

Environmental Study for Bayshore Development and Road Construction

Executive Summary



Prepared for Housing & Development
Board and Land Transport Authority

EIA Executive Summary

September 2022

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Prepared for Housing & Development Board (HDB)
and Land Transport Authority (LTA)



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Executive Summary

The Housing and Development Board (HDB) has awarded DHI Water & Environment (S) Pte Ltd (DHI) the contract to conduct an Environmental Impact Assessment (EIA) for the future housing and infrastructural developments within Bayshore area, bounded by Upper East Coast Road, Bayshore Road, East Coast Parkway (ECP) and Bedok Camp. The EIA, prepared for both HDB and LTA collectively, includes an Environmental Impact Assessment (EIA) and Environmental Management and Monitoring Plan (EMMP) covering the Study Area's ecology only. Baseline ecological surveys were conducted between 25 April and 21 July 2022.

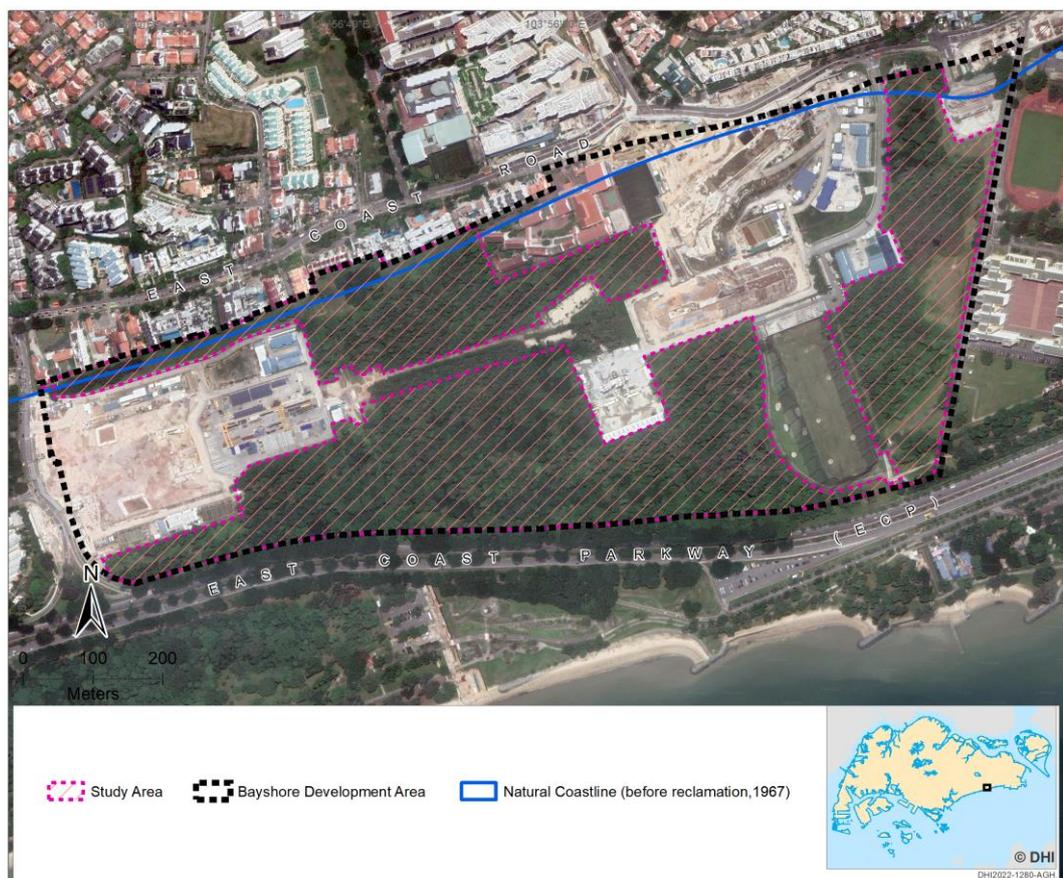


Figure 1.1 Study area and development area against existing site conditions on reclaimed land. Extent of reclaimed land spans from to natural coastline (blue) to existing coastline.

The Developments are located primarily on reclaimed land with an exotic-dominated secondary forest bounded on the north by construction developments for the new Thomson-East Coast Line Mass Rapid Transit (MRT) stations and on the south by East Coast Parkway (ECP) (Figure 1.1). Biodiversity present within the site is restricted to the remaining forested area within the boundary of the study area and are considered Ecologically Sensitive Receptors (ESRs).

With these proposed changes, there is a need to understand the baseline ecological conditions of the site, assess potential impacts on existing biodiversity associated with or caused by the Project during construction and post-construction phases, recommend suitable mitigation measures to reduce impacts on existing biodiversity, and to develop an Environmental Monitoring and Management Plan (EMMP).

The EIA has assessed the potential ecological impacts caused by proposed construction within the study area. In conclusion, the impacts are expected to be irreversible with the predicted Impact Significance on the identified sensitive receptors ranging from Slight Negative to Moderate Negative. With proper implementation of control measures and mitigation measures, the predicted Residual Impact Significances are generally all below Minor Negative Impact, except for the loss of flora and avifauna habitats during the construction phase, where the estimated 31.2 ha of vegetation clearance results in a Moderate Negative impact even after mitigation.

Ecological Baseline Findings

Extensive baseline surveys were conducted between 25 April and 21 July 2022 using methods aligned with NParks BIA guidelines (Table 1.1). A summary of the main findings of each aspect studied has been provided below. Detailed information can be found in Section 7 of this report.

Table 1.1 Ecological baseline survey methods

Ecological Receptor	Survey Method
Terrestrial Flora	Mapping of vegetation types
	Modified Gentry Plots (MGPs)
	Walking Transect
Terrestrial Fauna	Visual transect surveys
	Camera traps
	Acoustic bat stations
	Catch-and-release
Freshwater Fauna	Visual bank surveys
	Hand netting
	Overnight trap netting

Vegetation Composition and Habitat Mapping

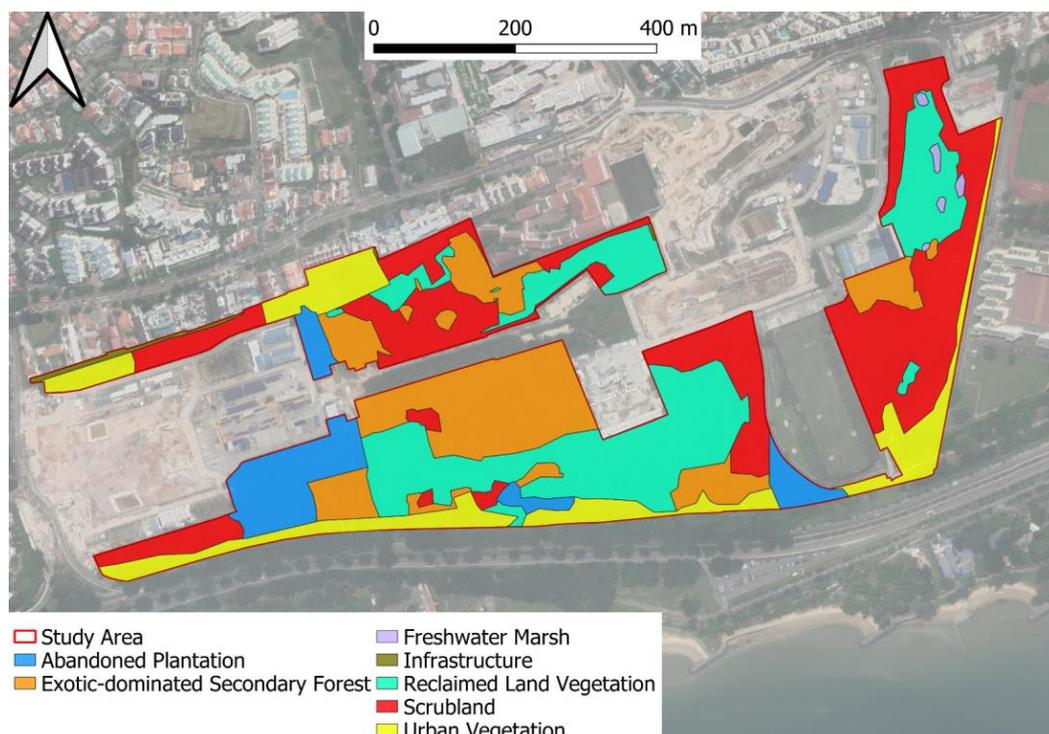


Figure 1.2 Habitat distribution within study area

The study area consists of six (6) vegetation types (Figure 1.2). Majority of the surveyed area was categorised as scrubland (9.42 ha, 30%), reclaimed land vegetation (8.13 ha, 25.89%), and exotic-dominated secondary forest (6.53 ha, 20.81%), which are vegetation types of lower conservation significance. Small patches of freshwater marsh were also recorded (0.13 ha, 0.41%), however they were assessed to likely be ephemeral.

Flora Inventory

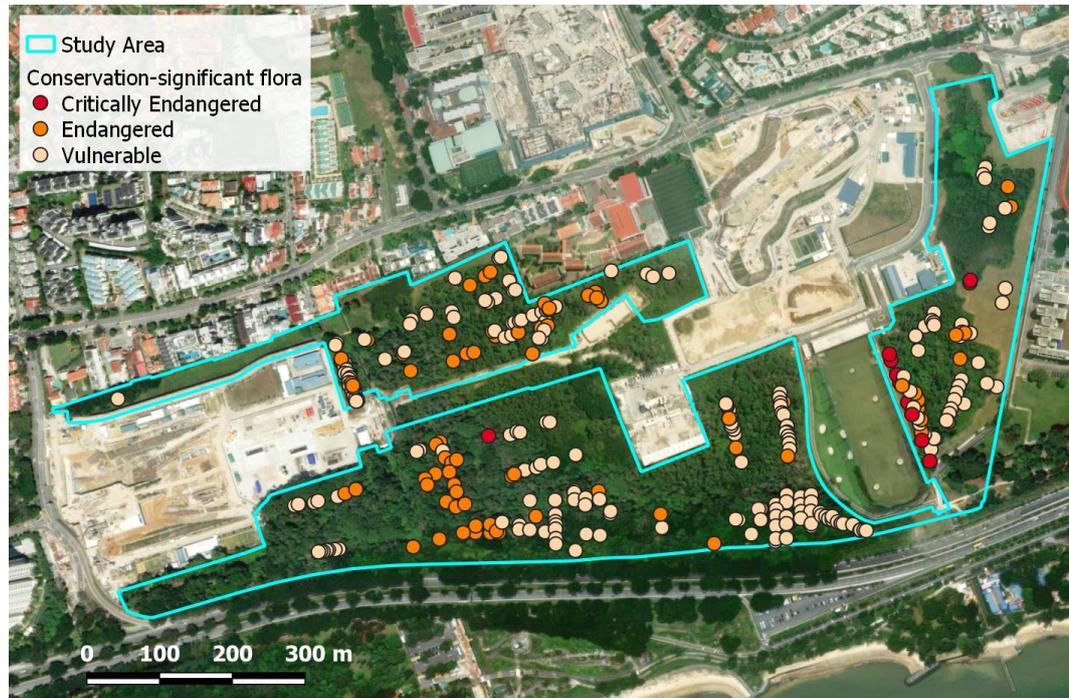


Figure 1.3 Distribution of flora of conservation significance throughout study area

A total of 196 flora species were recorded within the study area, of which 95 species were native (48.5%), 91 species were exotic (46.5%) and 10 were cryptogenic (i.e., species that has unknown or uncertain origin) (5.1%). Of the 95 native flora recorded, 22 (11.3%) were considered threatened species. This comprises of 6 Critically Endangered (CR), 5 Endangered (EN), 10 Vulnerable (VU) and 1 Presumed Extinct (EX) flora species. Of the 22 threatened plant species, 16 were considered of local conservation significance (Figure 1.3) as they were determined to be native species regenerated from wild populations. The remaining 6 species are of lower conservation significance as they were determined to originate from cultivated stock and/or are relics from past cultivations.

Fauna Surveys

A total of 147 species of fauna were recorded within the study area, including 54 species of avifauna (37%¹), 47 species of butterflies (21%), 19 species of odonates (15%), 8 species of amphibians (7%), 8 species of reptiles (3%), 5 species of mammals (8%) and 2 aquatic species (8%). The most speciose taxon recorded was avifauna, indicating that this area may serve as a refugia for avifauna. The species were recorded through transect surveys, camera traps and acoustic traps. A total checklist of species and their abundances can be found in Appendix I. Although common to Singapore, notable species recorded during the study include the Common Treeshrew (*Tupaia glis*), a species more commonly found in secondary forest habitats, and the Common Palm Civet (*Paradoxurus hermaphroditus*).

¹ Percentage of total documented fauna abundance

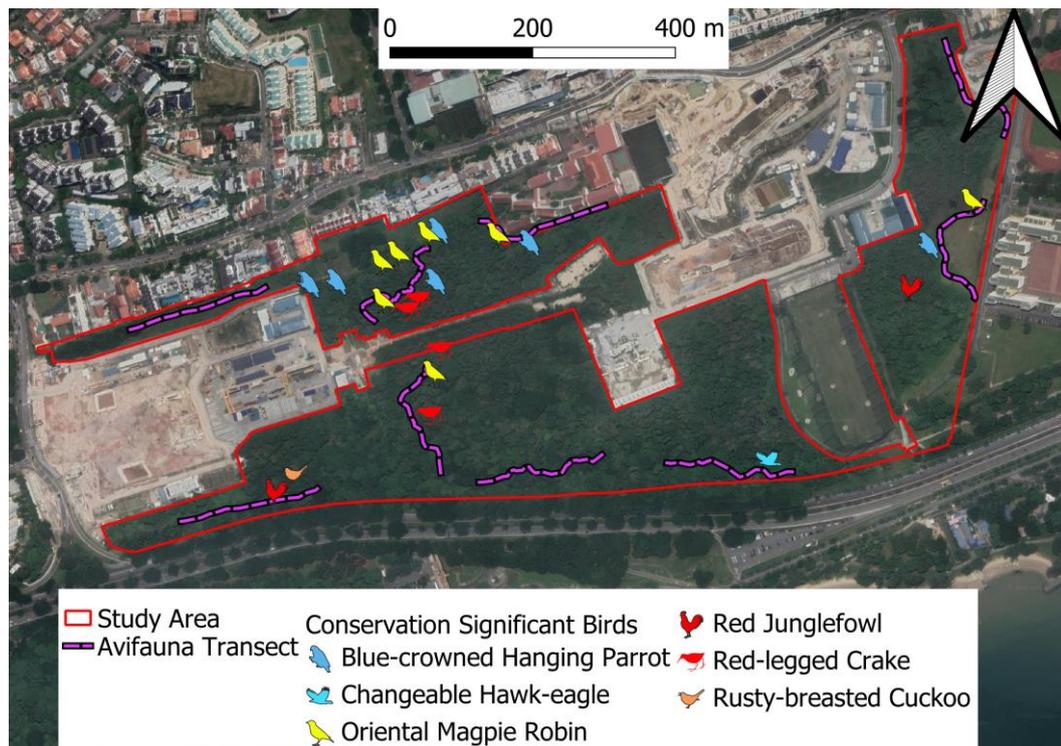


Figure 1.4 Distribution of conservation significant avifauna

Across all fauna groups, only 6 species of avifauna were determined to be of local conservation significance (Figure 1.4), including the Oriental Magpie-Robin (*Copsychus saularis*, EN), Blue-crowned Hanging Parrot (*Loriculus galgulus*, EN), Changeable Hawk-Eagle (*Nisaetus cirrhatus*, EN), Red Junglefowl (*Gallus gallus*, EN), Rusty-breasted Cuckoo (*Cacomantis sepulcralis*, VU) and Red-legged Crake (*Rallina fasciata*, VU).

Overall, the conservation value of the habitats and biodiversity found within the study area appears to be minor to moderate within Singapore's context, given the low species richness, the low proportion of species of conservation significance, and the dominance of exotic species particularly in the exotic-dominated secondary forest.

Impact Assessment

Potential impacts on the study area from the Developments were assessed through the Rapid Impact Assessment Matrix (RIAM). The methodology is detailed in Section 5.3, and the detailed assessments are described in Sections 8 (pre-construction and construction phase) and 9 (operational phase).

Five (5) main ecological impacts are predicted to arise from the pre-construction and construction activities (Table 1.2). The impacts are loss of habitat, disturbance from construction activities, injury or mortality to existing fauna, human-wildlife conflict, and light nuisance. Most impacts were evaluated to be slight to minor negative, except for impacts to flora and fauna stemming from loss of habitat, which was evaluated to be minor to moderate negative.

Table 1.2 Summary of impact significance for predicted ecological impacts during pre-construction and construction phase, before and after mitigation.

Predicted Ecological Impacts	Impact Significance (Before Mitigation)	Residual Impact Significance (After Mitigation)
Loss of Habitat	Minor negative to Moderate negative	Slight negative to Moderate negative
Disturbance from Construction Activities	Slight negative to Minor negative	Slight negative to Minor negative
Injury or Mortality to Existing Fauna	Slight negative	Slight negative
Human-Wildlife Conflict	Slight negative	Slight negative
Light Nuisance	Slight negative	Slight negative

Three (3) main ecological impacts are predicted to arise from the operational phase (Table 1.3). The impacts are roadkill, negative human-wildlife interactions, and bird-building collisions, which were evaluated to be slight to minor negative.

Table 1.3 Summary of impact significance for predicted ecological impacts during operational phase, before and after mitigation.

Predicted Ecological Impacts	Impact Significance (Before Mitigation)	Residual Impact Significance (After Mitigation)
Roadkill	Slight negative	Slight negative
Negative Human-Wildlife Interactions	Slight negative	Slight negative
Bird-Building Collisions	Minor negative	Slight negative

Key Mitigation Measures

Key mitigation measures developed to prevent exacerbation of and minimise, where possible, the predicted ecological impacts throughout the Developments are summarised in Table 1.4. These are further detailed in Section 8.4, 9.4 and 10.

Table 1.4 Summary of key mitigation measures and best management practices proposed in this study

Ecological Receptor	Key Mitigation and Best Practices	
	Construction Phase	Operation Phase
Flora	<ul style="list-style-type: none"> NParks to transplant, harvest saplings or propagules, or take stem cuttings of conservation-significant flora species where needed 	<ul style="list-style-type: none"> Replanting of trees and shrubs to adopt a tiered approach to replicate a forest environment with multi-layered canopies
Fauna (including habitats)	<ul style="list-style-type: none"> Avoid using barbed wire / concertina fencing around and within the work site to minimise fauna entrapments leading to injury or mortality. Fully biodegradable erosion control blankets should be used where possible to minimize fauna entrapments caused by 	<ul style="list-style-type: none"> Replanting of keystone fruiting flora species (e.g. <i>Ficus sp.</i> and <i>Caryota mitis</i>) to provide food resources to attract fauna species to populate the site during the operation phase Replanting of butterfly host plant species, e.g. the Pong Pong tree

	<p>abandoned erosion control blankets.</p> <ul style="list-style-type: none"> • Vegetation clearance to be conducted in a directional approach in stages to shepherd fauna out of the site • NParks- certified Animal Management Specialists to be engaged to remove or relocate fauna found within the work site 	<p>which is the host plant for the King Crow butterfly</p> <ul style="list-style-type: none"> • Minimise the usage of reflective surfaces within the development area to reduce the risk of bird strikes • Signages to be installed and awareness building among the residents to guide proper response to human-wildlife encounters • Explore the potential to naturalise drainage networks (e.g. bioswales and riparian plantings) to increase habitat availability for aquatic fauna
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