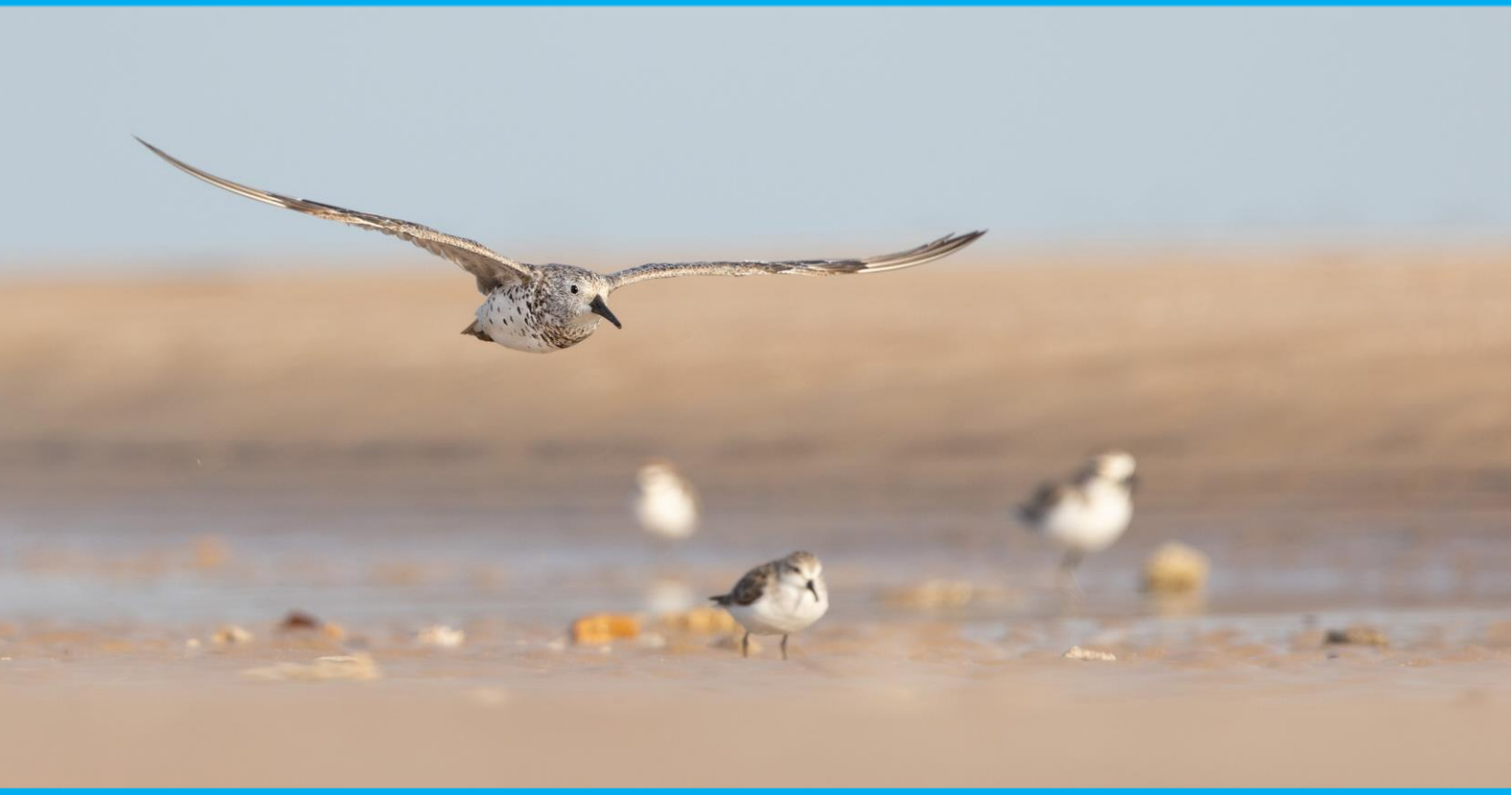

Shorebird Monitoring: Lee Point, Darwin, Northern Territory (October 2024)

Defence Housing Australia

Shorebird Monitoring: Lee Point, Darwin, Australia (October 2024)
Defence Housing Australia

Revision History

Version	Purpose	Issued by	Date	Reviewer	Date
1	Final	P. Tomkins	23.10.2024	M. Brown	23.10.2024

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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 environmental impact statement (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. Thus, this October survey will form part of an ongoing monitoring program aiming to quantify richness and abundance of shorebirds that spend their austral summer on Darwin's northern beaches.

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.

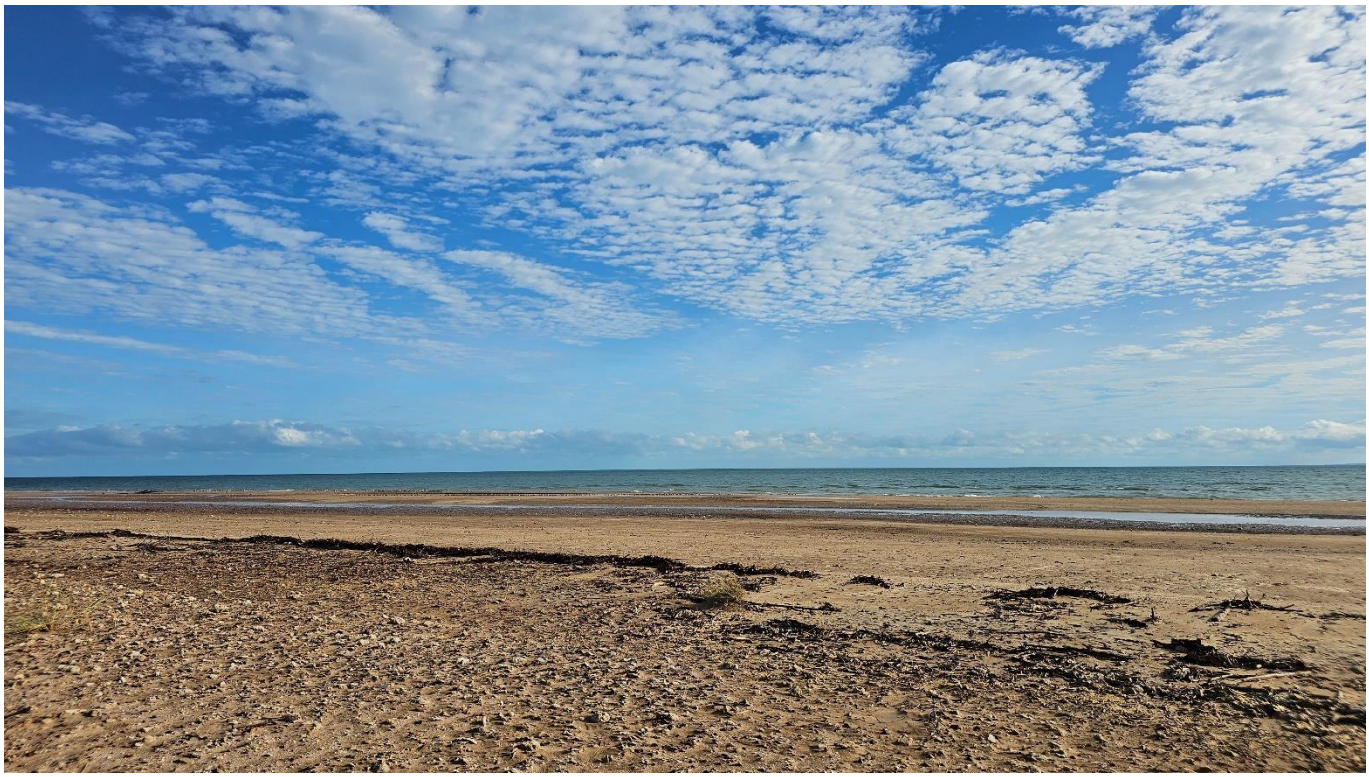

Plate 1 Lee Point

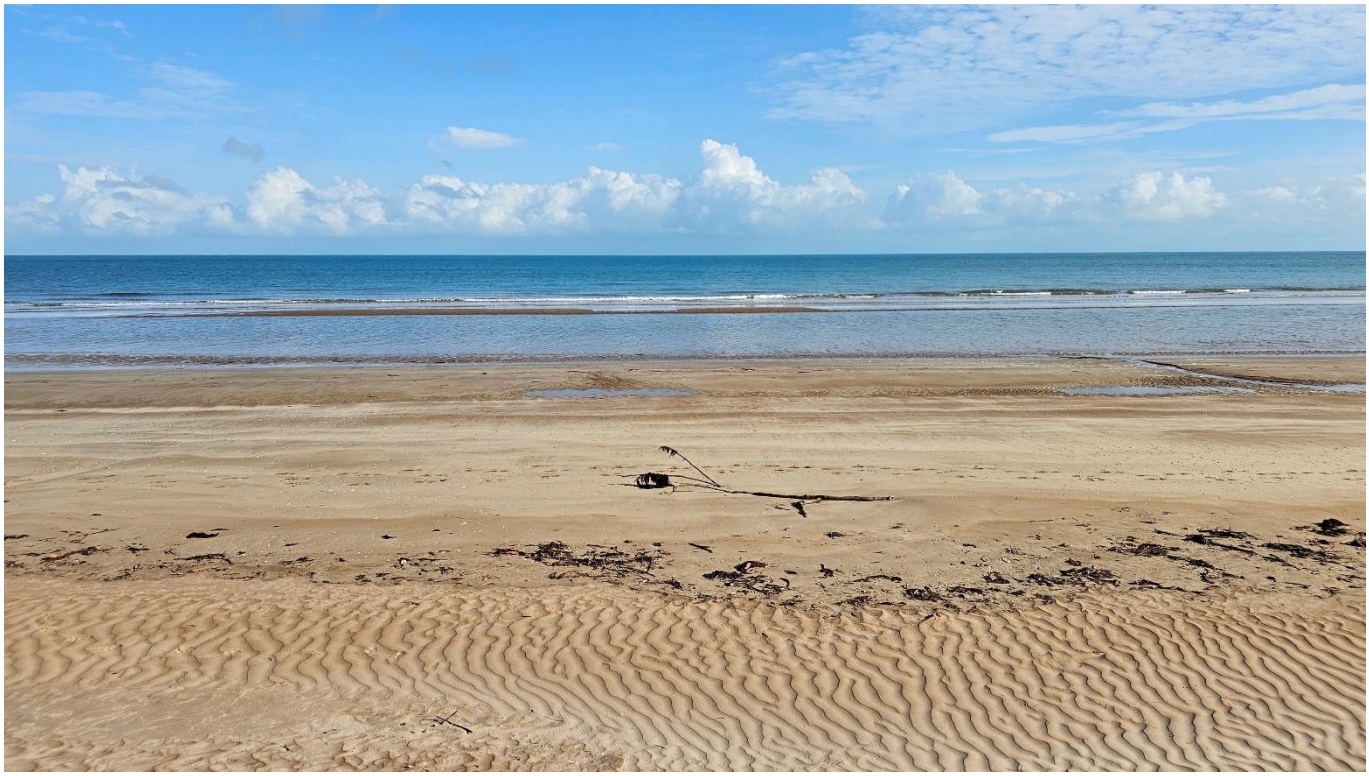

Plate 2 Sandy Creek

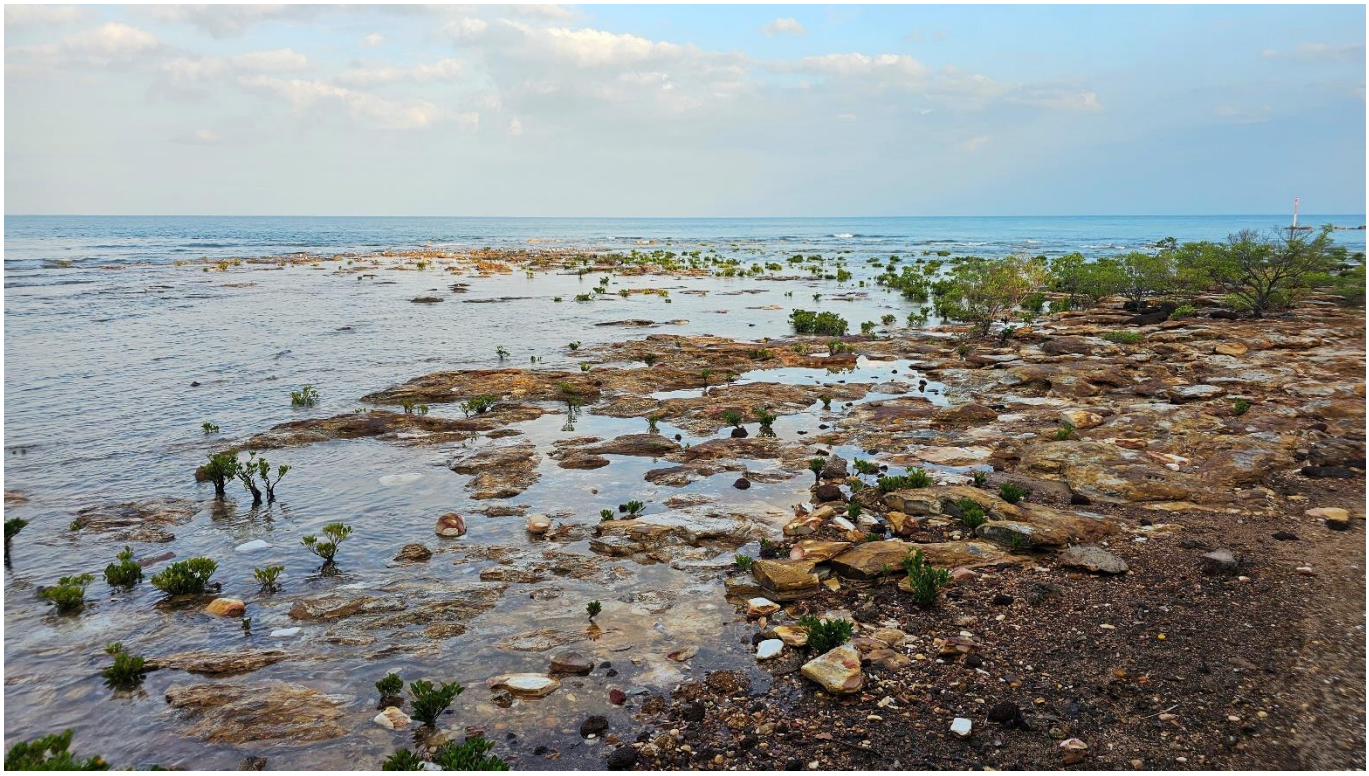

Plate 3 Nightcliff Rocks

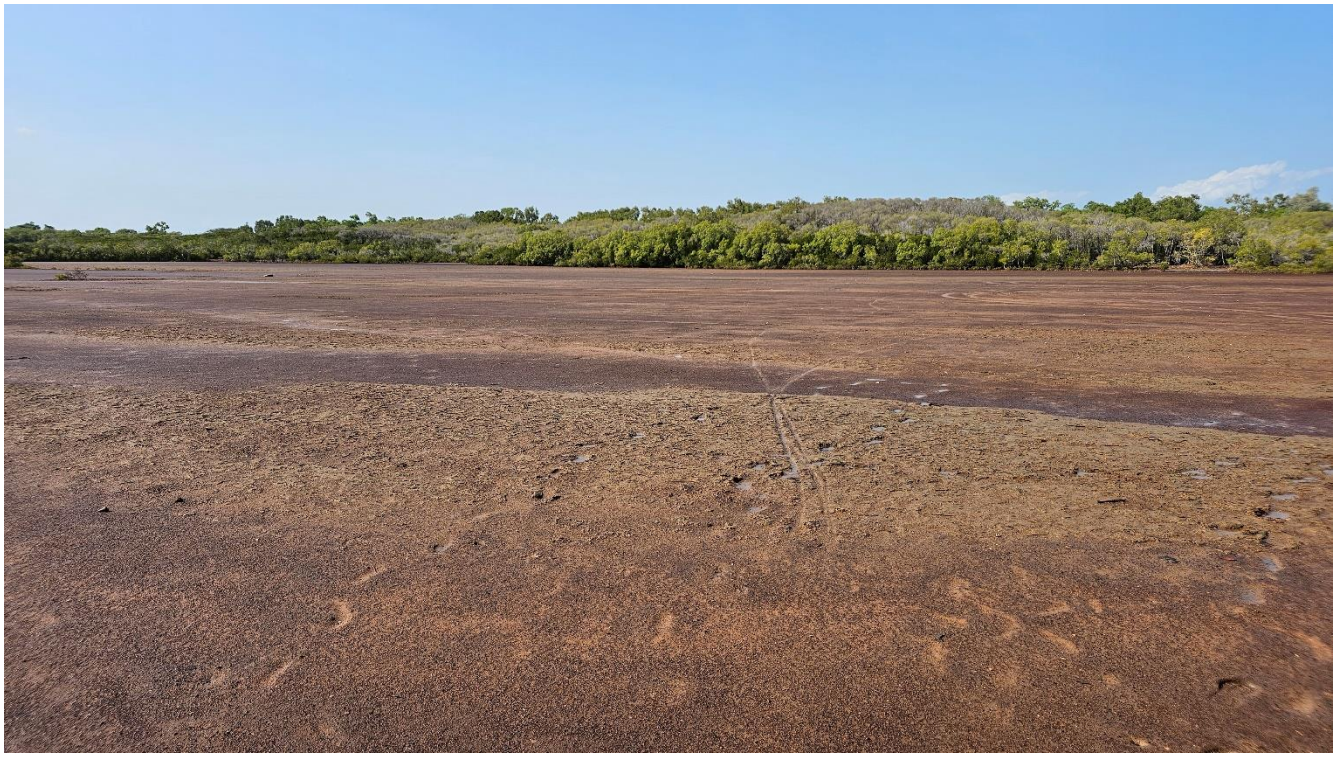

Plate 4　Spot on Marine

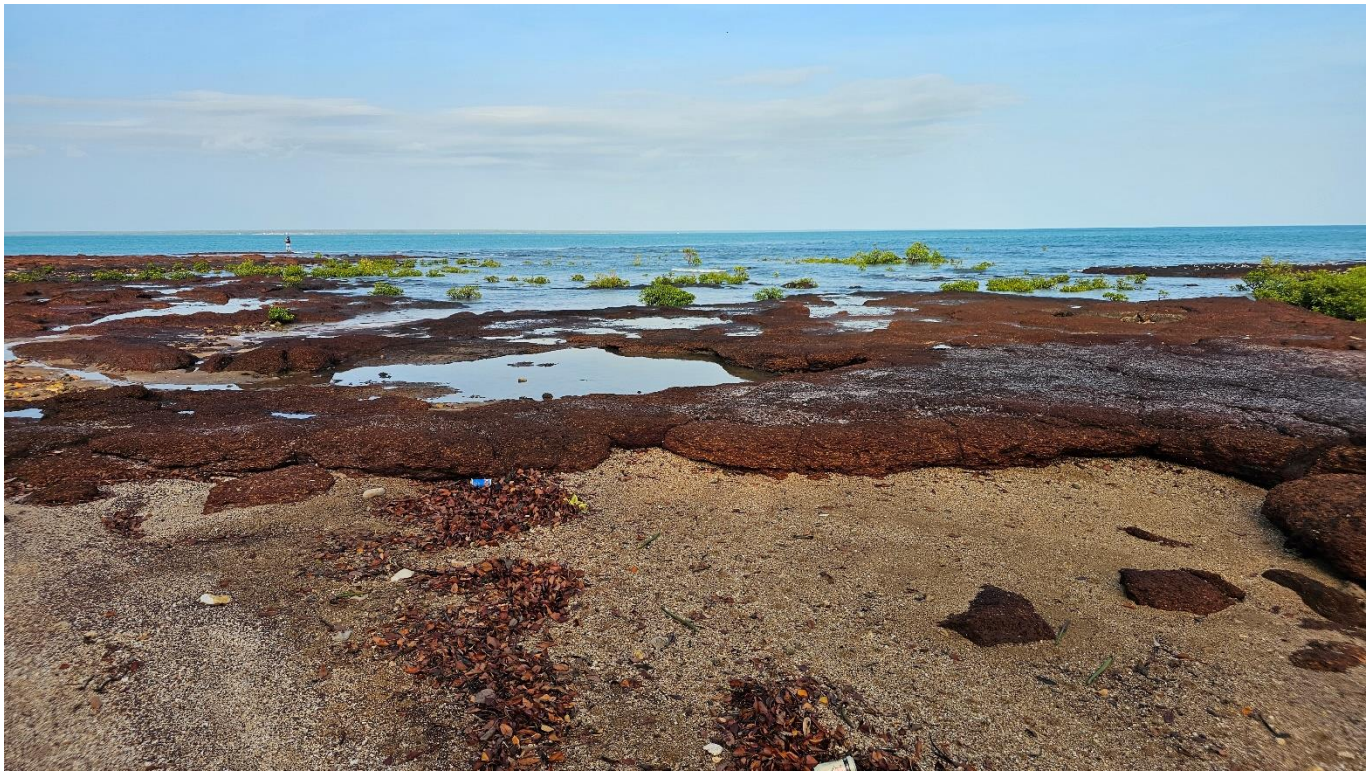

Plate 5　East Point

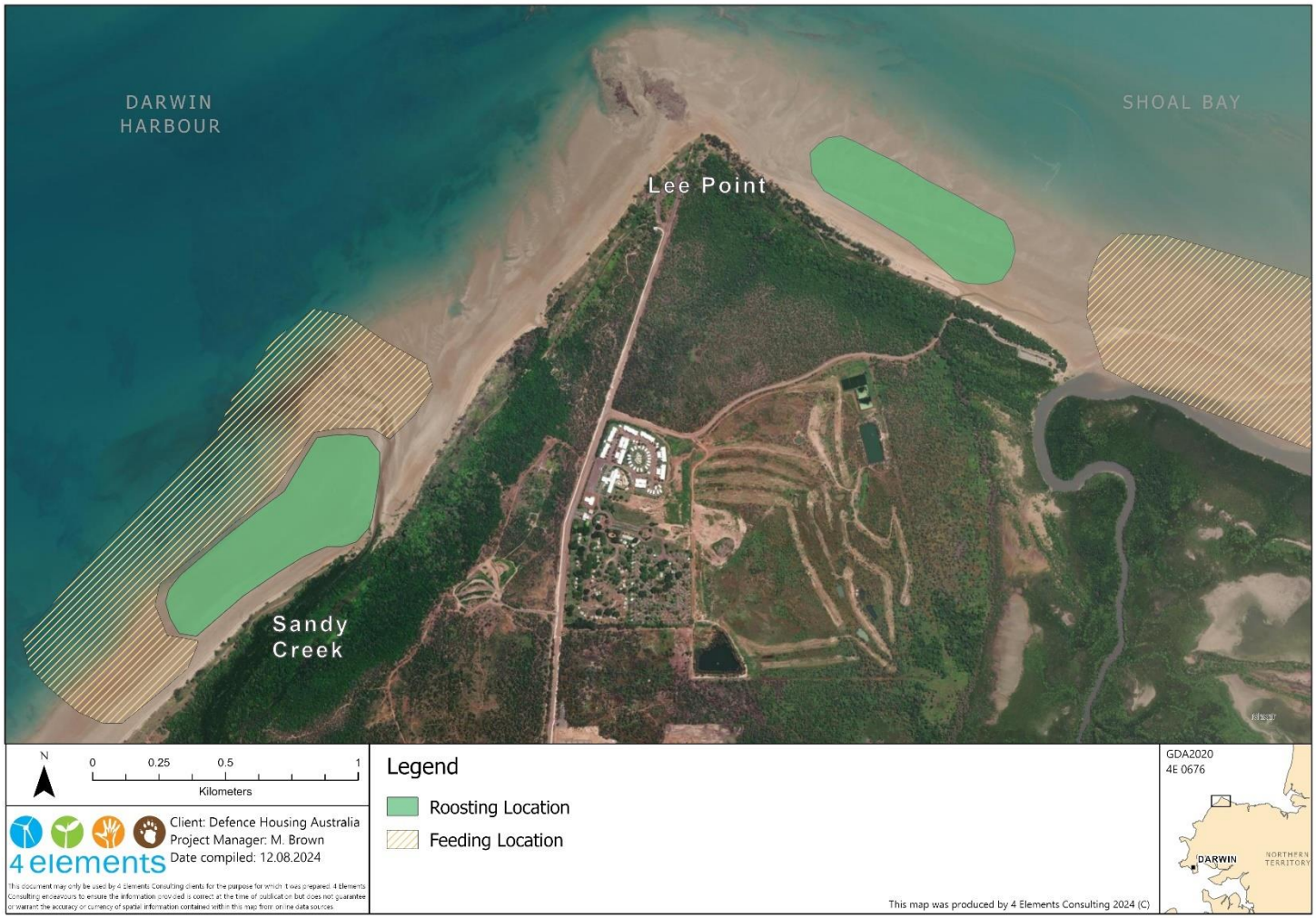

Figure 1 Lee Point and Sandy Point Survey Locations

2.2 Field Assessments

Shorebird surveys were undertaken from October 4thth-6th 2024 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 ensure birds were not disturbed, with each surveyor equipped with binoculars (10 x 42) and a spotting scope (20-60 x magnification).

Table 1 Survey Periods, Tide Data and Weather Data

Date	Site	High Tide Height (m)	High Tide Time	Weather	Temperature (ºC)	Rainfall (mm)	Wind Speed (km/h)/ Direction	Survey Period
04/10/24	Lee Point	6.99	06:51	Passing clouds	27	0	7 EW	06:30-08:30
04/10/24	Sandy Creek	6.99	06:51	Passing clouds	27	0	4 EW	06:30-08:30
05/10/24	Nightcliff Rocks	6.98	07:09	Passing clouds	27	0	4 EW	06:30-08:30
06/10/24	Spot on Marine	6.87	07:28	Passing clouds	27	0	4 EW	06:30-08:30
06/10/24	East Point	6.87	07:28	Passing clouds	27	0	4 EW	06:30-08:30

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

18 species of migratory shorebird were observed during the survey period – red knot (*Calidris canutus*), great knot (*Calidris tenuirostris*), bar-tailed godwit (*Limosa lapponica*), black-tailed godwit *(Limosa limosa*), whimbrel (*Numenius phaeopus*), far eastern curlew (*Numenius madagascariensis*), sanderling (*Calidris alba*), red-necked stint (*Calidris ruficollis*), common sandpiper (*Actitis hypoleucos*), sharp-tailed sandpiper (*Calidris acuminata*), terek sandpiper (*Xenus cinereus*), ruddy turnstone (*Arenaria interpres*), greater sand plover (*Charadrius leschenaultia*), siberian sand plover (*Charadrius mongolus*), pacific golden plover (*Pluvialis fulva*), grey plover (*Pluvialis squatarola*), grey-tailed tattler (*Tringa brevipes*) and common greenshank (*Tringa nebularia*). All observations made during the survey period are detailed below.

Lee Point

Lee Point was surveyed simultaneously with Sandy Creek on October 4th 2024. Fifteen species of migratory shorebird were recorded (**Table 2**), as well as 8 species of non-migratory waterbirds. Three disturbances and one potential disturbance was 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
06:30	Sooty oystercatcher	3	E	100	0	Roosting
06:30	Great knot	1900	E	100	0	Roosting
06:30	Red knot	450	E	100	0	Roosting
06:30	Crested tern	27	E	100	0	Roosting
06:30	Lesser crested tern	12	E	100	0	Roosting
06:30	Bar-tailed godwit	3	E	100	0	Roosting
06:30	Black-tailed godwit	1	E	100	0	Roosting
06:30	Siberian sand plover	60	E	100	0	Roosting
06:30	Greater sand plover	480	E	100	0	Roosting
06:30	Far eastern curlew	25	E	100	0	Roosting
06:30	Red-capped plover	46	E	100	0	Foraging
06:30	Grey-tailed tattler	1	E	100	0	Roosting
06:30	Ruddy turnstone	46	E	100	0	Roosting
06:30	Whimbrel	3	E	100	0	Roosting
06:30	Grey plover	5	E	100	0	Roosting
06:40	Silver gull	28	E	100	0	Roosting
06:40	Sharp-tailed sandpiper	12	E	100	0	Roosting
06:40	Common sandpiper	2	E	100	0	Roosting
06:40	Red-necked stint	22	E	100	0	Roosting
06:40	Sanderling	52	E	100	0	Roosting

06:40	Whiskered tern	42	E	100	0	Roosting
06:40	Pied oystercatcher	1	E	100	0	Foraging
07:00	Caspian tern	4	E	100	50	Roosting

Table 3 Disturbance Observations at Lee Point

Time	Type	Duration (min)	Shorebird Response	Species affected	Number Affected	Did the Affected Birds Leave the Site?	Entry and Exit Points of Disturbance	Notes
06:40	Human	30	None	-	-	No	Entry point unknown, exit point was the walking track west of the roost.	Birder approached us from the east and walked to within 80m of roosting birds before exiting west of the roost. No response from birds.
07:00	Black kite	2	Birds were visibly agitated and calling	Siberian sand plover, Greater sand plover, Red-necked stint, Red knot, Great knot	400	No	-	Black kite circled approximately 100m above a mixed flock of shorebirds. Birds were visibly agitated and calling until the kite flew away.
07:15	Whistling kite	1	Flushed	Siberian sand plover, Greater sand plover, Red-necked stint, Red knot, Great knot	160	No	-	Whistling kite flushed a small mixed flock of birds that settled approximately 150m down the beach.
07:30	Human	5	-	-	-	-	-	**Potential disturbance**. Two people walking towards shorebirds from the west but turned around approximately 200m from birds.

Plate 6 Mixed Flock at Lee Point

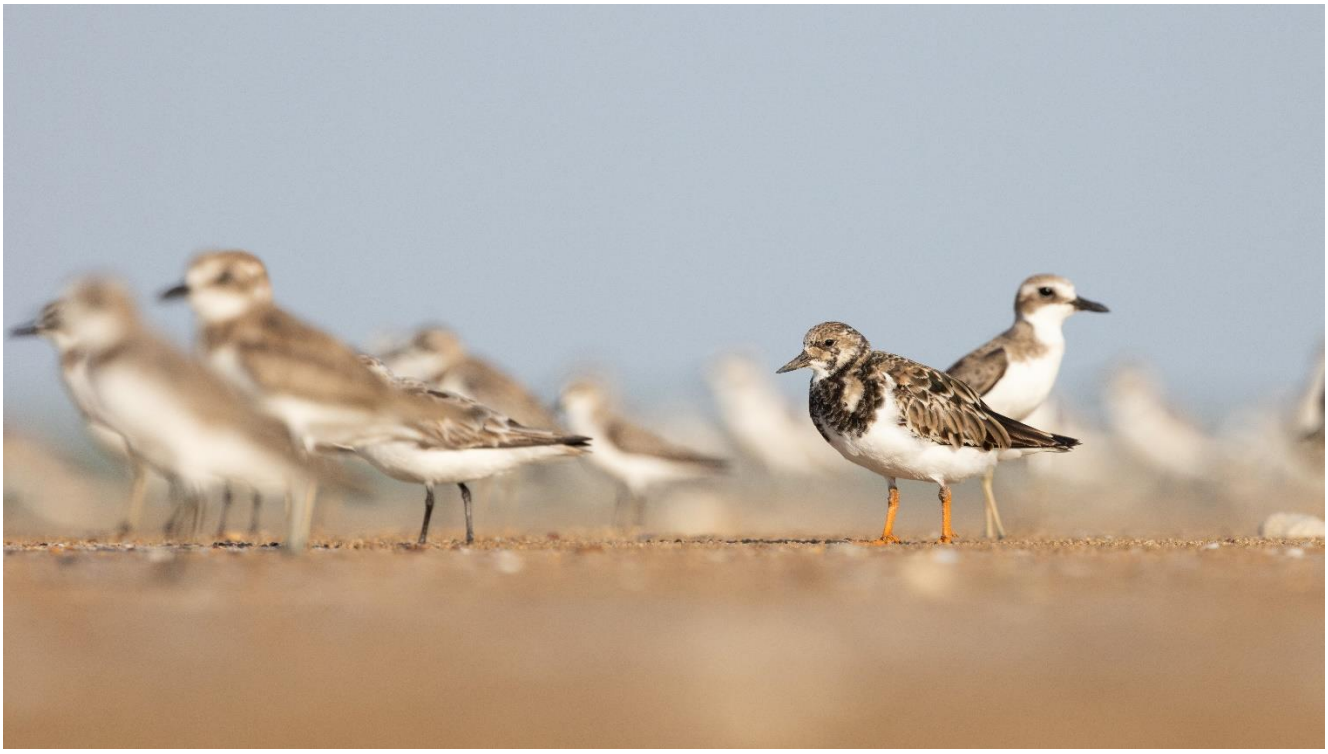

Plate 7 Ruddy Turnstone and Sand Plovers at Lee Point

Sandy Creek

Sandy Creek was surveyed simultaneously with Lee Point on October 4th 2024. Three species of migratory shorebird and three species of non-migratory waterbird were recorded during the survey period (**Table 4**). One disturbance and no potential disturbances were recorded during the survey period (**Table 5**).

Table 4 Bird Observations at Sandy Creek

Time	Species	No. Individuals	Direction from Surveyor	Distance from Observer (m)	Height (m)	Behaviour
06:30	Silver gull	18	SW	100	0	Roosting
06:30	Common sandpiper	3	SW	100	0	Foraging
06:30	Ruddy turnstone	2	SW	100	0	Foraging
06:30	Red-capped plover	8	SW	60	0	Foraging
06:50	Crested tern	1	N	60	80	Flying
07:30	Far eastern curlew	2	N	100	50	Flying

Table 5 Disturbance Observations at Sandy Creek

Time	Type	Duration (min)	Shorebird Response	Species	Number Affected	Did the Affected Birds Leave the Site?	Entry and Exit Points of Disturbance	Notes
07:00	Human	5	Walked away	Red-capped plover, Common sandpiper, ruddy turnstone	22	No	Entered and exited via walking track at the north end of the beach	Walker came within 50m of shorebirds before turning around

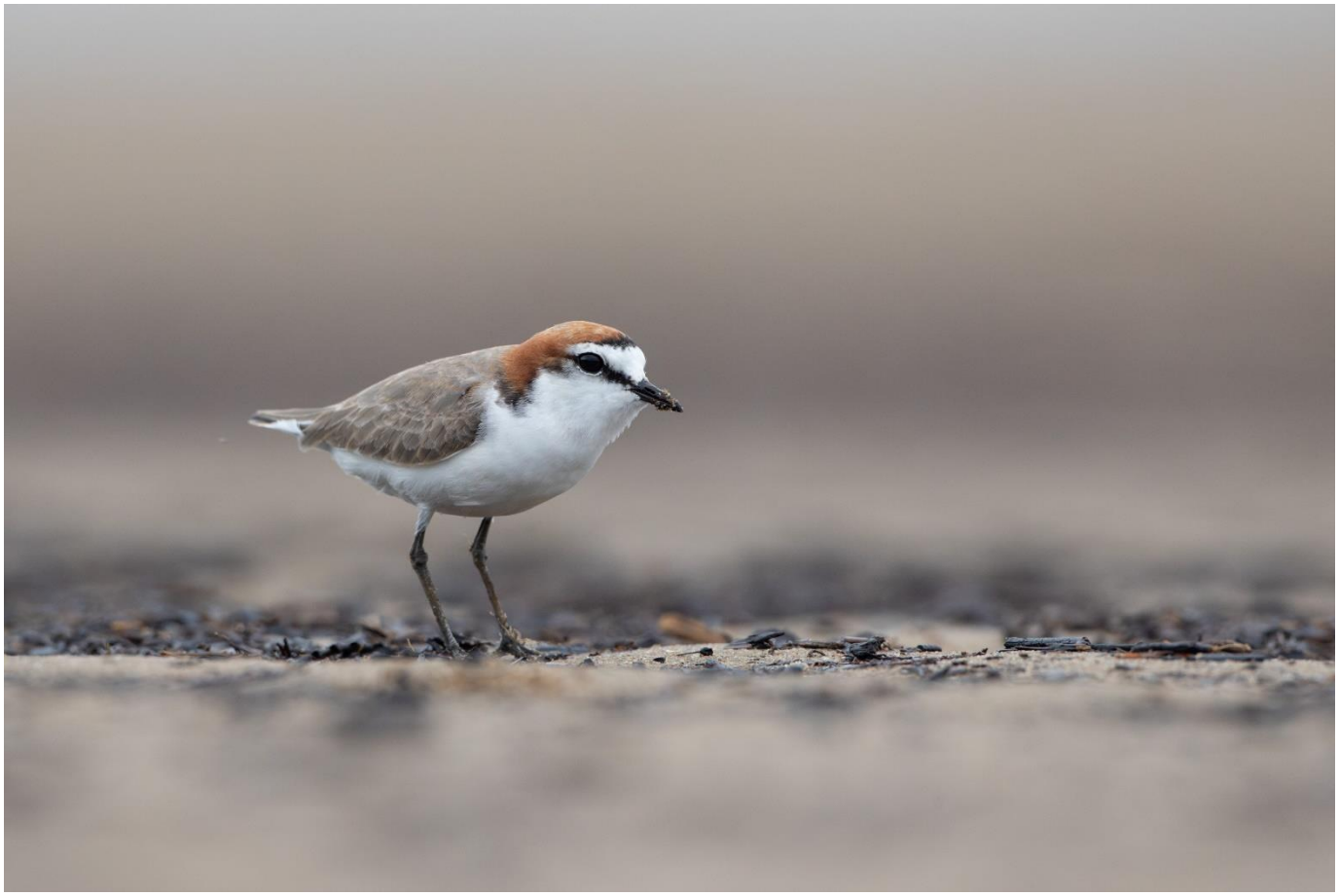

Plate 8 Red-capped Plover at Sandy Point

Nightcliff Rocks

Twelve species of migratory shorebird and six species of non-migratory waterbird were observed at Nightcliff Rocks during the survey period (**Table 6**). No disturbances and one potential disturbance (**Table 7**) was recorded during the survey period.

Table 6 Bird Observations at Nightcliff Rocks

Time	Species	No. Individuals	Direction from Surveyor	Distance from Observer (m)	Height (m)	Behaviour
06:30	Whimbrel	1	W	100	0	Roosting
06:30	Red knot	2	W	100	0	Roosting
06:30	Great knot	5	W	100	0	Roosting
06:30	Terek sandpiper	3	W	100	0	Roosting
06:30	Bar-tailed godwit	1	W	100	0	Roosting
06:30	Pacific golden plover	4	W	100	0	Roosting
06:30	Red-necked stint	10	W	100	0	Roosting
06:30	Ruddy turnstone	6	W	100	0	Roosting
06:30	Crested tern	45	W	100	0	Roosting
06:30	Lesser crested tern	5	W	100	0	Roosting
06:30	Greater sand plover	120	W	100	0	Roosting
06:30	Lesser sand plover	30	W	100	0	Roosting
06:30	Grey-tailed tattler	10	W	100	0	Roosting
06:30	Common sandpiper	2	W	100	0	Roosting
06:30	Masked lapwing	3	W	80	0	Foraging
06:30	Silver gull	22	W	100	0	Roosting
07:30	Pied oystercatcher	1	W	60	0	Roosting
07:30	Eastern reef egret	1	W	60	0	Roosting

Table 7 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
07:00	Human	-	-	-	-	No	-	**Potential disturbance.** Walker approached the edge of the rocks within 150m of birds before turning around.

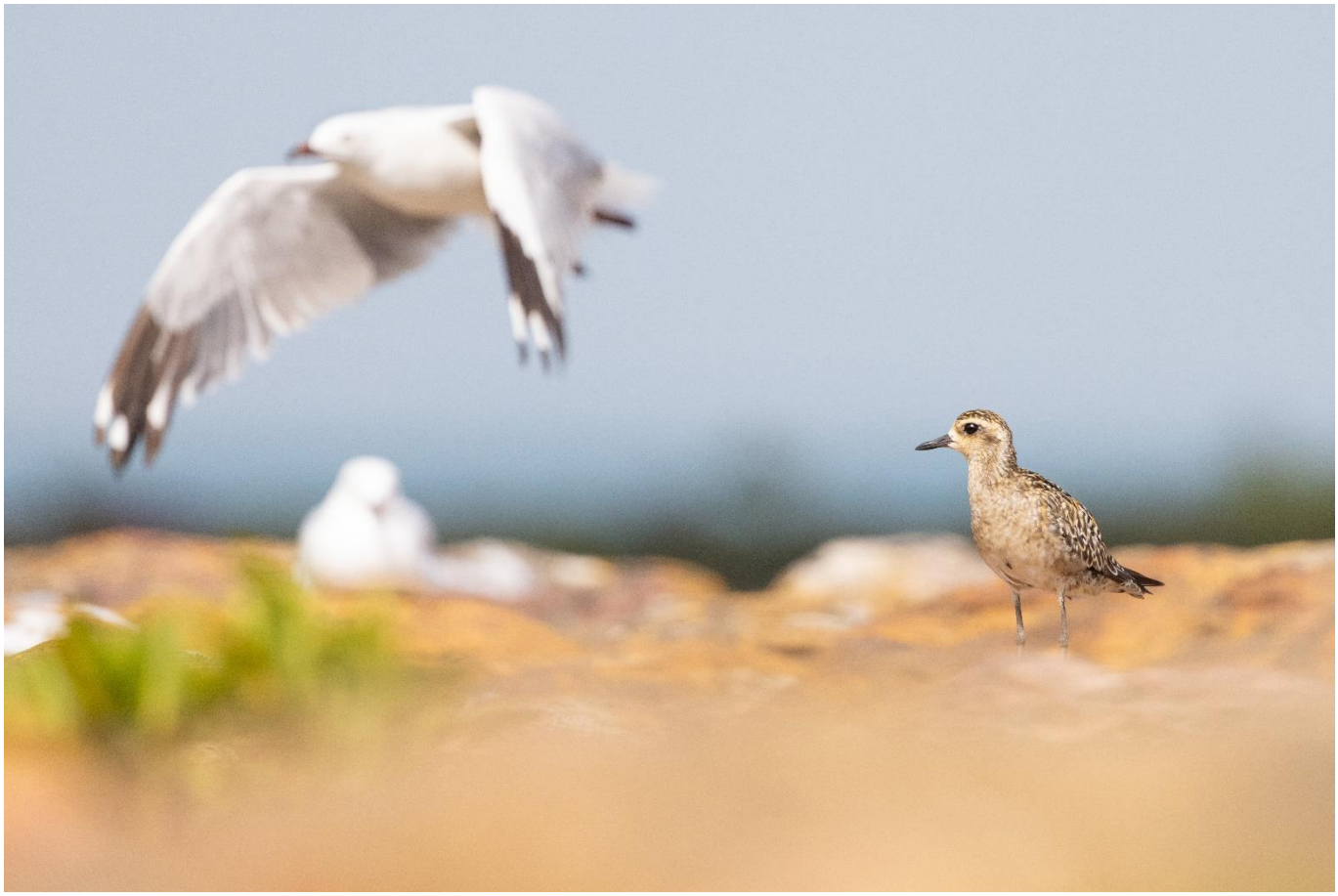

Plate 9 Pacific Golden Plover at Nightcliff Rocks

Spot on Marine

Four migratory shorebirds were recorded at Spot on Marine during the survey period (**Table 8**). No disturbances or potential disturbances were recorded during the survey period.

Table 8 Bird Observations at Spot on Marine

Time	Species	No. Individuals	Direction from Surveyor	Distance from Observer (m)	Height (m)	Behaviour
06:30	Whimbrel	23	SE	100	0	Roosting
06:30	Far eastern curlew	16	SE	100	0	Roosting
06:30	Pacific golden plover	10	SE	100	0	Roosting
06:30	Common greenshank	7	SE	100	0	Roosting

East Point

Ten species of migratory shorebird and four species of non-migratory waterbird were recorded at East Point during the survey period (**Table 9**). One disturbance and one potential disturbance was 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
06:30	Striated heron	3	W	100	0	Foraging
06:30	Pacific reef egret	1	W	60	0	Foraging
06:30	Crested tern	3	W	100	0	Foraging
06:30	Red-necked stint	22	W	100	0	Roosting
06:30	Great knot	28	W	100	0	Roosting
06:30	Buff-banded rail	1	S	50	0	Foraging
06:30	Whimbrel	1	W	100	0	Roosting
06:30	Ruddy turnstone	3	W	100	0	Roosting
06:30	Terek sandpiper	3	W	100	0	Roosting
06:30	Grey-tailed tattler	6	W	80	0	Roosting
06:30	Pacific golden plover	11	W	60	0	Roosting
06:30	Greater sand plover	125	W	80	0	Roosting
06:30	Lesser sand plover	35	W	100	0	Roosting
06:30	Common sandpiper	6	W	40	0	Roosting

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
07:30	Human	60	Flushed	Terek sandpiper, lesser sand plover, greater sand plover, red-necked stint, pacific golden plover, whimbrel, ruddy turnstone	120	No	Entered and exited via walking track adjacent to roost.	Fisherman walked onto rocks and flushed a mixed flock of shorebirds, which settled on rocks approximately 100m away.
08:00	Plane	1	None	-	-	-	-	**Potential disturbance.** Low flying plane passed within 300m of shorebirds.

Plate 10 Flushed Mixed Flock at East Point

4.0 Conclusion

The aim of this survey was to quantify richness and abundance of migratory shorebirds on Darwin's northern beaches during the month of October, as well as 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).

Seventeen species of migratory shorebird were recorded across the five survey sites, with the highest diversity and abundance recorded at Lee Point. Relatively few disturbances and potential disturbances were recorded at any of the sites.

5.0 References

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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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