NORTHERN TERRITORY GOVERNMENT
Department of
LANDS, PLANNING AND ENVIRONMENT

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Our ref: DEPWS2024/0154

Ms Mandy Trueman
Department of Lands, Planning and Environment
PO Box 3675
DARWIN NT 0801

Dear Ms Trueman

Re: Invitation to Comment on Referral – Wurrumiyanga Residential Subdivision

The Department of Lands, Planning and Environment (DLPE) has assessed the information submitted for the above referral and provides the following comments:

Flora and Fauna Division

The Flora and Fauna Division has reviewed the Referral and provides comments in the attached table **(Attachment 1).**

In summary, the Flora and Fauna Division considers that the direct impacts of the proposed subdivision at Wurrumiyanga are likely to pose a low risk to regional populations of threatened species and significant/sensitive vegetation present on the site.

There is some uncertainty regarding the magnitude and therefore the significance of the potential impacts on populations of some threatened species, particularly *Typhonium mirabile* and *Cycas armstongii*. These uncertainties are primarily a result of a lack of clarity associated with the methods employed to ascertain population sizes or assess the broader impacts of the subdivision on populations of these species. Based on expert opinion and understanding of the species populations on the Tiwi Islands, and re-interpretation of the results presented in the referral in the broader context of estimated global population sizes, Flora and Fauna Division are satisfied that the proposed subdivision poses a low risk to regional populations of threatened species.

Similarly, it is unlikely that indirect impacts to these values as a result of the subdivision will result in a significant impact. These risks could be further mitigated through the clarification of site management and handover milestones by the proponent. The proponent has committed through their contracting process to implement a Construction Environmental Management Plan (CEMP).

Rangelands Division

Weed Management Branch

A desktop assessment of the Northern Territory (NT) Weeds Database for the sites and surrounding areas and adjoining roads revealed historic data records of the following declared species:

Common Name	Botanical Name	Declared
Gamba grass	*Andropogon gayanus*	Class B
Rubber vine	*Cryptostegia madagascariensis*	Class A
Mission grass - perennial	*Cenchrus polystachios*	Class B
Hyptis	*Hyptis suaveloens*	Class B
Senna - coffee	*Senna occidentalis*	Class B
Senna - sicklepod	*Senna obtusifolia*	Class B
Sida - paddys lucerne	*Sida rhombifolia*	Class B
Sida - flannel weed	*Sida cordifolia*	Class B
Sida - spiny head	*Sida acuta*	Class B
Snake weed sp	*Stachytarpheta sp*	Class B

Of the listed species, gamba grass spread is of particular concern and is subject to a Statutory Weed Management Plan (SWMP). Gamba grass and mission grass are identified as part of the listed key threatening process ' Invasion of northern Australia by Gamba Grass and other introduced grasses'.

Statutory Requirements
All land in the NT is subject to the *Weeds Management Act 2001* (WM Act). The WM Act describes the legal requirements and responsibilities that apply to all persons, owners and occupiers of land regarding declared and potential weeds. General duties described in Division 1 of the WM Act include the requirement for owners or occupiers of land to take all reasonable measures to prevent land being infested with a declared weed and to prevent a declared weed from spreading.

There are four types of classifications for a declared or potential weed under the WM Act: Class A (to be eradicated); Class B (growth and spread to be controlled); Class C (not to be introduced into the Territory or part of the Territory); and Class D (prevent the growth and spread by actions of persons).

Gamba grass (*Andropogon gayanus*) is subject to a SWMP. All landholders and managers must adhere to management obligations outlined in these plans.

The following issues are raised in relation to the Environmental Impact Assessment (EIA) and should be considered for addressing:

- Melville Island has a lower density of weeds compared to other parts of the NT and any proposed works should seek to ensure there is no introduction of new weeds and minimal spread of known weeds.
- The species *Andropogon gayanus*, *Cenchrus polystachios* and *Cenchrus pedicellatu* are identified as components of the key threatening process 'Invasion of northern Australia by Gamba Grass and other introduced grasses' listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

- There is a general obligation under the WM Act to control weeds on land, this would extend to reasonable steps to contain or control seed production and spread from infested areas.

The Weed Management Branch recommends the following:

1. Biosecurity mitigation - potential borrow pits and roadsides that form a part of upgrades should be surveyed for weeds prior to clearing and/or use and any mitigations included in the Weed Management Plan (WMP). This includes treatment and control to prevent seed contamination of soil removed and transported from the sites.

2. Rehabilitation and Closure - include a schedule of surveillance of disturbed sites (roadsides and borrow pits) to ensure there has not been weed establishment/and or spread once sites are rehabilitated. Surveillance should be carried out up to and including flowering and seeding time and before fire.

3. Development of a comprehensive WMP that, at a minimum, addresses:

    - Weed control prior to construction phase (reduce weed seed load within and adjacent to project areas).
    - Hygiene procedures for all items coming on to the Tiwi Island, how will this be assured and monitored?
    - Managing weed spread of weed species already present in and adjacent to the project areas and corridors (power lines, roads and tracks etc.).
    - If soil/sand or 'fill' or other construction elements are brought in from elsewhere (i.e. the mainland) to the project area, how the proponent intends to ensure that these items are free of weed seeds or plant parts.
    - Current weed management objectives of the Tiwi Island Rangers and Tiwi Land Council.
    - The timing and management of weeds in the project areas and adjacent areas.
    - Detection and management of new weed species incursions in the project areas.
    - Assessing effectiveness of the implementation of the WMP and capacity of the WMP to be dynamic if the aims and goals of the plan and statutory obligations are not being met.
    - Statutory weed management requirements including all relevant NT Government SWMPs.
    - If the EPBC Act is applicable to this project, then requirements of the threat abatement plan to reduce the impacts on northern Australia's biodiversity by the five listed grasses should be met.
    - Ongoing weed management and weed monitoring post construction (operational phase).
    - Implementation and monitoring of all above.

Guidelines for the prevention of weed spread are outlined in '*Preventing Weed Spread is Everybody's Business'* and is available online[1].

Further information as to management requirements and the WMP for gamba grass is available online[2] or alternatively contact the Weed Management Branch for further advice on (08) 8999 4567.

1 https://denr.nt.gov.au/__data/assets/pdf_file/0011/257987/preventing-weed-spread.pdf
2 http://www.nt.gov.au/environment/weeds

Water Resources Division

Surface water
As the proposed subdivision site contains no waterways, there are no issues of concern requiring comment within the responsibilities of Surface Water Assessment Team.

Groundwater
As per the Pre-Referral Screening Report and in the Geotechnical Investigation by Douglas Partners, groundwater seepage in the subdivision has been addressed.

Licensing and Regulation
NT Portion 1640, Wurrumiyanga Township, Bathurst Island is not located within a water control district or water allocation plan area. The application proposes that water for the construction and operational phases of the project will be sourced from existing Power and Water reticulated water mains from the township borefield. The take of this water is currently exempt, as per Gazette G12 of 24 March 2021, from the requirement for a water extraction licence as the borefield consists of low-rate general purpose bores that are outside a water control district.

Further, both the construction and operational phases of the project benefit from exemptions to the *Water Act 1992*, being:

- Gazette S35 of 30 June 1992, exemption from requiring a permit to interfere with a waterway for road drainage works, culverts, bridges, and urban stormwater drainage works and constructed to engineering standard accepted by the relevant public authority, small rural dams, soil conservation and land care activities.
- Gazette S60 of 28 November 2008, exemption from requiring a water extraction licence for road works.
- Gazette G12 of 24 March 2021 provides exemption from requiring a bore work permit for all bores outside of a water control district and from the requirement for water extraction licence for low-rate general purpose bores outside a water control district.

In spite of these exemptions, all bore work must be undertaken by an NT licensed driller in accordance with the Minimum Construction Requirements for Water Bores in Australia. The final Statement of Bore must be provided to Water Resources via email to water.regulation@nt.gov.au.

Take of surface or groundwater for rural stock and domestic purposes does not require a water extraction licence. However, should take of surface or groundwater be proposed beyond the volumes already authorised or for purposes other than rural stock and domestic use, advice should be sought from the Water Resources Division regarding any licensing requirements or relevant exemptions.

Further information can be obtained from the DLPE website https://nt.gov.au/environment/water and by contacting water.licensing@nt.gov.au or call 08 8999 4455.

Environment Division

All persons are required to comply with the General Environmental Duty under section 12 of the *Waste Management and Pollution Control Act 1998* (NT) (WMPC Act). To help satisfy the General Environmental Duty, the proponent is advised to take notice of the list of environmental considerations below. The list is not exhaustive, and the proponent is responsible for ensuring their activities do not result in non-compliance with NT laws.

A non-exhaustive list of environmental issues that should be considered to meet requirements under NT law are listed below:

1. **Dust**: The proposed activities have the potential to generate dust, particularly during the dry season. The proponent must ensure that nuisance dust and/or nuisance airborne particles are not discharged or emitted beyond the boundaries of the premises.
2. **Noise**: The proponent is to ensure that the noise levels from the proposed premises comply with the latest version of the NT EPA Northern Territory Noise Management Framework Guideline available online[3].
3. **Erosion and Sediment Control (ESC):** The proponent must ensure that pollution and/or environment harm do not result from soil erosion.

   ESC measures should be employed prior to and throughout the construction stage of the development. Larger projects should plan, install and maintain ESC measures in accordance with the current International Erosion and Sediment Control Association (IECA) Australia guidelines and specifications. Where sediment basins are required by the development, the NT EPA recommends the use of at least Type B basins, unless prevented by site specific topography or other physical constraints.

   Basic advice for small development projects is provided by the NT EPA document: Guidelines to Prevent Pollution from Building Sites[4] and Keeping Our Stormwater Clean[5]
4. **Storage:** If an Environment Protection Approval or Environment Protection Licence is not required, the proponent should store liquids only in secure bunded areas in accordance with VIC EPA Publication 1698: Liquid storage and handling guidelines, June 2018, as amended. Where these guidelines are not relevant, the storage should be at least 110% of the total capacity of the largest vessel in the area.

   Where an Environment Protection Approval or Environment Protection Licence is required, the proponent must only accept, handle or store at the premises listed waste, including asbestos, as defined by the WMPC Act, in accordance with that authorisation.
5. **Site Contamination**: If the proposal relates to a change of land use or if the site is contaminated, including as a result from historical activities such as cyclones, a contaminated land assessment maybe required in accordance with the National Environment Protection (Assessment for Site Contamination) Measure (ASC NEPM). The proponent is encouraged to refer to the information provided on the NT EPA website[6], and the NT Contaminated Land Guidelines[7].
6. **Waste Management - Import and Export of Fill**: The proposed activities have the potential to generate fill and/or involve the importation of fill for use on-site. Untested fill material may already be present on the site. All fill imported or generated and exported as part of the activity must either be certified virgin excavated natural material (VENM) or be sampled and tested in line with the NSW EPA Guidelines[8]

   All imported fill material must be accompanied by details of its nature, origin, volume, testing and transportation details. All records must be retained and made available to authorised officers, upon

[3] https://ntepa.nt.gov.au/__data/assets/pdf_file/0004/566356/noise_management_framework_guideline.pdf
[4] https://ntepa.nt.gov.au/__data/assets/pdf_file/0010/284680/guideline_prevent_pollution_building_sites.pdf
[5] https://ntepa.nt.gov.au/__data/assets/pdf_file/0006/284676/guideline_keeping_stormwater_clean_builders_guide.pdf
[6] https://ntepa.nt.gov.au/your-environment/contaminated-land
[7] https://ntepa.nt.gov.au/__data/assets/pdf_file/0020/434540/guideline_contaminated_land.pdf
[8] https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/virgin-excavated-natural-material

request. The proponent should also consider the following NT EPA fact sheets: How to avoid the dangers of accepting illegal fill onto your land[9], and Illegal Dumping - What You Need to Know[10].

7. **Odour or Smoke:** The proposed activities may have the potential to create odours and/or smoke. The proponent must ensure that nuisance odours or smoke are not emitted beyond the boundaries of the premises.

Should you have any further queries regarding these comments, please contact the Development Coordination Branch by email DevelopmentAssessment.DEPWS@nt.gov.au or phone (08) 8999 4446.

Yours sincerely

Maria Wauchope
Executive Director Rangelands

13 September 2024

[9] https://ntepa.nt.gov.au/__data/assets/pdf_file/0005/285728/factsheet_avoid_danger_accepting_illegal_fill_to_your_land.pdf
[10] https://ntepa.nt.gov.au/__data/assets/pdf_file/0008/285740/factsheet_illegal_dumping_what_you_need_know.pdf

Attachment 1

Department of Infrastructure, Planning and Logistics – Wurrumiyanga Residential Subdivision

This submission is made under regulation 53 of the Environment Protection Regulations 2020

Government authority: Department of Lands, Planning and Environment – Flora and Fauna Division

<table>
<tr><th>Section of Referral</th><th>Theme or issue</th><th>Comment</th></tr>
<tr><td>LAND

Section 5.4.3</td><td>Biodiversity - Threatened Species

(Terrestrial Ecosystems; Marine Ecosystems)</td><td>Based on a search of DLPE databases within 10km of the boundary of the project area and fauna recorded during the terrestrial fauna and flora assessments for the proposed Wurrumiyanga Residential Subdivision, expert knowledge of species' habitat requirements, and information about habitats occurring within the site, the following threatened species have been recorded or may occur within or adjacent to the referral area.
<table>
<tr><th>Common Name</th><th>Scientific Name</th><th>TPWC Act*</th><th>EPBC Act**</th><th>Terrestrial</th><th>Estuarine</th><th>Marine</th></tr>
<tr><td>Brush-tailed Rabbit-rat</td><td>Conilurus penicillatus</td><td>Endangered</td><td>Vulnerable</td><td>✓</td><td>-</td><td>-</td></tr>
<tr><td>Pale-field Rat</td><td>Rattus tunneyi</td><td>Vulnerable</td><td>-</td><td>✓</td><td>-</td><td>-</td></tr>
<tr><td>Butler's Dunnart</td><td>Sminthopsis butleri</td><td>Vulnerable</td><td>Vulnerable</td><td>✓</td><td>-</td><td>-</td></tr>
<tr><td>Common Brushtail Possum (north-western)</td><td>Trichosurus vulpecula arnhemensis</td><td>-</td><td>Vulnerable</td><td>✓</td><td>-</td><td>-</td></tr>
<tr><td>Flatback Turtle</td><td>Natator depressus</td><td>-</td><td>Vulnerable</td><td>-</td><td>-</td><td>✓</td></tr>
<tr><td>Mertens' Water Monitor</td><td>Varanus mertensi</td><td>Vulnerable</td><td>Endangered</td><td>✓</td><td>-</td><td>-</td></tr>
<tr><td>Great Knot</td><td>Calidris tenuirostris</td><td>Critically Endangered</td><td>Critically Endangered</td><td>-</td><td>✓</td><td>-</td></tr>
<tr><td>Greater Sand Plover</td><td>Charadrius leschenaultii</td><td>Vulnerable</td><td>Vulnerable</td><td>-</td><td>✓</td><td>-</td></tr>
<tr><td>Lesser Sand Plover</td><td>Charadrius mongolus</td><td>Endangered</td><td>Endangered</td><td>-</td><td>✓</td><td>-</td></tr>
<tr><td>Red Goshawk</td><td>Erthyrotriochis radiatus</td><td>Vulnerable</td><td>Endangered</td><td>✓</td><td>-</td><td>-</td></tr>
</table></td></tr>
</table>

Section of Referral	Theme or issue	Comment

Partridge Pigeon	*Geophaps smithii smithii*	Vulnerable	Vulnerable	✓	-	-
Far Eastern Curlew	*Numenius madagascariensis*	Critically Endangered	Critically Endangered	-	✓	-
Tiwi Masked Owl	*Tyto novaehollandiae melvillensis*	Endangered	Endangered	✓	-	-
Cycad	*Cycas armstrongii*	Vulnerable	-	✓	-	-
Typhonium	*Typhonium jonesii*	Endangered	Endangered	✓	-	-
Typhonium	*Typhonium mirabile*	Endangered	Endangered	✓	-	-

* *Territory Parks and Wildlife Conservation Act 1976*
** *Environment Protection and Biodiversity Conservation Act 1999*

Brush-tailed Rabbit-rat: This species is known to inhabit eucalypt Open-forests with a favourable fire history (i.e. infrequent fires). Unlike mainland populations, the Brush-tailed Rabbit-rat has been regularly recorded on Bathurst Island during the last decade. It is possible that this species may utilise the eucalypt woodland within the proposed subdivision area, although the structural attributes of the vegetation as described in the referral and the proximity of the location to settlement suggest that the area does not represent preferred habitat for the species. Given the small area of likely sub-optimal habitat (2-15ha in total) proposed to be removed and the large area of potentially suitable habitat (40 067ha (Brocklehurst & Edmeades, 1998)), it is unlikely that the subdivision will result in a significant impact upon the Bathurst Island population of the Brush-tailed Rabbit-rat. Mitigation measures proposed by the applicant to be implemented before and during the construction phase of the project will likely further reduce any potential risks to the species.

Pale Field Rat: The closest records for this species to the proposed development area are approximately 6km to the northwest in riparian habitat. Habitat for this species is typically associated with riparian zones. Habitat of this type does not occur within the proposed subdivision footprint or surround. The Pale Field Rat is considered to have a low likelihood of occurring within the subdivision area due to preferred habitat not being present, the potential for a significant impact on a population of this species as a result of the proposal is very low.

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		Butler's Dunnart: Suitable Woodland and Open-forest habitat for this species is present within the subdivision area and the proponent has assumed that the species will be present despite a lack of targeted survey effort. These habitat types occur extensively across Bathurst Island totalling an estimated 40 067ha (Brocklehurst & Edmeades, 1998). These areas represent <0.04% and <0.01% of the mapped available habitat for the species on Bathurst Island. The Flora and Fauna Division consider it unlikely that the proposal would result in a significant impact upon population(s) of Butler's Dunnart on Bathurst Island. Mitigation measures proposed by the applicant to be implemented before and during the construction phase of the project will likely further reduce any potential risks to the species. Common Brushtail Possum (north-western): This species is considered highly likely to occur within the woodland habitats within the subdivision area. Field surveys within the proposed subdivision suggest that suitable foraging habitat and denning sites are also present. The species is common across the Tiwi Islands with Bathurst Island supporting a higher density population than Melville Island (Davies et al. 2021) and any individuals using the proposed subdivision site are considered to be part of this larger island 'population'. Construction and operation of the proposal would remove up to 15ha of suitable foraging habitat and 2ha of the most highly suitable denning habitat for the species, but there are very extensive areas of woodland habitats remaining outside of the subdivision footprint. The Flora and Fauna Division considers that the proposal poses a low risk to local population of this species. Mitigation measures proposed by the applicant to be implemented before and during the construction phase of the project will likely further reduce any potential risks to the species. Mertens' Water Monitor: Although this species has been recorded in proximity of the proposed subdivision site, the habitats considered suitable for this species are not present within the site. The proposed works are also unlikely to exacerbate the known threat to the species (Cane Toads) if current biosecurity arrangements for the Tiwi Islands are maintained. The Flora and Fauna Division considers it highly unlikely that the proposal would result in a significant impact upon population(s) of Mertens' Water Monitor on Bathurst Island. Tiwi Masked Owl: This species is thought to depend upon tall eucalypt Open forests, particularly those dominated by *Eucalyptus tetrodonta*, *E. miniata* and *Corymbia nesophila* for nesting sites whilst home ranges are thought to be large ranging across various habitats including Rainforest margins. Field survey information did not detect any Tiwi Masked Owl within approximately 7.5km of the subdivision site and the closest historical database record is approximately 7km to the west. It is considered unlikely that the development area supports nesting sites for the Tiwi Masked Owl given the lack of detection and small area of potential nesting habitat available on the site.

Section of Referral	Theme or issue	Comment
		Although the proponent appears to have significantly overestimated the extent of most suitable potential nesting habitat for the species, the Flora and Fauna Division agrees that the likelihood of a significant impact upon local or regional populations of Tiwi Masked Owl as a result of the proposed subdivision is low. The area of native vegetation proposed to be removed as part of the subdivision represents approximately 0.04% of the highest likelihood potential nesting habitat available on Bathurst Island. Any potential impacts on the home range of individuals as a result of the clearing will be further mitigated through the proponents development and implementation of pre-clearing fauna survey and a CEMP that incorporate specific actions targeted at detecting and managing any occurrence of the species within the development area at the time of works. Partridge Pigeon: Partridge Pigeons have been widely recorded from Bathurst and Melville Islands in a range of eucalypt dominated habitats. It is likely that the proposed subdivision area contains foraging habitat for Partridge Pigeon, however the proximity of the area to settlement reduces the likelihood that the habitat is preferred for nest sites. Given the likely sub-optimal quality of local habitat and extensive availability of suitable habitat for the species more broadly across the Tiwi Islands, it is considered unlikely that the proposed removal of up to 15ha of vegetation associated with the development would result in a significant impact upon regional populations of the species. Red Goshawk: This species is known to utilise the eucalypt Open-forest and Woodland vegetation communities of the Tiwi Islands as important nesting sites and foraging habitat. The Tiwi Islands population of the Red Goshawk represents a significant proportion of the Australian population and the breeding pairs on the Tiwi Islands are relatively well known. Large, tall trees providing suitable nesting sites are a limiting resource for the Red Goshawk and the locations of nests of the known breeding pairs are typically well known – although they do vary over the years. No nests are known to occur within or adjacent (within 4km) to the proposed development area and vegetation structure within the subdivision suggest that suitable sites for nesting would be unlikely. The Flora and Fauna Division consider it unlikely that the clearing of the native vegetation proposed as part of the subdivision proposal would impact the reproductive success of the Tiwi Islands population. It is conceivable that the area may be used opportunistically by Red Goshawk for hunting of part of a birds home range, however the proximity to settlement and the large areas of available foraging habitat across the Tiwi Islands suggest that the loss of this area of vegetation (<0.04% of the available foraging habitat on Bathurst Island alone) would be unlikely to impact the survival of the species. Overall, the Flora and Fauna Division considers that the proposed subdivision is unlikely to result in a significant impact upon regional populations of Red Goshawk and that implementation of commitments to pre-clearing fauna surveys and the CEMP will further mitigate any potential impacts upon this species.

Section of Referral	Theme or issue	Comment
		Marine and Estuarine Species (Flatback Turtle and Migratory Shorebirds): No habitat suitable for the Marine and Estuarine Species identified above will be directly impacted by the proposed subdivision. Similarly, it is considered highly unlikely that indirect impacts (e.g. surface water runoff) associated with the proposed development will impact adjacent receiving environments given the substantial (c. 500m) buffer between the development footprint and nearby receiving environments. The Flora and Fauna Division considers that the proposal is unlikely to have a significant impact on habitats important for these species. *Cycas armstrongii*: Targeted surveys identified stands of Darwin Cycads within the proposed subdivision. Based on the information provided, it is unclear whether the methodology employed by the proponent provides an adequate estimate of Darwin Cycad density within the surveyed area. The method as described does not identify if a modified Bitterlich Sweep height was employed to account for the discrepancy in height between Darwin Cycad reproductive maturity (0.5m tall) and the standard estimate height (1.3m). It is highly likely that if the estimate was obtained using the standard measurement height associated with the method that the density estimates provided are an underestimate of actual density of reproductively mature individuals. Based on the estimates provided, encountered densities were typically low (<200 stems/ha) although some areas in the southern part of the development area exceeded 250 stems/ha. It is recommended that the proponent clarify the methodology employed in the survey to qualify any uncertainty associated with the reported densities of reproductive individuals in relation to cycad heights. Field observations of Darwin Cycad on the Tiwi Islands confirm that there are extensive stands of 'high' (>400 stems/ha) and 'very high' (700 stems/ha) density populations on both Melville and Bathurst Islands. The Flora and Fauna Division considers that despite the uncertainty associated with the density estimates, it is unlikely that the removal of plants from within the subdivision area would constitute a significant impact upon the regional or global population of the species. *Typhonium jonesii*: Targeted field survey did not identify *T. jonesii* within the subdivision or surrounding area. The Flora and Fauna Division considers it highly unlikely that the proposed subdivision will significantly impact *T. jonesii*. *Typhonium mirabile*: Targeted surveys identified a substantial population of this species in and immediately adjacent to the proposed subdivision. This population is estimated to number in excess of 9000 individuals and represents the largest single occurrence of *T. mirabile* within its known distribution. The proposed development would result in the removal of approximately 482 known individuals as a result of habitat removal across the c. 15ha site. Habitat suitability modelling suggests between 21, 000ha and 38, 000ha of 'high likelihood' habitat for *T. mirabile* exists on Bathurst Island (exceeding 0.5 probability of occurrence/occupancy). Considering the caveats inherent in the model, this suggests that the

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		proportion of occupied habitat intersecting the development is likely to represent a very small proportion of the available habitat for the species on Bathurst Island (between 0.04% and 0.07%). The proposed clearing is therefore considered unlikely to result in a reduction in the availability of habitat to the extent that it results in a significant population decline or reduction in the Extent of Occurrence of *T. mirabile*. Similarly, the occurrence of a significant number of plants outside the development footprint in immediate proximity of the site means the proposal will not directly result in a reduction in the Area of Occupancy (AoO) for the species at the $2km^2$ assessment scale. Of more significance to the AoO is the management of indirect threats such as invasive species and fire as a result of the development. The proponent has committed to the development of a WMP as part of the CEMP and this will in part mitigate potential impacts upon residual populations in the area. However, as discussed below, it is recommended that the proponent develop a weed spread prevention plan detailing handover criteria and ongoing management principles for the site from an invasive species hygiene perspective. This should provide further mitigation against future declines in habitat quality and occupancy as a result of the development proposal. The predicted reduction in the global population of *T. mirabile* is estimated at approximately 5.13% based on the removal of these 482 individuals from a population estimate consisting of known survey and database records only (c. 9, 390). This decrease appears to only be attributed to "Bathurst Island" in the referral report. Estimates based on the current database records from Bathurst Island combined with those from the current survey suggest that the actual decrease based on this method is c. 5.21%. It is noted that given the large area of potentially highly suitable habitat present on the Tiwi Islands it could be reasonably expected that the Bathurst Island subpopulation of *T. mirabile* would greatly exceed the value of 9238 used to derive this estimate. Although results from surveys illustrate that the pattern of distribution of individual Typhonium plants across a site and patch is irregular, and not that of an organism occurring evenly across a given area, and considering a range of relevant factors, a lower bound estimate of 10,000 individual plants and upper bound estimate of 100,000 individuals could be applied for *T. mirabile*. Using a precautionary approach would assess the scale of impacts to the entire population based on the lower bound estimate, acknowledging that the range to the upper bound estimate is relatively large. Based on the lower bound estimate of 10,000 individuals, the Flora and Fauna Division considers that the subdivision would result in a reduction in the global population by a maximum of 4.8%, with the actual reduction likely to be substantially less than this. Even at the lowest population estimate, the Flora and Fauna Division considers that the impact is unlikely to alter the conservation status of the species or significantly impact an

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		important population, especially since the development is expanding the boundary of a highly disturbed zone, rather than sited within an extensive previously undisturbed area.
LAND Section 5.4.2	Biodiversity – Vegetation (Terrestrial Ecosystems)	Sensitive and/or Significant Vegetation: An approximately 2ha stand of large, potentially hollow-bearing trees was identified by the proponent during on ground surveys of the subdivision site. Vegetation with trees of this type is considered sensitive and/or significant given the important role they play as habitat for a range of woodland vertebrate species. The eucalypt woodlands of the Tiwi Islands are characterised by their largely intact distribution of tree size classes and high incidence of tree-hollows. This is likely a product of the high rainfall, rapid growth rates, relatively benign fire regimes and frequent incidence of tropical cyclones. Eucalypt woodlands are widely distributed across the Tiwi Islands totalling approximately c. 479,000ha in area. The proposed development site is located immediately adjacent to the Wurrumiyanga community and as such, the overall condition of the vegetation on the site was noted by the proponent to be negatively affected by both exotic species establishment and altered fire regimes. It is unlikely that this stand of vegetation would represent habitat critical to the survival of a population of threatened species given the extensive occurrence (c. 479000ha) of eucalypt dominated Woodlands and Open Forests on the Tiwi Islands more broadly and the small total area of disturbance involved. The Flora and Fauna Division considers the removal of approximately 15ha in total (c.15% of which is Sensitive/Significant) is unlikely to result in a significant impact upon the extent and availability of large hollow-bearing trees at the regional scale. Invasive Species Management: The referral documents note the development of a WMP as part of the site CEMP. The referral indicates that these plans will cover the construction phase of the development. Given the ongoing nature of the potential threat posed by the introduction of invasive species (including but not limited to declared weeds) during the construction phase, further details on the criteria associated with handover of the site from a weed and invasive species hygiene perspective should be provided.