ATTACHMENT A

LITCHFIELD COUNCIL

Community effort is essential

29 October 2019

Development Assessment Services and Lands Planning
Department of Infrastructure, Planning and Logistics
GPO Box 1680
Darwin NT 0801

RE: Letter of Comment Concurrent Application

PA2019/0337
Section 3321 (50) Secrett Road, Knuckey Lagoon, Hundred of Bagot
Rezone from Zone R (Rural) to Zone RL (Rural Living)
and Subdivide to Create Three Lots

Thank you for the Concurrent Application referred to this office on 11 October 2019, concerning the above. This letter will be tabled at Litchfield Council's next Council Meeting on 20 November 2019. Should this letter be varied or not endorsed by Council, you will be advised accordingly.

The following issues are raised for consideration by the Authority:

Council supports the granting of a Planning Scheme Amendment and Development Permit for the following reasons:

a) The subject site is suitable to rezone to allow for smaller lot sizes due to its location adjacent other lots in Zone RL (Rural Living) and its proximity to urban uses along Vanderlin Drive.

b) The proposed plan of subdivision is suitable to meet minimum lot sizes required for Zone RL (Rural Living), and, given the width of the proposed battleaxe for Lot 1, provides well for future subdivision opportunities.

Should the application be approved, the Council requests the following condition(s) be included as Condition(s) Precedent in any Development Permit issued by the consent authority:

a) Prior to the endorsement of plans and prior to the commencement of works, a schematic plan demonstrating the on-site collection of stormwater and its discharge into Litchfield Council's stormwater drainage system shall be submitted to and approved by Litchfield Council.

Should the application be approved, the following condition(s) pursuant to the *Planning Act* and Council's responsibility under the *Local Government Act* are also recommended for inclusion in any Development Permit issued by the consent authority:

a) A monetary contribution is required to be paid to Litchfield Council in accordance with its development contribution plan for the upgrade of roads and drainage infrastructure as a result of this development.

b) Engineering design and specifications for the proposed and affected roads, street lighting, stormwater drainage, vehicular access, pedestrian/cycle corridors, and streetscaping shall be to the technical requirements and approval of Litchfield Council, with all approved works constructed at the developer's expense.

Note: Design drawings shall be approved by Litchfield Council prior to construction of the works.

c) All existing or proposed easements or reserves required for the purposes of stormwater drainage, roads, access or for any other purpose, shall be made available free of cost to, and in favour of, Litchfield Council and/or neighbouring property owners.

Should the application be approved, the following notes are recommended for inclusion in any Development Permit issued by the consent authority:

a) Inspection fees and charges may apply in accordance with Litchfield Council's current Fees and Charges. Additional information can be found at www.litchfield.nt.gov.au.

b) A *Works Permit* is required from Litchfield Council before commencement of any work within the road reserve, which would include creation of any driveway crossover connecting to Litchfield Council's road network.

c) Notwithstanding any approved plans, signs within Litchfield Council's municipal boundaries are subject to approval under Clause 6.7 of the NT Planning Scheme.

If you require any further discussion in relation to this application, please contact **Litchfield Council's Planning and Development division** on 08 8983 0600 and you will be directed to the appropriate officer to address your query.

Yours faithfully

Nadine Nilon
Director Infrastructure and Operations

ATTACHMENT B

earl james & associates

Ph 08 8981 2494
Fax 08 8981 5205
Email darwin@eja.com.au
www.eja.com.au
GPO Box 884 Darwin NT 0801
10 Harvey St Darwin NT 0800
ABN 30 112 988 625

Concurrent Application

Section 3321, Hundred of Bagot

Reason for Concurrent Application

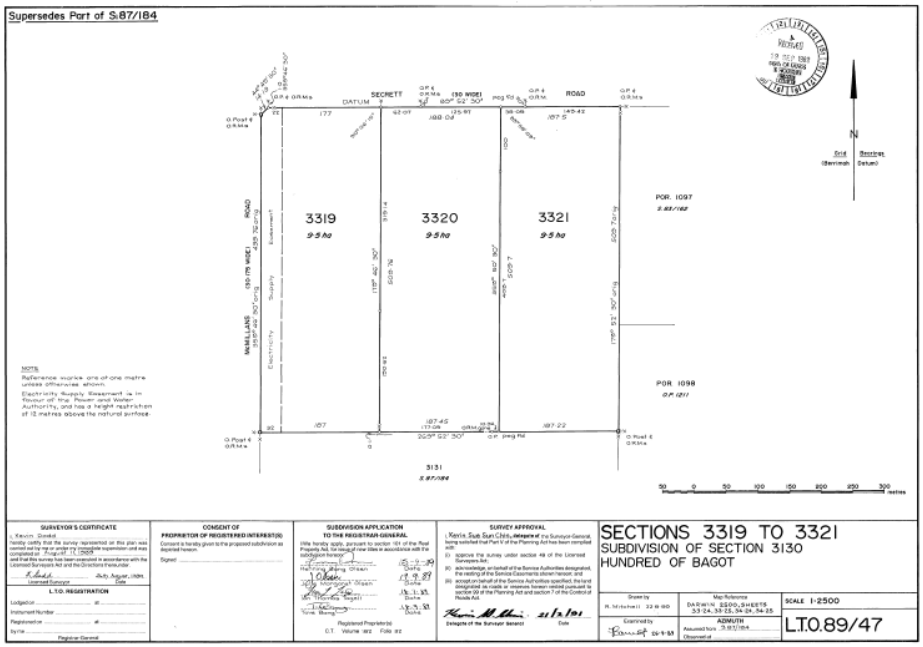
Section 3321, Hundred of Bagot is located in Secrett Road, Knuckey Lagoon and is owned by local residents Tove and Ian Tagell. The area of Section 3321 is in excess of 9.5 hectares with the property dimensions depicted on survey plan LTO89/047.

The Knuckey Lagoon locality is a rural living area with a variety of existing uses and is approximately 9 kms north east of the Darwin CBD. The property fronts onto Secrett Road which in turn can be accessed from Vanderlin Drive or the Stuart Highway.

The subject land is currently zoned R (Rural) under the NT Planning Scheme (NTPS). The minimum lot size permitted under the R zoning is 8 hectares but the merits of smaller rural living allotments in the immediate vicinity has previously been recognised when the Minister rezoned adjacent parcels Section 3319 and 3320 to RL (Rural living).

In order to yield lots with areas less than 8 hectares, Section 3321 will need to be rezoned and then the approval of the consent authority (Development Consent Authority) will be required for the proposed subdivision.

After consultation with representatives from the Department of Infrastructure, Planning and Logistics, it has been determined that the most appropriate course of action will be to utilise the Concurrent Application process as it will allow for a single application, a single exhibition period for the Planning Scheme amendment and development application components of the application and also allow for a single submission/comment from authorities and members of the community.

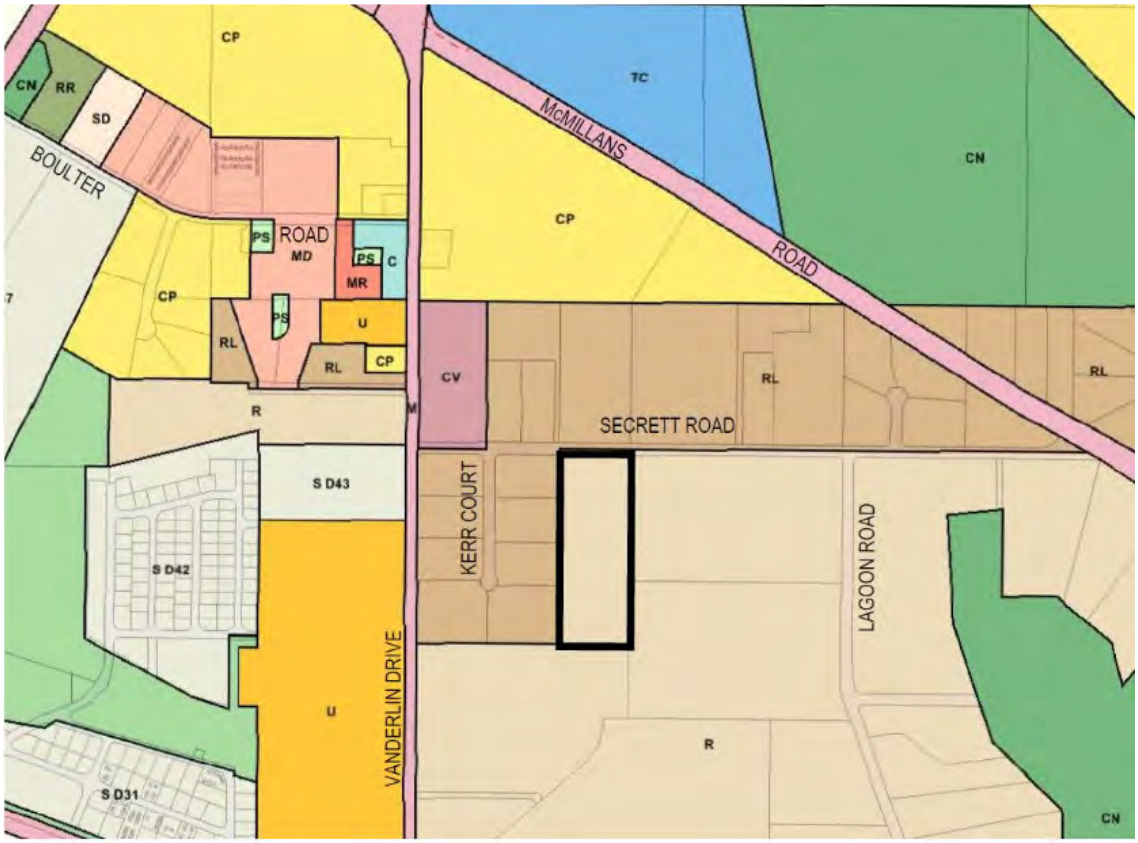


Description of the Proposed Amendment

The objective of this application is to create rural living parcels with a minimum lot size of 2 hectares.

In order to achieve that objective, the first step is to amend the NT Planning Scheme and change the zoning of Section 3321 from R (Rural) to RL (Rural Living). As mentioned previously, the zoning of the land immediately to the west (previously Sections 3319 and 3320) was changed to RL to facilitate a rural living subdivision that has now been completed and the land on the opposite side of Secrett Road is also zoned RL.

Existing zonings in the area are shown on the diagram below.



The primary purpose of the Rural zone, as described in the NTPS is *to provide for a range of activities including residential, agricultural and other rural activities.*

The larger (8 hectare minimum) lot sizes in zone R are meant to facilitate the separation between potentially incompatible uses and restrict closer settlement.

The primary purpose of zone RL is to *provide for low-density rural living and a range of rural land uses including agriculture and horticulture.*

The intention is to rezone Section 3321 to RL and this would be consistent with the zoning of the land on the opposite side of Secrett Road and the land immediately to the west.

Below is a comparison of the Zoning Tables for the existing and proposed zones.

Whilst the zones are generally consistent, Agriculture and Horticulture change to Discretionary uses in the RL zone. These changes are more compatible with the rural living lifestyle that is developing in the area.

Zoning Table – Zone RL

abattoir	x	
agriculture	D	6.1, 10.1, 10.2
animal boarding	D	6.1, 6.5.1, 10.1, 10.2
business sign	P	6.7
caravan park	x	
caretaker's residence	x	
car park	x	
child care centre	D	6.1, 6.5.1, 8.1.5, 10.2
community centre	D	6.1, 6.5.1, 10.2
domestic livestock	P	6.1, 10.1, 10.2
education establishment	x	
fuel depot	x	
general industry	x	
group home	P	7.1, 7.3, 7.10.5
helicopter landing sites	D	7.10.10
home based child care centre	P	6.5.1, 7.10.6
home based contracting	P	7.10.8, 10.2
home based visitor accommodation	S	7.10.1
home occupation	P	7.10.7
horticulture	D	10.2
hospital	x	
hostel	x	
hotel	x	
independent unit	P	6.5.1, 7.1, 7.3, 7.5, 7.10.4
intensive animal husbandry	D	6.1, 10.1, 10.2
leisure and recreation	x	
licenced club	x	
light industry	x	
medical clinic	x	
medical consulting rooms	P	6.5.1, 7.10.9
motel	x	
motor body works	x	
motor repair station	x	
multiple dwellings	x	
office	x	
passenger terminal	x	
place of worship	x	
plant nursery	D	6.1, 6.5.1, 10.2
promotion sign	x	
recycling depot	x	
restaurant	x	
retail agricultural stall	P	6.1, 10.2
rural industry	D	6.1, 6.5.1, 10.2, 10.6
service station	x	
shop	x	
showroom sales	x	
single dwelling	P	6.5.1, 7.1, 7.3
stables	D	6.1, 6.5.1, 10.1, 10.2
supporting accommodation	D	6.5.1, 7.1, 7.3, 7.5, 7.6, 7.7, 7.8, 10.2
transport terminal	x	
vehicle sales and hire	x	
veterinary clinic	D	6.1, 6.5.1, 10.2
warehouse	x	

P = Permitted S = Self Assessable D = Discretionary x = Prohibited

Zoning Table – Zone R

abattoir	x	
agriculture	P	6.1, 10.1, 10.2
animal boarding	D	6.1, 10.1, 10.2
business sign	P	6.7
caravan park	x	
caretaker's residence	x	
car park	x	
child care centre	D	6.1, 6.5.1, 8.1.5, 10.2
community centre	D	6.1, 6.5.1, 10.2
domestic livestock	P	6.1, 10.1, 10.2
education establishment	D	6.1, 6.5.1, 10.2
fuel depot	x	
general industry	x	
group home	P	7.1, 7.3, 7.10.5
helicopter landing sites	D	7.10.10
home based child care centre	P	6.5.1, 7.10.6
home based contracting	P	7.10.8, 10.2
home based visitor accommodation	S	7.10.1
home occupation	P	7.10.7
horticulture	P	6.1, 10.2
hospital	x	
hostel	x	
hotel	x	
independent unit	P	6.5.1, 7.1, 7.3, 7.5, 7.10.4
intensive animal husbandry	D	6.1, 10.1, 10.2
leisure and recreation	x	
licenced club	x	
light industry	x	
medical clinic	x	
medical consulting rooms	P	6.5.1, 7.10.9
motel	x	
motor body works	x	
motor repair station	x	
multiple dwellings	x	
office	x	
passenger terminal	x	
place of worship	D	6.1, 6.5.1, 10.2
plant nursery	P	6.1, 6.5.1, 10.2
promotion sign	x	
recycling depot	x	
restaurant	D	6.1, 6.5.1, 6.6, 10.2
retail agricultural stall	P	6.1, 10.2
rural industry	D	6.1, 6.5.1, 10.2, 10.6
service station	x	
shop	x	
showroom sales	x	
single dwelling	P	6.5.1, 7.1, 7.3
stables	D	6.1, 6.5.1, 10.1, 10.2
supporting accommodation	D	6.5.1, 7.1, 7.3, 7.5, 7.6, 7.7, 7.8, 10.2
transport terminal	D	6.1, 6.5.1, 6.6, 10.1, 10.2, 10.5
vehicle sales and hire	x	
veterinary clinic	D	6.1, 6.5.1, 10.2
warehouse	x	

P = Permitted S = Self Assessable D = Discretionary x = Prohibited

Statement of Strategic Intent

As mentioned previously, the Knuckey Lagoon locality is a rural living area with a variety of existing uses.

The land to the west is zoned RL, as is the land directly opposite on the northern side of Secrett Road. The property on the north eastern corner of the intersection of Vanderlin Drive and Secrett Road is zoned CV (Caravan Park) and further to the north is CP (Community Purpose) land comprising the Peter McAulay Centre (police and emergency services).

The land abutting the eastern and southern boundaries of Section 3321 is zoned Rural.

The area immediately to the west of Vanderlin Drive is referred to as Berrimah North. The ongoing development of this area is controlled by the Berrimah North Area plan which proposes, amongst other uses, urban residential, rural residential, community and light industry.

The Berrimah North Area Plan does not extend to the east of Vanderlin Drive however the rural living allotments being proposed for Section 3321, and those that have recently been developed to the west of Section 3321, will complement the denser uses that will develop as Berrimah North progresses.

Section 3321 is comprised within an area that is identified as Rural Area within the Litchfield Subregional Land Use Plan 2016 and similarly, as Rural Lifestyle in the Darwin Regional Land Use Plan 2015 (DRLUP).

One of the basic philosophies of the DRLUP is *increasing the choices in housing types, both on higher density more compact urban residential lots and a range of rural lifestyle lots.*

The DRLUP also *endorses the continuation and ongoing development of rural lifestyle lots within the Litchfield Municipality*

Consequently, the proposed Planning Scheme Amendment, and the intended use for the subject land, is consistent with the land use plans and land use objectives for the area.

Demand for rural lifestyle lots in the Knuckey Lagoon area has always been strong due to the convenient location which allows easy access to Darwin CBD, Casuarina, Palmerston and Litchfield via established arterial roads.

The proposed Planning Scheme amendment being proposed by this application, and the associated Development Application, will facilitate the development of rural lifestyle lots that will provide housing choice to help meet current demand.

The proposed lots, whilst also meeting demand, will help to establish a population base to support the proposed Berrimah North activity centre.

Land Suitability

A Land Suitability Assessment (LSA) in accordance with the NT Land Suitability Guidelines has been prepared by Graeme Owen, an Environmental Scientist with VPS Land Assessment and Planning.

The LSA (attached) advises that the land is relatively flat with slopes less than 0.5%.

The land is made up of land unit 3a which comprises mostly well drained, red Kandosols.

The land has previously been extensively cleared (prior to the introduction of clearing controls) with much of the northern part of the property used as a mango orchard. The orchard is no longer irrigated and is gradually being removed and replaced by mown grassland.

None of the remaining native vegetation will be affected by the establishment of the proposed property boundaries.

Section 3321 does not comprise any Priority Environmental Management areas.

The land does not have any physical characteristics that would make the proposed Planning Scheme amendment or the associated development proposal (create 3 lots) inappropriate.

Infrastructure

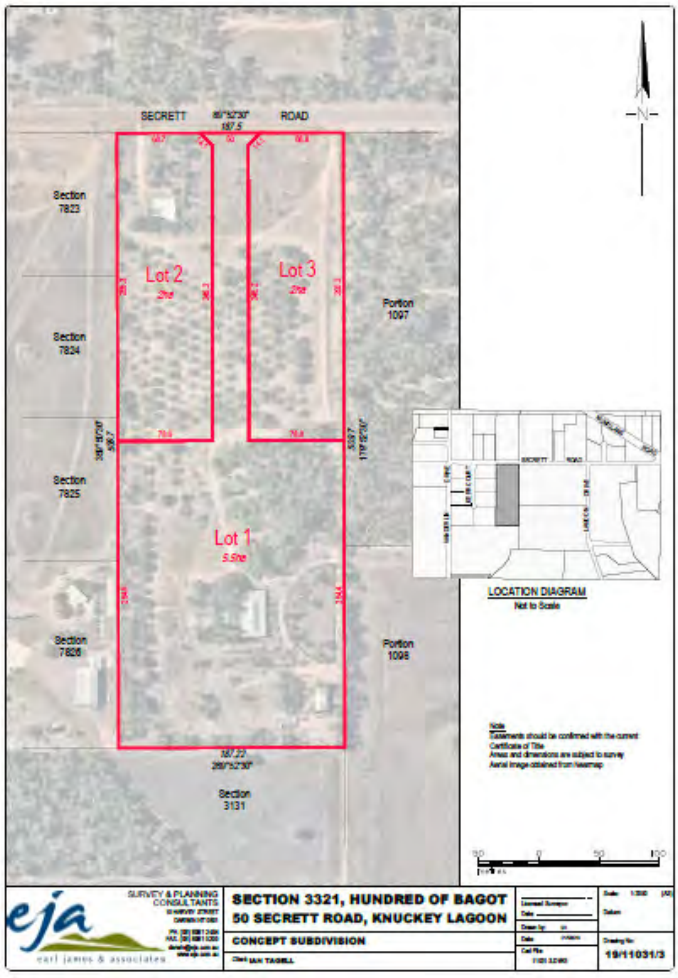
Preliminary engineering advice has been sought in relation to the capacity of the existing power and water reticulation in Secrett Road to service the three lots that may eventuate if the Planning Scheme amendment and Development Application are approved.

The advice is that there is sufficient capacity but it is appreciated that detailed engineering design will be required once the Development Application has been determined. The design, and subsequent construction of the new services will be carried out by certified design professionals and approved contractors in consultation with the Power and Water Corporation.

Reticulated sewerage is not available in this locality and on-site waste water treatment and disposal systems are currently utilised on the site. The existing systems operate effectively and the Land Suitability Assessment has not identified any issues with the existing soils being capable of handling the continued use of on-site systems.

Access into Section 3321 is from Secrett Road. There are currently two accesses and a third access is proposed for proposed Lot 1. Design and construction of the accesses will be in accordance with Litchfield council requirements.

Secrett Road forms part of an integrated, public road network that provides easy access to and from the subject land.



The concept subdivision proposal

Conclusion

The proposed Planning Scheme amendment will facilitate the development of a rural living subdivision that is expected to yield three lots.

The Land Suitability Assessment has determined that there are no physical impediments to the subdivision proposal and there are appropriate services adjacent to the site to service the proposed lots.

Amendment of the NT Planning Scheme as proposed by this application will be consistent with the Darwin Regional Land Use Plan and the Litchfield Subregional Land Use Plan and will facilitate suitable development in the area.

earl james & associates

Ph 08 8981 2494
Fax 08 8981 5205
Email darwin@eja.com.au
www.eja.com.au
GPO Box 884 Darwin NT 0801
10 Harvey St Darwin NT 0800
ABN 30 112 988 625

Proposed Development Report

Section 3321, Hundred of Bagot

This report forms part of a Concurrent Application seeking approval to change the zoning of Section 3321, Hundred of Bagot from R (Rural) to RL (Rural Living) and to subsequently subdivide the land in order to create 3 lots.

The report will assess the compliance of the proposed subdivision with the relevant sections of the NT Planning Scheme on the basis that the land is zoned RL.

Section 3321, Hundred of Bagot is located in Secrett Road, Knuckey Lagoon and is owned by local residents Tove and Ian Tagell. The area of Section 3321 is in excess of 9.5 hectares with the property dimensions depicted on survey plan LTO89/047.

The Knuckey Lagoon locality is a rural living area with a variety of existing uses and is approximately 9 kms north east of the Darwin CBD. The property fronts onto Secrett Road which in turn can be accessed from Vanderlin Drive or the Stuart Highway.

Whilst the Knuckey Lagoon area is primarily rural living, the area immediately to the west of Vanderlin Drive is referred to as Berrimah North. The ongoing development of this area is controlled by the Berrimah North Area plan which proposes, amongst other uses, urban residential, rural residential, community and light industry.

Developing Section 3321 for rural living allotments will complement the ongoing Berrimah North development and this was recognised by the Minister and the Development Consent Authority when the land immediately to the west (previously comprised within Sections 3319 and 3320) was rezoned to RL and subdivided into 8 rural living allotments.

As previously mentioned, this application is seeking the approval of the Development Consent Authority to subdivide Section 3321, Hundred of Bagot in order to create three lots in accordance with plan 19/11031/3.

The minimum lot size requirements for subdivisions are set out in Clause 11.1.1 of the NT Planning Scheme (NTPS). The minimum lot size in zone RL is 2 hectares and each of the proposed lots will comply with this minimum area provision.

Clause 11.4.2 deals with infrastructure in rural subdivisions and lists the following factors that design should take into account:

a) Minimise disturbance through earthworks associated with the provision of infrastructure

The only earthworks involved with the proposed subdivision will be the construction of the additional access to service proposed Lot 1. This work will be carried out in consultation with Litchfield Council and in accordance with standard erosion and sediment control measures.

b) Provide for connection to reticulated services where possible

There is existing, reticulated power and water in Secrett Road and this will be utilised for the proposed lots (discussed in more detail later on in this report).

c) Where no reticulated sewerage is available, demonstrate that the soils are suitable for the on-site absorption of effluent without detriment to the environment and in particular to ground and surface waters.

On site systems will be used for waste water treatment and disposal (discussed further in this report)

d) Where no reticulated water is available, demonstrate that an adequate supply of groundwater is available for domestic purposes

Reticulated water is available.

Clause 11.4.3 of the NTPS deals with lot size and configuration in rural subdivisions.

The purpose of this clause is to ensure that lots are of a size and configuration suited for the intended purpose. All of the proposed lots are certainly suitable for rural living.

Proposed Lots 2 and 3 are regular shaped and Lot 1 has a battle-axe access in order to accommodate a future public road if required at some time in the future.

30C(4)(a) – Compliance with an Interim Development Control Order

The subject area is not affected by an IDCO.

30C(4)(b) – Public Environmental Report or Environment Impact Statement

There is no requirement for a report or statement under the Environmental Assessment Act.

30C(4)(c) – Merits of the proposed development

The merit of rural living allotments in this immediate locality has previously been recognised by the relevant authorities and the compliance of the proposal with strategic planning for this area is addressed in the proposed Planning Scheme Amendment Report section of this Concurrent Application.

The proposal will make better use of a currently under-utilised land resource that is located in a convenient location.

30C(4)(d) – The physical characteristics of the land

A Land Suitability Assessment (LSA) in accordance with the NT Land Suitability Guidelines has been prepared by Graeme Owen, an Environmental Scientist with VPS Land Assessment and Planning.

The LSA (attached) advises that the land is relatively flat with slopes less than 0.5%.

The land is made up of land unit 3a which comprises mostly well drained, red Kandosols.

The land has previously been extensively cleared (prior to the introduction of clearing controls) with much of the northern part of the property used as a mango orchard. The orchard is no longer irrigated and is gradually being removed and replaced by mown grassland.

None of the remaining native vegetation will be affected by the establishment of the proposed property boundaries.

Section 3321 does not comprise any priority Environmental Management areas.

30C(4)(e) – Public facilities or open space

The subdivision does not create a demand for any additional public facilities or open space.

30C(4)(f) – Public utilities and infrastructure

There are currently two existing accesses from Secrett Road. The intention is for these accesses to provide access into proposed Lots 2 and 3 with a new access being required to service proposed Lot 1. Proposed Lot 1 will be a battle-axe allotment however the access has been designed 30m wide so it can accommodate a public road should Lot 1 and the land to the south be further developed in the future and require a formal road access.

The design and construction of all access points will be carried out in consultation with Litchfield Council as the responsible road authority.

Reticulated power and water are available in Secrett Road and this existing reticulation will be utilised to service the proposed lots. All design and construction will be carried out by certified design consultants and contractors in consultation with the Power and Water Corporation.

Reticulated sewerage is not available in this locality and on-site systems are currently used for the treatment and disposal of waste water. The existing systems, which operate effectively, will be retained and it is expected that proposed Lot 3 will also utilise an on-site system if and when it is developed in the future.

The LSA has concluded the land within each of the proposed 3 lots would be defined as low risk (high capability) for on-site wastewater systems.

The existing accesses off Secrett Road

30C(4)(g) – Potential impact on the existing and future amenity of the area

The proposed subdivision will create two additional, rural living allotments.

Given the low density and consistency with the existing development in the immediate vicinity there will be no adverse impact on the existing or future amenity of the

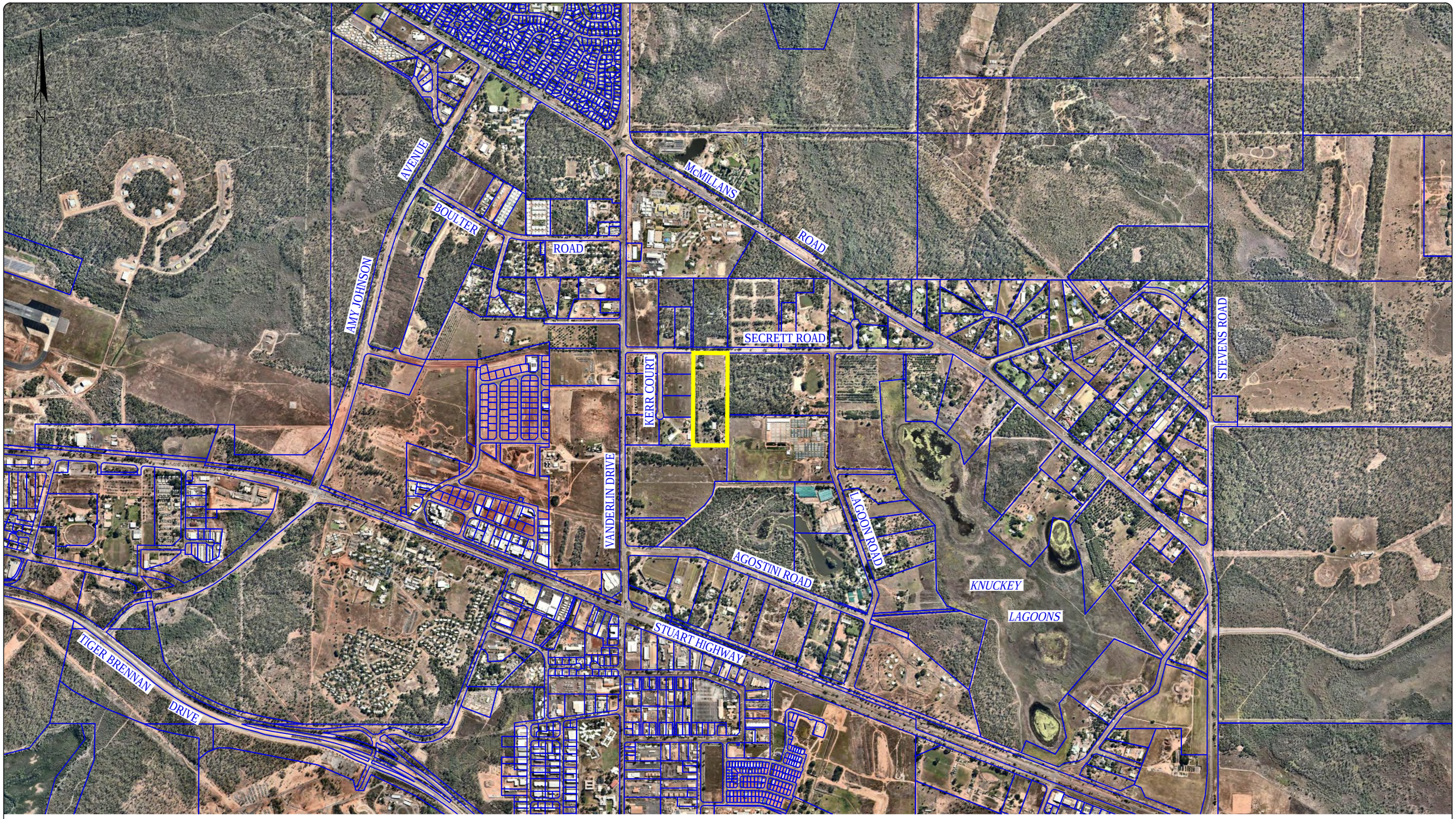


Image obtained from Nearmap

500 0 500 1000
metres

SURVEY & PLANNING CONSULTANTS
10 HARVEY STREET
DARWIN NT 0801
PH. (08) 8981 2494
FAX. (08) 8981 5205
darwin@eja.com.au
www.eja.com.au
earl james & associates

SECTION 3321, HUNDRED OF BAGOT
50 SECRETT ROAD, KNUCKEY LAGOON

LOCATION PLAN

Client: IAN TAGELL

Licensed Surveyor: .....
Date: .....

Drawn by: SH
Date: 23/7/2019
Cad File: 11031-5.DWG

Scale: 1:20 000 (A3)
Datum:

Drawing No: 19/11031/5

SECRETT ROAD

Section 7823

Section 7824

Section 7825

Section 7826

RL

Portion 1097

Portion 1098

Section 3131

50 0 50 100
metres

SURVEY & PLANNING CONSULTANTS
10 HARVEY STREET
DARWIN NT 0801
PH. (08) 8981 2494
FAX. (08) 8981 5205
darwin@eja.com.au
www.eja.com.au
earl james & associates

SECTION 3321, HUNDRED OF BAGOT
50 SECRETT ROAD, KNUCKEY LAGOON

REZONING PLAN

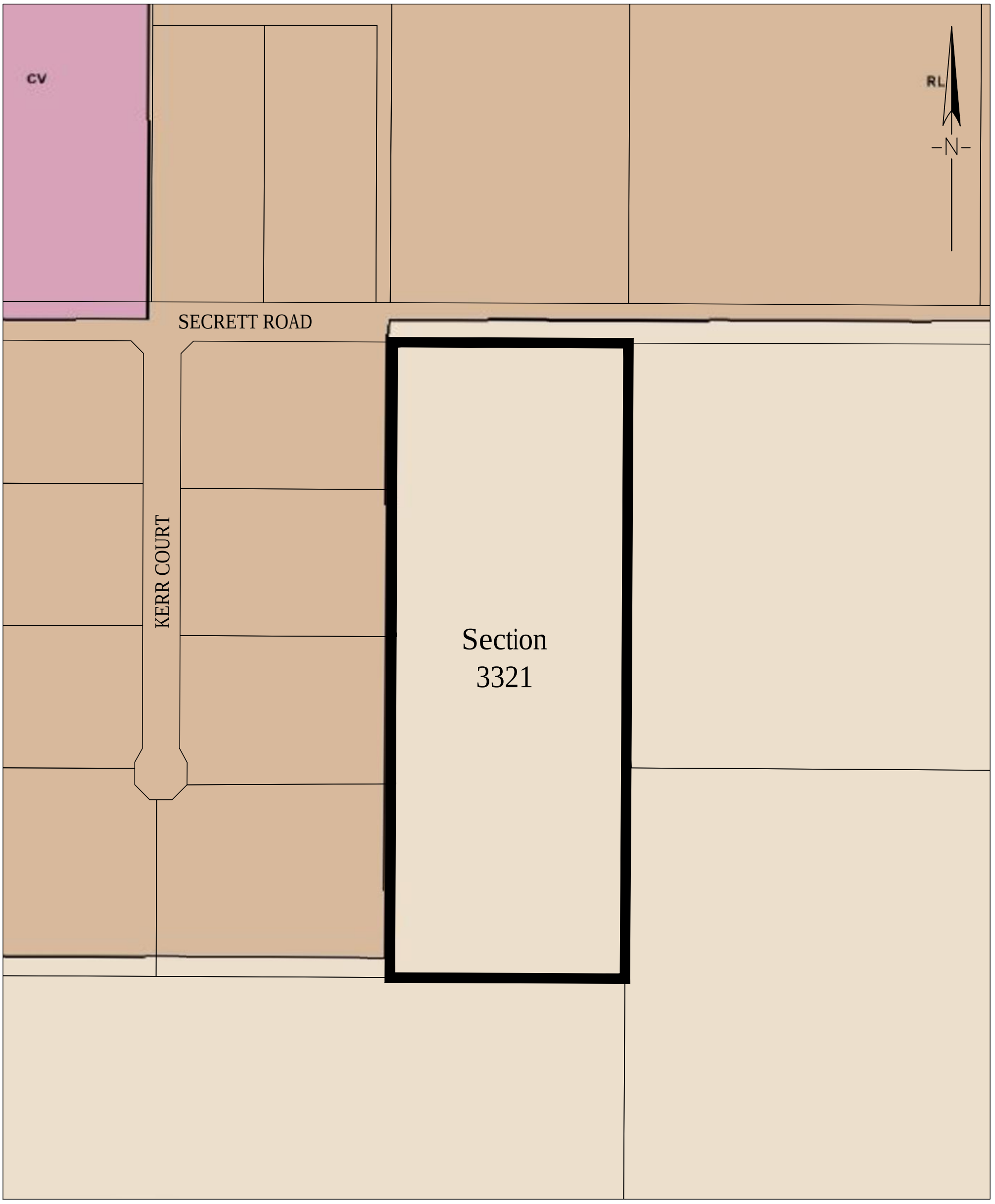
Client: IAN TAGELL

..... Licensed Surveyor:
Date: .....

Drawn by: SH
Date: 23/7/2019
Cad File: 11031-4.DWG

Scale: 1:2000 (A3)
Datum:

Drawing No: 19/11031/4



SURVEY & PLANNING
CONSULTANTS
10 HARVEY STREET
DARWIN NT 0801
PH. (08) 8981 2494
FAX. (08) 8981 5205
darwin@eja.com.au
www.eja.com.au
earl james & associates

SECTION 3321, HUNDRED OF BAGOT
50 SECRETT ROAD, KNUCKEY LAGOON

CURRENT ZONES

Client: IAN TAGELL

.....
Licensed Surveyor:
Date: .....

Drawn by: SH

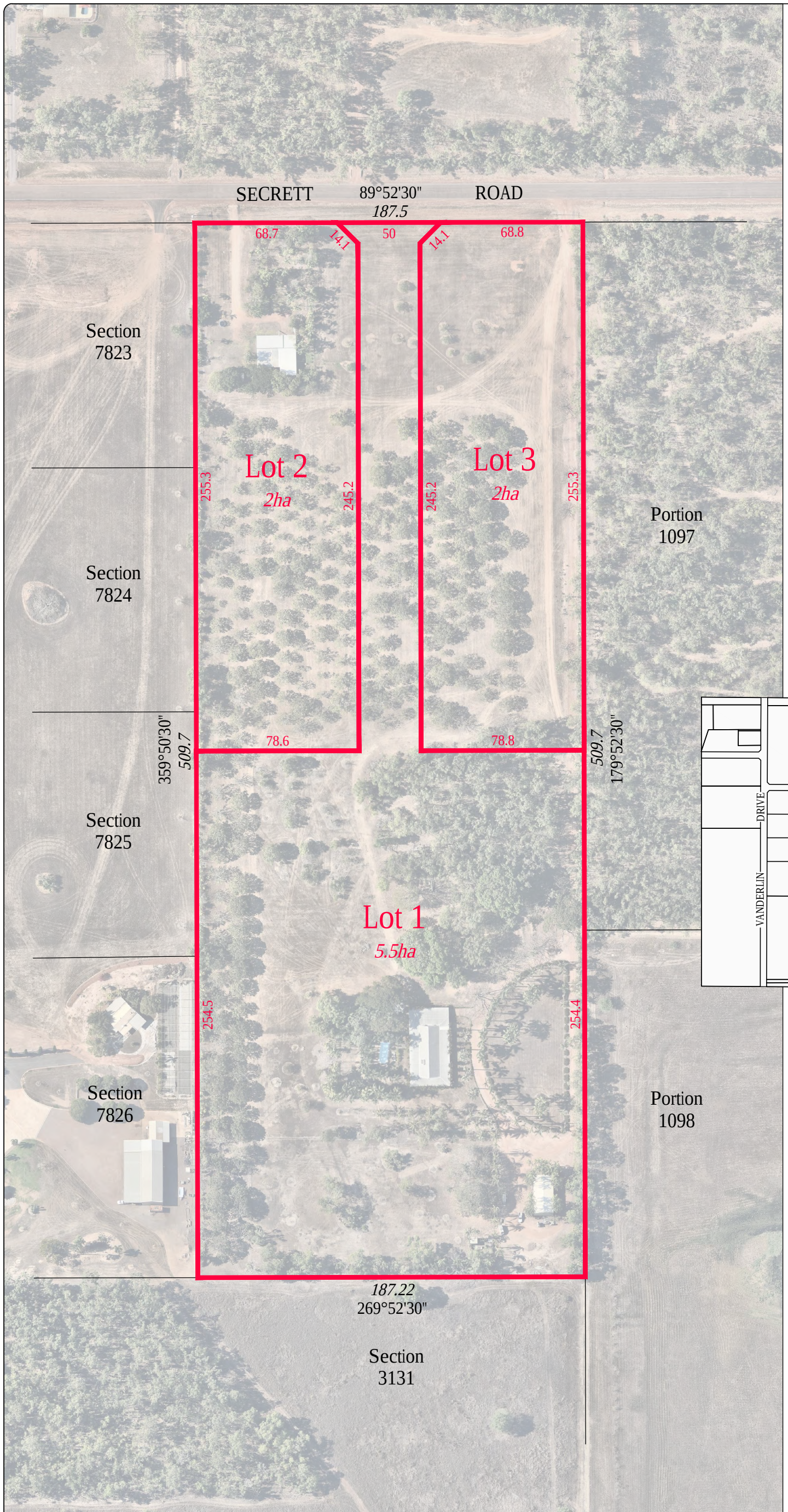
Date: 23/7/2019

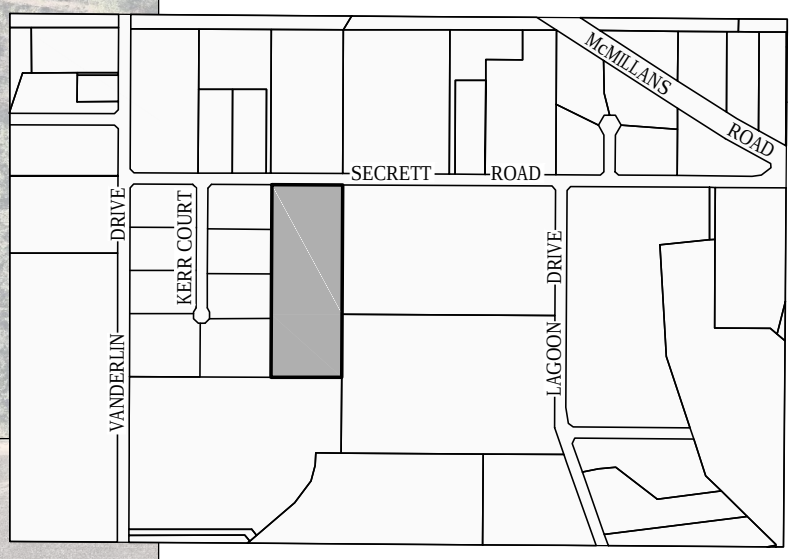
Cad File: 11031-6.DWG

Scale: 1:3000 (A3)

Datum:

Drawing No: 19/11031/6





LOCATION DIAGRAM

Not to Scale

Note

Easements should be confirmed with the current Certificate of Title

Areas and dimensions are subject to survey

Aerial image obtained from Nearmap

50 0 50 100

metres

SURVEY & PLANNING CONSULTANTS
10 HARVEY STREET
DARWIN NT 0801
PH. (08) 8981 2494
FAX. (08) 8981 5205
darwin@eja.com.au
www.eja.com.au
earl james & associates

SECTION 3321, HUNDRED OF BAGOT
50 SECRETT ROAD, KNUCKEY LAGOON

CONCEPT SUBDIVISION

Client: IAN TAGELL

Licensed Surveyor: .....

Date: .....

Drawn by: SH

Date: 21/5/2019

Cad File: 11031-3.DWG

Scale: 1:2000 (A3)

Datum:

Drawing No: 19/11031/3

Land Suitability Assessment: Sections 3321; Hundred of Bagot (50 Secrett Road, Knuckey Lagoon)

Compiled by

VPS Land Assessment and Planning

On behalf of

Ian Tagell c/o Earl James and Associates

July 2019

Reliance, Uses and Limitations

This report is copyright and is to be used only for its intended purpose by the intended recipient, and is not to be copied or used in any other way. The report may be relied upon for its intended purpose within the limits of the following disclaimer. This document has been prepared for the persons to whom it has been addressed and, if printed, should be printed in colour.

This study, report and analyses have been based on the information available to VPS Land Assessment and Planning at the time of preparation. VPS Land Assessment and Planning accepts responsibility for the report and its conclusions to the extent that the information was sufficient and accurate at the time of preparation.

Certain information contained in this report is based on sources believed to be reliable. VPS Land Assessment and Planning is not in a position to, and has not, verified the accuracy or completeness of such information. Accordingly, VPS Land Assessment and Planning takes no responsibility for, and assumes no liability in respect of, any information provided to it by others or sourced from external sources for the purpose of preparing this report, or the consequences of the use of such information.

Surface and subsurface conditions are created by natural processes and anthropogenic activities. Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. This Report is based on assumptions that the site conditions as revealed through selective sampling are indicative of conditions throughout the site. Data derived from literature and external data source review are interpreted to provide an opinion about overall site conditions and their likely impact on the proposed development. Natural landscapes are variable and actual subsurface conditions and soil depth may differ from those inferred to exist. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained.

Document Control Record

Prepared by	Graeme Owen
Position	Consultant Environmental Scientist
Signed	
Date	July 2019

Revision Status

Revision*	Description of Revision	Date	Approved
1	First Issue	1 July 2019	Graeme Owen

*Recipients are responsible for eliminating all superseded documents in their possession

VPS Land Assessment and Planning
ABN 75 917 726 387
PO Box 78, Palmerston NT 0831 Australia
vpsland@iinet.net.au www.landassessplan.com.au

Contents

List of Figures

List of Tables

1. Executive Summary

VPS Land Assessment and Planning was commissioned to conduct a Land Suitability Assessment (LSA) of Section 3321 Hundred of Bagot to assess the potential of the land for subdivision into 3 lots.

Section 3321 includes two existing homes and was once managed as a mango orchard however the remaining trees are no longer irrigated and are gradually being removed with the balance of the existing lot maintained as lawn and gardens with a small (~1 ha) area of retained native vegetation within proposed lot 1. Publicly available imagery shows that most native vegetation was cleared of prior to 2000. Establishing the lot boundaries for the proposed subdivision will require minimal disturbance of the site, other than the removal of a small number of mango trees, and clearing of native vegetation is not required.

Field investigation on Section 3321 confirmed that the soil-landscape reflects published land unit mapping (land unit 3a comprises mostly well drained, red Kandosols on low slopes) and did not identify any areas of constrained land. Assessment of Section 3321 against the seven categories within the Land Suitability Guidelines (NTG 2013) found the subject land is Highly Suitable (Class 1) for subdivision with all proposed lots including more than 1ha of unconstrained land adjacent to the proposed unconstrained public road access.

Field assessment confirmed that the soil-landscape across the site, and in particular proposed lot 3, is highly capable (Low Risk) of sustaining onsite wastewater management using treatment and disposal systems that will comply with the NT *Code of Practice* (DoH 2014a).

It is considered unlikely that Section 3321 provides suitable potential habitat for threatened native fauna as a result of historical clearing, land use changes and the arrival of invasive cane toads. However, as establishing the subdivision does not involve the clearing of native vegetation, it is expected that, even if present, no threatened species would be adversely affected by the proposed subdivision.

2. Introduction

VPS Land Assessment and Planning was commissioned to conduct a Land Suitability Assessment (LSA) of Section 3321 Hundred of Bagot (located at 50 Secrett Road, Knuckey Lagoon) to assess the potential of the land for 3 lot subdivision.

This report presents the results of the LSA. It provides an assessment of the issues and opportunities of the site in the context of the NT *Land Suitability Guidelines* (NTG 2013) and identifies other issues that may affect the suitability of the site for subdivision.

The *Land Suitability Guidelines* (NTG 2013) define land suitability as:

> *The fitness of a given area for land utilisation type (or land use), or the degree to which it satisfies the land user.*

The *Guidelines* address seven land suitability categories. These categories are:

- Drainage
- On-site wastewater management
- Erosion risk
- Soil salinity
- Acid sulphate soils
- Storm tide flooding
- Riverine flooding.

These categories are then assigned *suitability classes* in accordance with Table 2 of the *Guidelines* following assessment of the *relevant* characteristics identified through a review of existing land information and field investigations. Suitability classes 1-2 are considered to be generally 'unconstrained', while suitability classes 3-5 are considered to varying degrees to be 'constrained'. Land classified as suitability class 3-5 may prevent development from proceeding or require additional inputs in terms of design, planning and on-going management (NTG 2013).

The capability of the subject land to support onsite wastewater disposal is assessed against the capacity of the site to support onsite wastewater management systems that would comply with the NT *Code of Practice* (DoH 2014a).

This LSA includes an assessment of potential environmental issues associated with threatened flora / fauna and weeds.

3. Background

2.1. Site location

Section 3321 Hundred of Bagot (50 Secrett Road, Knuckey Lagoon) is located 2 kms east of Darwin International Airport (Figure 1) within the Litchfield Municipality.

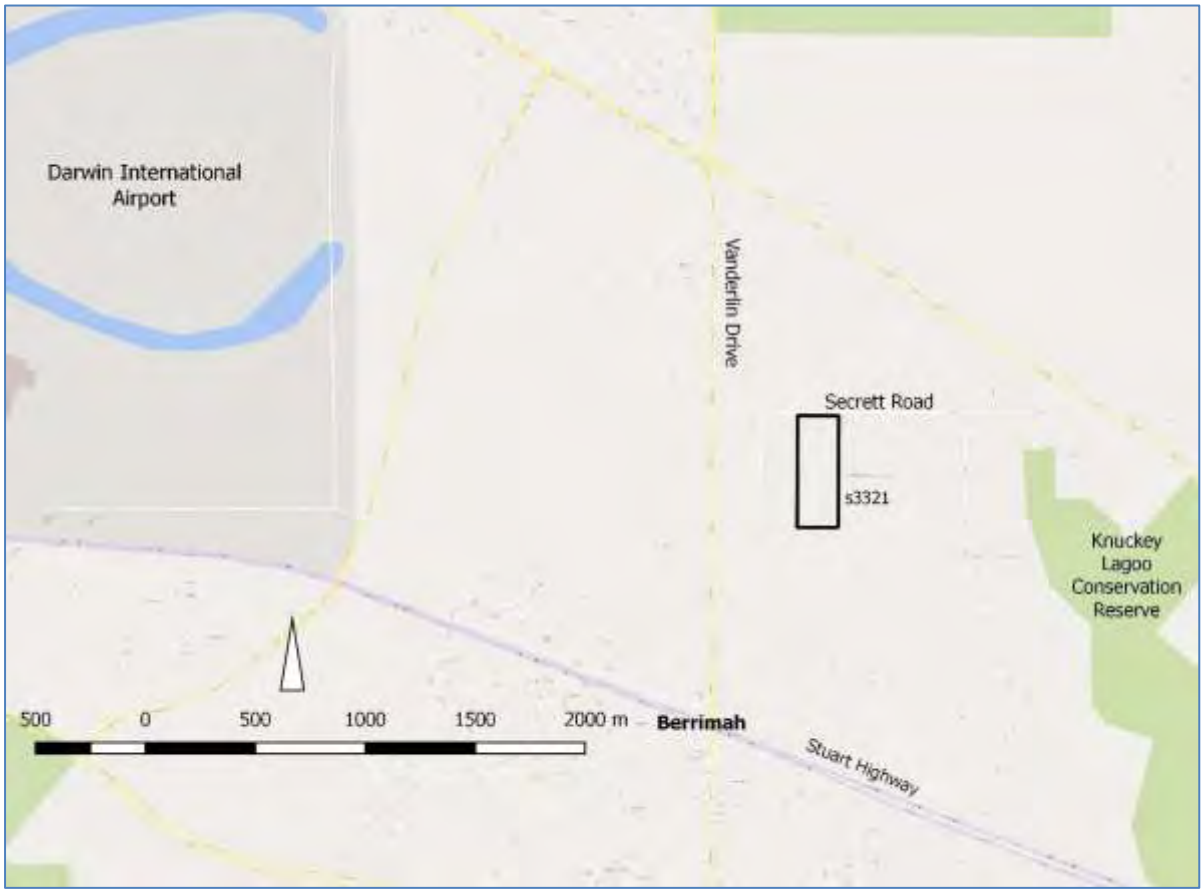


Figure 1: Location of Section 3321 at 50 Secrett Road, Knuckey Lagoon

2.2. Site Description

Section 3321 is zoned R - 'Rural' and comprises 9.5 ha (approximately 23.5 acres) with road access via Secrett Road (Figure 2). The lot was extensively cleared before clearing controls were implemented with much of the front half of the lot once managed as a mango orchard which is no longer irrigated and gradually being removed and replaced with mown grassland.

There are two existing residences on the block, one house located within proposed Lot 2 and the other at the rear within proposed Lot 3. Reticulated (town) water is available for all current and proposed residences on Section 3321. As reticulated sewer is not available the existing residences utilise onsite wastewater management (septics), as will any future residence on proposed lot 3. Existing bores in the vicinity of s3321 are not used for potable (drinking) water supply.

Other than the removal of some mango trees, no clearing of native vegetation is required to establish fence lines / boundaries for the proposed subdivision. The landowner reports no issues with soil drainage anywhere on the site.

Figure 2 Proposed layout and access for Section 3321

4. Desktop Review

3.1. Climate

The Knuckey Lagoon area experiences a monsoonal climate with two broad seasons; the "Dry Season" during which little to no rainfall occurs between April and September and the "Wet Season" over summer during which maximum rainfall generally occurs between November and March. The nearest rainfall data is collected at Berrimah Research Farm (Station Number: 14116) (BOM 2017) and shown in Table 1. There is no site-specific evaporation data available for this site however the BOM map of annual "*Average pan evaporation 1975-2005*" shows the Darwin region lies within an area that experiences 2000-2400mm average annual evaporation (which exceeds average annual rainfall).

Table 1 Berrimah Research Farm (14116) Monthly Rainfall (mm)

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	457	343	345	95.3	17.6	2.3	1.3	3.7	17.3	79	136	256	1724
Median	443	326	309	70.5	4.1	0.0	0.0	0.0	8.4	70	120	231	1692
Lowest	125	112	72	2.8	0.0	0.0	0.0	0.0	0.0	0	33	36	1039
Highest	868	845	935	379.2	267.5	46.2	20.3	30.8	111.2	250	353	583	2420

3.2. Land Resources

Land Unit Mapping

The Department of Environment and Natural Resources (DENR) has land unit mapping over the subject land (Fogarty *et al* 1984) published at a scale of 1:25 000.

According to Fogarty *et al* (1984), Section 3321 is mapped as land unit 3a (Table 2 and Figure 3).

Table 2 Summary of land unit descriptions (after Fogarty *et al* 1984)

Landform	Slope	Soils	Drainage	Vegetation
Plains - Flat to very gently undulating upland surface	0.5 - 2%	Deep Red Kandosols, minor Brown Kandosols (Deep red earths, minor yellow earths) occasionally up to 10% ferruginous subsoil gravel	Well drained	Open Forest; *Eucalyptus tetrodonta, E. miniata* with *Erythrophleum chlorostachys, Corymbia confertiflora, C. foelscheana;* Mid storey of *Cycas armstrongii, Livistona humilis, Syzygium suborbicular, Planchonia careya;* Grasses of *Mnesithea rottboellioides, Schizachyrium fragile, Heteropogon triticeus, Chrysopogon latifolius, Themeda triandra;* Small area of Woodland with Brown Kandosols with *C. foelscheana, E. miniata, Erythrophleum chlorostachys* and dense grasses.

Figure 3 DENR Land unit 3a across Section 3321

3.3. Onsite Waste Water Risk

Risk mapping for onsite wastewater disposal (DoH 2011) ranks land units in terms of *High*, *Moderate* and *Low* Risk. When expressed in terms of *land capability* (the capability of a site to support sustainable onsite wastewater disposal) the rankings relate to Low Capability, Moderate Capability and High Capability respectively. DoH (2011) rates Land unit 3a as *Moderate* Risk (Moderate Capability) for onsite wastewater management. The landowner reports no issues with soil drainage affecting existing septic systems.

3.4. Environmental Issues

Section 3321 is not within nor adjacent to a Litchfield Shire Priority Environmental Management (PEM) Area. There are no watercourses on or adjacent to the subject land and the nearest surface water is Ironstone Lagoon 500m to the southeast.

A desktop assessment of potential threatened flora and fauna that may occur within or nearby Section 3321 was undertaken. DENR flora data (NR Maps 2019) shows that no threatened flora species have been recorded within Section 3321 nor on adjoining land (Figure 4). DENR data (NR Maps 2019) of fauna in the vicinity of Section 3321 show only records of 3 threatened species (Table 3) on the completely cleared land of Section 2237 west of Section 3321 with the latest record of a threatened species in June 2000.

Table 3 Latest records for threatened species on Section 2237

Scientific Name	Common Name	Date recorded	TPWCA	EPBCA
Calidris ferruginea	Curlew Sandpiper	1/04/2000	VU	CR
Dasyurus hallucatus	Northern Quoll	8/06/2000	CR	EN
Mesembriomys gouldii gouldii	Black-footed Tree-rat	29/04/1998	VU	EN

A review of the conservation notes related to each species listed in Table 3 indicates that

- The Black-footed tree-rat requires large trees with hollows and a shrubby understorey and is notably disadvantaged by forest fragmentation and may be predated on by feral cats (Hill 2012). The cleared lands of Section 3321 do not provide the habitat requirements for the Black-footed tree-rat and the expanding development and clearing in the local area since the last record in 1998 means that it is considered unlikely that the species would be present on this land.
- The decline in quoll populations across the Top End has been well documented prior to the arrival of cane toads; it was thought that these declines were potentially due to predation by or competition from feral cats. However, population decline increased dramatically following the arrival of cane toad as quolls have been found to be “particularly susceptible” to cane toad poison (Woinarski and Hill 2012). With the ongoing presence of cane toads, increasing development nearby and the marked decrease in potential natural habitat in the local area as evidenced by the clearing between 2000 and 2017 it is considered very unlikely that quolls would be found on Section 3321.

- The Curlew Sandpiper is a migratory bird. According to Ward (2012) "*These non-breeding birds forage around coastal brackish lagoons, intertidal mud and sand flats, estuaries, saltmarshes and occasionally on inland freshwater wetlands*". It is considered very unlikely that this species would utilise Section 3321.

Given that Section 3321 has been cleared for a considerable number of years with ground cover dominated by introduced trees / grasses it is considered unlikely that Section 3321 would provide suitable potential habitat for threatened native fauna species. It is considered very unlikely that threatened fauna would be affected by subdivision of this block. However, as no clearing of native vegetation is required to establish fence lines along the boundaries of the proposed lots, if threatened species were present on the proposed lots, no disturbance of potential habitat will occur and therefore the impact of the proposed subdivision would be minimal.

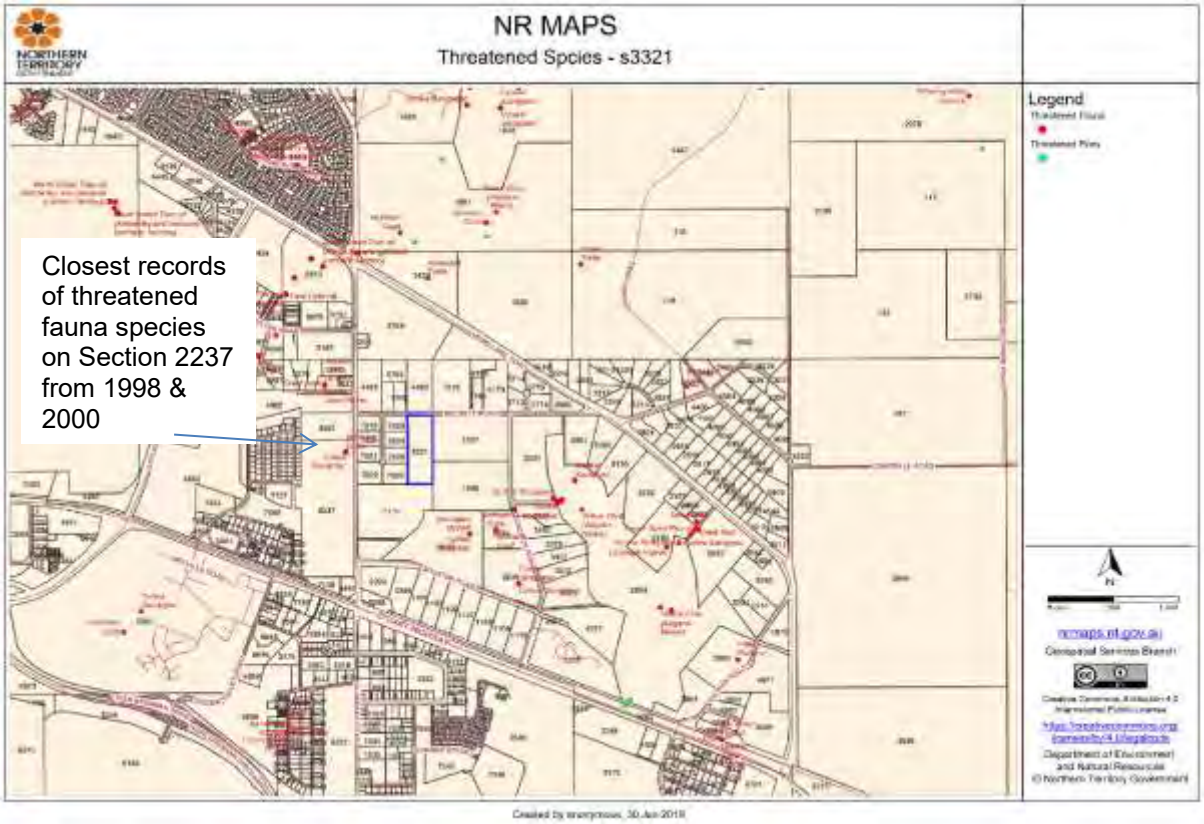


Figure 4 NR Maps extract - threatened flora / fauna in the vicinity of Section 3321

5. Field assessment

4.1. Overview

Field assessment was undertaken in 14 June 2019. As two of the proposed lots (lots 1 & 2) include long established residences, field assessment focussed of ensuring that each proposed lot would have at least 1 ha of unconstrained land and that proposed lot 3 would be capable of sustaining onsite wastewater management in compliance with the NT *Code of Practice* (DoH 2014a).

Field assessment involved traversing the area with a hand held Garmin GPS Map 64S. Several sites were assessed with a detailed profile description provided for a representative site within lot 3 (Figure 5 & Appendix 1) with vegetation descriptions at two other sites to assess site characteristics and validate the land unit description.

4.2. Soil and Landscape assessment

Field assessment confirmed that the land across both lots is generally consistent with land unit 3a (Figure 5). The land slopes generally towards the south / southeast with slope across generally 0.5% or less.

The soil at the representative site (Rep 1) within proposed lot 3 is described as a deep red Kandosol (Appendix 1) which is consistent with land unit 3a. Validation site 1 locates the eastern end of the septic RELN drain for the existing residence in proposed lot 2 which lies over 4.5m from the proposed lot boundary (compliant with boundary setback from NT *Code of Practice* (DoH 2014a)). Validation site 2 confirmed that the dominant vegetation (*Eucalyptus tetrodonta* woodland) along the eastern boundary is consistent with Land unit 3a. Validation site 3 is located at the RELN for the house in proposed lot 1 which is located within retained native vegetation within proposed lot 1 and on the adjoining lot to the east is also consistent with Land unit 3a.

Within proposed lots 1 & 2, some areas around the house and shed have been modified through landscaping and irrigation (Validation site 4).

Figure 5 Soil site and validation sites

4.3. Weeds

No weeds were identified on Section 3321. However, NR Maps data shows that Gamba grass (Class B & C) has been recorded within the road reserve for Secrett Road.

6. Land Suitability Assessment

5.1. Drainage

The land across Section 3321 comprises well drained, moderately deep to deep, Red Kandosols on low slopes to around 0.5% (consistent with Land Unit 3a). Areas around the existing houses and sheds has been modified through landscaping and irrigation however the landowner reports no issues with soil drainage.

5.2. On-site Wastewater Management

For onsite wastewater management, field inspection found that the land comprised well drained, deep, Red Kandosols on slopes up to 0.5%. In accordance with background *Land Capability Assessment Matrix for On-site Wastewater Management* from NT LCA Guidelines Table 3.7 (DoH 2014b:33-34) provided in Appendix 1, overall the land within each of the proposed 3 lots would be defined as *Low* Risk (High capability) for onsite wastewater disposal, suitable for septics using Standard Designs and Sizing Tables.

There are no waterways, as defined in AS/NZS1547:2012, within or adjacent to the subject land.

5.3. Erosion Risk

In this context, assessment of *erosion risk* is associated with the potential for accelerated erosion (above natural levels) associated with development of the land. Field assessment found that the land comprises generally low slopes to 0.5% and that the entire block is well grassed / vegetated. No active erosion was noted.

According to the *Land Suitability Guidelines* (NTG 2013), land with slopes up to 0.75% has a Low potential for accelerated soil erosion by water. It is likely that the significant ground cover has contributed to the lack of active erosion and given that establishing the new lots will require only minor land disturbance for the boundaries, the landscape presents only a low risk of accelerated erosion by water.

5.4. Soil Salinity

Salinity hazard mapping by Tickell and Tyson (1994) places Section 3321 within an area of Low Risk of soil salinity.

5.5. Acid Sulfate Soils

Mapping by DLRM (Hill and Edmeades 2004) indicates that Section 3321 is not within areas affected by actual or potential acid sulfate soils.

5.6. Storm Tide Flooding

Mapping by DLRM (2011) shows Section 3321 is not affected by storm tide flooding.

5.7. Riverine Flooding

There are no rivers or streams in the vicinity of the subject lots and there is no evidence to suggest that Section 3321 is at risk from riverine flooding.

5.8. Environmental Assessment – endangered species

Given that Section 3321 and the majority of surrounding blocks have been cleared and maintained as mown grasslands for over 19 years since 2000 it is considered very unlikely that the subject lot would provide suitable habitat for any threatened fauna species. As no clearing of native vegetation is required to establish fence lines along the boundaries of the proposed lots, if threatened species were present on the proposed lots no disturbance of potential native vegetation habitat will occur and therefore the impact of the proposed subdivision would be minimal. It is therefore considered very unlikely that any threatened fauna would be affected by the proposed subdivision.

5.9. Weeds

The lot is mowed with grass height maintained at a low level and no weed species were identified on Section 3321, however, Gamba grass (Class B - control) has been recorded within the road reserve for Secrett Road and ongoing vigilance will be required.

Advice on weed management is available in the *NT Weed Management Handbook* and individual weed management plans which are available from http://www.lrm.nt.gov.au/weeds (WMB 2018).

5.10. Land Suitability

An assessment of environmental constraints and administrative requirements identified through an analysis of data used for the desktop review combined with field validated soil and landscape information was undertaken in accordance with requirements of relevant NT Government documents including:

- NT *Land Suitability Guidelines* (NTG 2013)
- NT *Planning Scheme*
- NT *Code of Practice for Small On-site Sewage and Sullage Treatment Systems and the Disposal or Reuse of Sewage Effluent* (DoH 2014a).
- Environmental Health: *Guidelines for Land Capability Assessment for Onsite Wastewater Management.* NT Department of Health (DoH 2014b).

Based on the findings of the desktop review and site investigation, an assessment of the site was undertaken to determine land suitability classes and provide a summary of the issues for the subject land. The suitability class ratings have been applied only to the land mapped as unconstrained (i.e. from a drainage perspective). Any land is mapped as constrained (i.e. poorly drained or seasonally inundated) is not considered in the land suitability assessment.

Suitability classes can be improved through the use of engineering works and application of certain management practices. As per the Land Suitability Guidelines (NTG 2013, iv) a lower land suitability rating "*does not necessarily prevent a land use from occurring, but in most situations indicates that additional inputs in terms of costs, design, planning and ongoing management could be required in order to adequately address social, economic and environmental risks*."

Table 4 contains a summary of the land suitability assessment for Section 3321.

Table 4 Land Suitability Assessment for Section 3321

Land Suitability Category	Section 3321 Assessment	Suitability Class
Drainage Constrained land comprises areas that are wet or saturated either at, above or close to the land surface for a period of weeks to months typically during the wet season but potentially extending into the dry season as a result of rainfall, landscape function and/or position or soil hydrology factors.	The lot comprises Well drained Red Kandosols. Soil assessment – see Appendix 1. There is no indication of land affected by imperfect to poor drainage and the current owner reports no issues with soil drainage. Therefore, in the context of the *Land suitability Guidelines*, this area of land is also highly suitable.	S1 - Highly Suitable
Onsite Wastewater Management Land capability has been assessed in accordance with the *Land Capability Assessment Matrix for On-site Wastewater Management* from NT LCA Guidelines Table 3.7 (DoH 2014b:33-34)	Red Kandosols – High capability The current owner reports no issues with existing septic systems. Field assessment confirmed that the soil-landscape of proposed lots is highly capable of sustaining onsite wastewater management using treatment and disposal systems that will comply with the NT *Code of Practice* (DoH 2014a).	S1 - Highly Suitable
Erosion Risk Constrained land comprises soil landscapes that have a moderate to very high erosion risk with slope >0.75% (Suitability Classes 3-5). S3 - slopes 0.75-5% S4/S5 – slopes >5%	Slopes up to 0.5% were recorded The site is predominantly under grass and gardens with a small patch native vegetation within proposed lot 1. Other than the removal of some mango trees, no clearing of native vegetation is required to establish fence lines for the proposed subdivision. Development would require minimal land disturbance and overall the land is assessed as having a low erosion risk and is highly suitable.	S1 - Highly Suitable
Soil Salinity Land is constrained if soil salinity >4 dS/m ECe	The site supports a previously irrigated mango orchard that the owner states exhibited no signs of subsoil salinity. Salinity hazard mapping by Tickell and Tyson (1994) indicates Section 3321 has a Low Risk of soil salinity.	S1 - Highly Suitable
Acid Sulphate soils Land is constrained if soils contain greater than 0.02% oxidisable sulphur	Mapping by Hill and Edmeades (2004) shows Section 3321 is not affected by acid sulfate soils.	S1 - Highly Suitable
Storm tide flooding Coastal areas at elevations below the Primary (100-year Annual Recurrence Interval (ARI) Storm Tide inundation extent are constrained	Mapping by DLRM (2011) shows that Section 3321 is not affected by storm tide flooding.	S1 - Highly Suitable
Riverine Flooding Land is constrained if it is below the 1% Annual Exceedance Probability (AEP) flood level.	There are no watercourses in the vicinity of Section 3321 and no evidence to suggest that Section 3321 is affected by riverine flooding.	S1 - Highly Suitable

7. Conclusion

This land suitability assessment has found that Section 3321 comprises 9.5ha of land classed as *S1 – Highly Suitable* for subdivision (Table 4). Publicly available imagery shows that the land was predominantly cleared of native vegetation prior to 2000 and has since been managed as an orchard, gardens and mown grasslands with a small patch (~1ha) of retained native vegetation located within proposed lot 1.

Other than the removal of some mango trees, no clearing of native vegetation is required to establish fence lines for the proposed subdivision. Proposed lots 1 & 2 include long established residences utilising onsite wastewater management systems. Field assessment confirmed that the soil-landscape of proposed lot 3 is highly capable of sustaining onsite wastewater management using treatment and disposal systems that will comply with the NT *Code of Practice* (DoH 2014a).

It is considered very unlikely that any threatened fauna would be affected by the proposed subdivision.

8. References

AS/NZS 1547:2012 On-site domestic-wastewater management

BoM. 2008. Gridded average evaporation data - *Average pan evaporation 1975-2005 Map.* Bureau of Meteorology. http://www.bom.gov.au/climate/averages/climatology/gridded-data-info/metadata/md_ave_evaporation_1975-2005.shtml

Bryant K. 2008. *Soil Indicators of Queensland Wetlands: Field Guide*. Queensland Department of Natural Resources and Water

Cardno Pty Ltd. 2014. Elizabeth and Blackmore River Catchments Flood Study

DoH. 2014a. *Code of Practice for Small On-site Sewage and Sullage Treatment Systems and the Disposal or Reuse of Sewage Effluent.* Northern Territory Government

DoH. 2014b. *Environmental Health: Guidelines for Land Capability Assessment for Onsite Wastewater Management*. NT Department of Health. Released March 2014

Doody JS, Green B, Rhind D, Castellano C, Sims R & Robinson T. 2009. 'Population-level declines in Australian predators caused by an invasive species', *Animal Conservation*, vol. 12, pp. 46-53.

DENR. *NR Maps*. Department of Environment and Natural Resources digital data discovery tool

Fogarty PJ, Lynch B and Wood B. 1984. *The Land Resources of the Elizabeth, Darwin and Blackmore Rivers*. Land Conservation Unit, Conservation Commission of the Northern Territory (Bibliographic reference for Greater Darwin Area Land Units)

Hill B. 2012. Threatened Species of the Northern Territory- Black-footed Tree-rat *Mesembriomys gouldii*, Northern Territory Department of Land Resource Management,

Hill JV and Edmeades BFJ. 2008. *Acid Sulfate Soils of the Darwin Region.* Dept of Natural Resources, Environment, the Arts and Sport. Tech Report 09/2008D

Isbell RF. 2002. The Australian Soil Classification – Revised Edition. CSIRO Publishing

McKenzie NJ, Grundy MJ, Webster R and Ringrose-Voase R. 2008. *Guidelines for Surveying Soil and Land Resources – Second Edition*. CSIRO Publishing

National Committee on Soil and Terrain (NCST). 2009. *Australian Soil and Land Survey Field Handbook – Third Edition*. CSIRO Publishing

NTG. 2013. *Northern Territory Land Suitability Guidelines*. Northern Territory Government Darwin, Australia

Phillips BL, Greenlees MJ, Brown GP & Shine R. 2010. 'Predator behaviour and morphology mediates the impact of an invasive species: cane toads and death adders in Australia', *Animal Conservation*, vol. 13, pp. 53-59.

Tickell SJ and Tyson P.1994. *Dryland Salinity Hazard Map*. NT Department of Infrastructure, Planning and Environment. 2002 Revision.

Van Dam RA, Walden DJ, & Begg GW. 2002. *A preliminary risk assessment of cane toads in Kakadu National Park*, Supervising Scientist Report 164, Darwin, NT.

Weed Management Branch. 2018. *NT Weed Management Handbook*. DENR

Wells M. 2001. *Assessment of Land Capability for On-Site Septic Tank Effluent Disposal*. Department of Agriculture Western Australia Resource Management Technical Report No.63

Woinarski JCZ, Pavey C, Kerrigan R, Cowie I & Ward S. 2007. *Lost From Our Landscape: Threatened Species of the Northern Territory*. Northern Territory Department of Natural Resources, Environment and the Arts

9. Appendices

Appendix 1 - Soil Assessment

Soil and site descriptions

At all sites, the soil and landscape were described in accordance with the Australian Soil and Land Survey Field Handbook – Third Edition (NCST 2009) and The Australian Soil Classification – Revised Edition (Isbell 2002).

Land Capability for Onsite Wastewater Management:

A detailed *Land Capability Assessment* (LCA) has not been undertaken for Section 3321

To address the basic requirement of *Northern Territory Land Suitability Guidelines* (NTG 2013) all described soils are assessed in relation to the capability of the land at that site to support onsite wastewater management. For each described soil, the site is assessed and rated with reference to Table 3.7 '*Land Capability Rating Matrix'* from DoH (2014b:32-34). This matrix is used to assess the soil and site characteristics and provide an overall rating for the site in its natural or current condition with respect to its capability to support onsite wastewater management.

Land capability ratings in this table DO NOT take into consideration factors that can improve site capability such as wastewater treatment system selection (eg installing an AWTS in place of traditional septic), modifications to design / installation or a combination. Consideration of these and other factors would be included in a detailed LCA.

The overall rating for each soil site is generally determined by the most limiting rating for a feature.

High Capability (Low Risk) means the site is has a very good or high potential (low constraints) for effluent management.

Moderate Capability (Moderate Risk) means the site has features (constraints) which impose some limitations for effluent disposal but these constraints can be managed.

Low capability (High Risk) means the site is not well suited for effluent disposal with advanced treatment and land application systems needed to overcome limitations.

For wastewater (effluent) land application, field texture is used to determine the Soil Texture Class of the receiving soil (DoH 2014a). For this report, the depth of the nominal receiving soil layer has been set at 0.6m. Therefore, regardless of the soil classification (eg Tenosol, Kandosol etc), the soil layer with the heaviest field texture (ie highest clay content and likely most restrictive layer) within the top 0.6m of the soil profile is used to assign indicative Soil Texture Class. For soils shallower than 0.6m the heaviest or deepest layer within the soil profile is used.

Table below shows the *Soil Texture Class* and equivalent *Soil Category* based on field texture.

Soil Texture Class - *Code of Practice* (DoH 2014a:32)	**Equivalent Soil Category (AS/ANZS1547:2012)**	**Soil field textures per Class / Category (based on NCST 2009)**
Sand	1	Sand
Sandy Loam	2	Loamy sand, Clayey sand, Sandy loam
Loam	3	Loam, Silty loam
Clay Loam	4	Sandy clay loam, Clay loam, Clay loam (Sandy), Silty clay loam
Silty Clay	5	Light clay, Light medium clay
Clay	6	Medium clay to Heavy Clay

Soil Drainage and Wastewater treatment

Within in the land disposal site, wastewater must move through the soil profile quickly enough to prevent water ponding at the surface (system failure) but slowly enough to ensure sufficient contact time between the effluent and soil particles to breakdown pathogens and organic contaminants (Purdue Uni. 2006). If soil permeability is high and /or drainage is too fast then it is likely that the 'effluent-soil contact time' is too short and water leaving the effluent disposal area will still contain levels of pathogens and/or organic contaminants that present risks to human and/or environmental health.

For onsite wastewater disposal it is preferable to define the effect of the seasonal water table in terms of soil drainage status which indicates the duration of periods of saturated conditions likely to occur in most years (AS/NZS 1547:2012:17). For most places within the Top End, the depth to water table at the wettest time of year is not known. Depth to the seasonal or perched water table can however, be inferred from depth and degree of mottling within the soil profile. Whilst somewhat qualitative, Wells (2001) concluded that the Drainage Classes used in Soil and Land Survey (as per NCST 2009) are defined in terms of approximate duration of periods of saturation, as such these classes could also be used as an indicator or substitute for 'depth to seasonal water table' in order to derive a capability rating for a map unit or site.

As per NCST (2009:204), in soils that are Rapidly Drained "…. Excess water flows downward rapidly if underlying material is highly permeable There may be rapid subsurface lateral flow during heavy rainfall provided there is a steep gradient. Soils are usually coarse-textured, or shallow, or both."

As such, sites that are *Rapidly drained* have *Low Capability* for onsite wastewater due short effluent-soil contact time and correspondingly high potential for offsite transport of pathogens and/or organic contaminants. This limitation must be addressed through wastewater treatment system selection, modifications to design / installation or a combination

Rep Site 1 – Deep Red Kandosol (Red Earth)

Slope: 0.5%	**Stopped by:** Lack of auger		**Drainage**: Well		
Landform: Plain	**Surface water (m):** >50m		**Dry Surface colour:** 10YR 5/6 Yellowish Brown		
Erosion: Nil active	**Surface gravel (%)**: nil		**Surface**: Mown lawn		
Runoff: Slow	**Rock outcrop**: nil				
Vegetation: Mown lawn					
Level	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Depth (cm)	0 – 10	10 - 25	25 - 55	55 - 80	80 - 105+
Boundary	Clear	Gradual	Diffuse	Diffuse	
Field Texture	Sandy loam (Fine sand)	Sandy loam	Sandy loam - Heavy	Sandy loam - Heavy	Sandy clay loam
Structure	Massive earthy	Massive earthy	Massive earthy	Massive earthy	Massive earthy
Dominant Colour	10YR 3/4 Dark Yellowish Brown	7.5YR 3/2 Dark Brown	5YR 4/6 Yellowish Red	2.5YR 4/6 Red	10R 4/6 Red
Mottles	nil	nil	nil	nil	nil
Coarse Frags %	0	0	0	0	0
Wastewater - Soil Category					4 – Clay loam

Site 1 Soil profile

Rep Site 1 – Background Land Capability Assessment Matrix for On-site Wastewater Management from NT LCA Guidelines Table 3.7 (DoH 2014b:33-34)

This matrix is used to assess the soil and site characteristics and provide an overall rating for the site in its natural or current condition with respect to its capability to support onsite wastewater management.

Land capability ratings in this table do not take into consideration factors that can improve site capability

Land Features	Land Capability Class Rating			Rating
	High	Moderate	Low	
Site Characteristics				
Drainage Class (NCST 2009)	Moderately Well to Well drained	Imperfectly drained	Rapidly drained or poorly to Very poorly drained	**High**
Runoff	None or low	Moderate to high, need for diversionary structures	High to very high – diversion not practical	**High**
Flood risk	Never or <1 in 100	>1 in 100 and <1 in 20	<1 in 20	**High**
Proximity to watercourses	>50 m non-potable; >100 m potable	n/a	<50 m for non-potable; <100 m potable	**High**
Slope	<5%	5-10%	>10%	**High**
Landslip	Zero actual, or low potential for failure	Moderate to high potential for failure	Present or past failure	**High**
Surface gravel (spatial cover)	<20%	25-50%	>50%	**High**
Rock outcrop (spatial cover)	<10%	10-20%	>20%	**High**
Erosion potential	Zero or minor erosion potential	Moderate to high erosion potential	High to severe erosion potential	**High**
Exposure	High sun and wind exposure	Moderate sun and wind exposure	Low sun and wind exposure	**High**
Landform	Hill crests, convex side slopes and plains	Concave sideslopes and footslopes	Floodplains and incised channels	**High**
Vegetation Type	Turf or pasture	Shrubs or open woodland	Dense forest with little understorey	**High**
Average Rainfall	<800 mm/year	800 - 1400 mm/year	>1400 mm/year	**Low**
Pan Evaporation	>1400 mm/year	800 - 1400 mm/year	<800 mm/year	**High**

Land Features	Land Capability Class Rating			Rating
	High	Moderate	Low	
Soil Characteristics				
Fill	No fill; or fill good quality	Some fill; or fill moderate quality	Extensive fill, or fill poor quality	**High**
Soil category * (AS1547:2013)	2 and 3	4 and 5	1 and 6	**Moderate**
Profile depth	>0.5 m	0.25-5 m	>0.25 m	**High**
Presence of mottling	None	Moderate	Extensive	**High**
Coarse fragments	<20%	20-40%	>40%	**High**
pH	6-8	4.5 - 6	<4.5, >8	**High**
Emerson + Aggregate Class	4,6,8	2,3,5,7	1	**n/a**
Electrical Conductivity (ECe)	<0.8 dS/m	0.8-4 dS/m	>4 dS/m	**High**
Sodicity ESP %	<6%	6-14%	>14%	**High**
SITE RATING				**High^**

***** Soil Category taken from the soil layer at a depth of 60cm or the deepest layer in shallower soil within the soil profile

+ Emerson Aggregate Class taken from the layer within the receiving soil 60cm below the soil surface or the deepest layer in shallower soil – Sodicity is inferred from the Emerson class. Soil sites assessed by VPS within this land unit on adjoining blocks found no evidence of dispersive subsoils and it is assumed that these soils will be similar.

^ Site rating assessed as *High* (Low overall risk); in the context of the overall site characteristics, the "moderate" ratings for Soil Category and rainfall are more than offset by overall depth of soil (1m+) and soil type (Well drained Red Kandosol).

Validation site 2 – Photo of retained native vegetation along boundary fence

Validation site 3 – photo of RELN drain in propsoed lot 1 amongst retained vegetation

Appendix 2 Summary of setbacks relating to onsite wastewater disposal

DoH. 2014. Code of Practice for Small On-site Sewage and Sullage Treatment Systems and the Disposal or Reuse of Sewage Effluent

7.5 Proximity of Septic Tank and Disposal Area to Site Features (page 34)			8.9 Siting and Setback Distances (m) for Aerated Wastewater Treatment Systems (page 76)
Table 6 Setback Distances to Surface Feature	Minimum distance required in metres (m) from the closest point of effluent discharge to that site feature		8.9.3 Sub Strata/ Shallow Sub Surface Irrigation
Site Feature	1. Upslope from site feature	2. Downslope from site feature	(* 8.9.2 Surface Irrigation)
Building	6.0	3.0	1.5
Allotment boundary	4.5	2.5	0.5 (*2.5)
Swimming pool	6.0	3.0	1.0
Underground water tank	15	15	See Table 6
Bore or well	100	100	30 (chlorinated) (*30) 50 (unchlorinated) (*50)
Cutting	15	No restriction	See Table 6
Watercourse	50	30	See Table 6
Lake, swamp, etc	50	30	See Table 6
Watercourse from which water supplies extracted	200	100	30 (chlorinated) (*30) 50 (unchlorinated) (*50)
Water supply reservoir	200	100	See Table 6
Sub-surface disposal bed or trench	2.5	2.5	See Table 6
Septic tank	2.5	2.5	See Table 6
Rainwater tank			1.5 (*15)
driveway or paved surface			0.5
Open drain			3.0

NOTE.

1. For flat sites use column 2
2. Refer to Section 8.9 for exceptions to setback distances from site features for Aerated Wastewater Treatment Systems.

Appendix 3 Glossary

Depth of Soil (cm) (Isbell 2002)	Class Depth (cm) Very shallow: < 0.25 m Shallow: 0.25 - < 0.5 m Moderate: 0.5 - < 1.0 m Deep: 1.0 - < 1.5 m Very deep: 1.5 - 5 m Giant: > 5 m
Drainage (NCST 2009:202)	*Drainage* is a useful term to summarise local soil wetness conditions; that is, it provides a statement about soil and site drainage likely to occur in most years. It is affected by a number of attributes, both internal and external, that may act separately or together. Internal attributes include soil structure texture, porosity, hydraulic conductivity, and water-holding capacity, while external attributes are source and quality of water, evapotranspiration, gradient and length of slope, and position in the landscape
Drainage Classes (NCST 2009:202-204)	*Very poorly drained* - water is removed from the soil so slowly that the water table remains at or near the surface for most of the year. Surface flow, groundwater and subsurface flow are major sources of water, although precipitation may be important where there is a perched water table and precipitation exceeds evapotranspiration. Soils have a wide range in texture and depth, and often occur in depressed sites. Strong gleying and accumulation of surface organic matter are usually features of most soils. *Poorly drained* - water is removed very slowly in relation to supply. Subsurface and/or groundwater flow, as well as precipitation, may be a significant water source. Seasonal ponding, resulting from runon and insufficient outfall, also occurs. A perched water table may be present. Soils have a wide range in texture and depth; many have horizons that are gleyed, mottled, or possess orange or rusty linings of root channels.. All horizons remain wet for periods of several months *Imperfectly drained* - water is removed only slowly in relation to supply. Precipitation is the main source if available water storage capacity is high, but subsurface flow and/or groundwater contribute as available water storage capacity decreases. Soils have a wide range in texture and depth. Some horizons may be mottled and/or have orange or rusty linings of root channels, and are wet for periods of several weeks. *Moderately well-drained* - water is removed from the soil somewhat slowly in relation to supply, due to low permeability, shallow water table, lack of gradient, or some combination of these. Significant additions of water by subsurface flow are necessary in coarse-textured soils. Some horizons may remain wet for as long as one week after water addition. *Well- drained* - water is removed from the soil readily but not rapidly. Excess water flows downward readily into underlying, moderately permeable material or laterally as subsurface flow. Soils are often medium in texture. Some horizons may remain wet for several days after water addition. *Rapidly drained* - water is removed from the soil rapidly in relation to supply. Excess water flows downward rapidly if underlying material is highly permeable. There may be rapid subsurface lateral flow during heavy rainfall provided there is a steep gradient. Soils are usually coarse-textured, or shallow, or both. No horizon is normally wet for more than several hours after water addition.
Emerson Aggregate Test (Amended) (Patterson 2013)	Amended Emerson Aggregate Test using distilled water Class 1 - Slaking with Complete Dispersion Class 2 – Slaking with Some Dispersion Slaking (Class 2) Class 2 Slake 1 – Slight slaking

	Class 2 Slake 2 – About half slaked Class 2 Slake 3 – Fully slaked Class 7 – Swelling, No Slaking Class 8 – No Swelling, No Slaking Note: (Source: Patterson 2013) 1. For wastewater management, soils are not generally physically disturbed (not ploughed) therefore the remould component of Emmerson Test is not relevant. 2. Non-dispersive, slaking subsoil are not an issue for effluent disposal
Mottles (Moore 2004)	Mottles can be seen as a pattern of spots or blotches of different colour interspersed within the dominant matrix soil colour. They are concentrations of iron oxides which have resulted from the redistribution of iron oxides due to alternating episodes of aerobic and anaerobic (ie oxidising and reducing) soil conditions common in seasonally waterlogged (poorly drained) soils.
Perched water table (AS/NZS 1547:2012:15)	Groundwater that has beneath it unsaturated soil material into which the groundwater drains NOTE: A perched water table is nearly always periodic or seasonal.
Secondary waste - water treatment (AS/NZS 1547:2012:16)	Aerobic biological processing and settling or filtering of effluent received from a primary treatment unit
Waning (AS/NZS 1547:2012:92)	(Land) Element up-slope is steeper; (land) element down-slope is gentler; thus water is progressively slowed down as it runs off, promoting soil wetness
Watercourse (AS/NZS 1547:2012:18)	A stream that: (a) Has visible bed and banks, that is, an eroded channel no matter how small but not a defined non-eroded grassy course or drainage depression; and (b) Is partially fed with water from some source other than surface water run-off (for example, springs, snowfields, or spongy soil that absorbs rainfall and then releases it into the stream over a longer period)

earl james & associates

Ph 08 8981 2494
Fax 08 8981 5205
Email darwin@eja.com.au
www.eja.com.au
GPO Box 884 Darwin NT 0801
10 Harvey St Darwin NT 0800
ABN 30 112 988 625

Ref: 11031

9 August 2019

Development Consent Authority
GPO Box 1680
Darwin NT 0801

Re: Section 3321, Hundred of Bagot

A Concurrent Application is to be lodged seeking approval to rezone the subject land from R to RL and to subdivide the property for the purpose of creating 3 lots.

The only works associated with the proposed subdivision will be the construction of a lot access from Secrett Road and consequently there will be no impact on adjoining parcels and no impact on upstream and downstream flows.

Regards,

Kevin Dodd

earl james & associates

Ph 08 8981 2494
Fax 08 8981 5205
Email darwin@eja.com.au
www.eja.com.au
GPO Box 884 Darwin NT 0801
10 Harvey St Darwin NT 0800
ABN 30 112 988 625

Ref: 11031

9 August 2019

Development Assessment Services

GPO Box 1680

Darwin NT 0801

Re: Section 3321, Hundred of Bagot

A Concurrent Application is to be lodged seeking approval to rezone the subject land from R to RL and to subdivide the property for the purpose of creating 3 lots.

There are existing buildings on Section 3321 however these are in excess of 30 metres from a proposed boundary so there will be no conflict with building regulations in relation to the offset of the building from a boundary

Regards,

Kevin Dodd

Licensed Surveyor

Concurrent Application
RECORD OF MEETING - Pre-application meeting

30B Meeting with planning adviser required before making concurrent application

30B(4) The purpose of the meeting is to enable the planning adviser to give the person information and guidance relevant to the concurrent application.

This document will be completed by the planning adviser(s) and a copy retained on TRM **LUPD2016/0010-102**.

Copy of the completed checklist/ record of meeting document will be provided to applicant at conclusion or shortly after the meeting.

	Preliminary details		
1	**Appointment date & time**	Date: 22 May 2019 Time: 9 am	
2	**Attendees** (including DIPL staff in attendance)	Kevin Dodd Chris Humphries Fiona Ray	
3	**Meeting start / end time**	**Start**: 9am	**End: 9.30am**
4	**Land details** Parcel details	Section 3321 Hundred of Bagot	
5	**Land area subject of application**	9.5ha	
6	**Current zone**	R (Rural)	
7	**Current land use**	Rural	
8	**Proposal summary**	**Rezoning: RL (Rural Living)** **Development: Subdivision to create 3 lots**	
9	**Record of discussion – key points, issues discussed**		
	Issues or items that: • need to be considered by applicant and addressed in the proposal • have potential to guide, constrain or prevent the proposal • are likely to generate public comment or comment/requirements from service authorities		
	Amendment aspects discussed:		
	• Established policy / planning direction for locality (including published policy documents)		☒
	• Compatibility with existing land uses on site and surrounding area		☒
	• Significant Development Report – likely to be required?		☒
	• Land capability		☒
	• Public/community facilities & open space		☐
	• Utilities, facilities and infrastructure		☒
	• Impact on existing and future amenity of the area		☒
	• Public interest		☐
	• Natural, social, cultural or heritage values		☐
	NOTES: Ability to connect to reticulated water and demonstrating 1ha of unconstrained land on all lots were identified as critical.		

	Development aspects:	
	• Compliance with requirements of proposed zone (preliminary advice only)	☒
	• Environmental assessment	☒
	• Utilities, facilities and infrastructure	☒
	• Existing buildings on-site	☐
	NOTES: Identified relevant clauses of the Scheme pertaining to subdivision of Rural land.	
10	**Concurrent application process**	
	Concurrent application process (including next steps and decision points) has been discussed	☐
	NOTES Discussed options to undertake either; Concurrent application or Rezoning application followed by a Subdivision application.	
11	**General notes – any other items or issues to be considered**	
	NOTES	

12	**Advice to applicant**			
	Recommendation to consult with other agencies prior to application lodgement			
	Aboriginal Areas Protection Authority	☐	Department of Infrastructure, Planning & Logistics - Land Administration	☐
	Civil Aviation Safety Authority	☐	Department of Infrastructure, Planning & Logistics - Survey	☐
	Council	☐	Department of Primary Industry and Resources	☐
	Darwin International Airport	☐	Department of Infrastructure, Planning & Logistics - Public Transport	☐
	Darwin Port Corporation	☐	Department of Infrastructure, Planning & Logistics - Transport Assets	☐
	Department of Health – Environmental Health	☐	Department of Infrastructure, Planning & Logistics - Transport Policy and Planning	☐
	Department of Health – Medical Entomology	☐	NBN Co	☐
	Department of Justice	☐	Northern Territory Police	☐
	Department of Environment and Natural Resources – Biodiversity Conservation and Assessment	☒	NT Fire and Rescue Service	☐
	Department of Environment and Natural Resources – Environment protection and sustainability	☐	NT Work Safe	☐
	Department of Environment and Natural Resources – Environmental Assessment	☐	Power and Water Corporation - Power	☐
	Department of Tourism and Culture – Heritage Conservation	☐	Power and Water Corporation - Water	☒
	Other:			

	The final decision on the amendment proposal contained within a concurrent application rests with the Minister for Infrastructure, Planning and Logistics. The final decision on the development proposal contained within a concurrent application rests with the consent authority. The advice and opinions expressed during a pre-application meeting in no way pre-empts the Minister or consent authority's decision(s) on the proposal. The advice provided above is preliminary only, made on the basis of information immediately available at the time of meeting and the professional opinion of the Planning Adviser. Full assessment of the application will occur after lodgement of the application and may result in a different outcome.

	Post meeting action
13	**DIPL follow up action (if any): Nil**
14	**DIPL Contact name and details** **Chris Humphries 89947513** **Fiona Ray 8999 7937**

15	**This is a true record of discussions (please sign):**	
	Applicant(s)	**Planning Adviser(s)**
	23/5/2019	23/05/19
	Name: Kevin Dodd	**Name: Christopher Humphries**
	Name:	**Name:**

PRIVACY NOTE:

The Department of Infrastructure, Planning and Logistics, is authorised under the *Planning Act* to collect the information on this form, or otherwise provided by you, to consider a concurrent application.

Some of the personal information provided by you on this form may be publicly available, as part of a public exhibition process. The information may also be provided to other NT Government agencies, the Australian Valuation Office, local governments and Commonwealth Government Departments and agencies, as required by law.

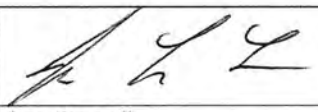
Collection of personal information on this form is done in accordance with the privacy legislation contained within the *Information Act 2002 (NT)*. For more information please refer to the Department of Infrastructure, Planning and Logistics privacy statement located at www.nt.gov.au/dlpe.

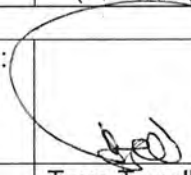
Any personal information provided can be subsequently accessed by you on request.

LAND OWNER/S AUTHORISATION TO LODGE A DEVELOPMENT APPLICATION UNDER THE PLANNING ACT 1999

signatures from ALL landowners registered on the land title must be provided

The owners and/or persons duly authorised as signatory on behalf of the landowner, hereby authorise:**		
NAME (please print)	*Earl James and Associates*	
Contact number:	Ph: 89812494	Mob: 0409 269 815
to lodge a development application under the *Planning Act 1999* over the property described as:		
LOT/ NT PORTION:	*Section 3321*	
LOCATION/TOWN	*Hundred of Bagot*	
STREET ADDRESS:	[redacted]	
PROPOSED DEVELOPMENT:	*Concurrent Application*	

OWNERS SIGNATURE :		
NAME: (please print)	Ian Tagell	
TITLE: (ie. company director/secretary)		
Contact number:	Ph: 0418 895 462	Mob:
DATE:	9/8/19.	

OWNERS SIGNATURE :		
NAME (please print)	Tove Tagell	
TITLE: (ie. company director/secretary)		
Contact number:	Ph: 0418 895 462	Mob: 0418894018
DATE:	9/8/19.	

NORTHERN TERRITORY GOVERNMENT