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Emerge Environmental Services Pty Ltd ABN 57144772510 trading as Emerge Associates

Document Reference: EP25-135(11)—013A KSB

Emerge contact: Rachel Weber

14 July 2026

Attention: Mitch Brown
Wolfdene
Level 5, 28 The Esplanade, Perth WA 6000

Delivered by email to: [redacted]

Dear Mitch

TARGETED SHOREBIRD SURVEY – 28 PLACID WATERS PARADE, COODANUP

1 INTRODUCTION AND SCOPE OF WORK

Wolfdene is proposing to develop 28 Placid Waters Parade for residential development (hereafter referred to as the 'site'). The site lies within the City of Mandurah and is bounded by William Road to the east, Serpentine River to the north, residential development and a wetland to the west and Peel Parade and the Peel Inlet to the south. The location of the site is shown in **Figure 1**.

Emerge Associates (2026) previously completed a *Basic Fauna and Targeted Black Cockatoo Assessment* within the site, which identified habitat potentially suitable for multiple migratory shorebirds listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and State *Biodiversity Conservation Act 2016* (BC Act).

Emerge were engaged by Wolfdene to undertake a targeted survey within the site for listed migratory shorebirds previously identified by Emerge Associates (2026) as potentially occurring. The purpose of the assessment was to record any migratory shorebird individuals and confirm habitat extent and values. The assessment was completed with reference to the Environmental Protection Authority's (EPA's) technical guidance (EPA 2020) and the EPBC Act *Policy Statement 3.21 Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species* (DCCEEW 2017).

As part of this scope of work, the following tasks were undertaken:

- Desktop study to provide contextual information relevant to the assessment of migratory shorebirds within the site.
- Field surveys to record migratory shorebirds (if present) and habitat.
- Analysis and mapping of contextual information, shorebird sightings and foraging habitat.
- Documentation of the desktop study, methods, results, discussion and conclusions.

2 DESKTOP STUDY

2.1 Migratory shorebirds

Shorebirds are birds that inhabit the shorelines of coastal and inland water bodies throughout most of their life cycle and are primarily from the Sandpiper (Scolopacidae) and Plover (Charadriidae) families (DCCEEW 2017). Threatened and migratory terns (Laridae), which occur in similar habitats,

were also included in this report due to their status under the EPBC Act (seven species). Australia is an important ecological and geographic region within the East Asian–Australasian Flyway, which extends from Siberia and Alaska through east and southeast Asia to Australia and New Zealand. Within this network, Australia regularly supports 37 migratory shorebird species listed under the EPBC Act. These species migrate annually between breeding grounds in the northern hemisphere and non-breeding habitats in Australia, relying on wetlands, estuaries, mudflats, beaches and other intertidal habitats for foraging and roosting (DCCEEW 2017). They are protected under the EPBC Act and international agreements, including the Japan–Australia Migratory Bird Agreement (JAMBA), China–Australia Migratory Bird Agreement (CAMBA), the Republic of Korea–Australia Migratory Bird Agreement (ROKAMBA) and the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention).

The 32 migratory shorebirds with a moderate likelihood of occurrence are shown in **Table 1** (Emerge Associates 2026).

Table 1: Threatened, specially protected or priority shorebird species with moderate likelihood of occurrence in the site

Species name	Common name	Status		Habitat description
		WA	EPBC Act	
Migratory shorebirds as per* EPBC Act *Policy Statement 3.21				
Actitis hypoleucos	Common sandpiper	MI	MI	Edge of sheltered waters salt or fresh, e.g. estuaries, mangrove creeks, rocky coasts, near-coastal saltlakes (including saltwork ponds), river pools, lagoons, claypans, drying swamps, flood waters, dams and sewage ponds. Preferring situations where low perches are available.
Arenaria interpres	Ruddy turnstone	MI	VU (MI)	Tidal mud and reef flats, sheltered rocky coasts, stony and seaweedy beaches and sandpits, dry coral ridges (Abrolhos) and pebbly shores of near-coastal saltlakes (including saltwork ponds).
Calidris acuminata	Sharp-tailed sandpiper	VU (MI)	VU (MI)	Occurs in tidal mudflats, saltmarshes and mangroves, as well as, shallow fresh, brackish or saline inland wetlands. It is also known from floodwaters, irrigated pastures and crops, sewage ponds, saltfields.
Calidris alba	Sanderling	MI	MI	Mainly steeply shelving sandy beaches exposed to ocean swell. Also sandy inlets, estuarine sandbanks and near-coastal saltlakes (including saltwork ponds).
Calidris canutus	Red knot	EN	VU (MI)	Mud and sand flats in estuaries and on sheltered coasts. Also near-coastal saltlakes, including saltwork ponds.
Calidris falcinellus	Broad-billed sandpiper	MI	MI, MA	Tidal mudflats, reefs, saltmarsh, freshwater wetlands, sewage ponds, favours muddy ooze.
Calidris ferruginea	Curlew sandpiper	CR	CR (MI)	Mainly shallows of estuaries and near-coastal saltlakes (including saltwork ponds) and drying near-coastal freshwater lakes and swamps. Also beaches and near-coastal sewage ponds.
Calidris melanotos	Pectoral sandpiper	MI	MI	Mainly fresh waters (swamps, lagoons, river pools, irrigation channels and sewage ponds); also samphire flats around estuaries and saltlakes (Johnstone & Storr 1998).
Calidris ruficollis	Red-necked stint	MI	MI	Tidal mudflats, saltmarshes, sandy or shelly beaches, saline and freshwater wetlands (coastal and inland), saltfields, sewage ponds.

Table 1: Threatened, specially protected or priority shorebird species with moderate likelihood of occurrence in the site (continued)

Species name	Common name	Status		Habitat description
		WA	EPBC Act	
Calidris subminuta	Long-toed stint	MI	MI	Mainly freshwater swamps (especially when drying and where vegetation is short), river pools, lagoons and claypans; also brackish pools, sewage ponds and samphire flats around estuaries and saltlakes.
Calidris tenuirostris	Great knot	CR	VU (MI)	Mud or sand flats in estuaries and on sheltered coasts. Also near-coastal saltlakes, including saltwork.
Charadrius dubius	Little ringed plover	MI	MI	Open, muddy or sandy shores of lakes, swamps, tidal areas, sewage ponds or farm dams. Rare but regular summer migrant to Australia.
Charadrius leschenaultii	Greater sand plover	VU	VU (MI)	Wide sandy or shelly beaches, sandpits, tidal mudflats, reefs, sand cays, mangroves, saltmarsh, dune wilderness, bare paddocks, seldom far inland.
Charadrius mongolus	Lesser sand plover	EN	EN (MI)	Sandy beaches and tidal estuarine flats. Also near-coastal saltlakes, including saltwork ponds.
Limosa lapponica	Bar-tailed godwit	MI	MI	Estuarine sand and mudflats and sandy beaches with loads of seaweed; also reef flats and near-coastal saltlakes (including saltwork and sewage ponds)
Limosa limosa	Black-tailed godwit	MI	EN (MI)	Tidal mudflats, estuaries, sewage ponds, shallow river margins, brackish or saline inland lakes, flooded pastures, airfields.
Numenius madagascariensis	Eastern curlew	CR	CR (MI)	Mainly tidal mudflats; also reef flats, sandy beaches and rarely near-coastal lakes (including saltwork ponds).
Numenius phaeopus	Whimbrel	MI	MI	Estuaries, mangroves, tidal flats, coral cays, exposed reefs, flooded paddocks, sewage ponds, bare grasslands, sportsgrounds and lawns.
Pluvialis fulva	Pacific golden plover	MI	MI	Estuaries, mudflats, saltmarshes, mangroves; rocky reefs and stranded seaweed on ocean shores; margins of shallow open inland swamps; sewage ponds, short-grass paddocks, sportsgrounds, airfields, ploughed land.
Pluvialis squatarola	Grey Plover	MI	VU (MI)	Mudflats, saltmarsh, tidal reefs and estuaries, rarely inland.
Tringa brevipes	Grey-tailed tattler	P4 (MI)	MI	Tidal mud and reef flats, sheltered rocky coasts, stony and seaweedy beaches and sandpits, dry coral ridges (Abrolhos) and pebbly shores of near-coastal saltlakes (including saltwork ponds).
Tringa glareola	Wood sandpiper	MI	MI	Mainly shallow fresh waters (lagoons, swamps, claypans, river pools, dams, bore overflows and sewage ponds); occasionally brackish swamps, rarely saltlakes and estuaries.
Tringa nebularia	Common greenshank	MI	EN (MI)	Mudflats, estuaries, saltmarshes, margins of lakes, wetlands, claypans (fresh and saline), commercial saltfields, sewage ponds.
Tringa stagnatilis	Marsh sandpiper	MI	MI	Mainly shallow fresh or brackish waters: swamps, lakes, river pools, soaks, sewage ponds and bore overflows. Occasionally estuaries and salt ponds, and rarely coasts.
Xenus cinereus	Terek sandpiper	MI	VU (MI)	Tidal mudflats, estuaries; shores and reefs of islands; coastal swamps, commercial saltfields.

Table 1: Threatened, specially protected or priority shorebird species with moderate likelihood of occurrence in the site (continued)

Species name	Common name	Status		Habitat description
		WA	EPBC Act	
Threatened and migratory terns				
Chlidonias leucopterus	White-winged black tern	MI	MI	Vegetated and open wetlands, brackish and saline lakes, saltfields, irrigated lands, sewage ponds and occasionally offshore.
Gelochelidon nilotica	Gull-billed tern	MI	MI	Beaches, mudflats; fresh, brackish wetlands, including far inland; grasslands, crops, ploughed fields, airfields.
Hydroprogne caspia	Caspian tern	MI	MI	Mainly sheltered areas, estuaries (when not laden with silt) and tidal creeks; occasionally near-coastal saltlakes (including saltwork ponds) and brackish pools in lower courses of rivers; rarely fresh waters.
Sternula albifrons	Little tern	MI	VU (MI)	Species is mainly coastal, being found on beaches, sheltered inlets, estuaries, lakes, sewage farms, lagoons, river mouths and deltas.
Sterna hirundo	Common tern	MI	MI	Offshore waters, beaches, reefs, bays, estuaries, sandflats, saltfields, sewage ponds, freshwater wetlands.
Sternula nereis nereis	Australian fairy tern	VU	VU	Sheltered blue-water seas close to land, estuaries (when free of silt) and near-coastal lakes.
Thalasseus bergii	Crested tern	MI	MI	Mainly blue-water seas (especially within 3 km of land), including southern estuaries in summer and autumn (when free of silt); also tidal creeks in north, but not penetrating far into larger estuaries.

2.2 Shorebird habitat

Shorebirds use tidal mudflats, saltmarshes, and shallow waters for foraging. Habitat varies by species and is influenced by specialised feeding techniques, prey availability (including invertebrates, crustaceans, and small fishes) and sediment characteristics. In coastal areas, they typically forage on soft tidal substrates exposed at low tide (DCCEEW 2017).

Shorebirds require safe roosting areas during high tide. They generally prefer open, slightly elevated habitats that provide good visibility of predators but may use more sheltered locations during poor weather. Common roosting habitats include estuary mouth sands, saltmarshes, adjacent grasslands, mangroves, freshwater wetlands, claypans, and occasionally rock groynes and exposed reefs (DCCEEW 2017).

The *Directory of Important Wetlands in Australia* identifies nationally important wetlands and Ramsar sites identify internationally important wetlands. The northern portion of the site lies within an important wetland, 'Peel-Harvey Estuary' (DBCA 2026a). The 'Peel-Yalgorup System' Ramsar site lies adjacent to the southern portion of the site (DBCA 2017). Multiple 'conservation' category wetland features associated with the Peel-Harvey Estuary/ Peel-Yalgorup System are mapped as extending within the site (UFIs 3255, 15232, 14573 and 15229) (DBCA 2026b). The locations of mapped wetlands within and adjacent to the site are shown in **Figure 2**.

Shorebirds are regularly recorded in the Peel Inlet within the Peel-Yalgorup System. The Peel Inlet is a BirdLife International Important Bird Area and is the most important area for waterbirds in south-western Australia (DCCEEW 2025). It supports many migratory bird species, including more than 1% of multiple migratory shorebird species (BirdLife International 2023).

The Emerge Associates (2026) report identified six fauna habitats within the site, of which two were determined to represent suitable shorebird and migratory shorebird habitat: **marsh** and **mudflats**. These habitats occur in the northern portion of the site, as shown in **Figure 3**. Depending on the frequency and depth of inundation of the **mudflat** and **marsh** habitats within the site, they may

provide foraging and roosting habitat for a range of migratory shorebird species that frequent the Peel-Yalgorup System.

3 METHODS

3.1 Field survey

Two zoologists from Emerge visited the site on 26 May, 11 June and 14 July 2026 to conduct the field survey.

3.1.1 Weather conditions

Weather conditions during each survey event are summarized in **Table 2**. Although BoM (2026) recorded rainfall on 11 June 2026, no rain occurred during the survey.

Table 2: Survey timing and weather conditions during survey dates

Date	Time	Tide	Temp (°C) (BoM 2026)^	Wind direction and speed (km/hr) (BoM 2026)^	Rainfall (mm) (BoM 2026)^
26/05/2026	07:00-08:30	High	15.2	NNE 17	0
11/06/2026	16:00-17:00	Low	15	SSW 2	6.4
14/07/2026	09:00-11:00	High	11.4	E 6	0

^weather data from Mandurah Station 009977

3.1.1 Habitat assessment

Zoologists reviewed the shorebird habitats previously identified as being suitable and made additional notes and refinements to boundaries, where required. Notes were made on presence of available foraging and roosting habitats within the site and level of inundation of these areas.

3.1.2 Targeted searches

Zoologists surveyed the **mudflat** and **marsh** habitats for approximately one hour during each survey date, using binoculars to identify shorebirds. For each observation, the species, number of individuals, and behaviour (foraging or roosting) was recorded.

3.2 Analysis and data preparation

3.2.1.1 Migratory shorebird identification

Shorebirds were identified through comparison with named material and the use of field guides and taxonomic keys. Taxonomy and nomenclature of scientific and common names follows the Australian Faunal Directory (AFD) (DCCEEW 2026).

3.3 Survey limitations

It is important to note constraints imposed on assessments and the degree to which these may have limited outcomes. An evaluation of the desktop study and methods applied in the current assessment against standard constraints outlined in the EPA document *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020) and the EPBC Act *Policy Statement 3.21 Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species* (DCCEEW 2017) is provided in **Table 3**.

Table 3: Evaluation of the fauna assessment against standard constraints outlined in EPA (2020) and DCCEEW (2017)

Constraint	Degree of limitation	Details
Level of survey	No limitation	Three targeted shorebird surveys were undertaken which was appropriate for identifying targeted species. A basic assessment was sufficient to confirm shorebird habitat.
Scope	No limitation	The survey focused on EPBC Act listed migratory shorebird species.
Proportion of fauna identified, recorded and/or collected.	No limitation	All shorebirds recorded were able to be positively identified to species level.
Sources of information e.g. previously available information (whether historic or recent) as distinct from new data.	No limitation	Adequate information was available from database searches, previous surveys and literature references.
The proportion of the task achieved and further work which might be needed.	No limitation	The task was achieved in its entirety.
Experience level of personnel	No limitation	The shorebird survey was undertaken by two qualified zoologists with one to two years of experience in undertaking shorebird surveys in Western Australia. Technical review was undertaken by a principal environmental consultant with over 15 years' experience in environmental science in Western Australia.
Suitability of timing and season	Limitation	DCCEEW guidance recommends survey effort comprises (a) multiple surveys during the period when most shorebirds are present in the area, which aligns with the non-breeding season (approx. spring/summer) and (b) one survey during the northern hemisphere breeding season (approx. March-August). The surveys were undertaken in May and June which coincides with (b) - the northern hemisphere breeding season. Therefore, timing was considered adequate to provide an indication of the non-breeding and non-migrating shorebird populations of the site. Further surveys during the primary non-breeding season would be required to determine shorebird species presence and use of the site, so a limitation applies.
Suitability of weather	No limitation	Surveys were conducted under suitable weather conditions, with no high rainfall or strong winds, ensuring optimal conditions for detecting shorebird species under DCCEEW's guidelines.
Completeness	No limitation	The desktop study and field survey components of the survey were completed comprehensively.
Spatial coverage and access	No limitation	The site coverage was adequate given that at a minimum survey coverage should include all the habitat thought to be used by the same population of shorebirds and the entire area of contiguous habitat where shorebirds may occur. For large areas or for areas where many birds are expected, it is recommended that at least two people undertake the counts. The current surveys followed the above recommendation, so no limitation applies.
Survey intensity	No limitation	The intensity of the survey was adequate as per the DCCEEW guidelines requiring 'one survey during the northern hemisphere breeding season to capture data on birds that remain in Australia during the breeding season (March to August).'

Table 3: Evaluation of the fauna assessment against standard constraints outlined in EPA (2020) and DCCEEW (2017) (continued)

Constraint	Degree of limitation	Details
Influence of disturbance	No limitation	Most of the site is highly modified due to historical disturbance. However, no recent disturbance to suitable shorebird habitats was noted that may have affected outcomes of the survey.
Adequacy of resources	No limitation	All resources required to perform the survey were available. The guidance currently available from DCCEEW on the assessment of EPBC Act listed migratory shorebirds is adequate to conduct and prepare surveys appropriately.

4 RESULTS

4.1 Migratory shorebird habitat

The site contains habitat for shorebirds within the broader Peel-Yalgoup System. The **marsh** and **mudflat** habitats previously recorded within the site were confirmed to comprise suitable habitat (foraging and roosting) for migratory shorebirds. At the time of the surveys, the **mudflat** habitat contained shallow standing water but was not fully inundated.

The mudflat and marsh habitats provide feeding opportunities across tidal cycles including access to invertebrates, crustaceans and small fish during inundation. When exposed, these habitats together with adjacent vegetation are likely to provide suitable roosting areas for some shorebird species.

4.2 Migratory shorebird inventory

One migratory shorebird was recorded in the site during the field survey.

Two non-migratory shorebird species were recorded in and adjacent to the site, as detailed in **Table 4.**

Table 4: Shorebirds observed within and adjacent to the site during the shorebird survey

Scientific name	Common name	Date	No. of individuals	Behaviour	Habitat	EPBC listing
Elseyornis melanops	Black-fronted dotterel	11.06.2026	20	Foraging	Mudflat	Not listed
Himantopus leucocephalu	Pied Stilt	26.05.2026 11.06.2026	15	Foraging	Lake adjacent to site	Marine
Hydroprogne caspia	Caspian tern	26.05.2026	1	Flyover	-	Migratory

5 DISCUSSION

The low number of migratory shorebirds during the field survey was not unexpected, as the surveys were undertaken during the northern hemisphere breeding season when most migratory shorebird populations have departed Australia to travel to breeding grounds in the northern hemisphere. A portion of non-breeding and immature individuals may remain in Australia during this period and therefore may be detectable during this period (DCCEEW 2017).

Consistent with DCCEEW (2017), the survey aimed to detect any non-breeding individuals of the target migratory shorebirds listed in **Table 1** remaining within the site and surrounds, as well as confirming potentially suitable habitat. As the survey was undertaken outside of the non-breeding season, it represents only a snapshot of site usage, and the low number of migratory shorebirds cannot be interpreted as evidence of absence. Additional surveys during the main non-breeding

season in spring/summer, when the majority of the target shorebird species are present in the region, would be required to determine presence, abundance and frequency of use of the site.

The **marsh** and **mudflat** habitats within the site provide potentially suitable foraging habitat for migratory shorebirds. Although these habitats occupy a relatively small area, they are connected to extensive areas of similar habitat within the adjacent Peel-Harvey Estuary. Consequently, any use of the site by migratory shorebirds is expected to occur in conjunction with the broader estuary complex rather than as an isolated habitat resource.

The 32 listed migratory shorebird species with a moderate likelihood of occurring in the site (Emerge Associates 2026) have all been previously recorded within the Peel-Yalgorup system (Birdlife Australia 2026; DBCA 2023; Lester 2013).

The **marsh** and **mudflat** habitats lie within the Peel-Harvey Estuary important wetland area but not within the mapped boundary of the internationally important Peel-Yalgorup System Ramsar site. However, due to its proximity migratory shorebirds occurring in the Ramsar site may also use the habitat within the site.

While the **marsh** and **mudflat** habitats within the site form part of the Peel-Harvey Estuary, they represent only a very small proportion of habitat available within the broader area. Their limited extent suggests they are unlikely to constitute an important feeding or roosting area in their own right. Although the current survey was not undertaken during the primary non-breeding season and therefore could not quantify the site's use by migratory shorebirds, it is reasonable to conclude that the habitat may be used opportunistically by migratory shorebirds as part of the wider Peel-Harvey Estuary and, to a lesser extent, Peel-Yalgorup System Ramsar site, rather than supporting a discrete population of migratory shorebirds.

DCCEEW (2017) provide a framework for identifying 'important habitat' for migratory shorebirds under the EPBC Act. The **marsh** and **mudflat** habitats within the site are not already identified as internationally important (criterion 1) and the habitats are unlikely to meet criterion 2 which relates to usage by population(s), abundance and species richness. Therefore, it is unlikely that the **marsh** and **mudflat** habitats within the site would classify as important habitat. Nevertheless, surveys undertaken during the primary non-breeding season would be required to quantify migratory shorebird species richness, abundance and site use before this could be confirmed.

6 CONCLUSIONS

- One migratory shorebird was recorded flying over the site during the survey: Caspian tern (*Hydroprogne caspia*). However, the survey was undertaken during the breeding season, when most migratory shorebirds are not present in Australia.
- The **marsh** and **mudflat** habitats were confirmed to provide potentially suitable foraging and roosting habitat for 32 migratory shorebirds.
- The **marsh** and **mudflat** habitats lie within a nationally important wetland (Peel-Harvey Estuary) and close to an internationally important wetland (Peel-Yalgorup System Ramsar site). The potentially suitable habitat within the site represents only a very small proportion of habitat available within the broader area, suggesting it is unlikely to constitute an important feeding or roosting area in its own right.

7 SUMMARY AND CLOSING

We trust that this letter provides sufficient details on the shorebird values within the site. Should you have any questions regarding the content of this letter, please do not hesitate to contact the undersigned.

Yours sincerely

Emerge Associates

Rachel Weber
PRINCIPAL ENVIRONMENTAL CONSULTANT
cc: nil

Encl: Figure 1: Site Location
Figure 2: Wetland Features
Figure 3: Migratory Shorebird Habitat

General References

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Figures

Figure 1: Site Location

Project: Targeted Shorebird Survey
28 Placid Waters Parade, Coodanup
Client: Wolfdene

Plan Number:
EP25-135(11)--F79
Drawn: GAR
Date: 01/07/2026
Checked: KSB
Approved: RAW
Date: 03/07/2026

N

0 50 100 150
Metres
Scale: 1:5,000@A4
GDA2020 MGA Zone 50

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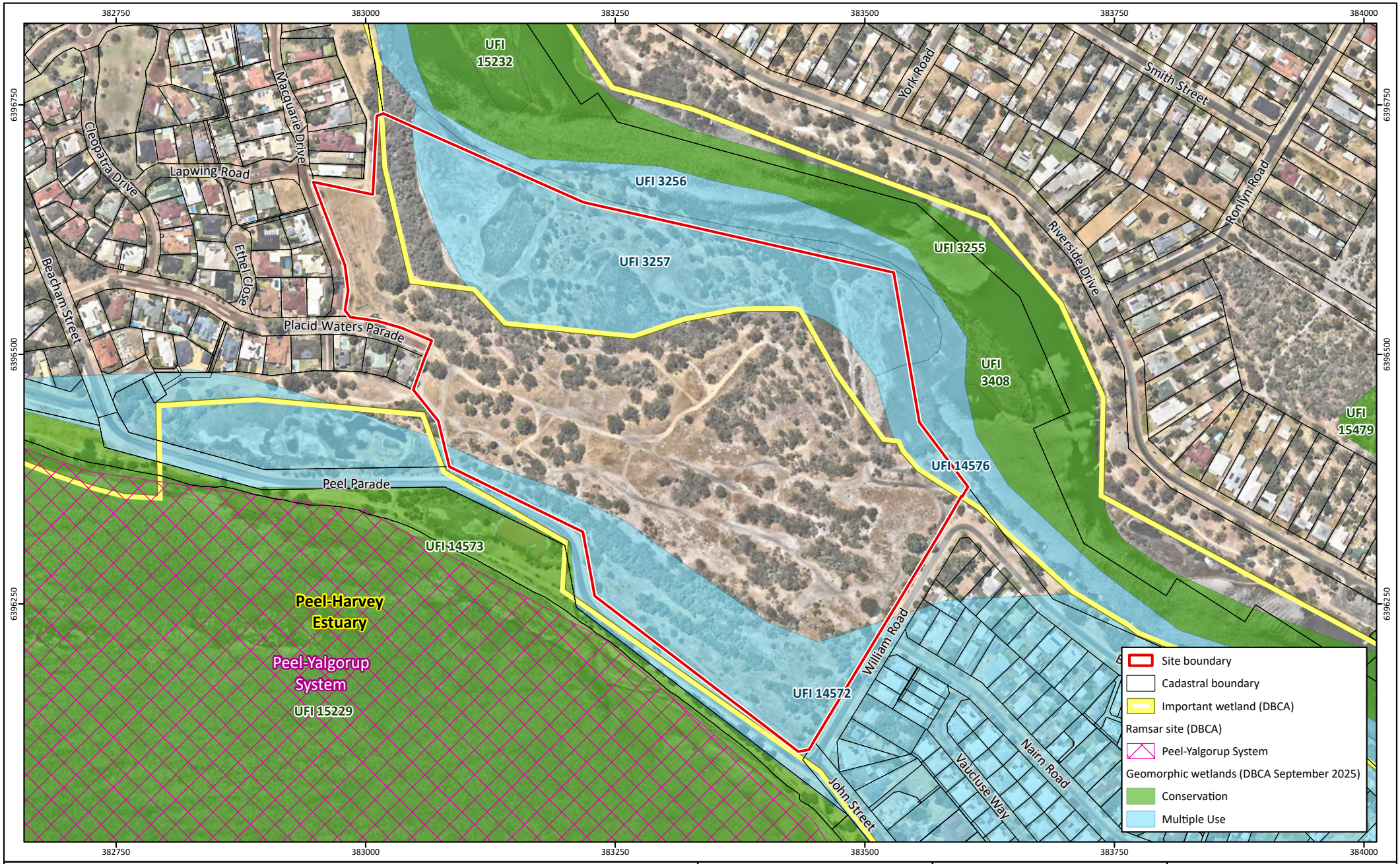

Figure 2: Wetland Features

Project: Targeted Shorebird Survey
28 Placid Waters Parade, Coodanup
Client: Wolfdene

Plan Number:
EP25-135(11)--F80
Drawn: GAR
Date: 01/07/2026
Checked: KSB
Approved: RAW
Date: 03/07/2026

N

0 50 100 150
Metres
Scale: 1:5,000@A4
GDA2020 MGA Zone 50

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Figure 3: Migratory Shorebird Habitat

Project: Targeted Shorebird Survey
28 Placid Waters Parade, Coodanup

Client: Wolfdene

Plan Number:
EP25-135(11)--F81

Drawn:	GAR
Date:	01/07/2026
Checked:	KSB
Approved:	RAW
Date:	03/07/2026

N

0 50 100 150
Metres

Scale: 1:5,000@A4

GDA2020 MGA Zone 50

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