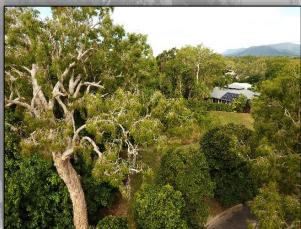


Ecological Impact Assessment

Lot 1 "The Sands"13-42 Barrier Street, Port Douglas QLD.









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Front Cover images

Top: Aerial view above property, looking towards coastline. Bottom right: Looking South over property, featuring a large habitat tree. Bottom left: Intact wetland community on property.

Ecological Impact Assessment V2

Lot 1 "The Sands" 13-42 Barrier Street, Port Douglas, QLD.

Table of Contents

1. Introduction	1
2. Survey area assessment	2
3. Codes of Concern (potential impacts and mitigation)	6
4. Exemption from clearing permit	8
5. Primary Environmental Compliance	8
6. Additional environmental compliance	9
7. Conclusion	10
8. Errors	11
9. Appendices	11
Appendix 1: RE details	
Appendix 2: EPBC Report Excerpt	
Appendix 3: Wildnet Species list	
Appendix 4: Listed weed	
Appendix 5: Boundaries Map	21
Appendix 6: Species to be utilised	22

1. Introduction

"The Sands" (13 – 42 Barrier Street) is an estate located in Port Douglas a little over an hour from Cairns. It is classed as low – medium density residential under the Douglas Shire Planning Scheme and is a gated community which places an emphasis on living with natural assets and aesthetic value.

Lot 1 is the focus of this report and is approximately $\frac{3}{4}$ of an acre in size, it sits only 5 metres above sea level, is around 70m x 40m and has an hour glass style shape.

The property has two main sections, a vegetated wetland and a cleared area of manicured grass. The grass has established on fill that has been brought in previously and sits a little higher than surrounding blocks.

Outside of the estate, natural landscapes and housing are abundant, Four Mile beach is only a few minutes' walk East through Bruno Reidwig Park. To the West, holiday houses and resorts centre around Port Douglas Road which heads down to the main shopping precinct.

The purpose of this report is to identify if any matters of state environmental significance will be negatively impacted by the construction of a pool in a wetland environment, and if so, how to best mitigate them. The identification of any endangered, vulnerable or near threatened (EVNT) flora species during surveillance will help guide this along with the Local Government codes.

Please note this report does not consider the structural integrity, or maintenance of structures moving forward.



Figure 1: Aerial view over Lot 1 "The Sands" 13-42 Barrier Street, facing North East.

2. Survey area assessment

A timed meander was carried out along the fringe of the wetland, easily identified plants were confirmed first, then field books were used to confirm species on a second run, lastly samples were taken from a third run to identify with online resources such as the Rainforest Key. This process was carried out until no more species could be identified within the immediate vicinity of the fringe.

Desktop analysis was carried out to further confirm the presence of EVNT species and any conflicts with MSES, various online reports were requested and consulted to achieve this. Reports included an EPBC act protected matters report, MSES layers from Qspatial, and Queensland Government generated species lists.

The wetland vegetation is wild in accordance with the Queensland Government definition, "being in an independent state of natural liberty", it contains various layers of intact and quality vegetation. This includes large habitat trees, *Mangrove sp., Pandanus sp.*, ferns and sedges. The ground layer is minimal as little light reaches it and even during the dry season may be covered in brackish water.

The listed regional ecosystem for this area is 7.2.8 endangered Palustrine Wetland, dominated by *Meleleuca leucadendra* which is consistent with the flora identified in the survey.

One EVNT species was identified, *Myrmecodia baccarii* the "Ant Plant" being listed as Vulnerable under the NCA Act 1992. Several examples of this plant were seen in a single tree, the largest habitat tree observed in the north west of the property (*Meleleuca dealbata*).

Although various environmental weeds exist in the disturbed fringe bordering the manicured grass and high-quality wetland only one listed weed was identified, *Sphagneticola trilobata* (Singapore Daisy). This dense ground cover is observed to be encroaching on the intact wetland vegetation and a high threat to its flow and natural recruitment.

Whilst the wetland does adjoin and flow into a much larger reserve of similar quality and vegetation type, its connectivity is low and the inflow is primarily formed by run off from surrounding properties and streets.

It is desired that a pool and decking be established on the fringe of this high-quality vegetation and the manicured grass, a particular microclimate which is the result of natural and manmade impacts. Largely dominated by weeds, there is also several valuable indigenous species which can be utilised to minimise impacts from the works.

An area of approximately 100m2 is to be used in this section of the property and this consists of a pool which will be above ground and floating decks.

Key points:

- EVNT species identified are outside works area and believed to not be impacted by desired works.
- Works to only be carried out in highly disturbed non-wild area.
- Weed control and indigenous plants used to enhance biodiversity.
- Minimal footprint and disturbance to area in question.



Figure 2: Aerial view showing original GPS data from timed meander overlayed with aerial image and current property boundaries. Note names are the result of initial field based identification and may have changed after desktop analysis (See Table 1).

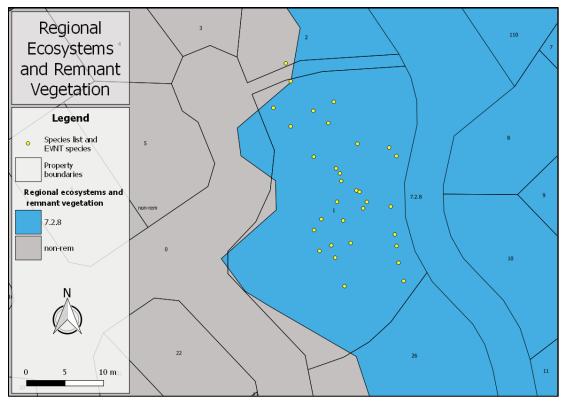


Figure 3: Remnant vegetation map, note error in most of the property being listed as remnant when only a minority of it is.

Flora species list					
Scientific name	Common name	Family	Lifeform	EVNT	Wons / declared
Asplenium australasicum	Birds Nest Fern	Aspleniaceae	Tree/Shrub	No	No
Acacia crassicarpa	Brown Salwood	Mimosaceae	Tree	No	No
Acrostichum speciosum	Mangrove Fern	Pteridaceae	Shrub	No	No
Archontophoenix alexandrae	Alexandra Palm	Arecaceae	Tree	No	No
Crotalaria goreensis	Gamba pea	Fabaceae	Herb	No	No
Cyperus involucratus	Umbrella sedge	Cyperaceae	Graminoid	No	No
Cyperus javanicus	N/A	Cyperaceae	Graminoid	No	No
Euphorbia heterophylla	Milkweed	Euphorbiaceae	Herb	No	No
Ficus obliqua	Small -leaved Fig	Moraceae	Tree	No	No
Fimbristylis pauciflora	N/A	Cyperaceae	Graminoid	No	No
Fiurena umbelata	N/A	Cyperaceae	Graminoid	No	No
Flagellaria indica	Supplejack	Flagellariaceae	Tree/Shrub	No	No
Heritiera littoralis	Looking-Glass Mangrove	Malvaceae	Tree	No	No
Hibiscus tilaceus	Cottonwood	Malvaceae	Tree	No	No
Homolanthus novoguinesis	Bleeding heart	Euphorbiaceae	Tree/Shrub	No	No
Ludwigia octocvalvis	Water Primrose	Ongraceae	Shrub	No	No
Macaranga tanarius	Macaranga	Euphorbiaceae	Tree	No	No
Macroptilium atroperpureum	Siratro	Fababceae	Vine	No	No
Meleleuca dealbata	Grey Paperbark	Myrtaceae	Tree	No	No
Meleleuca leucadendra	Weeping Meleleuca	Myrtaceae	Tree	No	No
Mimosa diplotricha	Sensitive Weed	Fabaceae	scrambler	No	No
Myrmecodia baccarii	Ant Plant	Rubiaceae	Bulbous	V	No
Pandanus solmslaubachii	Swamp Pandan	Pandanaceae	Tree	No	No
Pandanus tectorius	Beach Pandan	Pandanaceae	Tree	No	No
Platycerium hilii	Elkhorn fern	Polypodiaceae	Epiphyte	No	No
Sclera levis N/A		Cyperaceae	Graminoid	No	No
Sheflera actinophyla	umbrella tree	Araliaceae	Tree/Shrub	No	No
Sida acuta	Broomweed	Malvaceae	Shrub	No	No
Sida cordifolia	Heart Leaf Sida	Malvaceae	Shrub	No	No
Sphagneticola trilobata	Singapore daisy	Asteraceae	Scrambler	No	Yes
Stachtarpheta cayennensis	Snake Weed	Verbenaceae	Shrub	No	No
Stenotaphrum secundatum	Buffalo grass	Poaceae	Graminoid	No	No
Terminalia arenicola	Brown Damson	Combretaceae	Tree	No	No
Typha dominingensis	Bull Rush	Typhaceae	Graminoid	No	No
Urochloa humidicola	N/A	Poaceae	Graminoid	No	No

Table 1: List of indigenous and exotic flora species identified in disturbed fringe and adjacent wetland.



Figure 4: Aerial view of land to be used in non-wild fringe, highlighted in red. Note a small area outside of this will be filed with soil but revegetated with native plants, the remaining area will be restored functioning wetland.

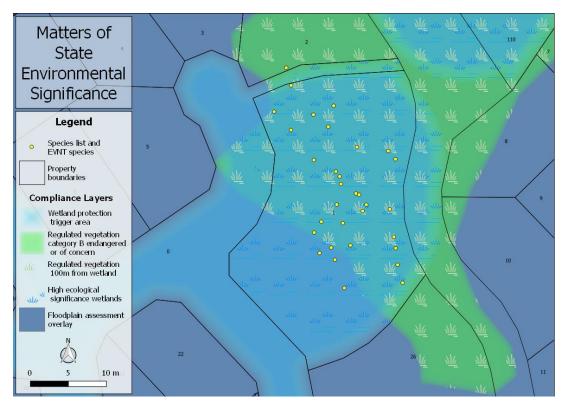


Figure 5: Various matters of state environmental significance are present on site and in the surrounding area.

3. Codes of Concern (potential impacts and mitigation)

PO1 – Development protects matters of environmental significance

The desire to build the structure in question arises from the desire to admire and engage with the surrounding environment. As such it makes sense for the development to support it. Six indigenous species of ground cover (ferns and sedges) have been identified in the non-wild fringe and these are to be transplanted to form a new garden which complements the development.

Weed control will also need to be carried out with appropriate herbicide application and manual removal taking place to provide suitable areas for the natives to be planted back into.

A high level of recruitment can be expected in this environment as there is an excess of water and light, this means follow up will be required to support the wetland to fully establish and hold its own ground. It may be desirable to apply additional native nursery grown plants to act as a cover and suppress weedy recruitment.

It is of high importance that the six local provenance plants (highlighted in appendix 6) are utilised/supported.

Weed control must be carried after the completion of the pool the development, in doing so the natural values in the immediate vicinity of the construction will be protected from erosion and other possible disturbance. Whilst *Typha domingensis* is native and believed present on site, its widely distributed and often causes management issues. Having secure populations of this will add to the biodiversity of the property however if it is at the cost of the other species present it should be avoided. Please refer to appendix 6 to see these species in more detail.

PO2 – Development is located, designed and constructed to avoid significant impacts on matters of environmental significance.

MSES layers identify Lot 1 as having several matters of significance, whilst these matters are present on the property, they are not present in the area where development is planned to occur. MSES vegetation will not be modified at all during these works.

The area particularly in question has been subject to slashing in the past and has had land fill added. It does not meet the requirement to be considered as a "wild environment". In positioning the structure here, it voids the need to develop any of the high quality wild environments on the property.

PO3 – An adequate Buffer to areas of state environmental significance is provided and maintained and PO4-Wetland and Wetland buffer areas are maintained, protected and restored.

The development will result in a buffer which is of relevance in width to the site. Currently the area is predominantly invasive species, however restoration and occupancy of the property will act as a buffer itself from such threats. The structure of the revegetation is to be done in a manner that suppress' weedy recruitment, offers habitat and is also aesthetically pleasing. Clustered and sporadic plantings of existing sedges and ferns with in fill from external stock will achieve this.

PO5 – Development avoids the introduction of non-native pest species (plant or animal), that pose a risk to ecological integrity.

Due to the presence of declared weeds being on site and category 1 electric ants close by it is of high importance that hygiene protocols be implemented to avoid the introduction of pests or the spreading of them elsewhere.

Such protocols will include washing down boots and equipment that meet the ground in the non-wild wetland area, they should be washed down next to the non-wild wetland area before leaving site. Any green waste removed from site is advised to go to an appropriate transfer station where it can be correctly treated. This is particularly important for the invasive species being removed for revegetation.

Soil and plants brought in to the property should be surveyed for invasive ants **before** coming in, an increase of electric ant infestations has been observed in the area and diligence is required to prevent their spread. If mulch is utilised to suppress weedy recruitment and support wetland establishment it needs to be properly cured and preferably sourced from native areas, this will avoid the introduction of weedy seeds.

Limnocharis flava is a restricted weed under the Biosecurity Act 2014 and has been observed in the Port Douglas region in the past, any operators working in wetland environments should be familiar with this plant and clean down equipment in a secure location before travelling to new sites.

Responsibility of domestic pets needs to be understood by occupants, under local laws it is required that a person who keeps an animal must maintain a proper enclosure and prevent the animal from wandering or escaping the persons land. Native plants and animals are protected by law.

PO6 – Development protects and enhances ecological connectivity and or habitat extent.

Connectivity is not a feature provided by the waterway as inflow is from surrounding streets and properties. Habitat extent is enhanced through before mentioned weed control and revegetation techniques.

PO7 – Development minimises disturbance to matters of state environmental significance (including existing ecological corridors) and PO8 – Development is set back from waterways to protect and maintain water quality, hydrological functions, ecological processes, biodiversity values, riparian and instream habitat values, and connectivity, instream migration.

Whilst the regional ecosystem map demonstrates almost the whole property is remnant ecosystem, we can see this is not the case on the ground. Maintaining a 10m buffer from the actual wetlands would require the loss of 1/5 non-wild land (0.150ac) which is a significant impact to the development.

Minor development is planned within 10 metres of existing riparian vegetation and watercourses however it is believed that avoiding this is unachievable.

House construction will primarily sit on the raised fill pad with some soil being brought in to fill a section of the non-wild wetland. A pool is to be extend past the synthetic bank and within 3m of the watercourses edge, occupying around 25m2 within the 10m buffer.

No soil is to be removed during the construction of the pool (within 10m of the actual wetland) and it is possible to carry out works whilst no water is present. As such, erosion, turbidity and contamination to the wetlands can be avoided.

The recommended process for infill, pool and footing construction is:

- 1) Implement hygiene practices of boot and equipment wash down
- 2) Remove and store local provenance plants as listed in appendix 6
- 3) Remove weeds
- 4) Install sediment fencing
- 5) Commence infill and construct pool/footings
- 6) Transplant local provenance plants back and plant additional stock as required
- 7) Support plantings and natural recruitment thorough ongoing maintenance

If the individuals carrying out the transplanting are familiar with a better practice, that will achieve a higher level of success, that process may be incorporated.

All concrete waste must be removed from site and no unset concrete is to meet natural water supplies.

Rock armouring and dense planting of *Lomandra sp.* on the infill will avoid erosion when flows return in time. The pool design may in high flows create riffles which are not normal to the site and could cause sediment to deposit in alternate areas, however these are highly localised impacts and not believed to be negative.

Approximate figures suggest that at ¾ of an acre (0.69ac), most of the block (0.33ac) is cleared for development. The functioning intact wetlands is less than that (0.28ac) and the non-wild fringe between the two occupies the minority (0.08ac).

If the recommendations within this plan are implemented, the development size would increase (0.34ac) but the functioning wetland would also become the majority of the property (0.35ac).

The design of the house and pool is in such a manner that makes the most of the lay of the land and holds its natural assets high, the pool is in an isolated non-wild concave section of wetland which is believed to have little to no environmental impacts upstream or downstream.

Additionally, considering the controls that prevent disturbance during construction, along with weed control and revegetation, it is believed that positive environmental impacts such as habitat enhancement will result.

4. Exemption from clearing permit

DES: Not assessed within this report. **DNRME:** Not assessed within this report. **DSC:** Not assessed within this report.

5. Primary Environmental Compliance

DES: Not assessed within this report.DNRME: Not assessed within this report.DSC: Ecological Impact Assessment required

6. Additional environmental compliance

Biosecurity Act 2014

Property exists within the National Electric Ant Eradication Program biosecurity zone, notify authorised inspector within 24 hrs of suspect ants. Hygiene practices advised during construction and maintenance, regular surveillance from program also recommended.

Property may exist within National Tropical Weeds Eradication Program Biosecurity Zone, NTWEP notify authorised officer within 24 hrs of suspected identification. Potential for *Limnocharis flava* infestation, caution to crews maintaining modified wetland.

Singapore daisy is a restricted invasive plant, it must not be given away, sold, or released into the environment without a permit.

7. Conclusion

Whilst the development infringes on MSES wetlands the impact on its values are expected to be negligible. With the ability to carry out works when no water is present and the minimised footprint due to cantilevered decks, issues such as turbidity, erosion and loss of habitat are significantly reduced.

In addition to this, if the recommendations for construction and maintenance are followed it is possible for the development to have a positive impact. The removal of listed and environmental weeds will further secure the natural values present, whilst the transplanting of indigenous species present in the non-wild fringe will honour local provenance and place a focus on Biodiversity (Please see Appendix 6 for more information).

When it is desired to utilise natural assets, it must be clearly understood that a commitment is undertaken to responsibly manage them, the maintenance of this area by an experienced crew is essential to the successful establishment of healthy wetlands.

This development has an exciting opportunity to be an exemplary balance of land utilisation and conservation.

Summary Points

- One NCA Act 1992 EVNT / EPBC Act 1999 species was identified at the time of surveillance although this is outside the area of development.
- Adjoining regional ecosystem status is remnant/endangered, not the area where works are to be carried out.
- Hygiene practices such as washing equipment and boots operating in the non-wild wetland area will prevent the spread of weeds.
- Negligible impacts are expected to occur during construction and maintenance of the development in a non-wild wetland if recommendations in section 3 are followed.
- Transplanting existing plants and maintaining the recruitment of indigenous species in the nonwild wetland will honour local provenance flora and expand functioning wetland values.
- The removal of listed and environmental weeds will further secure the natural assets adjoining the property.
- Revegetation of bank with indigenous species for erosion control and habitat will reduce impact from infill.
- Care should be taken not to damage Pandanus and Mangroves when removing weeds, some are growing together on the immediate edge of the wild wetlands.
- All soil and plants entering the site must be surveyed for electric ants before entering
- Ongoing maintenance of restored wetland is required.
- To avoid losing the target taxa for reintroduction, action must be taken soon.

8. Errors

Names may appear incorrect on timed meander map due to further correction during desktop analysis.

Spatial errors may exist within mapping data.

9. Appendices

Appendix 1: RE details

Regional ecosystem details for 7.2.8

Regional ecosystem	7.2.8
Vegetation Management Act class	Of concern
Wetlands	Palustrine wetland (e.g. vegetated swamp).
Biodiversity status	Endangered
Subregion	9, 2, 1, 3, (6), (7), (8)
Estimated extent1	Pre-clearing 2000 ha; Remnant 2017 2000 ha
Extent in reserves	High
Short description	Melaleuca leucadendra open forest to woodland on sands of beach origin
Structure category	Mid-dense
Description	Melaleuca leucadendra (weeping tea tree) open forest to woodland. Sands of beach origin. (BVG1M: 22b)
Supplementary description	Stanton and Stanton (2005), D38; Tracey and Webb (1975), 17 (in part)
Protected areas	Girramay NP, Daintree NP, Hinchinbrook Island NP, Russell River NP, Paluma Range NP, Kurrimine Beach NP, Hull River NP, Halifax Bay Wetlands NP, Ella Bay NP, Anderson Street CP, Moresby Range NP
Special values	Potential habitat for NCA listed species: Nepenthes mirabilis (Bramston Beach), Piper mestonii
Fire management guidelines	SEASON: Early to mid-dry season. INTENSITY: Low with occasional moderate. INTERVAL: 3-10 years. STRATEGY: Burn with anticipated rain as it will increase patchiness. Create burn mosaics using progressive burning. Do not deliberately burn submerged swamps but allow fire to carry into their edge. ISSUES: Avoid peat fires and maintain awareness of high biomass grasses which can increase fire intensity and spread. Avoid burning ant plants.
Comments	Threatened by housing developments, and changes to hydrology. Distributed patchily along the entire coastline of the Wet Tropics, particularly common in northern areas.

1 Estimated extent is from version 11 pre-clearing and 2017 remnant regional ecosystem mapping. 1 Figures are rounded for simplicity. For more precise estimates, including breakdowns by tenure and other themes see remnant vegetation in Queensland.

Appendix 2: EPBC Report Excerpt

(Please note this applies to surrounding area also).



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about <u>Environment Assessments</u> and the EPBC Act including significance guidelines, forms and application process details.

Report created: 02/07/19 17:50:41

Summary Details Matters of NES Other Matters Protected by the EPBC Act Extra Information Caveat Acknowledgements



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

<u>Coordinates</u> Buffer: 1.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	1
National Heritage Places:	1
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	1
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	39
Listed Migratory Species:	46

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A <u>permit</u> may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	98
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	19
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Plants		
Acriopsis emarginata		
Pale Chandelier Orchid [83928]	Vulnerable	Species or species habitat may occur within area
Canarium acutifolium		
[23956]	Vulnerable	Species or species habitat may occur within area
Myrmecodia beccarii		
Ant Plant [11852]	Vulnerable	Species or species habitat likely to occur within area
<u>Phaius australis</u>		
Lesser Swamp-orchid [5872]	Endangered	Species or species habitat may occur within
Frogs		
Litoria davi		
Australian Lace-lid, Lace-eyed Tree Frog, Day's Big- eyed Treefrog [86707]	Endangered	Species or species habitat may occur within area
Name	Status	Type of Presence
Litoria nannotis		
Waterfall Frog, Torrent Tree Frog [1817]	Endangered	Species or species habitat may occur within area
Litoria rheocola		
Common Mistfrog [1802]	Endangered	Species or species habitat likely to occur within area

Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
<u>Gallinago hardwickii</u>		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Limosa lapponica		
Bar-tailed Godwit [844]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
<u>Tringa nebularia</u>		
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area



Wildlife Online Extract

Date submitted: Tuesday 02 Jul 2019 17:46:15 Date extracted: Tuesday 02 Jul 2019 17:50:14 Email: japitcher_83@hotmail.com Species List for a Specified Point Longitude: 145.4703 The number of records retrieved = 108 Latitude: -16.5195 Type: Native Records: All Species: All Status: All Distance: 1 Date: All Search Criteria:

Disclaimer

As the DSITIA is still in a process of collating and vetting data, it is possible the information given is not complete. The information provided should only be used for the project for which it was requested and it should be appropriately acknowledged as being derived from Wildlife Online when it is used.

The State of Queensland does not invite reliance upon, nor accept responsibility for this information. Persons should satisfy themselves through independent means as to the accuracy and completeness of this information.

No statements, representations or warranties are made about the accuracy or completeness of this information. The State of Queensland disclaims all responsibility for this information and all liability (including without limitation, liability in negligence) for all expenses, losses, damages and costs you may incur as a result of the information being inaccurate or incomplete in any way for any reason.

Kingdom	Class	Family	Scientific Name	Common Name	a	A	Records
animals	birds	Accipitridae	Haliastur indus	brahminy kite	0		4
animals	birds	Accipitridae	Milvus migrans	black kite	0		, ,
animals	birds	Accipitridae	Elanus axillaris Dondine cristotus	black-shouldered kite	0 J		- c
animals	birds	Accipitude	ranuon cristatus Tadoma radiah	casiciii usprey radiah shaldurch	ק כ		، ر
animals	birds		Anas superciliosa	Pacific black duck	00		- 、
animals	birds		Aerodramus terraereginae	Australian swiftlet	C		. 0
animals	birds		Earetta novaehollandiae	white-faced heron	00		
animals	hirds		Euretta narzetta	little enret	C		. C
animals	birds		Ardea intermedia	intermediate earet	00		
animals	birds	Ardeidae	Foretta sacra	eastern reef earet	C		
animals	birds	Ardeidae	Ardea alba modesta	eastern great egret	00		ŝ
animals	birds	Artamidae	Artamus leucorvnchus	white-breasted woodswallow	0		9
animals	birds	Burhinidae	Esacus magnirostris	beach stone-curlew	>		2
animals	birds	Campephagidae	Lalage leucomela	varied triller	C		2
animals	birds	Campephagidae	Coracina papuensis	white-bellied cuckoo-shrike	o		2
animals	birds	Charadriidae	Charadrius ruficapillus	red-capped plover	с О		
animals	birds	Charadriidae	Charadrius leschenaultii	greater sand plover	>	>	e
animals	birds	Charadriidae	Vanellus miles miles	masked lapwing (northern subspecies)	o		4
animals	birds	Charadriidae	Elseyornis melanops	black-fronted dotterel	o		e
animals	birds	Charadriidae	Charadrius mongolus	lesser sand plover	ш	ш	9
animals	birds	Charadriidae	Pluvialis fulva	Pacific golden plover	SL		e
animals	birds	Charadriidae	Vanellus miles	masked lapwing	o		.
animals	birds	Columbidae	Chalcophaps indica	emerald dove	0		, - 1
animals	birds	Columbidae	Geopelia humeralis	bar-shouldered dove	C		4
animals	birds	Columbidae	Ptilinopus superbus	superb fruit-dove	0		, .
animals	birds	Columbidae	Ptilinopus regina	rose-crowned fruit-dove	0		, - .
animals	birds	Columbidae	Columba leucomela	white-headed pigeon	0		, -
animals	birds	Columbidae	Ducula bicolor	pied imperial-pigeon	C		9
animals	birds	Columbidae	Geopelia striata	peaceful dove	0		2
animals	birds	Cuculidae	Scythrops novaehollandiae	channel-billed cuckoo	o		-
animals	birds	Cuculidae	Chalcites minutillus russatus	Gould's bronze-cuckoo	ပ		-
animals	birds	Cuculidae	Eudynamys orientalis	eastern koel	с О		.
animals	birds	Dicruridae	Dicrurus bracteatus	spangled drongo	o		e
animals	birds	Estrildidae	Lonchura castaneothorax	chestnut-breasted mannikin	o		.
animals	birds	Halcyonidae	Dacelo leachii	blue-winged kookaburra	o		-
animals	birds	Halcyonidae	Dacelo novaeguineae	laughing kookaburra	o		-
animals	birds	Halcyonidae	Todiramphus sanctus	sacred kingfisher	o		2
animals	birds	Halcyonidae	Todiramphus sordidus	Torresian kingfisher	0		, - 1
animals	birds	Hirundinidae	Hirundo neoxena	welcome swallow	o		, -
animals	birds	Laridae	Sterna sumatrana	black-naped tern	ร่		,
animals	birds	Laridae	Thalasseus bergii	crested tern	S		2
animals	birds	Landae	Hydroprogne caspia	Caspian tern	s c		2
animals	DIrds	Laridae	Chroicocephalus novaenollandiae	silver gull	י כ		2 0
animals	DIrds		Gelochelidon nilotica	guil-billed tern	א א		2
animais	DIrds	Landae	I naiasseus pengalensis	lesser crested tem	0		-
							Page 1 of 3
				Queensland Government Wildlife Online - Extract Date 02/07/2019 at 17:50:14	xtract Date	e 02/07/2019	at 17:50:14

Kingdom	Class	Family	Scientific Name	Common Name	Α Δ	Records
animals	birds	Laridae	Sternula albifrons	little tern	SL	2
animals	birds	Maluridae	Malurus amabilis	lovely fairy-wren	o	<u>_</u>
animals	birds	Megapodiidae	Megapodius reinwardt	orange-footed scrubfowl	U	5
animals	birds	Meliphagidae	Meliphaga notata	yellow-spotted honeyeater	o	2
animals	birds	Meliphagidae	Ramsayornis modestus	brown-backed honeyeater	0	÷
animals	birds	Meliphagidae	Lichmera indistincta	brown honeyeater	00	, , ,
animals	birds	Meliphagidae	Gavicalis versicolor	varied honeyeater	00	- c
animals	Dirds	Meliphagidae	Philemon corniculatus	noisy triarbird	، د	. 7
animals	birds	Meliphagidae	Myzomela obscura	dusky honeyeater	0	, - .
animals	birds	Meliphagidae	Meliphaga gracilis	gracetul honeyeater	0	<u> </u>
animals	birds	Meliphagidae	Philemon buceroides	helmeted friarbird	o	4
animals	birds	Meropidae	Merops ornatus	rainbow bee-eater	U	7
animals	birds	Monarchidae	Monarcha melanopsis	black-faced monarch	SL	<u> </u>
animals	birds	Monarchidae	Grallina cyanoleuca	magpie-lark	o	4
animals	birds	Monarchidae	Myiagra rubecula	leaden flycatcher	o	,
animals	birds	Nectariniidae	Dicaeum hirundinaceum	mistletoebird	o	2
animals	birds	Nectariniidae	Nectarinia jugularis	olive-backed sunbird	o	5
animals	birds	Oriolidae	Oriolus sagittatus	olive-backed oriole	o	-
animals	birds	Oriolidae	Sphecotheres vieilloti	Australasian figbird	o	2
animals	birds	Oriolidae	Oriolus flavocinctus	yellow oriole	o	-
animals	birds	Pachycephalidae	Pachycephala melanura	mangrove golden whistler	o	-
animals	birds	Pachycephalidae	Colluricincla megarhyncha	little shrike-thrush	0	 1
animals	birds	Psittacidae	Trichoglossus haematodus moluccanus	rainbow lorikeet	o	5
animals	birds	Rhipiduridae	Rhipidura leucophrys	willie wagtail	0	2
animals	birds	Scolopacidae	Tringa brevipes	grey-tailed tattler	SL	<u> </u>
animals	birds	Scolopacidae	Numenius minutus	little curlew	SL	. .
animals	birds	Scolopacidae	Tringa nebularia	common greenshank	SL	n
animals	birds	Scolopacidae	Numenius phaeopus	whimbrel	SL	က
animals	birds	Scolopacidae	Calidris ruficollis	red-necked stint	SL	2
animals	birds	Scolopacidae	Numenius madagascariensis	eastern curlew	Е	2
animals	birds	Scolopacidae	Limosa lapponica baueri	Western Alaskan bar-tailed godwit	>	e .
animals	birds	Sturnidae	Aplonis metallica	metallic starling	0	, . .
animals	birds	Threskiornithidae	Threskiornis molucca	Australian white ibis	0	, ,
animals	reptiles	Crocodylidae	Crocodylus porosus	estuarine crocodile	> (en .
plants	Equisetopsida	Acanthaceae	Avicennia marina subsp. australasica		00	1/1
plants	Equisetopsida	Annonaceae	Miliusa branei		ں د	11
plants	Equisetopsida	Annonaceae	Polyalthia nitidissima	polyalthia	с o	1/1
plants	Equisetopsida	Apocynaceae	l abernaemontana orientalis		00	1/1
plants	Equiseropsida	Apocynaceae			י כ	
plants	Equisetopsida	Arecaceae	Livistona muelleri	dwarr ran palm	0	11
plants	Equisetopsida	Celastraceae	Elaeodenaron melanocarpum	1	50	1/1
plants	Equisetopsida	Ceratopnyllaceae	Ceratopnylium demersum	nornwort	50	1/1
plants	Equisetopsida	Chenopodiaceae	Sarcocornia quinquettora subsp. quinquettora		00	1/1
plants	Equisetopsida	Chenopodiaceae	l ecticornia australasica		00	1/1
plants	Equisetopsida	Cyperaceae	Fimbristylis ferruginea		00	1/1
plants	Equisetopsida	Cyperaceae	Fimbristylis paucitiora		0	1/1
						Darie 2 of 3

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Records	711 711 711 711 711 711 711 711 711 711	
۸	000000000000000000000000000000000000000	
_		
Common Name	hydrilla comet grass dentella flintwood	as naturalised. under the <i>Nature Conservation Act 1992</i> . The codes are Extinct in the Wild (PE), Endangered (E). Not Protected (.). Not Protected (.). der the <i>Environment Protection and Biodiversity Conservation Act 1999</i> . The values of EPBC are indangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V). If the taxon for the record option selected (i.e. All, Confirmed or Specimens). The second number located after the / indicates the number of specimen records for the taxon.
Scientific Name	Schoenoplectus subulatus Fuirena umbellata Cyperus javanicus Eleocharis equisetina Pleomele angustifolia Euphorbia biñda Hydrilla verticillata Glochidion harveyanum Glochidion harveyanum Glochidion benthamianum Phyllanthus novae-hollandiae Perotis rara Pseudoraphis jagonis Ixora timorensis Dentella repens Scolopia braunii Stylidium alsinoides	d h o c c c c c c c c c c c c c c c c c c c
Family	Cyperaceae Cyperaceae Cyperaceae Cyperaceae Cyperaceae Draceanaeae Phyllanthaceae Phyllanthaceae Phyllanthaceae Phyllanthaceae Poaceae Rubiaceae Rubiaceae Salicaceae Stylidiaceae	 Y indicates that the taxon is introduced to Queensland and Q - Indicates the Queensland conservation status of each taxon Vulnerable (V), Near Threatened (NT), Least Concern (C) o A - Indicates the Australian conservation status of each taxon u Conservation Dependent (CD), Critically Endangered (CE), Records – The first number indicates the total number of records This number is output as 9999 if it equals or exceeds this value.
n Class	Equisetopsida Equisetopsida Equisetopsida Equisetopsida Equisetopsida Equisetopsida Equisetopsida Equisetopsida Equisetopsida Equisetopsida Equisetopsida Equisetopsida Equisetopsida	icates that the taxon i ites the Queensland i ates the Queensland contest the Australian co ervation Dependent (in The first number india the first output as 999 if i er is output as 999 if i
Kingdom	plants plants plants plants plants plants plants plants plants plants cODES	 I - Y indica Q - Indica Vulnee A - Indica A - Indica This numbe This numbe

Page 3 of 3 Queensland Government Wildlife Online - Extract Date 02/07/2019 at 17:50:14

Appendix 4: Listed weed

Singapore Daisy invading the edges of high quality endangered wetland.



Appendix 5: Boundaries Map

Building plan overlayed on aerial imagery, note the non-wild wetland highlighted in green where restoration is to occur.



Appendix 6: Species to be utilised



Above: The non – wild fringe around 12 months ago. Note the cut lawn in the lower part of the image, and the high-quality wetland behind.



Above: The non-wild fringe as of the 23/8/2020. Note the increase in weeds on the left.





Above two: Fiurena umbelata (Hexagonal style stems) was abundant and many specimens are present for transplanting in the area. Several specimens have been flagged.





Above two: Sclera levis had several plants present along with a look alike weed (Cyperus invulucratus) with triangle stems. Several specimens have been flagged.



Above: Fimbristylis pauciflaura had several individuals identified but it is likely there will be more. Several specimens have been flagged.



Above: Ludwigia octovalvis has seen a decline due to Cyperus invulcratus dominating. Several specimens have been flagged.



Above: Acrostichum speciosum, bipinnate fern with thick leaflets. Individual pictured is within non-wild wetland however after reassessment and the growth of weeds, this plant could not be found.



Above: Cyperus javanicus was present with two plants next to each other and in good condition, one has been flagged.

Before works commence, a team of qualified operators are to collect the target taxa (six pictured above) which exist in the non-wild wetland and maintain them for replanting later. It is recommended that this happen soon, to avoid further impacts from invasive species.

It is also advised that cuttings and seed collection occur to increase the chances of success and to provide a larger number of plants to reintroduce. This will assist with aesthetics, and environmental and maintenance purposes.

A high level of natural recruitment from both invasive and native flora is expected after works have occurred, ongoing maintenance will be of high importance if the area is to establish as a healthy wetland system and balance human utilisation.

Whilst *Astrostichum speciosum* was not observed during a recent reassessment, it is believed individuals will still be present and attention should be given to identify them upon removal of other target taxa.

Small *Cyperus involucratus* may be confused for the native *Sclera levis*, care should be taken to not remove/reintroduce this weed.

Once these plants have been removed, the pad footings are to be installed using an excavator, which will operate from the bank and not enter the depression. It will remove weeds and conduct necessary excavations to install the infrastructure.

Sediment fencing as previously discussed is to be installed and works carried out during dry periods of weather, the removal of top soil should be minimised where possible.

When removing weeds from the immediate edge of the wild wetland, care should be taken not to damage large native flora which are not to be removed. Established *Panadanus sp.* and Mangrove species could be impacted.

After construction, the same team which removed and maintained the plants is to reintroduce them in a manner that supports aesthetics and wetland structure.

The infill and bank is to be revegetated to assist in habitat development and erosion control.

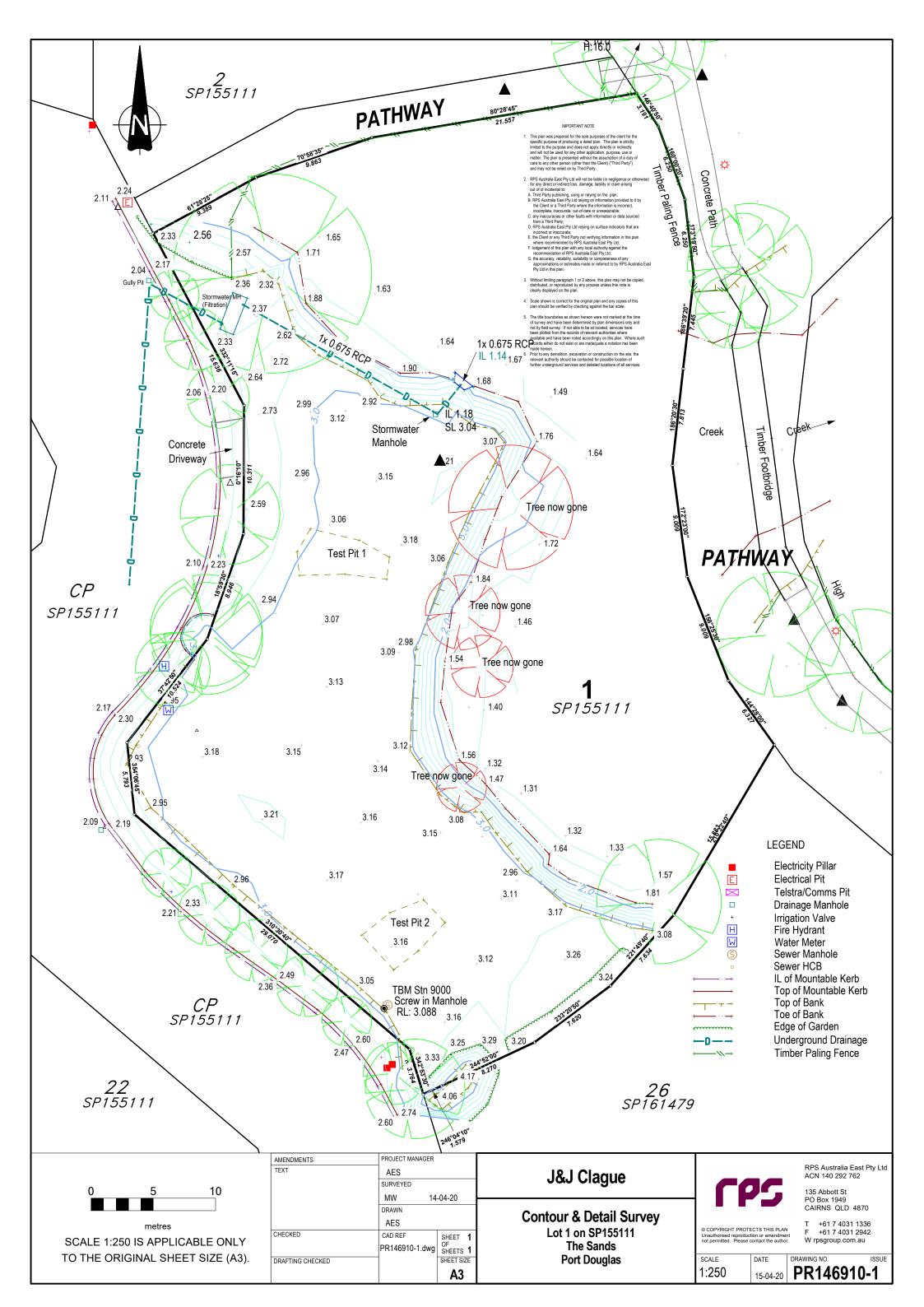
With loss of *Typha sp.* due to removal and infill, it is desirable to replace this with an indigenous plant that provides similar services to fauna. These may include *Astrostichum speciosum*, *Ludwigia octovalvis*, and *Lomandra sp.*.

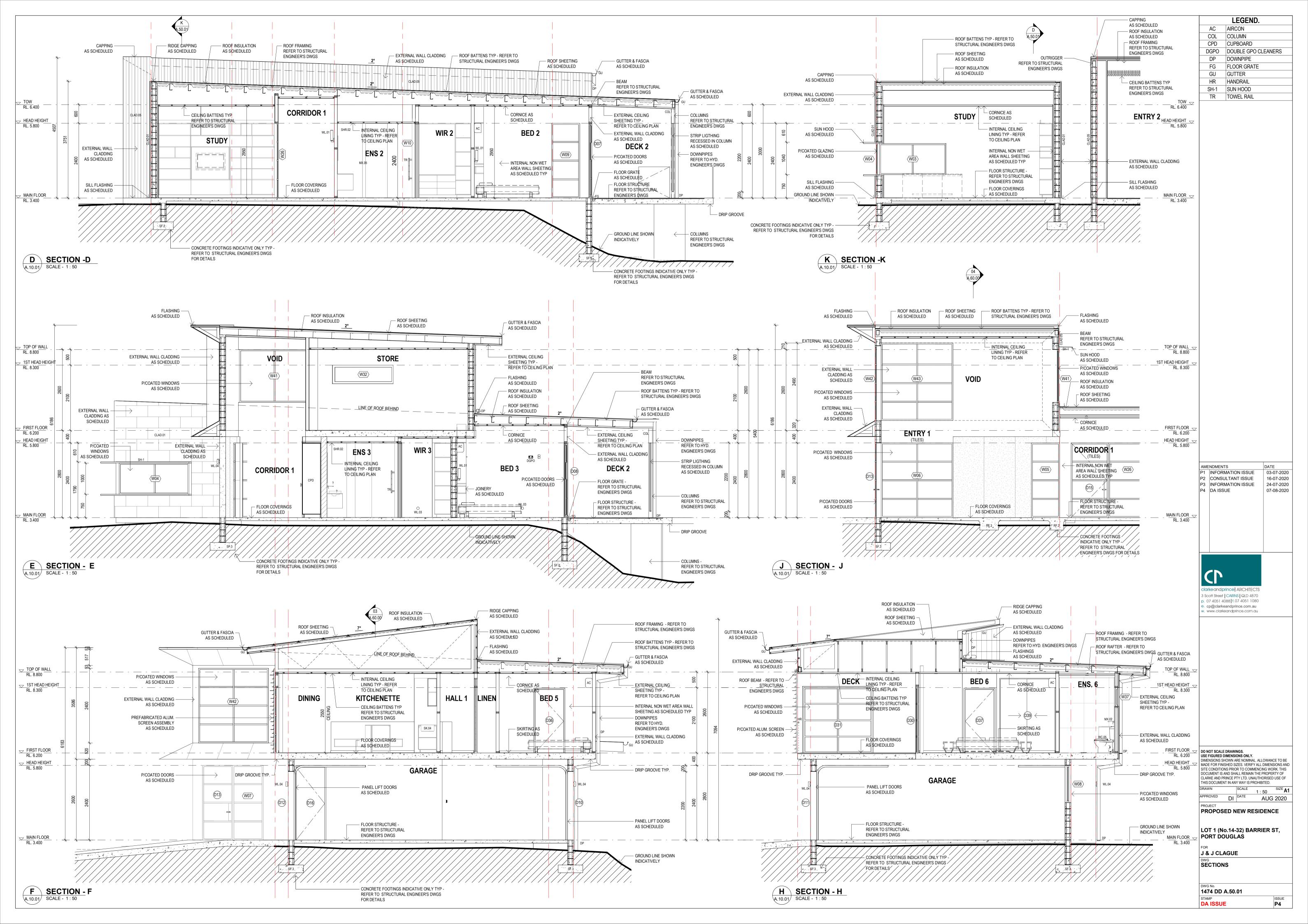
Furthermore, it is recommended that the gardens at the front of the property be used to contribute to habitat with plants that support local pollinators, birds and frogs to be used. It is at the discretion of the client and their chosen contractor as to which plants are used, however it is important they are indigenous and provide services to native fauna.

The loss of *Typha sp.* is an understandable outcome as it can tend to dominate and would require significant management. If this can be attained then it would be preferential, however not if it is at the expense of other species highlighted in this section.

Disclaimer

Whilst all care has been taken to present the necessary information to the most accurate degree it should be noted that the surveys conducted upon the property in question are not fully comprehensive and unidentified flora and fauna may exist. Spatial data is based upon the reliability of data sources and some error may exist as a result. Care should be taken by the landholders to ensure compliance is met with all relevant agencies and authorities. The writer of the report excepts no responsibility for the actions of others and negative outcomes that may follow.













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02 FENCE DETAIL SCALE - NTS

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ABBREVIATIONS: G1 GATE (900 WIDE) G2 GATE (3000 WIDE)	
-//// 1200H CHAINMESH FENCE -EE- EXISTING ELECTRICITY	ć
LINE - EXACT LOCATION TBC ON SITE	
-W W EXISTING WATER MAIN EXACT LOCATION TBC ON SITE EXISTING SEWER MAIN	
- S EXACT LOCATION TBC ON SITE	-
AMENDMENTS	ATE
P1INFORMATION ISSUECP2CONSULTANT ISSUE1P3INFORMATION ISSUE2	3-07-2020 6-07-2020 24-07-2020 07-08-2020
P5REVISED SITE SETOUT2P6REVIEW SUBMISSION0P7LANDSCAPE ISSUE1	23-09-2020 98-10-2020 3-10-2020 5-10-2020
clarke and prince ARCHITECTS 3 Scott Street CAIRNS QLD 4870 p. 07 4051 4088 f.07 4051 1080 e. cp@clarkeandprince.com.au	
w. www.clarkeandprince.com.au	
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SITE CONDITIONS PRIOR TO COMMENCING WORK. THIS DOCUMENT IS AND SHALL REMAIN THE PROPERTY OF CLARKE AND PRINCE PTY LTD. UNAUTHORISED USE OF THIS DOCUMENT IN ANY WAY IS PROHIBITED. DRAWN SCALE As indicated SIZE A1	
As indicated A1 APPROVED DI DATE OCT 2020 PROJECT PROPOSED NEW RESIDENCE	
LOT 1 (No.14-32) BARRIER ST, PORT DOUGLAS	
FOR J & J CLAGUE DWG SITE PLAN	
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