

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

*Defence Housing Australia*



4 elements

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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 November 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.

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## 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 November 3<sup>rd</sup>-5<sup>th</sup> 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 (°C) | Rainfall (mm) | Wind Speed (km/h)/ Direction | Survey Period |
|----------|------------------|----------------------|----------------|------------------------|------------------|---------------|------------------------------|---------------|
| 03/11/24 | Lee Point        | 6.69                 | 06:29          | Passing clouds         | 25               | 0             | 6 EW                         | 06:00-08:00   |
| 03/11/24 | Sandy Creek      | 6.69                 | 06:29          | Passing clouds         | 28               | 0             | 6 EW                         | 06:00-08:00   |
| 04/11/24 | Nightcliff Rocks | 6.62                 | 06:53          | Passing clouds         | 28               | 0             | 2 EW                         | 06:00-08:00   |
| 05/11/24 | Spot on Marine   | 6.47                 | 07:18          | Passing clouds         | 30               | 0             | 4 EW                         | 06:30-08:30   |
| 05/11/24 | East Point       | 6.47                 | 07:18          | Sunny / passing clouds | 28               | 0             | 2 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

Fifteen species of migratory shorebird were observed during the survey period – red knot (*Calidris canutus*), great knot (*Calidris tenuirostris*), bar-tailed godwit (*Limosa lapponica*), whimbrel (*Numenius phaeopus*), far eastern curlew (*Numenius madagascariensis*), 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. All observations made during the survey period are detailed below.

#### Lee Point

Lee Point was surveyed simultaneously with Sandy Creek on November 3<sup>rd</sup> 2024. Thirteen species of migratory shorebird were recorded (**Table 2**), as well as ten species of non-migratory waterbirds. Two disturbances and no 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 |
|-------|------------------------|-----------------|-------------------------|----------------------------|------------|-----------|
| 06:00 | Caspian tern           | 1               | E                       | 100                        | 0          | Roosting  |
| 06:00 | Bar-tailed godwit      | 21              | E                       | 100                        | 0          | Roosting  |
| 06:00 | Crested tern           | 24              | E                       | 100                        | 0          | Roosting  |
| 06:00 | Great knot             | 3700            | E                       | 100                        | 0          | Roosting  |
| 06:00 | Red knot               | 300             | E                       | 100                        | 0          | Roosting  |
| 06:00 | Silver gull            | 5               | E                       | 100                        | 0          | Roosting  |
| 06:00 | Pacific golden plover  | 1               | E                       | 100                        | 0          | Roosting  |
| 06:00 | Ruddy turnstone        | 20              | E                       | 100                        | 0          | Roosting  |
| 06:00 | Terek sandpiper        | 10              | E                       | 100                        | 0          | Roosting  |
| 06:00 | Sharp-tailed sandpiper | 9               | E                       | 100                        | 0          | Roosting  |
| 06:00 | Common sandpiper       | 1               | E                       | 100                        | 0          | Roosting  |
| 06:00 | Whimbrel               | 8               | E                       | 100                        | 0          | Roosting  |
| 06:00 | Far Eastern Curlew     | 22              | E                       | 100                        | 0          | Roosting  |
| 06:00 | Greater sand plover    | 380             | E                       | 100                        | 0          | Roosting  |
| 06:00 | Siberian sand plover   | 40              | E                       | 100                        | 0          | Roosting  |
| 06:00 | Sooty oystercatcher    | 1               | E                       | 100                        | 0          | Roosting  |
| 06:00 | Red-capped plover      | 2               | E                       | 100                        | 0          | Foraging  |
| 06:00 | Common tern            | 18              | E                       | 100                        | 0          | Roosting  |
| 06:00 | Little tern            | 50              | E                       | 100                        | 0          | Roosting  |
| 06:00 | Whiskered tern         | 6               | E                       | 100                        | 0          | Roosting  |
| 06:00 | Gull-billed tern       | 2               | E                       | 100                        | 0          | Roosting  |

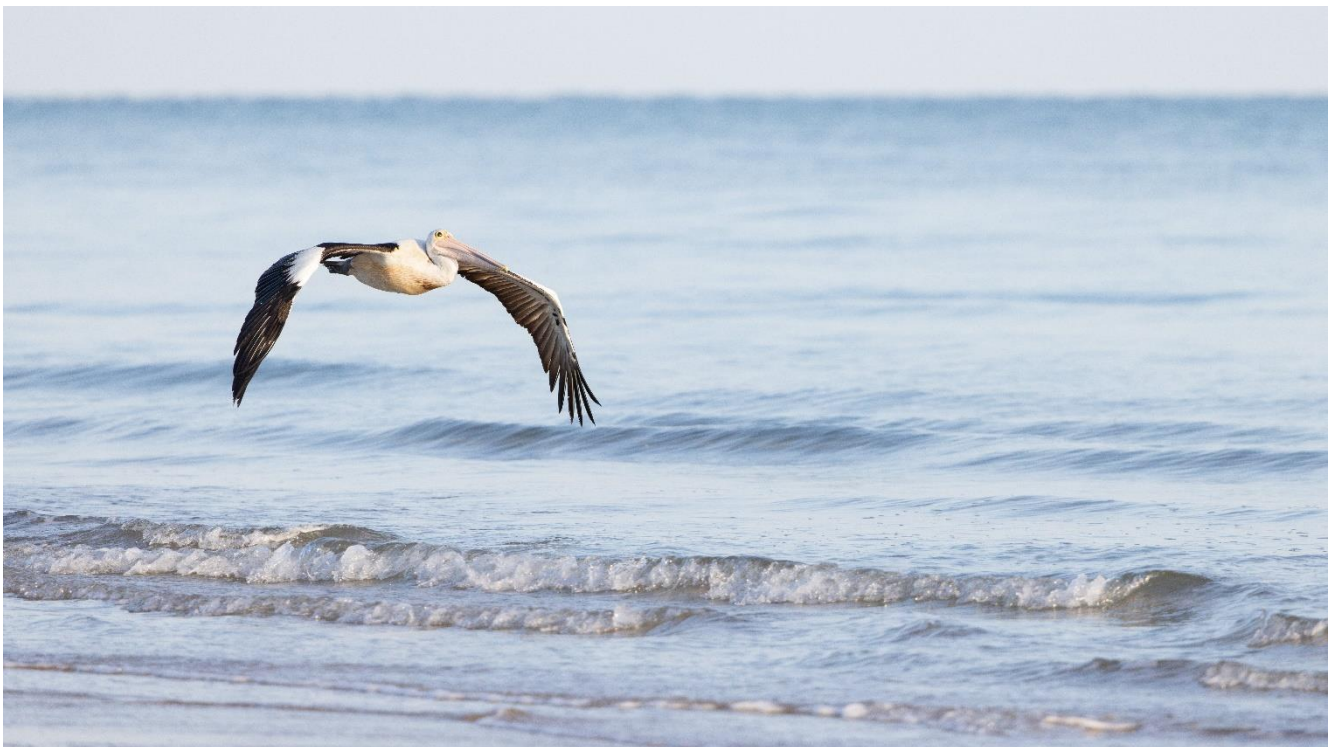
|       |                    |     |   |     |    |          |
|-------|--------------------|-----|---|-----|----|----------|
| 07:00 | Australian pelican | 1   | E | 100 | 10 | Flying   |
| 07:36 | Red-necked stint   | 120 | E | 100 | 0  | Roosting |

**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  |
|-------|--------------------|----------------|-----------------------------------|--|-----------------|--|--|--|
| 07:00 | Australian pelican | 1              | Flushed to new roosting spot      | Caspian tern, bar-tailed godwit, crested tern, great knot, red knot, silver gull, pacific golden plover, ruddy turnstone | Approx. 300     | No                                     | Flew along the beach   | Pelican flew low over small group of roosting birds, causing them to swap spots and join a larger group approximately 200m east along the beach. |
| 07:33 | Human              | 15             | Some flushed, but didn't fly away | Mixed flock of terns   | Approx. 100     | No                                     | Entered and exited from walking track close to bird look-out tower south-west of roosting birds. | Black kite circled approximately 100m above a mixed flock of shorebirds. Birds were visibly agitated and calling until the kite flew away.       |



**Plate 6 Mixed Flock at Lee Point**



**Plate 7 Australian Pelican at Lee Point**

*Sandy Creek*

Sandy Creek was surveyed simultaneously with Lee Point on November 3rd 2024. Three species of migratory shorebird and six species of non-migratory waterbird were recorded during the survey period (**Table 4**). No disturbances and one potential disturbance was 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 |
|-------|--------------------|-----------------|-------------------------|----------------------------|------------|-----------|
| 06:00 | Silver gull        | 12              | SW                      | 100                        | 0          | Roosting  |
| 06:00 | Common sandpiper   | 2               | SW                      | 100                        | 0          | Foraging  |
| 06:00 | Red-capped plover  | 16              | SW                      | 60                         | 0          | Foraging  |
| 06:00 | Whimbrel           | 1               | SW                      | 100                        | 0          | Foraging  |
| 06:00 | Crested tern       | 8               | SW                      | 60                         | 0          | Foraging  |
| 06:00 | Little tern        | 3               | SW                      | 100                        | 0          | Foraging  |
| 07:10 | Common sandpiper   | 1               | SW                      | 80                         | 0          | Foraging  |
| 07:30 | Australian pelican | 1               | W                       | 150                        | 50         | Flying    |
| 07:45 | Black-necked stork | 1               | SW                      | 100                        | 0          | Foraging  |

**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   |
|-------|-------|----------------|--------------------|---------|-----------------|--|--|---|
| 07:30 | Human | 10             | None               | -       | -               | No                                     | Entered and exited via walking track at the north end of the beach | Walker came within 250m of shorebirds before turning around.<br><b>Potential disturbance.</b> |



**Plate 8 Black-necked stork at Sandy Creek**

*Nightcliff Rocks*

Eleven species of migratory shorebird and six species of non-migratory waterbird were observed at Nightcliff Rocks during the survey period (**Table 6**). One disturbance and two potential disturbances (**Table 7**) were 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 |
|-------|-----------------------|-----------------|-------------------------|----------------------------|------------|-----------|
| 06:00 | Beach stone-curlew    | 2               | W                       | 100                        | 0          | Roosting  |
| 06:00 | Pied oystercatcher    | 2               | W                       | 100                        | 0          | Roosting  |
| 06:00 | Whimbrel              | 2               | W                       | 100                        | 0          | Roosting  |
| 06:00 | Greater sand plover   | 60              | W                       | 100                        | 0          | Roosting  |
| 06:00 | Siberian sand plover  | 20              | W                       | 100                        | 0          | Roosting  |
| 06:00 | Pacific golden plover | 15              | W                       | 100                        | 0          | Roosting  |
| 06:00 | Masked lapwing        | 2               | W                       | 100                        | 0          | Roosting  |
| 06:00 | Silver gull           | 20              | W                       | 100                        | 0          | Roosting  |
| 06:00 | Crested tern          | 50              | W                       | 100                        | 0          | Roosting  |
| 06:00 | Lesser crested tern   | 10              | W                       | 100                        | 0          | Roosting  |
| 06:00 | Red-necked stint      | 20              | W                       | 100                        | 0          | Roosting  |
| 06:00 | Great knot            | 100             | W                       | 100                        | 0          | Roosting  |
| 06:00 | Ruddy turnstone       | 7               | W                       | 100                        | 0          | Roosting  |
| 06:00 | Red knot              | 20              | W                       | 100                        | 0          | Roosting  |
| 06:00 | Grey-tailed tattler   | 1               | W                       | 100                        | 0          | Roosting  |
| 06:00 | Terek sandpiper       | 1               | W                       | 100                        | 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   |
|-------|-------|----------------|------------------------------|-------------------------|-----------------|--|---|---|
| 07:10 | Human | 20             | Flushed to new roosting spot | All species from survey | Approx. 300     | No                                     | Entered and exited via walking track next to beach. | Fisherman walked straight onto roost and flushed birds. The birds flew around for a couple of minutes before settling on rocks approx. 100m east of original roost. |
| 08:10 | Boat  | 1              | None                         | -                       | -               | -                                      | From boat ramp                                      | Boat drove approx. 200m from roost. <b>Potential disturbance.</b>   |
| 08:16 | Boat  | 1              | None                         | -                       | -               | -                                      | From boat ramp                                      | Boat drove approx. 200m from roost. <b>Potential disturbance.</b>   |





**Plate 9 Masked lapwing at Nightcliff Rocks**

*Spot on Marine*

Two migratory shorebirds and one non-migratory waterbird 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           | 33              | SE                      | 100                        | 0          | Roosting  |
| 06:30 | Far eastern curlew | 22              | SE                      | 100                        | 0          | Roosting  |
| 06:30 | Crested tern       | 1               | SE                      | 100                        | 0          | Roosting  |

*East Point*

Nine species of migratory shorebird and two 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 | Ruddy turnstone       | 4               | W                       | 100                        | 0          | Roosting  |
| 06:30 | Grey-tailed tattler   | 24              | W                       | 100                        | 0          | Roosting  |
| 06:30 | Common sandpiper      | 7               | W                       | 100                        | 0          | Foraging  |
| 06:30 | Greater sand plover   | 53              | W                       | 100                        | 0          | Roosting  |
| 06:30 | Pacific golden plover | 6               | W                       | 100                        | 0          | Roosting  |
| 06:30 | Whimbrel              | 2               | W                       | 100                        | 0          | Roosting  |
| 06:30 | Whiskered tern        | 1               | W                       | 100                        | 0          | Roosting  |
| 06:30 | Siberian sand plover  | 12              | W                       | 100                        | 0          | Roosting  |
| 06:30 | Great knot            | 5               | W                       | 100                        | 0          | Roosting  |
| 06:30 | Terek sandpiper       | 5               | W                       | 100                        | 0          | Roosting  |
| 06:30 | Crested tern          | 6               | W                       | 100                        | 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  |
|-------|--------|----------------|--------------------|---------|-----------------|--|--|--|
| 07:27 | Human  | 15             | None               | -       | -               | -                                      | Entry and exit via walking track next to beach | Person fishing came within 100m of shorebirds but did not elicit a response. |
| 07:01 | Jetski | 1              | None               | -       | -               | -                                      | Travelling north along shoreline               | Jet ski drove approx.. 300m from roost<br><b>Potential disturbance.</b>      |



**Plate 10 Common Sandpiper 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).

Fifteen 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.

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## 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.

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