	Whimbrel	6	SE	100	30	Roosting
9:00	Striated heron	1	SE	100	0	Roosting
9:25	Whimbrel	2	SE	100	15	Roosting

Table 8 Disturbance Observations at Spot on Marine

Time	Type	Duration (min)	Shorebird Response	Species	Number Affected	Did the Affected Birds Leave the Site?	Entry and Exit Points of Disturbance	Notes
08:22	Plane	1	None	NA	NA	No	NA	High-altitude flyover; no visible response observed **Potential disturbance**
09:32	Dog	1	None	NA	NA	No	NA	Dog moving along periphery; did not approach roosting shorebirds
09:56	Helicopter	1	None	NA	NA	No	NA	Low-altitude flyover; no visible response observed **Potential disturbance**

East Point

Three species of migratory shorebird and one species of non-migratory waterbird were recorded at East Point during the survey period (**Table 9**). Two disturbances and no potential disturbances were recorded during the survey period (**Table 10**).

Table 9 Bird Observations at East Point

Time	Species	No. Individuals	Direction from Surveyor	Distance from Observer (m)	Height (m)	Behaviour
08:30	Common sandpiper	2	W	100	0	Roosting
08:30	Grey-tailed tattler	3	W	100	0	Roosting
08:30	Siberian sand plover	9	W	100	0	Roosting
08:58	Pacific reef heron	1	NW	80	0	Foraging

Table 10 Disturbance Observations at East Point

Time	Type	Duration (min)	Shorebird Response	Species	Number Affected	Did the Affected Birds Leave the Site?	Entry and Exit Points of Disturbance	Notes
08:50	Human	5	None	NA	NA	No	Two people walked south along the beach	No response from shorebirds observed
09:02	Human	10	None	NA	NA	No	Entered and exited via walking track next to beach	Two fishermen remained >100 m north of roosting birds; no disturbance triggered

4.0 Conclusion

The aim of this survey was to quantify the richness and abundance of shorebirds remaining on Darwin's northern beaches during the northern hemisphere breeding season, and to gather data on anthropogenic disturbance at five key feeding and roosting locations. Monitoring was conducted in accordance with the *Shorebird Monitoring Plan: Lee Point, Darwin, Northern Territory* (Ecology and Heritage Partners 2023).

During the Year 2 winter survey, a total of 12 shorebird species were recorded across the five survey sites, with the highest diversity and abundance observed at Lee Point (9 species). Overall, few disturbance events were recorded, and no events resulted in significant displacement of shorebirds from the survey sites.

Compared to Year 1, the number of individual shorebirds observed increased substantially, from 198 individuals in Year 1 to 844 in Year 2. The most notable change occurred at Lee Point, where counts rose from 134 individuals in Year 1 to 782 in Year 2, indicating a marked increase in shorebird presence at this site during the winter survey period.

5.0 References

Ecology & Heritage Partners (2023). *Shorebird Monitoring: Lee Point, Darwin, Northern Territory (Winter 2023)*. Report prepared for Defence Housing Australia, Darwin, Northern Territory.

EcOz Environmental Consulting (2022). *Shorebird Monitoring Program Lee Point Master-planned Urban Development*. Defence Housing Australia, Darwin, Northern Territory.

Lilleyman, A. (2017). *Report on Potential Impacts from Disturbance to Migratory Shorebirds in Darwin: Defence Housing Australia – Lee Point Master-planned Urban Development.* Defence Housing Australia, Darwin, Northern Territory.

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