



NOONAMAH RIDGE

EIS EXECUTIVE SUMMARY

Developed by
INTRAPAC

Preamble

This document is a summary of an Environmental Impact Statement (EIS) for the Noonamah Ridge development. The EIS addresses the Terms of Reference provided by the Northern Territory Environment Protection Agency (NTEPA) – provided in Appendix A.

This Executive Summary and the EIS are both structured as follows:

SECTION 1 – CONTEXT

- Overview of the project and the proponent.
- Relevant land information (ownership, tenure, zoning etc.).
- Other possible developments in the area.
- Legislative and planning framework within which this project will occur.
- Stakeholder and community consultation process to date.

SECTION 2 – PROJECT DESCRIPTION

- The planning and design principles underpinning the development.
- The social and service infrastructure that will be provided, how it will be provided, who will be responsible for providing it and for maintaining it, and the staging of its provision.

SECTION 3 – EXISTING ENVIRONMENT

- The site's key environmental characteristics:
 - o Land (soils, geology and topography)
 - o Water (surface and ground)
 - o Biodiversity (vegetation communities, threatened species and conservation-significant values)
 - o Biting insects
 - o Cultural heritage (sacred, archaeological and heritage sites)
 - o Air quality and noise.

SECTION 4 – ECONOMIC & SOCIAL CONTEXT

- Economic context for this development.
- Existing local and regional social infrastructure.
- Likely economic and social benefits of this development.

SECTION 5 – RISK ASSESSMENT

- Risk assessment of the potential impacts of the project's activities (as described in Section 2) on the existing environment (as described in Section 3) – both inherent risk (i.e. without any mitigation or management measures put into place) and residual risk (assuming the successful implementation of the Environmental Management Plan described in Section 5).
- Assessment of the level of certainty that the proposed mitigation and management measures will be effective.

Preamble

SECTION 6 – ENVIRONMENTAL MANAGEMENT PLAN

- Design, planning and management measures that will be put into place prior to, during and after construction of the development to minimise impacts on the environment (as identified in the risk assessment in Section 4).

SECTION 7 – SOCIAL IMPACT MANAGEMENT PLAN

- Mitigation measures that will be put in place during the design, construction and occupancy phases of the project to minimise economic and social impacts.
- The ongoing consultation and social impact monitoring that will be undertaken.

SECTION 8 – COMMITMENTS

- (In the main EIS document only) Lists the commitments Intrapac will adhere to prior to, during and after construction of the development to ensure that the environmental impact of this development is minimised.
- Describes where the commitments will be incorporated within the SU zone text in the NT Planning Scheme.

SECTION 9 – ACRONYMS, GLOSSARY AND REFERENCES

- Provided in the main EIS document only.

In support of these sections, technical reports are provided in the appendices of the EIS, as listed below.

Appendix A	Terms of Reference (cross-referenced)
Appendix B	List of people involved in compiling the EIS
Appendix C1	Traffic Impact Assessment
Appendix C2	Conceptual Traffic Management Plan
Appendix C3	Construction Traffic Monitoring Report
Appendix D	Recreational Lake and Subgrade Suitability: Preliminary Geotechnical Investigation
Appendix E	Groundwater Report
Appendix F	Surface Water Quality Monitoring Report
Appendix G	Land Suitability Assessment
Appendix H	Land Capability Assessment
Appendix I	Flora and Fauna Report
Appendix J	Aquatic Ecology Report
Appendix K	Biting Insects Assessment Report
Appendix L	Archaeological Survey Report
Appendix M	AAPA Certificate
Appendix N	Consultation Register
Appendix O	Draft Area Plan and Principles
Appendix P	Draft Specific Use Zone Text
Appendix Q	Rezoning Application Statement of Effect

1 : Context

1.1 OVERVIEW

The project is known as 'Noonamah Ridge'.

The project proposes a high quality, master-planned, rural community that provides a range of lot sizes and types, with an emphasis on retaining and enhancing the rural character and amenity of the area. It will comprise approximately 4,200 homes accommodating an estimated 11,000 people, and is envisaged to be delivered over a 30-year timeframe, although this could extend to longer. It will consist of up to two local villages that include local shops, services and community facilities. The development of one of these will occur during the first stage of the project. An enterprise area is also proposed to facilitate the generation of local employment opportunities.

The project area is located 7 km south-east of the township of Humpty Doo and 36 km south-east of the Darwin CBD – see Figure 1.1 and Figure 1.2. The project area is approximately 2,800 hectares.

The project area is private freehold land that will be developed in partnership with the two landholders – Koolpinyah Station Pty Ltd and Norama Enterprises Incorporated.

CURRENT STATUS

Development proposals assessed under the Planning Act require referral under the Environmental Assessment Act if they have the potential to cause a significant impact to the environment. A Notice of Intent (NOI) was submitted to the Northern Territory Environment Protection Authority (NTEPA) on 22 December 2013 for consideration under the Environmental Assessment Act. The NOI for this project constituted the initial notification to the NTEPA of Intrapac's proposal to develop the Noonamah Ridge site.

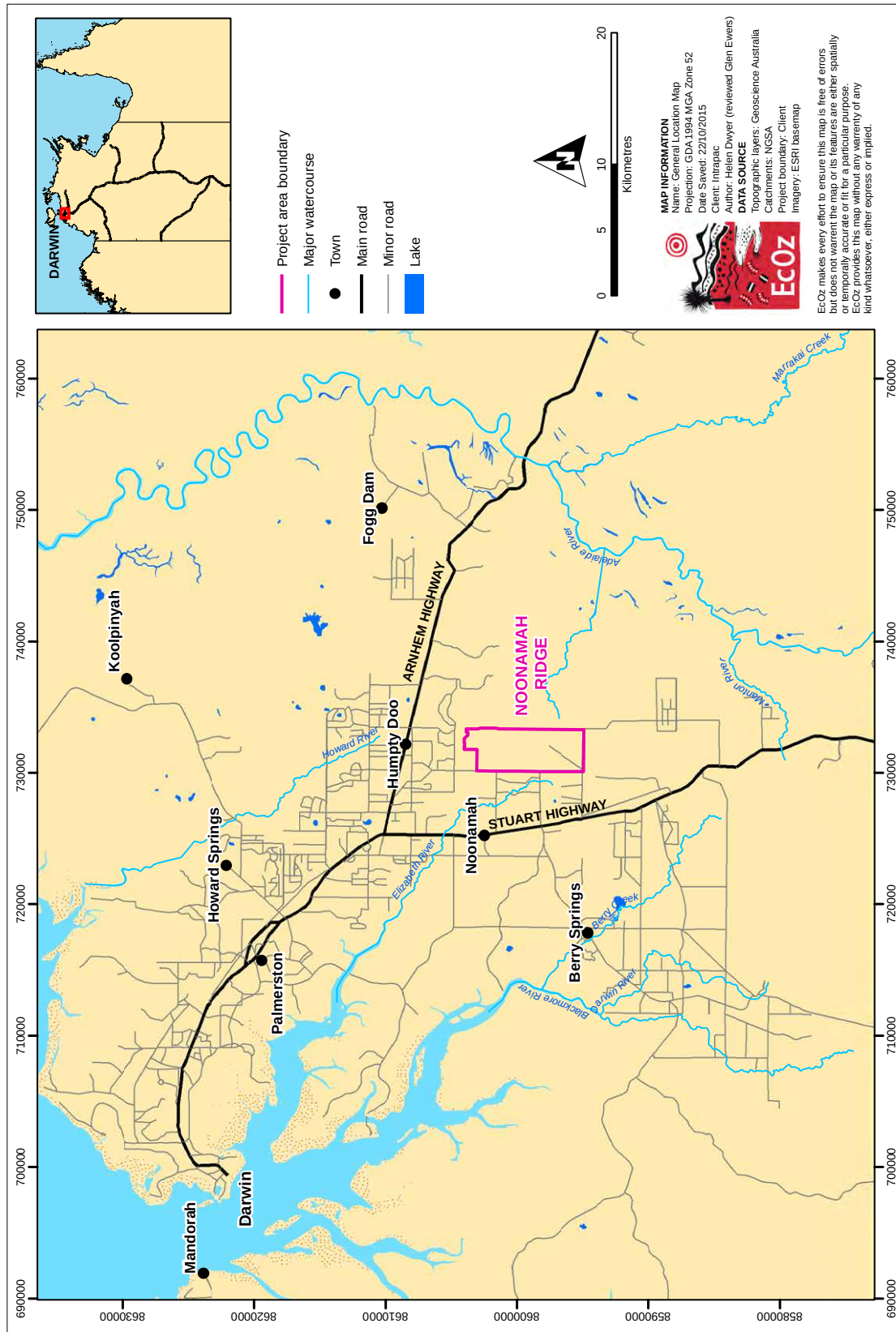
NTEPA reviewed the NOI in consultation with NT Government advisory bodies and determined that the project should be assessed at the level of an Environmental Impact Statement (EIS). The associated Terms of Reference were released in December 2014. The EIS process is explained on the NTEPA website. It culminates in the NTEPA providing the responsible Minister (in this instance the Minister for Lands and Planning) with an assessment report on the EIS. The Minister, taking into consideration the assessment report, will then determine whether or not an approval will be issued to Intrapac to undertake the development and, if so, the conditions that will apply.

Concurrently, the project will seek to establish appropriate zoning for the proposed development through an amendment to the NT Planning Scheme, as described in detail in Section 1.6. The project will be divided into various stages, each designed and delivered according to planning approvals and market demand. Each stage will require a separate development application under the Planning Act. The EIS therefore represents the first of many approval processes with which the project will be required to comply.

Intrapac plans to commence development in mid-2016.

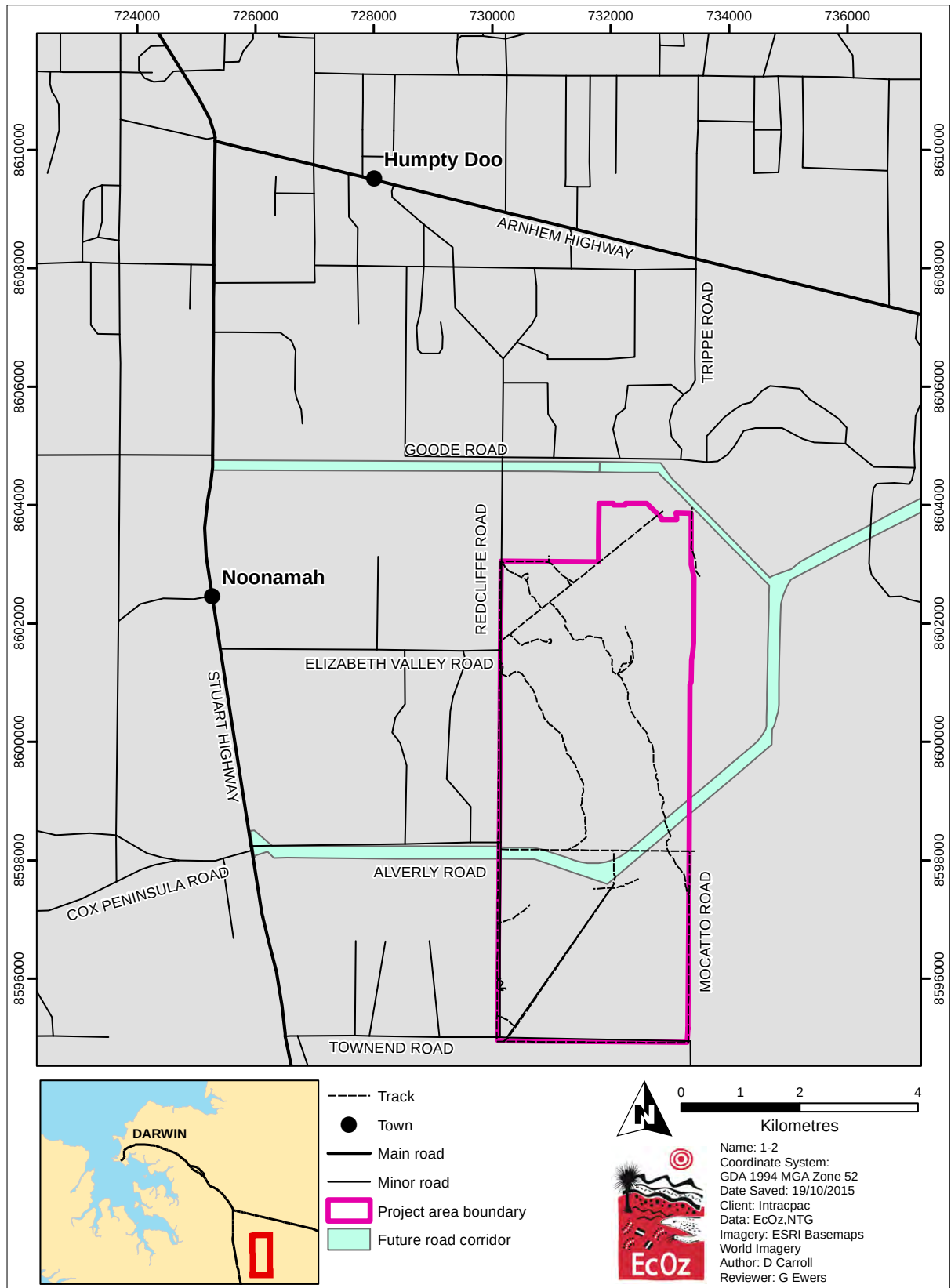
1 : Context

Figure 1.1. Map of the location of the project area within greater Darwin



1 : Context

Figure 1.2. Map of the location of the project area within the local context



1 : Context

1.2 PROPONENT

The project developer is Intrapac Projects Pty Ltd. Established in 1984, Intrapac is a privately-owned property development company which has built up a track record over 30 years of creating high quality developments. Intrapac is considered one of Australia's most successful private land developers, having won multiple industry awards. Intrapac's project portfolio spans Victoria, Queensland, Western Australia and New South Wales. The proposed development is Intrapac's first venture in the Northern Territory.

For previous projects, Intrapac has successfully negotiated environmental outcomes at both the state and federal level. Intrapac has developed a reputation for creating high quality, livable neighbourhoods – winning some of Australia's most prestigious awards in the process. Intrapac is a multiple Urban Development Institute of Australia (UDIA) excellence award-winner for a number of property developments in Victoria.

1.3 DEVELOPMENT CONTEXT

Darwin's median rental price for a house is much higher than the national figure and housing affordability continues to be of concern in the Northern Territory. This is driven, in part, by housing supply. The National Housing Supply Council Report (2011) estimates that the 'NT has by far the largest housing shortfall relative to the total number of households at 14.6 %.' So with 72,590 households in the NT according to the 2011 Census, the shortfall for the NT equates to 10,600 dwellings. Fewer houses leads to increases in house and rental prices, further compounded by the acknowledged impact of major resource and construction projects on rental availability and pricing.

Predicted increases in economic growth, employment and the population of Darwin all point to the need for additional housing options to ease the housing supply and affordability burden. The development of Noonamah Ridge presents one such option. Anecdotally, many Darwin residents want a rural lifestyle without the maintenance requirements associated with a 2 ha lot. Similarly, many people want more space but cannot afford to buy in established suburbs around central Darwin. Current town planning in the rural area is very restricted in this regard. By providing a range of rural-style lots between 800m² and 20,000m², Noonamah Ridge presents a unique product that the market has not seen to date. A key outcome of the community consultation was the desire within the rural area for retirement living or smaller lots to allow for down-sizing and thereby avoid moving away from the community and existing support networks.

Land supply (specifically greenfield subdivision) in the NT is traditionally driven by the release of land owned by the NT Government through selected land release programmes such as expressions of interest processes. Development is delivered through a development lease, where private developers essentially deliver new lots on behalf of the government. These are typically limited to the development of traditionally urban and suburban environments such as Zuccoli, Johnston and Bellamack, and more recently the award of Berrimah farm. The delivery of additional rural properties to cater for increasing demand in this market segment is therefore not accommodated within the traditional land release programs, and is instead limited to ad hoc and infrequent subdivision by private landowners in accordance with existing zoning rights. Consequently, there is the lack of rural land supply and of housing options within the rural community. The incremental subdivision of rural land by private landowners also fails to adequately plan for, or accommodate, social and physical infrastructure requirements – with developers only making a nominal contribution to road and services upgrades. The development of Noonamah Ridge as a master-planned, rural community will allow for greater consideration of local social and physical infrastructure needs – including appropriate land reservation for services such as schools, sporting facilities and community centres – as well as improved natural environmental outcomes.

1 : Context

Property development, by its nature, is demand-driven. Subdivision applications will occur in stages in accordance with market demand and with detailed analysis of the financial feasibility of the project. Development activities will only commence if Intrapac is satisfied that sufficient demand exists to justify the project, and that the development can be delivered in a cost-effective manner. Infrastructure will also only be provided to the level required to deliver each stage of the project. Consequently, a temporary drop in demand or the decision not to proceed with future stages does not affect the project.

The project area is located in a part of greater Darwin that is undergoing substantial development activity and that has significant development potential. These include a range of recent rural residential subdivisions, ongoing development activity around the Humpty Doo rural activity centre (which incorporates a range of residential development across diverse lot sizes, and a retirement living development), and an expanded light industrial estate (an NT Government development).

1.4 LAND INFORMATION

The project area is in the locality of Lloyd Creek, which lies within the South Ward of the Municipality of Litchfield. The tenure of land surrounding the project area is freehold land directly to the north, west and south, with a large area of perpetual pastoral lease land neighbouring to the east. Land parcels within the Noonamah Ridge project area are currently zoned Rural and Rural Living.

The project area is largely undeveloped pastoral land, but there is little evidence of cattle grazing within. Some quarrying and extractive industry has been undertaken in the north of the area. There is a telecommunications tower and transponder site in the south, with an access easement and track from the south-western corner. The project area is used for a number of informal recreational pursuits such as off-road driving, pig hunting and mountain-biking.

Several mining tenements exist over the land. In light of this proposed development, the Department of Mines and Energy have applied a 'no applications allowed' to the project area to restrict any future mineral title applications.

1.5 LEGISLATION AND APPROVALS

There are NT and Commonwealth legislation, guidelines and approvals that pertain to this project. Apart from the NT Environmental Assessment Act mentioned above, the other key legislation is the Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act 1999.

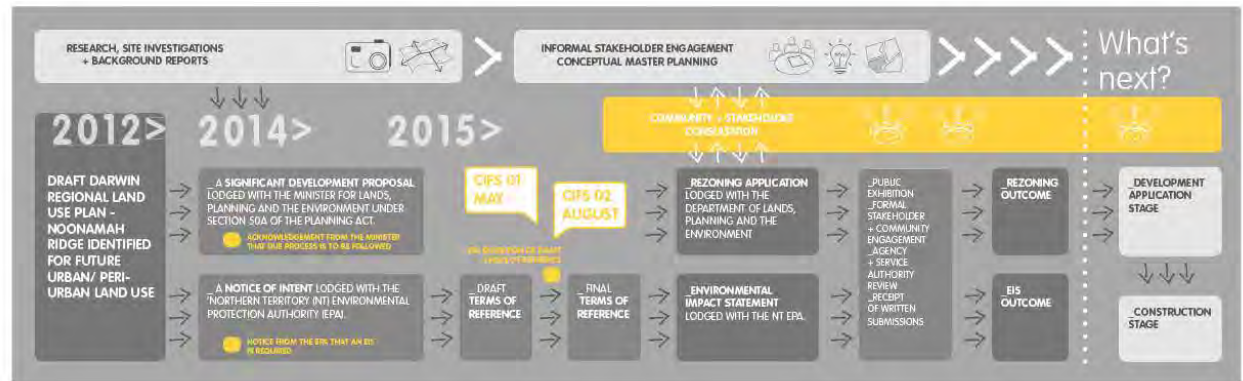
Under this Act, actions that have, or are likely to have, a significant impact on a 'matter of national environmental significance' require approval from the federal Minister for the Environment. If the Department of Environment determines that a project will likely significantly impact on a matter of national significance, it is declared a 'controlled action' and is required to undergo assessment and approval under the Act. The Noonamah Ridge development was referred to the Department of Environment in 2014 and was deemed a controlled action likely to have a significant impact on listed threatened species and communities (Sections 18 and 18A of the Act) – EPBC reference 2014/7269. The department requires assessment through 'preliminary documentation'. This form of assessment includes a public consultation phase, in which any third parties can comment on the proposed action.

An Aboriginal Areas Protection Authority certificate (C2015/111) has been acquired for the project area. It identifies a sacred site immediately to the south-east of the project area, with an associated Restricted Works Area within the project area – see Figure 3.10.

1 : Context

1.6 LAND USE PLANNING AND APPROVALS PROCESS

This section outlines the planning application process and how it relates to the EIS process. The process is best explained using a flowchart, as depicted below.



The project area is currently located in Zone RL (Rural Living) and Zone R (Rural) which, under the NT Planning Scheme, only allow for large residential / rural lots. To facilitate the development of the project, it is necessary to first rezone the land to one that allows for the development of the site in accordance with the project vision. Such a rezoning constitutes a 'Planning Scheme amendment'.

On the advice of the NTEPA and DLPE, it was determined that a NT Planning Scheme amendment can be processed and approved prior to the environmental determination on the EIS. Once a rezoning is in place, subdivision applications can be lodged; however, these can only be processed and approved if the EIS process has been concluded. A rezoning application has consequently been prepared and lodged with the DLPE as a process concurrent to the EIS. The intention of the NT Planning Scheme amendment application lodged with DLPE is to establish the land use rights that will allow for the development of the project area in keeping with the project vision.

Two of the key objectives of the proposed NT Planning Scheme amendments that are of relevance to this EIS are:

- To incorporate the outcomes of the EIS in a way that will provide the NTEPA with the certainty that both environmental commitments and the management measures contained within the EMP (Chapter 5) will be delivered for the life of the project (i.e. both during and after the construction stage of the project). This is achieved through the incorporation of environmental commitments (Chapter 7) into the proposed Area Plan and Specific Use Zone for the site.
- To reflect the outcomes of the community and stakeholder consultation process, providing the broader community with the certainty that key principles of the concept master plan – including those introduced to address community concerns – will be enforced both during and after the construction stage of the project.

The NT Planning Scheme amendment application can be viewed on the Noonamah Ridge website (www.noonamah.com). The process makes provision for a four-week public exhibition period, as well as a hearing at which interested and affected parties can make concerns known. Comments received during this process can influence the outcome of the application, as well as inform the final approved development intensity/scale.

1 : Context

After NT Planning Scheme amendment approval, and before development can commence, a development application must be submitted to the NT Development Assessment Services for subdivision of the site. Subdivision applications for this development will be undertaken in stages across the site, with the size of each stage and the number of proposed allotments directly informed by market demand and feasibility assessments. Upon receipt, each development application is subject to comment by relevant authorities (government departments, service providers etc.). The process also makes provision for a two-week public exhibition period, as well as a hearing at which interested and affected parties can make concerns known. Comments received during this process can influence the outcome of the application. The Development Consent Authority assesses the application and, if consenting, issues a permit. The permit usually contains conditions that incorporate the advice received during the comment period.

The development application (subdivision) process makes provision for a two-week public exhibition period, as well as a hearing at which interested and affected parties can make concerns known. Comments received during this process can influence the outcome of the application.

Following approval of each subdivision application, and the consequent construction of the physical infrastructure, Intrapac proposes to undertake (where possible) a process of normalising the individual lot zonings from the Specific Use zone to the relevant zone under the NT Planning Scheme. This is to ensure that the development falls within the NT Planning Scheme itself, thus simplifying the ongoing land use management of the development in the future. The undertaking to normalise zoning is a direct response to stakeholder consultation with Litchfield Council.

To ensure that ongoing environmental commitments and objectives are achieved, additional clauses will be introduced by Intrapac into the main body of the NT Planning Scheme that are specific to Noonamah Ridge – for example, specifying a range of minimum lot sizes for Zone SD (Single Dwelling) to prevent the future subdivision of lots.

1.7 CONSULTATION

Intrapac worked closely with numerous stakeholders – including Ministers and government departments, service providers and local council. Consultation with Aboriginal stakeholders was undertaken through the Aboriginal Areas Protection Authority, who consulted directly with known traditional owners and custodians, and identified relevant sacred sites that have been taken into consideration in the master planning of the development (see Section 3.5.1).

The initial aim of consultation was to determine whether there was merit to developing the subject site. Once it was decided that there was, there have been frequent meetings, briefings and discussions with key stakeholders to explain the project vision, and to seek advice and guidance on the correct process to follow.

Intrapac also undertook a comprehensive community consultation process using the following consultation tools:

- A project website was established at an early stage, and all consultation material was made available through this website to ensure the transparency of the process. The website allowed people to register their interest and provide comment. To date approximately 145 registrations have been received, of which approximately 70 % are interested in land release or expressed support for the proposal.
- Direct, one-on-one consultation was undertaken with key community members on request.

2 : Project Description

- Two Community Information and Feedback Sessions were held:
 - o Session One (May 2015) introducing the project vision and concept, and seeking feedback from the community. Approximately 250 people attended this session; the majority were residents from the area. Forty-five feedback forms were completed.
 - o Session Two (August 2015) outlining changes made to the proposal based on community feedback, presenting the revised project vision, providing technical information on services and environmental issues, and seeking feedback from the community. Approximately 20 feedback forms were received.

Comments received from key stakeholders have indicated a high level of support for the principles behind the development, as well as the technical ability of the land to accommodate development. While certain members of the community are not in favour of the development of lots smaller than 2 ha in the rural area, a strong response was received in support of the need for the creation of new villages and for a range of lot sizes. Respondents identified affordability as a barrier to entry in the property market, and a desire to have smaller properties available for first home buyers and for the ageing population to downsize.

Table 1.1 outlines key comments received during the abovementioned consultation process, and the development changes made as a result.

Table 1.1. Summary of outcomes and changes made to development comments

COMMENTS	CHANGES / RESPONSE
Lots should be no smaller than 2 ha	The aim is a rural development with a range in lot sizes, with smaller lots structured around the villages and at key locations. The majority of the site will comprise larger rural lots.
There needs to be more opportunities for first home buyers and people wanting to downsize, as well as for retirement living	A range in lot sizes is proposed, with smaller lots and retirement living to be provided in the villages, and other key locations.
Existing lots should be buffered	A larger buffer has been included along all boundaries that abut, or are opposite, existing larger lots to ensure that the visual amenity and character is protected.
There are too many rural villages	The number of villages has been reduced from five to two.
Concerns relating to groundwater	- Water quality and quantity testing is underway, and will be dealt with in accordance with approval agency requirements. - A range of mitigation measures will be implemented to avoid impacting upon local aquifers.
Concerns relating to stormwater	A range of stormwater management devices will be utilised, with the aim of ensuring that stormwater is discharged at pre-development rates and quality.
Need better access to shops and quality produce	- The rural village will provide opportunity for new shops. - A local fresh produce community garden will be provided.
Need better access to medical facilities	The proponent will work with the Department of Health to identify opportunities to improve medical facilities in the region.
Need better access to community facilities; including schools, child care, and for ageing residents	The rural village will provide childcare, a site for a new school, and other amenities and community facilities as required.
The environment should be protected (fauna and flora)	Conservation-significant areas have been identified to be retained or investigated further.

2 : Project Description

The EIS has been prepared early in the project-planning phase and so the project description presented in this section is based only on the early design work undertaken by Intrapac. Following completion of the environmental assessment process, the development master plan will be further progressed to the point where a subdivision application can be submitted under the Planning Act. It is the role of the EIS to present sufficient information to provide for assessment of the development's potential to cause significant impacts to the environment, and to present a plan for avoiding and reducing those impacts as the development progresses through more detailed planning and approvals.

2.1 OVERVIEW

It is proposed that Noonamah Ridge will consist of the following:

- Approximately 4,200 homes accommodating around 11,000 people.
- A range of lot types between 800 and 20,000 m² (based on the land's capabilities and market demand). Lot sizes along Redcliffe Road and to the northern boundary will be complementary to existing neighbouring lot sizes.
- Two rural activity centres (villages) – similar in size to the existing Fannie Bay or Parap village centres – potentially including:
 - o Community facilities (schools, childcare, kindergartens and shared buildings)
 - o Local shops and services
 - o Sports fields
 - o Community gardens
 - o Bus stops.
- A residential mix of approximately 90 % of the site (including the provision of open space, community facilities and social infrastructure). The remaining 10 % of the site will be for enterprise/commercial purposes.
- Alternative approaches to the delivery of services and infrastructure to the development.
- No less than 15 % of the site being green space and public open space.
- Approximately 35 km of pedestrian and cycle paths.
- Additional bus services to Humpty Doo, Coolalinga, Palmerston and Darwin CBD.

A preliminary Area Plan and a concept master plan have both been devised for the development (see Figure 2.1 and Figure 2.2). The design of this development has been strongly influenced by the outcomes of both the stakeholder and community consultation processes described in Section 1.7.

ECOLOGICALLY SUSTAINABLE DEVELOPMENT

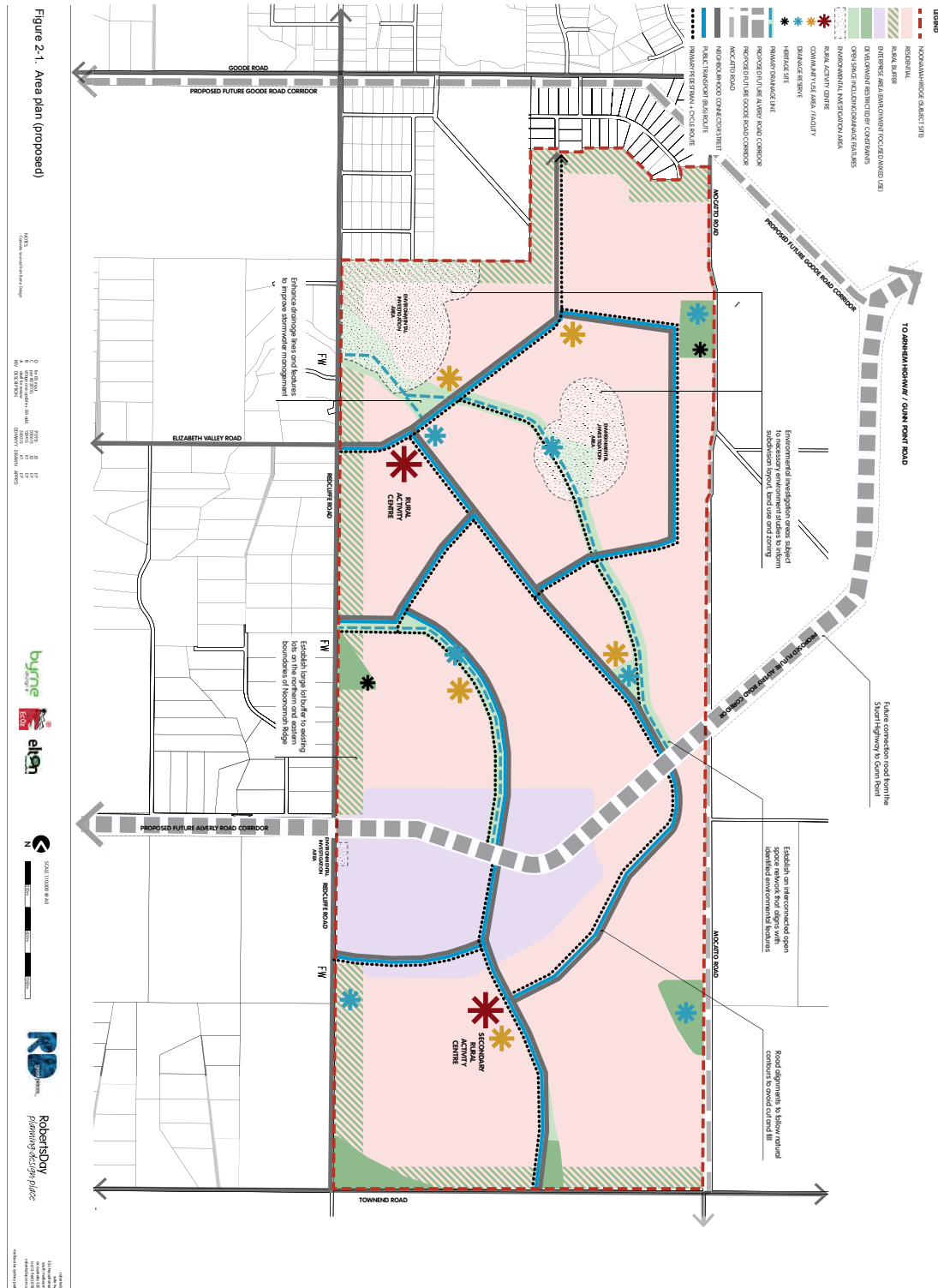
Ecologically sustainable development (ESD) is 'development which aims to meet the needs of Australians today, while conserving ecosystems for the benefit of future generations'. The three main facets of ESD that require consideration when assessing potential impacts of development are economic, social and environmental.

ESD is one of the core principles guiding the development of Noonamah Ridge and there are many aspects of Noonamah Ridge that can be considered as complying with, and contributing to, ESD. As a master-planned

2 : Project Description

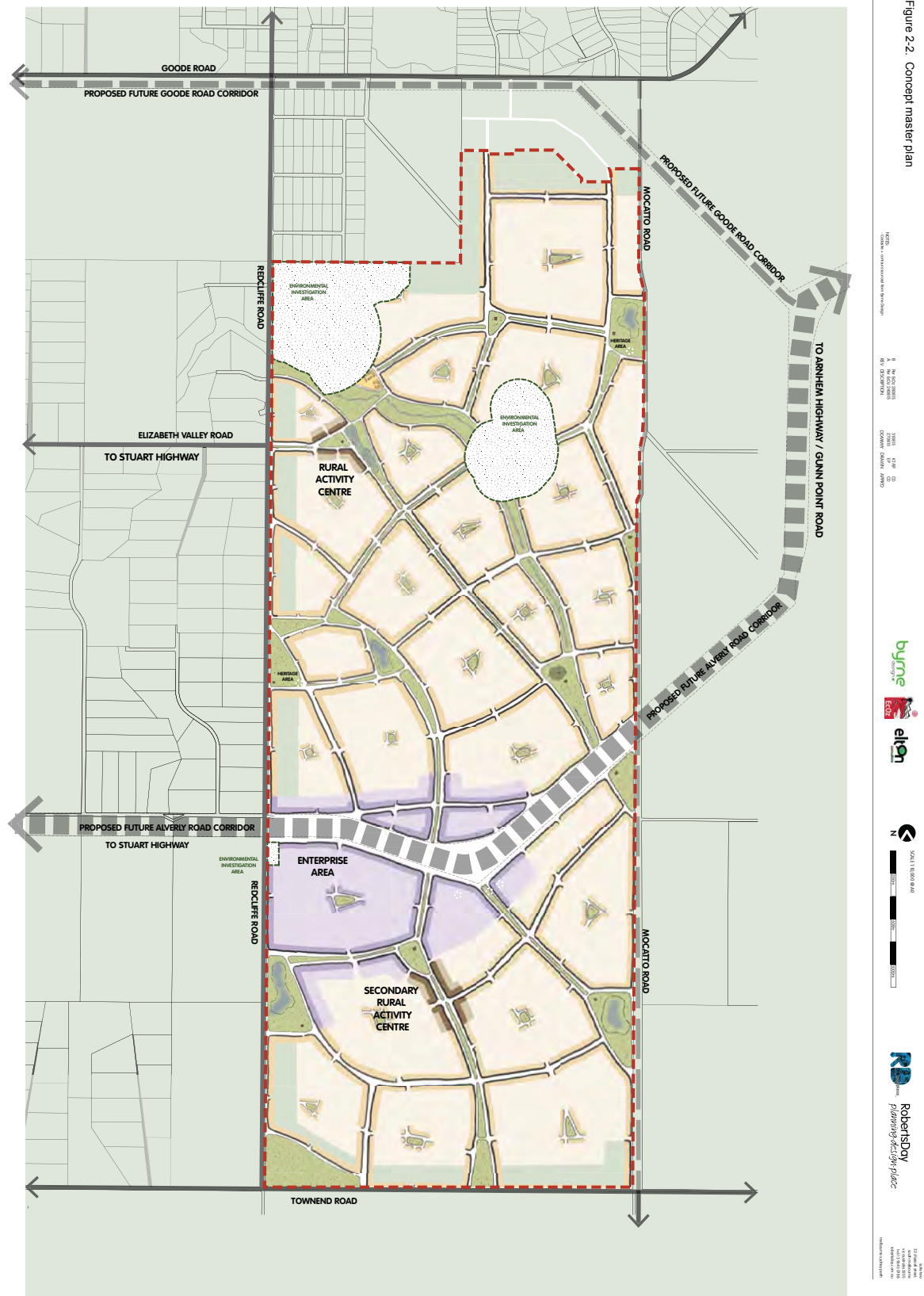
development, this development is opposite to the current incremental and ad hoc subdivision of rural land by private landowners which fails to adequately plan for, or accommodate, social and physical infrastructure requirements, as well the environmental context within which these piece-meal developments occur.

Figure 2.1. Area plan (proposed)



2 : Project Description

Figure 2.2. Concept master plan



2 : Project Description

PLANNING DESIGN PRINCIPLES

The concept master plan for Noonamah Ridge (Figure 2.2) has been developed utilising the principles of 'Timeless Neighbourhood Design'. While these principles are normally applied to urban developments, they have been adapted to this development to ensure that, where possible, the rural subdivision achieves the principles of good development – in particular, providing opportunity for walkability and connectivity which has not traditionally been a focus in Darwin's rural area.

The development will be sensitive to the people residing along its boundary. Lot sizes along Redcliffe Road and to the northern boundary will be complementary to existing lots/homes in order to create an interface between them. Setbacks will be provided to the development's boundaries in accordance with the requirements of the NT Planning Scheme and will be endorsed through the application of building envelopes. Streets will connect to existing road reserves (to the north of the site) promoting a connected community and allowing existing residents to access facilities within Noonamah Ridge. A relevant controlling clause will be introduced into the NT Planning Scheme to ensure that, once developed, no further subdivision of individual properties will be permitted.

The Land Suitability Assessment (Appendix G) and, where relevant, Land Capability Assessments will be used to guide subdivision design and lot sizing for each stage.

HOUSING DESIGN PRINCIPLES

A key component of the vision that Intrapac has for Noonamah Ridge is to provide a built environment with structures that tread lightly on the site, acknowledge the particularity of the tropical climate, and reflect the aesthetics of the landscape. Buildings within the development will be subject to tried-and-tested tropical architectural design whilst integrating energy efficient practices. See Figure 2.3 and Figure 2.4 for examples of some of these characteristics that will underpin housing design at Noonamah Ridge.

High-level architectural design guidelines will be developed and incorporated into each sale agreement. The main aim of the guidelines will be to ensure key outcomes in relation to environmental sustainability and climate responsive design, and to ensure key elements of the rural character are maintained – particularly in those areas of the site with the smaller lot sizes. The guidelines will aim to not be too prescriptive and will allow for incremental development of houses in keeping with existing rural living habits. A covenant will be placed on the title of each property. This will require an assessment of building plans against the guidelines and approval before construction can commence. The assessment and approval process will be undertaken by a nominated representative of the development (either an internal staff member or a controlling architect).

Building envelopes will be established for all lots to ensure the appropriate placement of dwellings in relation to each other, and in response to land capability. At the time of lodgement of each subdivision application, a building envelope plan for each lot will be lodged for endorsement as part of the subdivision development permit. All development will need to be in keeping with these building envelope plans to ensure occupancy certificates can be granted. Copies of the building envelope plan will be attached to each deed of sale.

2 : Project Description

Figure 2.3 Sketches and photographs of the characteristics that will underpin housing design at Noonamah Ridge



Figure 2.4 Sketches and photographs of the characteristics that will underpin housing design at Noonamah Ridge



2 : Project Description

2.2 COMPONENTS

Given the projected population of Noonamah Ridge, the development will be planned to be reasonably self-contained in terms of social infrastructure in order to avoid the potential for overloading existing services in nearby rural communities. In the early stages, Noonamah Ridge will rely on many facilities and services in Humpty Doo and Palmerston until it has reached thresholds to make its own facilities and services viable.

Benchmarks for social infrastructure provision have not been developed for the NT, partly because of the high variability between Territory communities. Palmerston City Council has adopted within its community plan a set of benchmarks to guide its future planning (City of Palmerston 2008). These have been used to guide indicative planning of social infrastructure for Noonamah Ridge.

Based upon the Palmerston benchmarks, upon completion Noonamah Ridge would require (for 11,000 residents):

- 2 primary schools
- 1 middle/high school
- A family services hub with family support services, early childhood services and space for government programs.
- 5 – 6 childcare centres
- 3 – 4 neighbourhood meeting rooms
- 2 local multi-purpose community centres.

The NT Department of Education has agreed to provide a primary school within the Noonamah Ridge. However, the staging of the Noonamah development suggests that a primary school might not be provided for at least five years into the development program, and any new middle/high school would be further into the future. Thus, while the government school needs of the Noonamah Ridge community may be met by proposed new schools in time, in the short-term school students will need to be accommodated in existing schools, which will need to be expanded to accommodate growth associated with Noonamah Ridge. A middle/high school – if developed within Noonamah Ridge – would also not be built until well into the development, so students would initially be accommodated at nearby schools.

A multi-purpose children and family centre in the village would complement existing facilities, and responded to a need documented through the community consultation process. In terms of childcare, as the development proceeds there will be demand for new facilities. Privately-operated childcare centres could be established within the proposed village, should an operator determine that there is demand for such a facility. It is also possible for childcare centres to be located within areas with a residential zoning.

Each application for subdivision will typically include an update to the demographic information, and an assessment as to whether social infrastructure proposed and already developed is meeting the requirements of the new and existing community in the broader area. This will ensure the ongoing appropriate delivery of social infrastructure in a timely and coordinated manner.



2 : Project Description

VILLAGES

The first rural activity centre will be a village providing for the daily needs of residents (within Noonamah Ridge and the surrounding community). Currently referred to as 'Village One', development will commence with Stage 1 of the project. Village One will include a community of around 1,500 people in five neighbourhoods surrounding the rural activity centre. The design of Village One will be defined by the natural landform and waterways – see Figure 2.5 for a preliminary master plan (developed for community engagement purposes) and Figure 2.6 for an artist's impression.

A range of lot and housing types will be developed in Village One – including 20,000 m² rural residential lots around the edges of the village, smaller lots (800 – 4000 m²) moving toward the rural activity centre, and higher density housing directly adjacent and within the centre. Also included will be provision of land for aged care and retirement living.

Village One will contain a concentration of commercial and retail activity (potentially including a supermarket) located on the main street. Home-based businesses, medium-density dwellings, attached homes and smaller lot dwellings will be clustered around Village One close to the amenities the centre will offer. Streets will be designed to be safe and highly interconnected, as well as landscaped to promote walking and cycling. Walking and cycling paths will be provided within open spaces, creating recreation opportunities.

The village will be centred around a lake and extensive parklands – including a Village Green with a building for community use. A community garden and sports fields will be in close proximity to the rural activity centre, within walking distance of the surrounding residents. The bus route will travel through Village One, stopping in the rural activity centre.

Village One will include the provision of land for a new primary school, and could include land for a high school. Additional facilities such as childcare, meeting/ function spaces, a library and community health services, and land for a new volunteer fire brigade and other community organisations will also be considered.

A second rural activity centre will be developed at the southern end of the project in the latter stages of the project (in approximately 20 years' time), with facilities to be determined on an 'as needs' basis closer to the time.

ENTERPRISE AREA

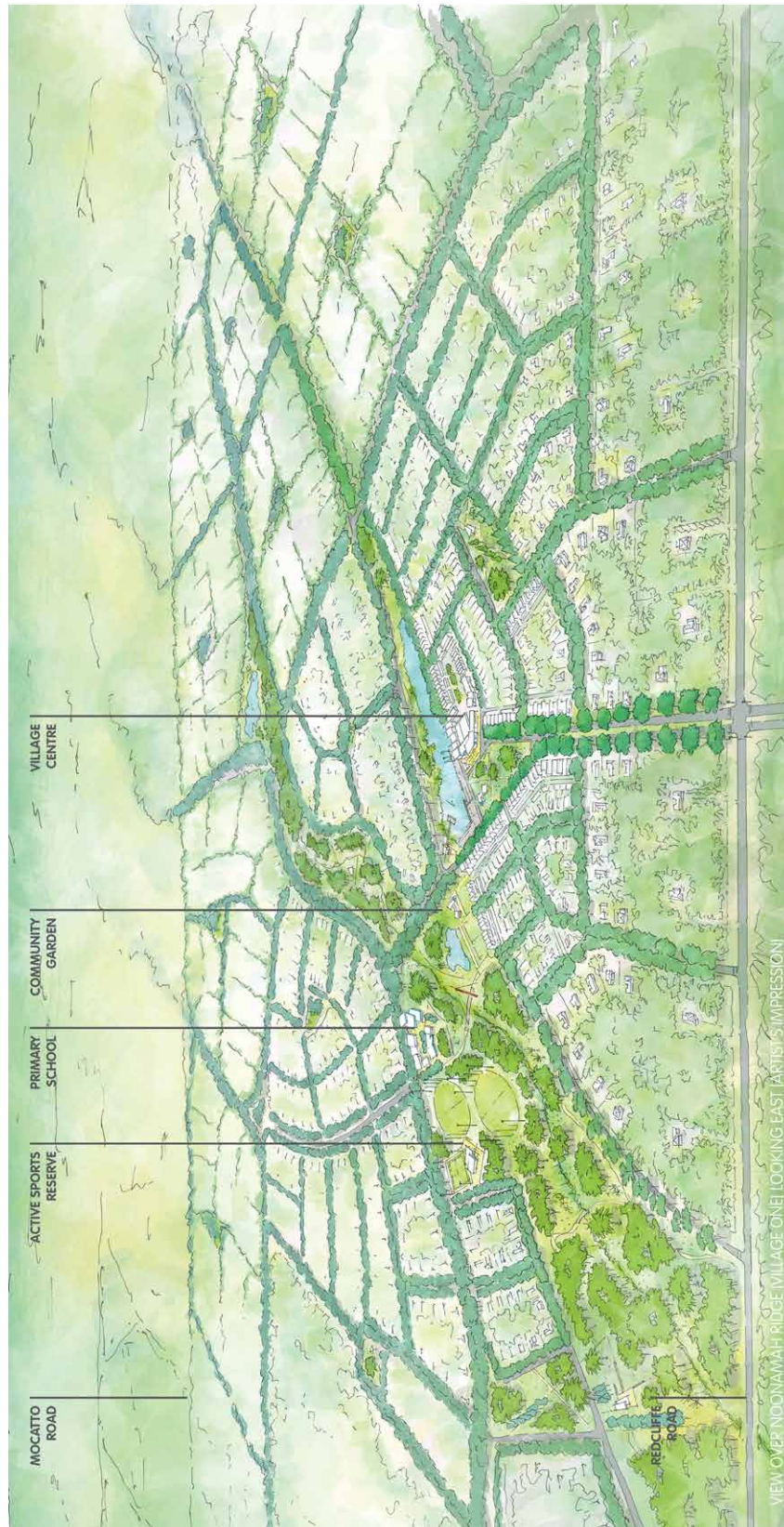
During initial consultation with the NT Planning Commission, the need for employment land was flagged by the Commission. In response, Intrapac has committed to providing an enterprise area within the development that will provide the opportunity for the establishment of an employment centre. The site is located on the future Alverly Road corridor, an earmarked heavy vehicle corridor between the possible future industrial port areas at Cox Peninsula and Glyde Point. While the final make-up of this area is subject to further investigation and market demand, it could include:

- Light or general industry
- Transport-related industry
- Transport hub
- Science and technology-related industry.



2 : Project Description

Figure 2.6. Artist's impression of Village One



2 : Project Description

GREEN SPACES

Intrapac considers the natural environment within the project area to be a unique attribute of the site. As shown in the concept master plan (see Figure 2.2 and Figure 2.7), Noonamah Ridge contains a network of green spaces that include public open spaces (see sub-section below), existing waterways and remnant vegetation. The indicative location of these green spaces coincides either with walkability design criteria (e.g. for open spaces such as parks and sporting venues) or with conservation-significant values (e.g. sensitive vegetation types and threatened species). All conservation-significant values identified in Section 3.3.4 are contained within the green space network. Second-order waterways are buffered by at least 50m as required in the Land Clearing Guidelines (NTG 2010).

OPEN SPACES

Public open spaces will be located throughout Noonamah Ridge to provide amenity for residents – including playgrounds, BBQ and picnic facilities, public artwork, exercise equipment, walking and cycling trails – as well as to provide sports fields and recreation facilities for both the new community and surrounding residents (see Figure 2.7).

Less open space is provided within the rural area because lots are bigger. Where parks are provided, they will be informal in character. Within the sub-urban and general urban areas there will be a range of parks, becoming more formal the nearer they are to the rural activity centres.

ENVIRONMENTAL INVESTIGATION AREAS

Certain sites within the project area have been identified during field surveys as being environmentally sensitive. Most have been encapsulated within the green space network proposed for the development (as discussed in the preceding section); however, three locations have been depicted on the conceptual master plan as 'environmental investigation areas'. They have been labelled as such because there are uncertainties associated with them that require further ecological investigation prior to the development of a final master plan.

The small 'environmental investigation area' adjacent to Redcliffe Road near the Alverly Road intersection relates to the threatened flora species – *Typhonium praetermissum* – contained within. The uncertainty relating to this site is that, because it is located immediately adjacent to the Alverly Road corridor owned by the NT Government, it might be disturbed when that road is developed. Further discussion amongst stakeholders about the fate of and, if retained, responsibility for management of that population will need to occur prior to the road corridor being developed.

The other two 'environmental investigation areas' in the north of the project area are significantly larger. The particular uncertainty relating to these is the distribution of the threatened Howard River Toadlet within them. The species is most readily identified in the wet season from the calls it makes within suitable inundated areas (see the Flora and Fauna Assessment in Appendix I – for more detail). What is known about this species' ecology is that at the end of the wet season it moves from its breeding grounds into surrounding habitat and burrows underground during the dry season to 'hibernate'. What is not known is what constitutes the species' preferred dry season habitat.

Intrapac is committed to protecting the two key populations of the Howard River Toadlet that occur within the project area, but until the distance and direction of the toadlets' movements are determined, an adequate buffer between toadlet habitat (both calling and hibernating) and the development cannot be determined.

Further studies are needed, and all of these buffer zones will be further refined prior to any development affecting the 'environmental investigation areas'.

2 : Project Description

PROJECT FOOTPRINT

Out of a total area of approximately 2,800 ha, a maximum of approximately 1,570 ha of the project area will be cleared for the development. Of this, a maximum of approximately 880 ha will be impervious surfaces such as bitumen, concrete and rooftops; the remaining being gardens, grassed areas and bushland.

STAGING

It is envisaged that the development will be completed over the course of 30 years – possibly longer – with approximately 150 – 200 lots/homes sold and constructed each year (see Figure 2.8). This time frame is dependent on market drivers, as well as population and economic growth in the region.

The first stage will involve the release of 400 lots and the commencement of Village One. A primary school, community centre, community garden, corner store and cafe are proposed to be available to both existing surrounding residents and the new community in the first stages of development. Each stage of development will be co-ordinated with the timely provision of services, infrastructure and employment opportunities – see relevant sections below regarding the staging of head works and associated infrastructure.

RESPONSIBILITY

Construction of each stage of the development will be undertaken by a civil contractor. Following construction, the responsibility for the maintenance and upkeep of infrastructure and open space will likely lie with Intrapac for a period of 'on maintenance', before responsibility being completely handed over to the relevant authority ('off maintenance'). Management of green spaces is discussed above.

Artist's impression of a streetscape picture



2 : Project Description

Figure 2.7. Map of proposed open space and recreation network



2 : Project Description

Figure 2.8. Maps showing the staging of the development



0 - 3 YEARS

🏠 320
👤 870



4 - 7 YEARS

🏠 730
👤 1,980



8 - 11 YEARS

🏠 1,200
👤 3,200



12 - 14 YEARS

🏠 1,850
👤 5,000



15 - 18 YEARS

🏠 2,410
👤 6,500



19 - 22 YEARS

🏠 2,755
👤 7,450



23 - 26 YEARS

🏠 3,365
👤 9,100



27+ YEARS

🏠 4,200
👤 11,000

2 : Project Description

2.3 TRANSPORT

Prior to approval from Litchfield Council for each subdivision, Intrapac will need to have the approval of the Department of Transport and/or the Department of Infrastructure (DoI) with respect to the design and undertaking of roadworks associated with the development. In addition, a condition is generally placed on the subdivision development permit requiring the provision of plans – to the satisfaction of the relevant authority – and approval of the plans by this authority, prior to commencement of works.

Within the vicinity of Noonamah Ridge, the Stuart Highway (north of Cox Peninsula Road) and Arnhem Highway (west of Humpty Doo) have moderate traffic volumes (i.e. numbers of cars) with more than 3,000 vehicles per day per direction. Traffic volumes are otherwise generally quite low within the local area due to the rural setting.

Two bus routes currently provide services from Palmerston to the project area – Route 440 and Route 445. Both bus routes primarily travel along the Stuart Highway. Services are provided for both routes Monday to Saturday, with neither having timetabled services on Sundays or public holidays.

There are several road schemes being considered for the future road network as discussed with the Department of Transport (DoT) during the stakeholder workshop. All potential road schemes proposed by NT Government are preliminary concepts with no planning or design undertaken to date. The main road scheme in the vicinity of the study area is a high-capacity road link between Stuart Highway and Palmerston via Channel Island Road, providing an alternative to Stuart Highway. Figure 2.9 shows the assumed implementation stage for each new road within the study area.

Noonamah Ridge is designed to be relatively self-contained in the provision of residents' daily needs (including education, recreation and employment, as well as daily necessities) thereby reducing the number of vehicle trips required to leave Noonamah Ridge. For external trips, private car use is likely to be the predominant mode of transport choice for residents of Noonamah Ridge in the short and medium term. In the long term, the transport network will need to respond to the predicted increase in walking, cycling and public transport use that is demonstrated in other suburbs of Darwin.

PROPOSED INFRASTRUCTURE

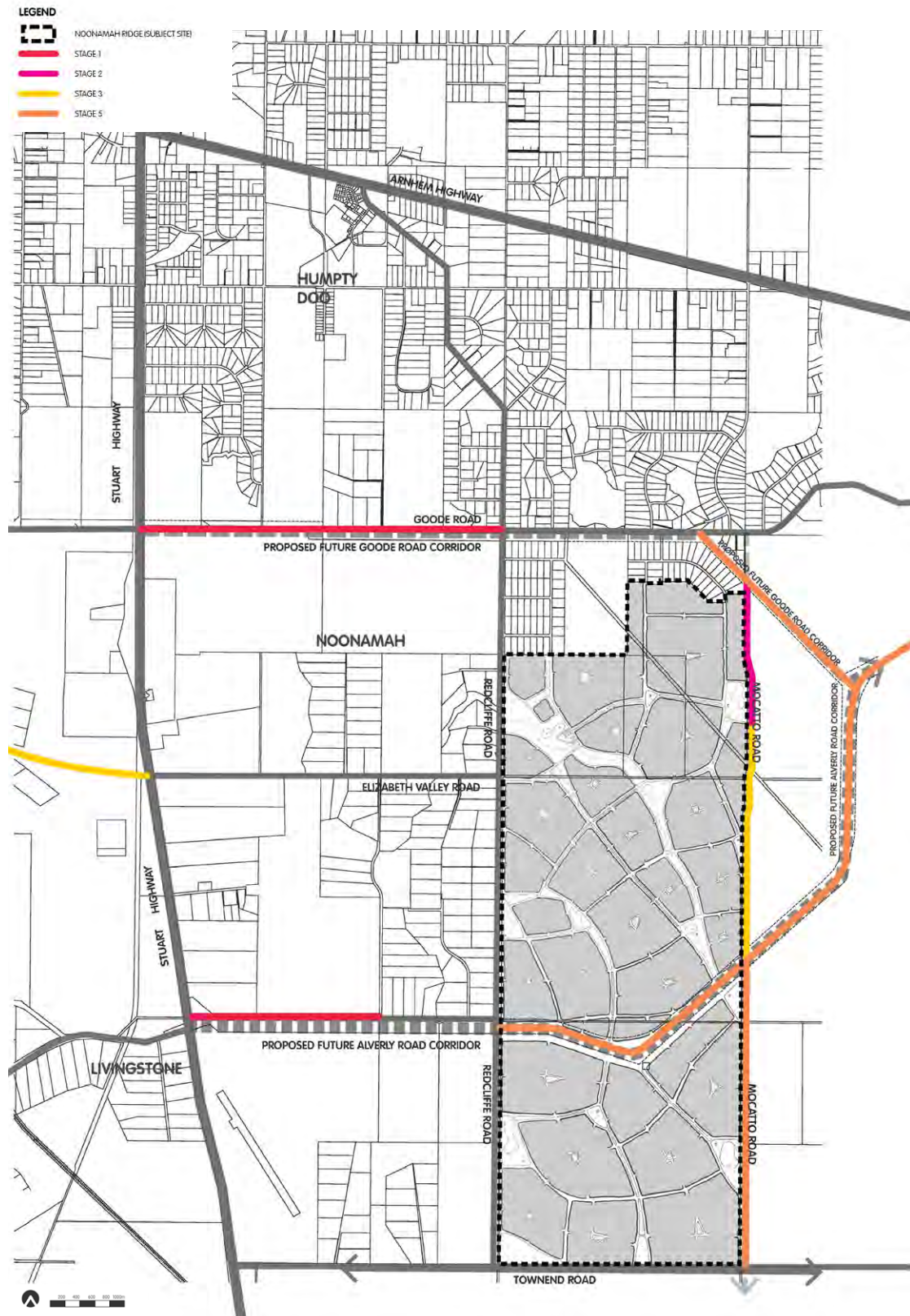
The proposed street network within the development is highly interconnected and allows for direct access to neighbourhoods, reducing the need for traffic on local collector roads. Modelling shows that six external intersections and a number of roads will require upgrades as a result of new road schemes and access roads into the development. All internal roads will be constructed by Intrapac with ongoing maintenance by Litchfield Council. External road upgrades for works not associated with the development are the responsibility of the DoI. Where upgrades to external roads are required to service the proposed development, an appropriate level of contribution will be required by Intrapac. This could take the form of development contributions or direct construction.

To enable connection to other areas within the greater Darwin region, extensions to existing bus services will be investigated prior to development. Investigation of the feasibility of extending bus routes would be undertaken in conjunction with the NT Government and private bus operators. Bus shelters and other infrastructure related to public transport will be constructed to the requirements of DoT, and ownership will be ceded to the NT Government, along with responsibility for the long-term maintenance of this infrastructure.

To encourage residents of Noonamah Ridge to make active transport choices, cycle or shared paths will be provided within the site as part of each development stage, extending the previous network as required (see Figure 2.10).

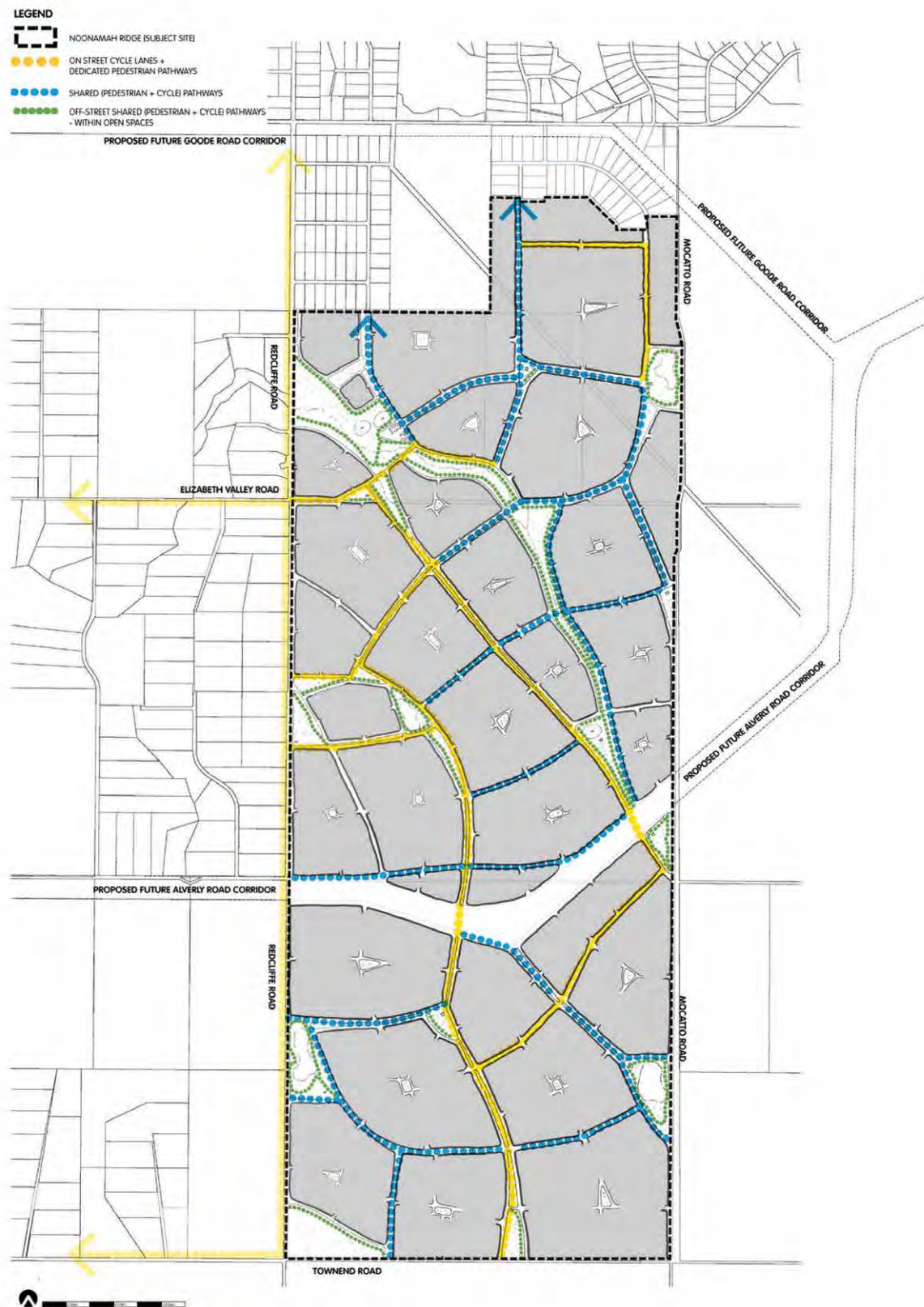
2 : Project Description

Figure 2.9. Timing of future road schemes



2 : Project Description

Figure 2.10. Map of internal cycling and pedestrian network (preliminary)



2 : Project Description

2.4 ELECTRICITY

Prior to the approval of each subdivision (stage), Intrapac will have to demonstrate to both PWC and Litchfield Council that there is sufficient electricity to supply the new subdivision without impinging on the supply to existing users. In addition, a condition is generally imposed on the developer by the responsible authority in relation to the ensuring that required upgrades to electrical infrastructure to support the development will be undertaken, prior to commencement of works.

The existing Power and Water Corporation (PWC) network in the rural area is a 22 kV (overhead) power line that runs along Redcliffe Road. There is minimal spare capacity in the existing PWC network and, as such, it is inadequate for servicing the whole development. A new substation (Strangways Zone Substation) is currently under construction and due to be commissioned in the next 12 months. It is adjacent to the existing McMinns Zone Substation located at the Stuart Highway/Arnhem Highway intersection.

The estimate load allocations for the development are classified as 'basic supply' and equate to approximately 37.96 MVA. This is the loading that would be used to size electricity reticulation throughout the development – including substation sizing. For sizing of feeders to the subdivision, diversity is used and the diversified total load is 21.11 MVA.

Proposed supply strategy

The proposed subdivision can be serviced with the provision of up to three dedicated feeders – one overhead and two underground – with the requirement for the second underground feeder to be assessed during the later stages of development. These are the minimum requirements for the development. Total capacity of the three feeders (based on a 70 % loading) is 22.96 MVA, which accounts for the estimated diversified total load.

It has been communicated to Intrapac that PWC's preferred power supply solution is for Noonamah Ridge to be connected to the Strangways Zone Substation which is currently under construction, and that there is capacity for at least two feeders to be connected for such a purpose.

Intrapac will be responsible for the design and construction cost of the required feeders (external to the project area). Once constructed, these feeders will become PWC assets and, as such, Intrapac will no longer have control over the connected load. As is typical in a land development project of this nature, Intrapac will install the internal power distribution network to the satisfaction of PWC and cede this infrastructure to the responsible authority on completion. Intrapac is also investigating the opportunity to own, manage and maintain the electrical infrastructure as a utility provider, if possible.

2.5 STREET LIGHTING

For Noonamah Ridge, no overhead streetlights will be used. Low/ground level lighting will only be provided in the rural activity centres and on roads where the average lot size is 2,000 m² or smaller. In transition areas between peri-urban and rural areas, the option of sensor lighting (i.e. that which comes on in response to car movement triggers) will be considered.

2.6 TELECOMMUNICATIONS

An underground Telstra cable runs along Alverly Road, crosses Redcliffe Road and continues up the firebreak to service the existing telecommunications tower. As telecommunications services are provided on an 'as needs' basis, there are no current plans for expansion of the existing infrastructure.

Intrapac will coordinate with the relevant authorities to provide a system of pipes and pits throughout the subdivision area to enable the National Broadband Network Corporation (NBN Co) to pull through fibre optic cable as part of each individual stage of works.

2 : Project Description

2.7 POTABLE WATER

There is no water infrastructure within the project area. Residential allotments near the site are serviced with individual groundwater bores. There are pipes running along the Stuart Highway 3 km west of the development; however, these pipes are not able to accommodate an increase in pressure. PWC has advised that the existing pump station on Stuart Highway does not have sufficient capacity to service the entire development and will therefore need to be upgraded if connection to mains water is required.

The total peak day storage required for both residential and non-residential use within Noonamah Ridge at full occupancy is 23,945 megalitres (ML). The ultimate peak hour flow required is 451.14 L/s

Proposed supply strategy – Stage 1

Intrapac intends to service Stage 1 of the development – 400 lots – with groundwater extracted from onsite aquifers. Preliminary onsite groundwater investigations have been conducted on six groundwater investigation bores and a number of prospective aquifers have been identified in the central and southern portions of the project area. Water quality in all aquifers tested is of potable quality and preliminary yields appear to range up to a maximum of 15 L/s.

Water resource regulators estimate that the recharge rate in this region is approximately 200 millimetres per annum, based on standard recharge estimation techniques. The NT Government currently requires that 80 % of recharge be apportioned to the environment (to maintain stream and spring flows, and to protect groundwater-dependent ecosystems). That leaves 20 % for consumptive use. Sustainable use is therefore considered the extraction of not more than the 20 % of estimated annual recharge, which equates to 40 millimetres per annum. The volume of groundwater that can be sustainably extracted from the aquifers in the project area can therefore be calculated by multiplying this amount by the land area of the development (40 mm multiplied by 28,000,000 m²), which equates to 1,120 ML a year. This is more than sufficient to supply Stage 1.

It is proposed that 300 lots of Stage 1 will be serviced with potable water piped from bore-fields located within the project area. Each bore-field will comprise a number of bores extracting from the same aquifer (with sufficient distance between them to avoid interference). Water extracted from the bore-fields would be pumped to a holding tank located on a high point within the project area and then piped to properties. The bore-field will be 'gauged' in order to monitor water extraction and ensure extraction is within sustainable limits as defined by the licencing process under the Water Act. The remaining 100 lots of Stage 1 will be sized and located in areas in which it is possible for each lot to have its own bore (or for a number of lots to share a bore). In the event that some of these larger lots are unable to access sufficient potable groundwater, the abovementioned bore-fields will be able to accommodate these (perhaps requiring the drilling of an extra bore within them).

A Groundwater Sustainability Study – including pump testing of groundwater bores – will be undertaken to verify the existence of a sustainable water supply for Stage 1 of the development, and to understand and predict the response of the aquifer to extraction. In the unlikely event that it is found that the aquifers within the project area are not able to sustainably supply the water needs for Stage 1, there remains the option of connecting to mains water (see next section).

Proposed supply strategy – future stages

Concurrently with Stage 1, Intrapac intends to investigate the viability of the Koolpinyah Aquifer (see Section 3.2.2 for more detail) as an ongoing water supply for Noonamah Ridge. This aquifer is accessible through a pastoral lease that has the same owner as the majority of the project area. Water would be piped to the project area, pumped up to water tanks on elevated sites, and then dispersed throughout the development's internal reticulation. This bore-field, if developed, would be gauged to ensure sustainable extraction.

If the Koolpinyah Aquifer does not present a feasible water supply for the project, Intrapac proposes to enter into an agreement with PWC to connect Noonamah Ridge to mains water supply. This agreement could include cost-sharing or development contributions/levies. From an infrastructure perspective, this would involve the following:

2 : Project Description

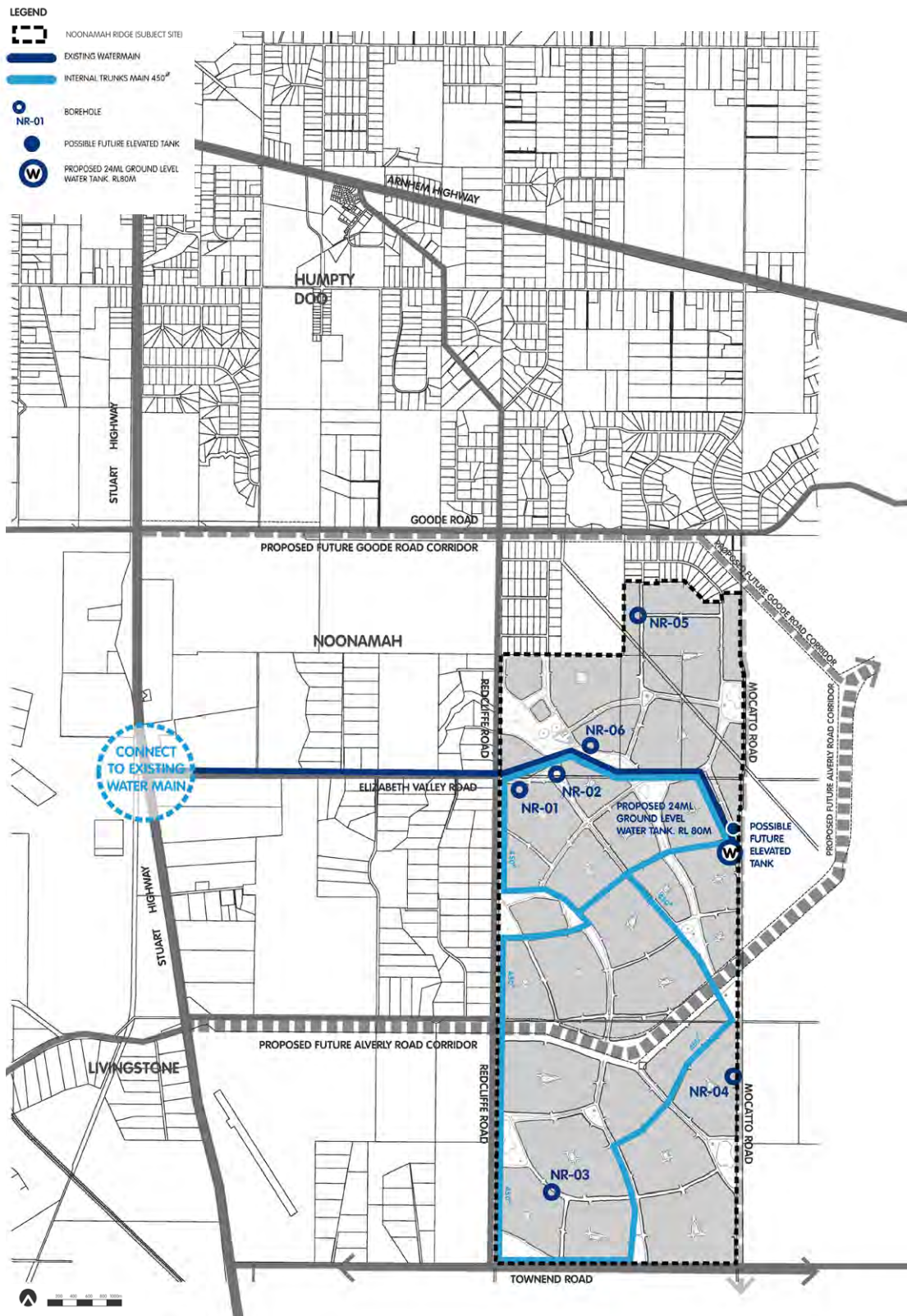
- 1) Construction of a replacement booster pump station at Stuart Highway
- 2) Construction of a rising main along Elizabeth Valley Road
- 3) Construction of a ground-level water tank (and possibly an elevated tank) within the site
- 4) Provision of an internal pipe for distribution and reticulation to the majority of allotments

If sufficient groundwater resources are identified beneath the project area and within the Koolpinyah aquifer, Intrapac intends to investigate the potential of becoming a water utility for the Noonamah Ridge development and beyond. As such, Intrapac would install, own, and be responsible for the maintenance and upgrade of the required water supply infrastructure for the project. Groundwater extraction bores within rural properties will be owned, installed and maintained by the residents. If connecting to mains supply is necessary, PWC are responsible for approving required water infrastructure works. Once constructed, the ground-level water tank, pump station and all water infrastructure will become PWC assets and will be maintained by PWC.



2 : Project Description

Figure 2.11. Map of proposed water infrastructure



2 : Project Description

2.8 STORMWATER

There is no significant drainage infrastructure within the project area. Litchfield Council currently has no plans for upgrading and/or formalising the stormwater management infrastructure in the areas surrounding the project area.

Preliminary calculations of pre-development and post-development peak flow rates (m^3/s) have been calculated for each catchment within the project area. The results indicate that – in the absence of any mitigation measures – there will be an increase in run-off flow rates of approximately 8.7 % for a Q100 event, 10.1 % for a Q20 event and 10.5 % for a Q5 event. Onsite stormwater management will be based on the peak flow for a critical event. The critical event will be determined at the detailed design stage, through a series of iterative calculations – for instance, it may be that a 10-minute Q2 storm will be critical, or instead a 60-minute Q5 storm may be the critical event. The assessment of post-development flow conditions will be carried out progressively by engineers in line with the development staging.

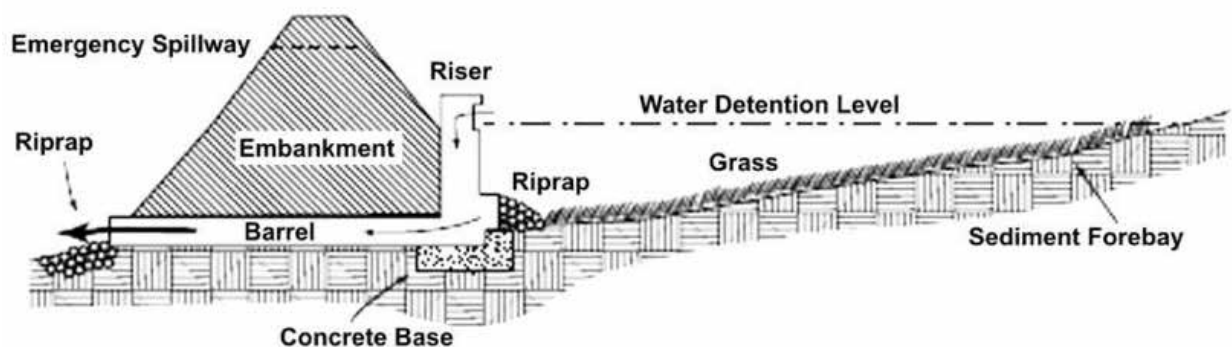
Proposed stormwater management strategy

The proposed stormwater management strategy is to embrace selected applications of water-sensitive urban design (WSUD). This is an urban planning and design philosophy that aims to overcome some of the deficiencies associated with conventional developments by integrating ‘whole of water cycle’ management into new urban development and re-development areas. WSUD promotes an approach to urban development that responds to the site’s natural features, protects natural ecosystems onsite and downstream, and optimises the use of water as a resource.

WSUD was developed for southern climates where annual rainfall is more regular than in the tropics. Many WSUD solutions utilise some form of vegetation that works well in a southern climate, where there is effectively continual rainfall throughout the year. However, the tropics pose challenges for vegetation receiving large volumes of water during the wet season and then being subject to a long dry period in the dry season. This can lead to weeds growing during the wet season and/or damage and fatality of plants due to extended periods of high volumes of water. Therefore, careful consideration and modelling will be undertaken prior to adopting WSUD stormwater management solutions within the tropical context of the project area. These are likely to be detention basins, grassed swales, gross pollutant traps and porous pavement.

Detention basins will be constructed at various locations across the development, with the greenfield nature of the project area allowing flexibility in relation to the number and location of basins. These features are designed to manage water flows during critical storm events – refer to Figure 2.12 for an example. When flow rates are higher than pre-development conditions, stormwater will be diverted to detention basins for controlled release via small outlet pipes that are designed to maintain pre-development flows to downstream drainage lines. A spillway structure will also be included to accommodate for a Q100 event. The specific size, type and location of these detention basins will be defined during detailed design.

Figure 2.12. Example standard drawing for a detention basin



2 : Project Description

The development is proposed to include a permanent waterbody in the form of a recreational lake to enhance the landscaping and amenity values of the area surrounding the rural activity centre. The lake will be located around the rural activity centre in a location along the waterway in Catchment D (see Figure 2.2). The size of the lake is anticipated to cover between 7 and 15 ha. The Townsville Constructed Lakes Design Guideline (DesignFlow & RPS 2010) will be the main reference document for the design of the lake (as recommended by Palmerston City Council, which has much experience in the construction and maintenance of similar lakes in a tropical climate). The lake will be used to provide stormwater retention during rainfall events and provide water quality treatment to remove sediments. Given the high rate of evaporation in the region, it is expected that recharge of the lake will be required during the dry season.

Erosion and sediment controls aim to minimise the creation of drainage, erosion and subsequent sedimentation issues – particularly during construction periods when soil disturbance, earthworks and land clearing result in exposure of soils to erosive forces (e.g. wind and rain). The Noonamah Ridge development is still in the preliminary design and planning phase, and so the detail required to create an ESCP for any stage (let alone the whole development) does not yet exist. Instead, broad principles of erosion and sediment control have been outlined in the Environmental Management Plan (EMP). It is a standard condition of development permits that an Erosion and Sediment Control Plan (ESCP) be developed and submitted to DLRM prior to commencement of works. The development contractor, or suitably qualified sub-consultant, will therefore devise a site-specific and project-specific ESCP for each subdivision, and all works will be required to be undertaken under the ESCP.

Detention basins, swales and underground pipe networks will be constructed as part of each subdivision stage. The detailed civil engineering design for each stage will include future-proofing considerations (e.g. design calculations for Stage 1 will account for the run-off contribution from Stage 2 and 3 catchments etc.). Construction of drainage works outside the project area is not proposed.

Since the site is located within Litchfield Council, all drainage structures and features will become Litchfield Council assets after an on-maintenance period. The exception to this will be any drainage works that are built on NT Government land – such as Alverly Road reserve – which will be maintained by the Department of Infrastructure.

2.9 SEWERAGE

Prior to approval of each subdivision (stage), Intrapac will have to seek approval from Litchfield Council, DLRM, DoH and the NTEPA with respect to wastewater management for the development. This would require, amongst other things, demonstrating that there is sufficient capacity within the sewerage treatment system to service the new subdivision without impinging on the service provided to existing users.

There is no sewer infrastructure near the site. Residential developments around the project area are serviced with septic tanks in each lot. The closest centralised sewerage treatment facility is located in Humpty Doo and does not have spare capacity for additional inputs. PWC have advised that reticulated municipal sewer treatment services are not proposed for the area in the near future.

Based on 4,155 lots, the peak capacity will be 14,542 equivalent persons (EP) and the total wastewater generated will be 2.9 ML/day (assuming generation of 200 L/EP/day). The flow associated with this value will be 200 L/EP/day. Each of the seven stages proposed will have approximately 2,000 – 2,500 EP which equates to 0.4 – 0.5 ML/day.

2 : Project Description

Proposed wastewater management strategy – community-scale

A community-scale, onsite treatment solution is the preferred wastewater management method for Noonamah Ridge. Integrated Transpiration (IT) technology is proposed as a suitable decentralised wastewater treatment facility (see Figure 2.13). The system is an in-ground, enclosed recirculating system which uses a series of holding tanks and evapo-transpiration channels to treat and dispose of the effluent. The evapo-transpiration channels are planted with a selection of native/exotic plants (but not invasive/weed species) which further treat the effluent and take up the nutrients. The plants use the treated effluent as their primary water source, and the IT system becomes a series of landscaped garden beds that can be incorporated into the landscaping plan of the development. To allow for remote control and monitoring of the operation of the IT system, an electronic system is incorporated into the design which controls all pumps and monitors levels throughout the facility. When critical limits are reached, the system initiates an alarm condition.

With the IT system, irrigation storage and wet weather retention is accomplished through the use of an appropriately sized, sub-surface, storage tank (rather than holding ponds), which minimises the infiltration of groundwater and stormwater into the system. Effluent storage in IT systems is incorporated as part of the standard design of the system and is sized by considering the relevant climate data (historic rainfall for at least 50 years) for each site and optimised using modelling. An IT system has been successfully used for the last two years in nearby Coolalinga – providing local practical experience and availability of data and feedback to assess the system's performance.

The treated effluent will be treated to 'Class A' standard (i.e. tertiary treatment, which is required where there is high risk of direct human contact with water). Beneficial reuse of treated water (e.g. irrigation of amenity areas) will be encouraged where possible to maximise the sustainability of the treatment system. Preliminary calculations indicate that 30 to 40 ha are required for disposal of treated wastewater through irrigation. Based on the concept master plan, 136 ha will be available for irrigation on playing/sports fields, school grounds, drainage and linear reserves, and neighbourhood and local parks.

Figure 2.14 indicates where wastewater treatment sites are being considered, and shows the indicative sewer internal reticulation and associated catchments. There are a number of issues that require consideration for the preliminary design stage:

- Site topography, to allow gravity flow of the sewer collection network where possible.
- Proximity to drainage lines and seasonally-inundated and/or saturated zones.
- Proximity to water supply bores.
- Potential interaction with groundwater and/or high seasonal water-tables
- Avoidance of natural ephemeral wetland areas, sensitive vegetation and cultural heritage sites.
- A school and a commercial retail area are proposed and these are of indeterminate size at this stage.

A preliminary Land Capability Assessment (see Appendix H) concluded that there are sufficient unconstrained soils within the sampled land units capable of supporting on-site wastewater management systems. However, the site has some areas that are not suitable for disposal – including a number of rocky ridges and some wetland areas. Prior to the detailed design stage, site-specific LCA's will be required to determine the location for every community-scale wastewater treatment facility, and for every subdivision that contains lots that will have a residential septic system.

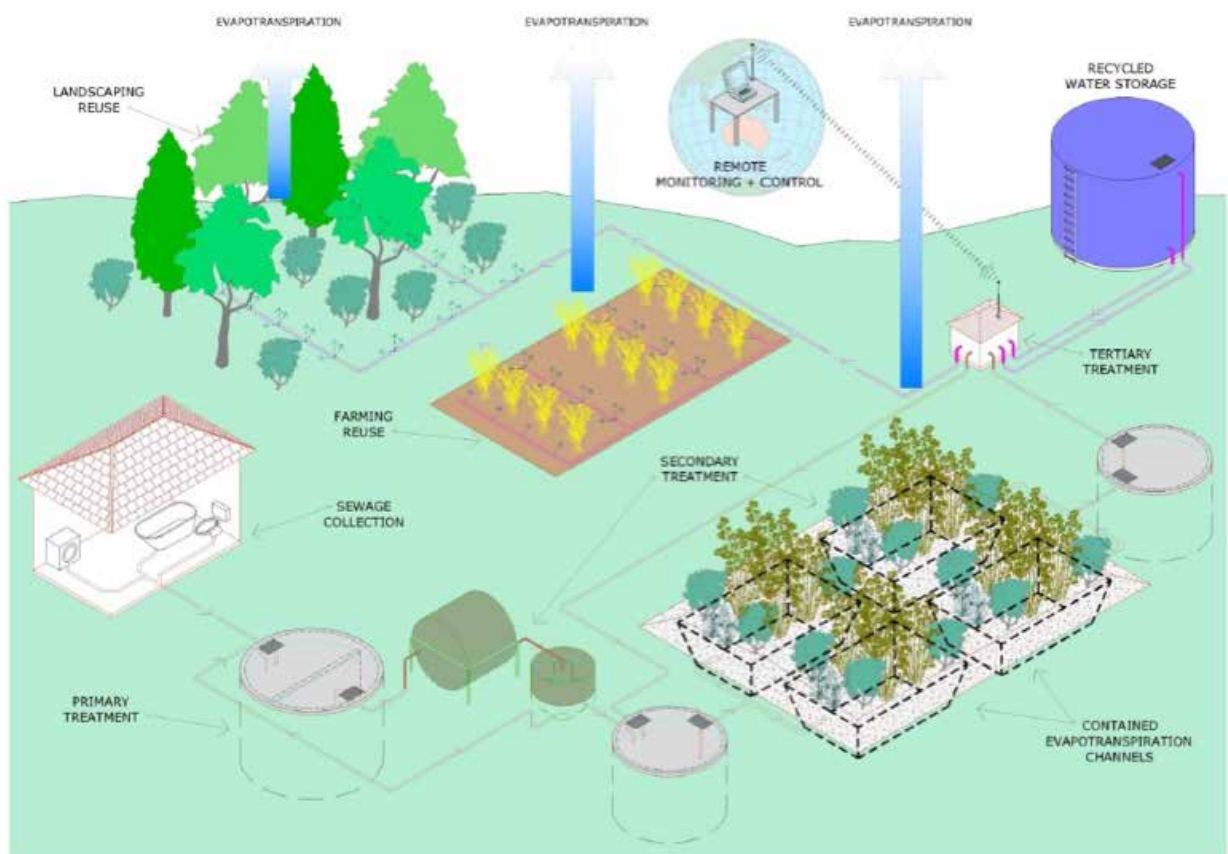
The proposed IT system can be managed and operated by a single operator under the direct oversight of PWC and Department of Health. The supplier will take responsibility for commissioning the treatment facility within a dedicated commission, defects and liability timeframe. Intrapac will then take over ownership after the commissioning process has been completed and validated by the relevant government agencies. An ongoing maintenance agreement between the contractor and Intrapac will then be implemented.

2 : Project Description

Proposed wastewater management strategy – individual lots

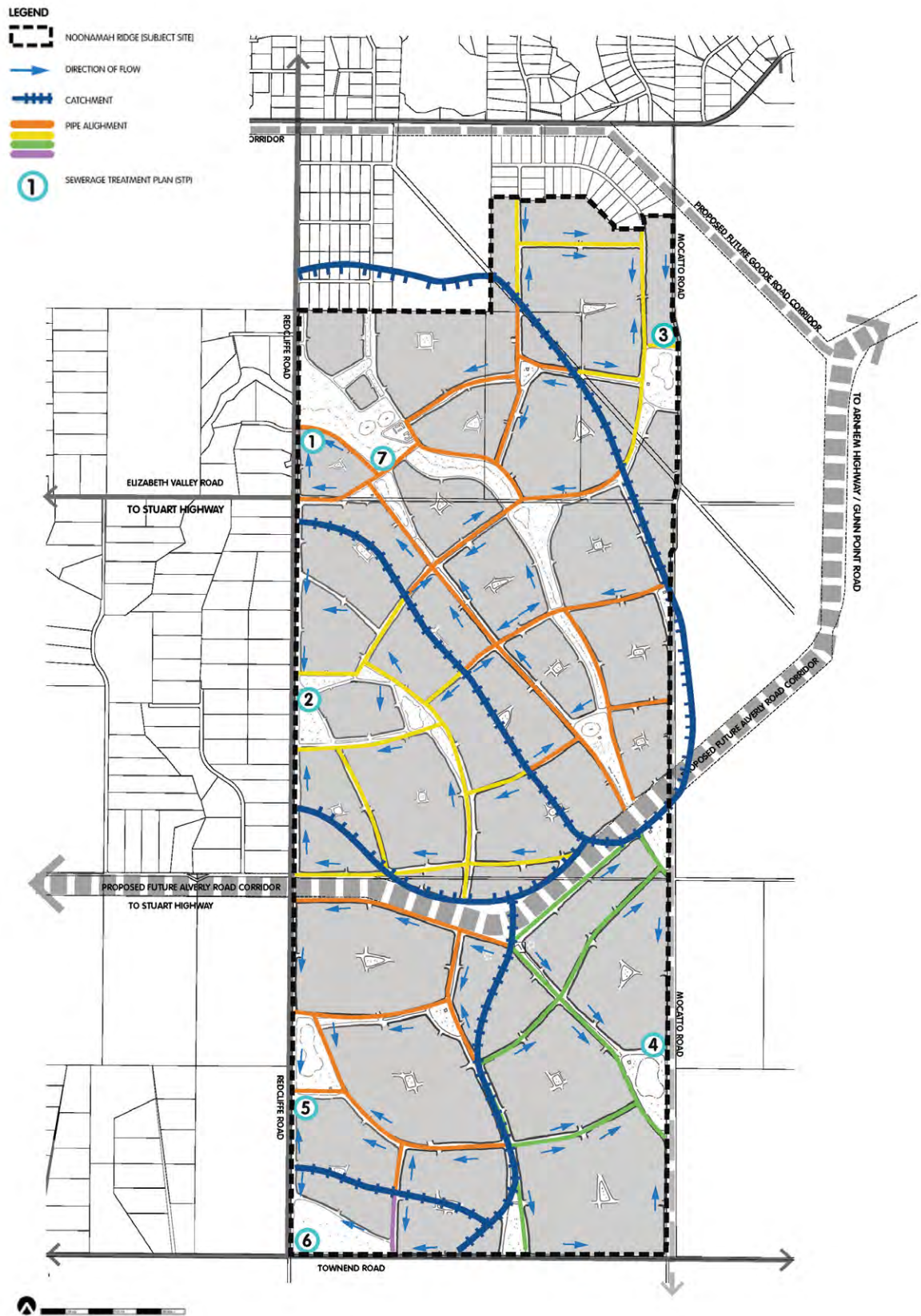
Where individual lot sizes have suitable land available for onsite wastewater management, individual wastewater management systems may be used. Sizing of rural lots will be sufficient to accommodate all required setbacks from buildings, watercourses, lot boundaries, bores etc. The existing application and approval requirements will ensure that individual lot systems are appropriately designed, sited and installed to minimise risks of environmental pollution, and health and safety concerns.

Figure 2.13. Diagram of integrated transpiration wastewater treatment system



2 : Project Description

Figure 2.14. Map of proposed sewer internal reticulation and associated catchments



3 : Existing Environment

2.10 DOMESTIC WASTE MANAGEMENT

Currently residents in the local area are responsible for taking their own rubbish and recyclables to the Humpty Doo transfer station. For the first stage of the development, this will continue to be the case. As the development evolves, collection of domestic waste will be undertaken using rubbish and recycling trucks, and will be the responsibility of Litchfield Council. Internal roads within the development will be designed to accommodate onsite collection.

2.11 EMERGENCY SERVICES PROVISIONS

Prior to approval of each subdivision (stage), Intrapac will need to have the approval of Northern Territory Police, Fire and Emergency Services with respect to fire-fighting arrangements within the development.

The nearest police station is in Humpty Doo. The nearest ambulance service operates out of Palmerston. The nearest hospital is in the Darwin northern suburb of Tiwi. A new hospital is proposed for Palmerston. Provision of police and ambulance services is the responsibility of the NT Government.

With regards to fire services, the project area is within the boundaries of Bushfire NT (Vernon Council Region). Livingstone Volunteer Brigade is responsible for the area south of Alverly Road. The area from Alverly Road to Goode Road is not gazetted to a brigade but is taken on by Elizabeth Valley Volunteer Brigade.

The project area lies just outside of the NT Fire and Rescue emergency response area (Goode Road is southern boundary). If there is a house fire during business hours, the nearest fire brigade is at Humpty Doo. Under Section 6 of the Fire and Emergency Act, the Fire and Rescue Service can only respond to incidents outside an emergency response area if sufficient resources of the Fire and Rescue Service remain available to respond to incidents within an emergency response area. Intrapac will seek to have the emergency response area extended to include the project area. The provision of land for a new volunteer fire brigade will be considered within Village One.

Prior to approval from Litchfield Council, Intrapac will need to have the approval of Northern Territory Police, Fire and Emergency Services with respect to fire-fighting arrangements within the development.

One of the public buildings within Village One – most likely the school or the community hall – will be constructed as a cyclone shelter.

2.12 CONSTRUCTION

The selection of construction-related infrastructure will be determined by the project scope and the layout of the land being developed. At this stage no indication can be given as to their location, suffice to say that set-up and establishment will be in accordance with the relevant construction company's site set-up and establishment guidelines, as well as an integrated project management plan incorporating the Environmental Management Plan (EMP).

Construction infrastructure will be temporary and will be sited to ensure no impact on environmentally- or culturally-sensitive areas, which have been comprehensively surveyed and mapped as part of the EIS process. All areas used during construction will be remediated by the construction contractor.

3 : Existing Environment

The purpose of this chapter is to summarise the existing environment within which the project area is situated. There are technical reports within the appendices of the EIS that describe some of the topics in this chapter in more detail.

3.1 LAND

The topography of the Darwin region is dominated by a relatively flat to gently undulating surface generally less than 30 – 40 m above sea level. However, the project area is distinct in that it features a substantial series of quartzite and sandstone hilly ridges running diagonally through it on a north-west to south-east alignment (see Figure 3.1). The highest points within the project area are approximately 80 m above sea level and are situated in the south in the vicinity of the telecommunications tower. The lower areas – largely on the eastern and western boundaries of the project area – are approximately 30 m above sea level.

Fourteen land units – each ‘a reasonably homogenous part of a land surface, distinct from surrounding terrain with consistent properties in landform, soil and vegetation’ (Jessop & King 1997) – occur within the project area (see Figure 3.2). The soil types within the project area comprise a combination of hydrosols, kandosols and rudosols.

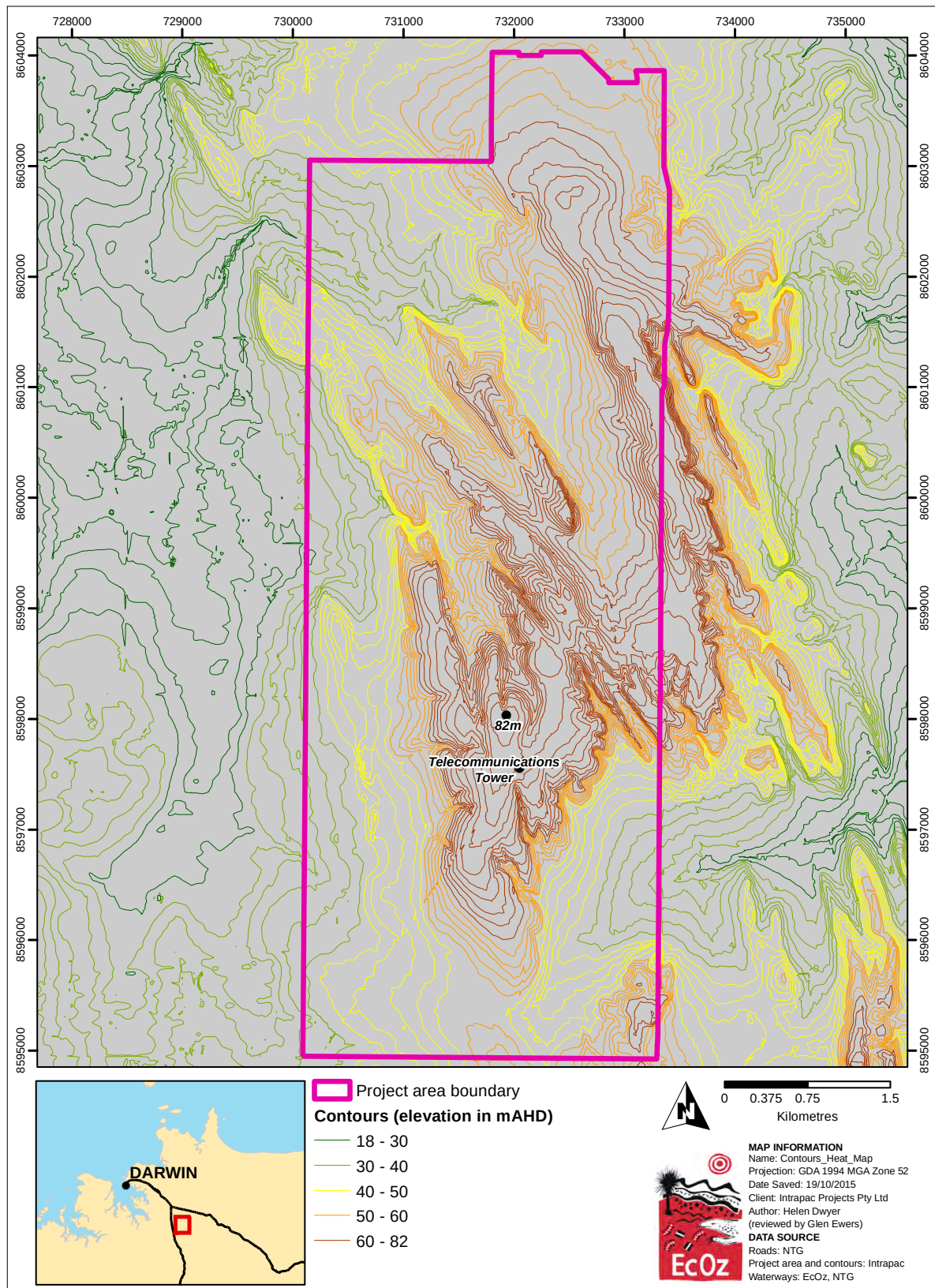
A Land Suitability Assessment (LSA) is a requirement for all developments that are subject to Clause 11.4.1 (Site Characteristics of Subdivisions of Rural and Unzoned Land) of the NT Planning Scheme. The LSA undertaken for the project area identified the following site characteristics that may require further consideration throughout the planning, design and construction of the proposed development:

- In general the ridges, side slopes and uplands are rapidly to moderately well-drained – hence categorised as ‘suitable’ with respect to drainage. Lower slope areas are imperfectly drained due to landform and soils, and are categorised as ‘marginally suitable’. Low-lying drainage floors and creek lines generally receive stormwater runoff and direct it toward the west and east of the project area. These areas are seasonally waterlogged and/or inundated, and are categorised as ‘not suitable’ for development.
- Areas of slopes > 0.75 % are categorised as ‘marginally suitable’ and slopes > 5 % are categorised as ‘not suitable’ in terms of erosion risk.
- The presence of creeks and drainage lines within the project area indicates that there is a risk of riverine flooding in low-lying areas. Flood mapping is not available for the project area, but modelling has been undertaken for the main drainage system within the site, presenting the 1 % AEP (1 in 100 years) flood line. Further modelling is required to identify other areas within the project area below the 1 % AEP line. Such areas may be considered unsuitable for development and mitigation measures will be required.
- Soil salinity, acid sulfate soils and storm tide flooding are not considered a risk due to the location and characteristics of the site, and therefore the entirety of the project area is categorised as ‘highly suitable’ (S1) in terms of these assessment categories.

It is important to note that the NT Land Suitability Guidelines (DLPE 2013) state that ‘land suitability promotes land uses that utilise land for its most suitable economic use while also reducing potential environmental and social risks. It 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 may be required in order to adequately address social, economic and environmental risks.’

3 : Existing Environment

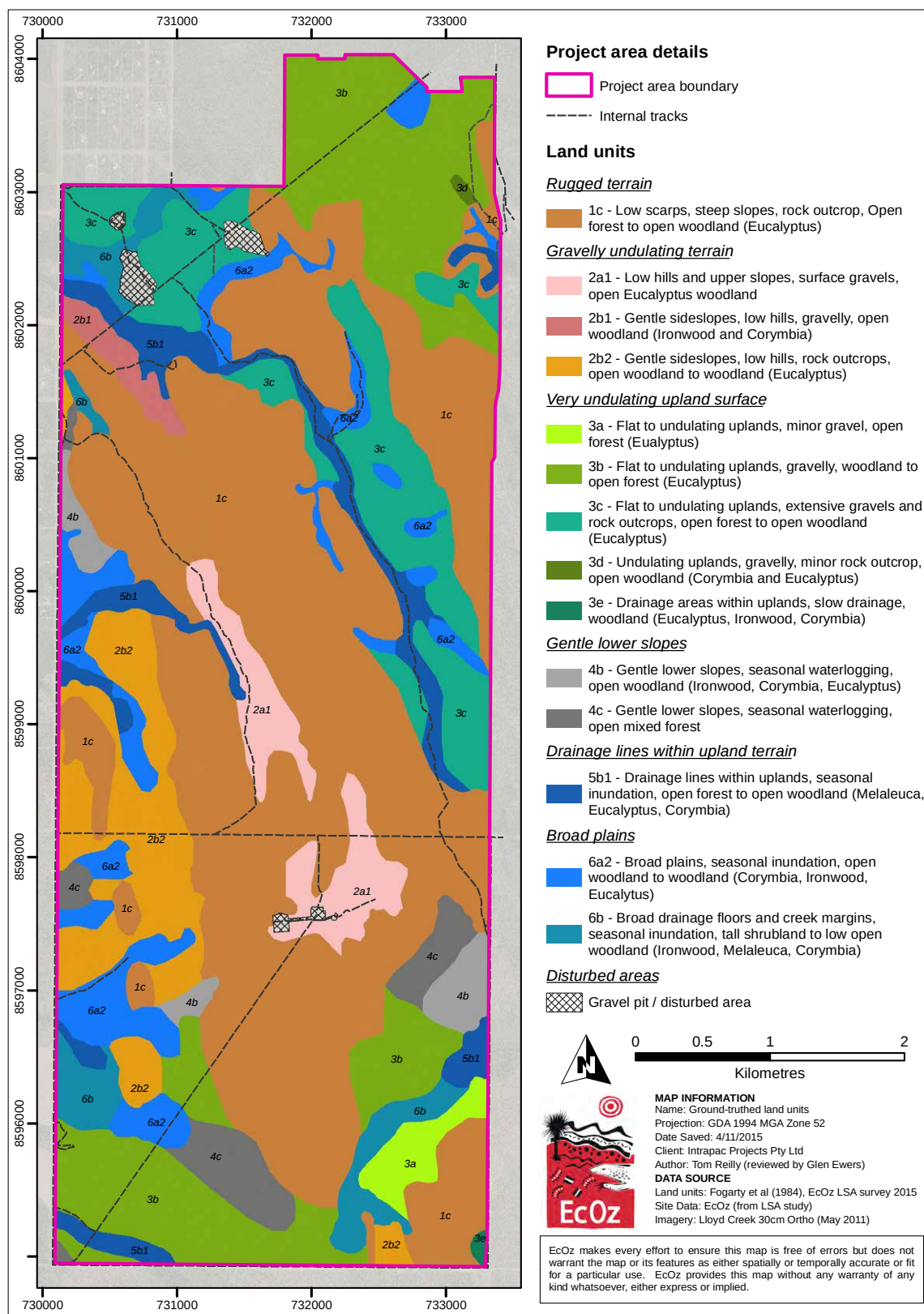
Figure 3.1. Map of the contours of the project area and surrounds



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3 : Existing Environment

Figure 3.2. Map of the ground-truthed land units within the project area



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ14400 - Noonamah Ridge Estates EIS\01 Project Files\General Environment Maps_HD\Ground-truthed land units.mxd

3 : Existing Environment

3.2 WATER

3.2.1 SURFACE WATER

The project area lies within two surface water catchments, as mapped by the National Geochemical Survey of Australia (NGSA 2011). The majority of the project area (63 %) is in the upper Elizabeth River catchment, a major tributary of the Darwin Harbour catchment, with the remaining eastern section draining into the Adelaide River catchment (see Figure 3.3). The project area encompasses approximately 22 % of the upper Elizabeth River catchment, as defined by the area of the catchment upstream of the Stuart Highway.

Drainage within the project area can be summarised as narrow, rapidly-draining seasonal gullies and upland drainage lines (first order) in the ridges and upper slopes, which capture and divert runoff toward the broad drainage floors and seasonal creek lines (second order) in the lowlands (see Figure 3.4). Some upland gullies end in overland flow and hence are non-continuous drainage lines. Broad seasonally-inundated drainage floors exist within poorly-drained areas; many of these do not have distinct drainage lines within them. There are no major wetlands within the project area.

There are ten sub-catchments within the project area, draining either west into the Elizabeth River or east toward the Adelaide River (see Figure 3.3). The largest sub-catchment in the project area (Sub-catchment D) traverses the project area from south-east to north-west, discharging along the northern section of the western boundary.

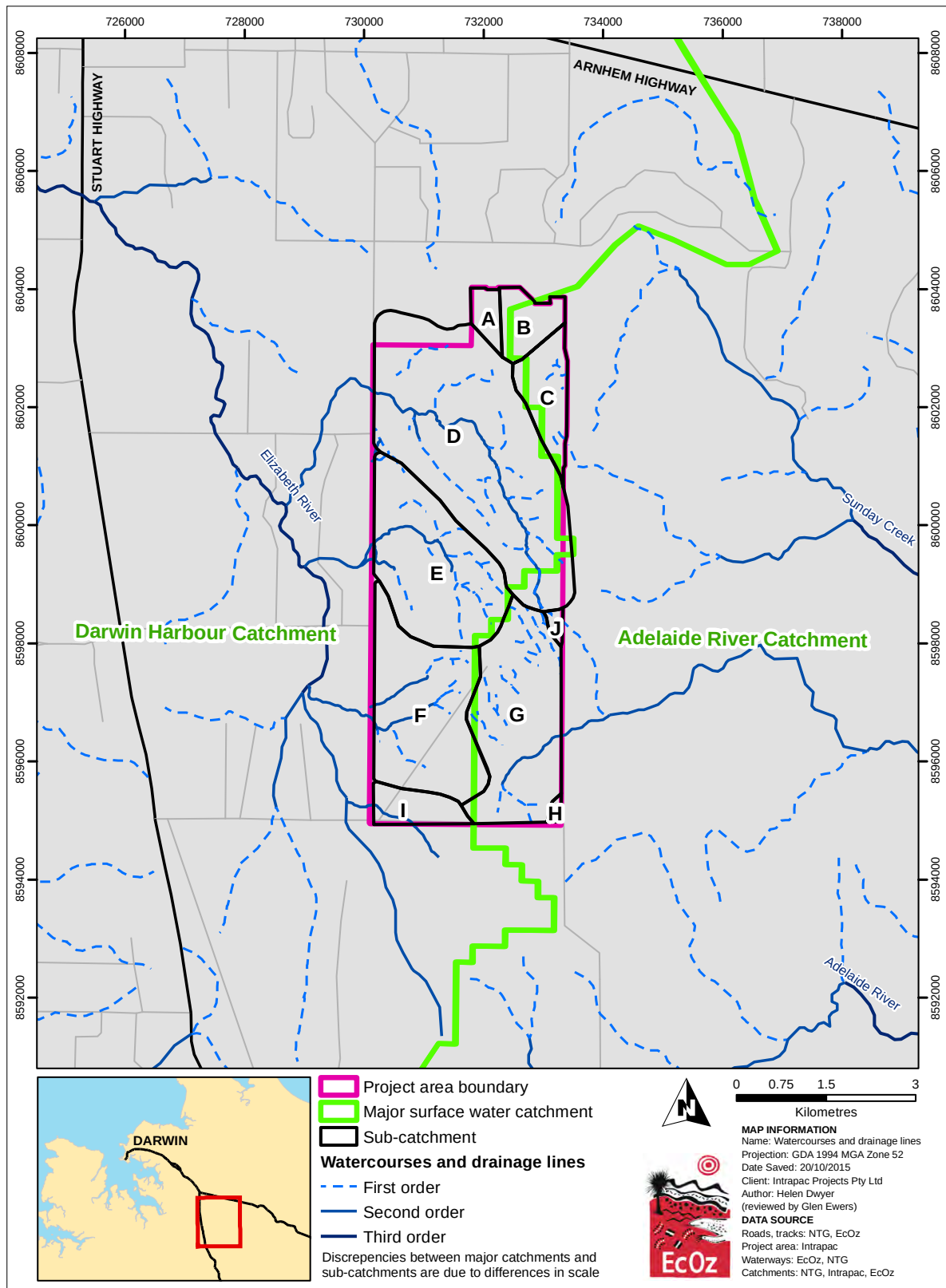
During the community consultation sessions held for this development, a number of residents of properties to the west of Redcliffe Road indicated that since roadworks and drainage easement works were undertaken on Redcliffe Road approximately seven years ago, their properties have experienced seasonal flooding. The land areas within the project area that may be susceptible to flooding are limited by the relatively steep topography and rapid-draining upland areas. Modelling of the 1 % AEP has been prepared for the largest catchment within the project area (Sub-catchment D) indicating that flooding may occur within 50 – 100 m of drainage lines (see Figure 3.4).

There are no known downstream consumptive users of surface water (i.e. extraction for water supply) that originates from the project area, but there are likely to be significant recreational (e.g. fishing) and aesthetic values held by both the general public and local land-owners along the Elizabeth River and its tributaries.

Ongoing monitoring and reporting of the water quality of Elizabeth River by the NT Government for the Darwin Harbour Report Cards has consistently assigned the water quality an “A” condition rating (‘excellent water quality’) from 2010 – 2014 (DLRM 2014). The existing quality of water within the project area is generally very good, with low turbidity and low concentrations of suspended solids, dissolved ions and heavy metals. Macro-invertebrate data analysis at two sites at the boundary of the project area had lower than expected taxonomic richness. This may be attributable to naturally-poor habitat availability for macro-invertebrate colonisation and/or hydrological conditions associated with their location high in the catchment.

3 : Existing Environment

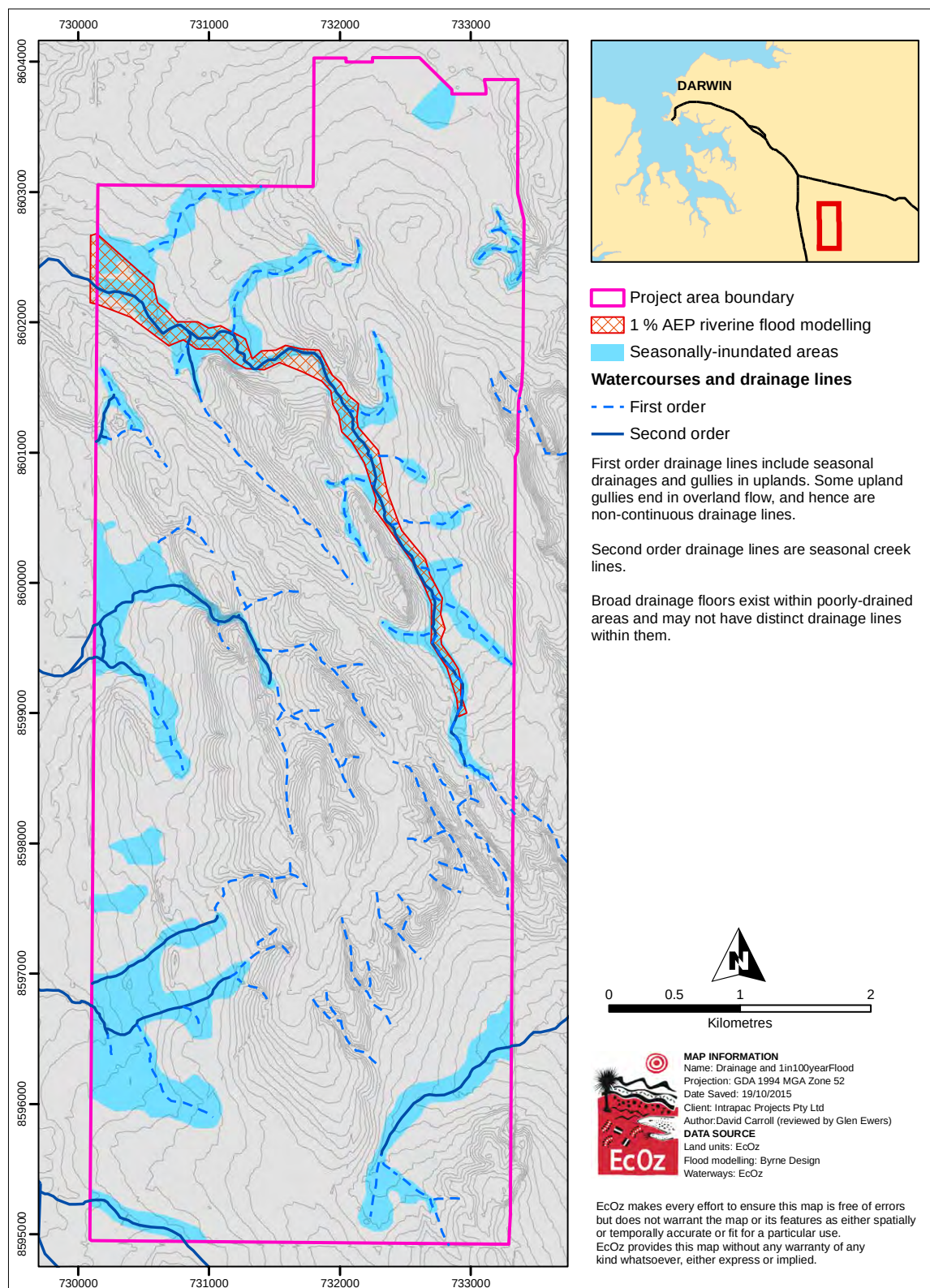
Figure 3.3. Map of the drainage lines and watercourses within the project area and surrounds



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\Z14400 - Noonamah Ridge Estates EIS\01 Project Files\General Environment Maps_HDI\Watercourses and drainage lines.mxd

3 : Existing Environment

Figure 3.4. Map of the ground-truthed surface water hydrology and available 1 % AEP riverine flood modelling within the project area



Path: Z:\01 EcOz Documents\04 EcOz Vantage GIS\214400 - Noonamah Ridge Estates EIS\01 Project Files\General Environment Maps_HD\Drainage and 1in100yearFlood.mxd

3 : Existing Environment

3.2.2 GROUNDWATER

The project area is situated within a complex geological area that results in a variable hydro-geology, and therefore significant variability in yields from bores in the existing rural developments surrounding the project area. There are numerous users of groundwater – both domestic and commercial – in the existing rural subdivisions west and north of the project area.

To the north-east of the project area lies an extensive aquifer system – commonly known as the ‘Koolpinyah Aquifer’ – that is hosted in overlying sands, gravels, caverns and pores of the Koolpinyah Dolostone. This broad-scale aquifer is shown in Figure 3.5 and is approximately 4 km from the project area at its closest point. Where fractures and/or karstic features have developed in the dolostone, there are good prospects for high-yielding aquifers. However, there has been an apparent overuse of the Koolpinyah Aquifer in some areas, as observed in regional groundwater level monitoring records, and reduced seasonal flows in surface water and springs in the nearby Howard River catchment (Fell-Smith and Sumner 2011).

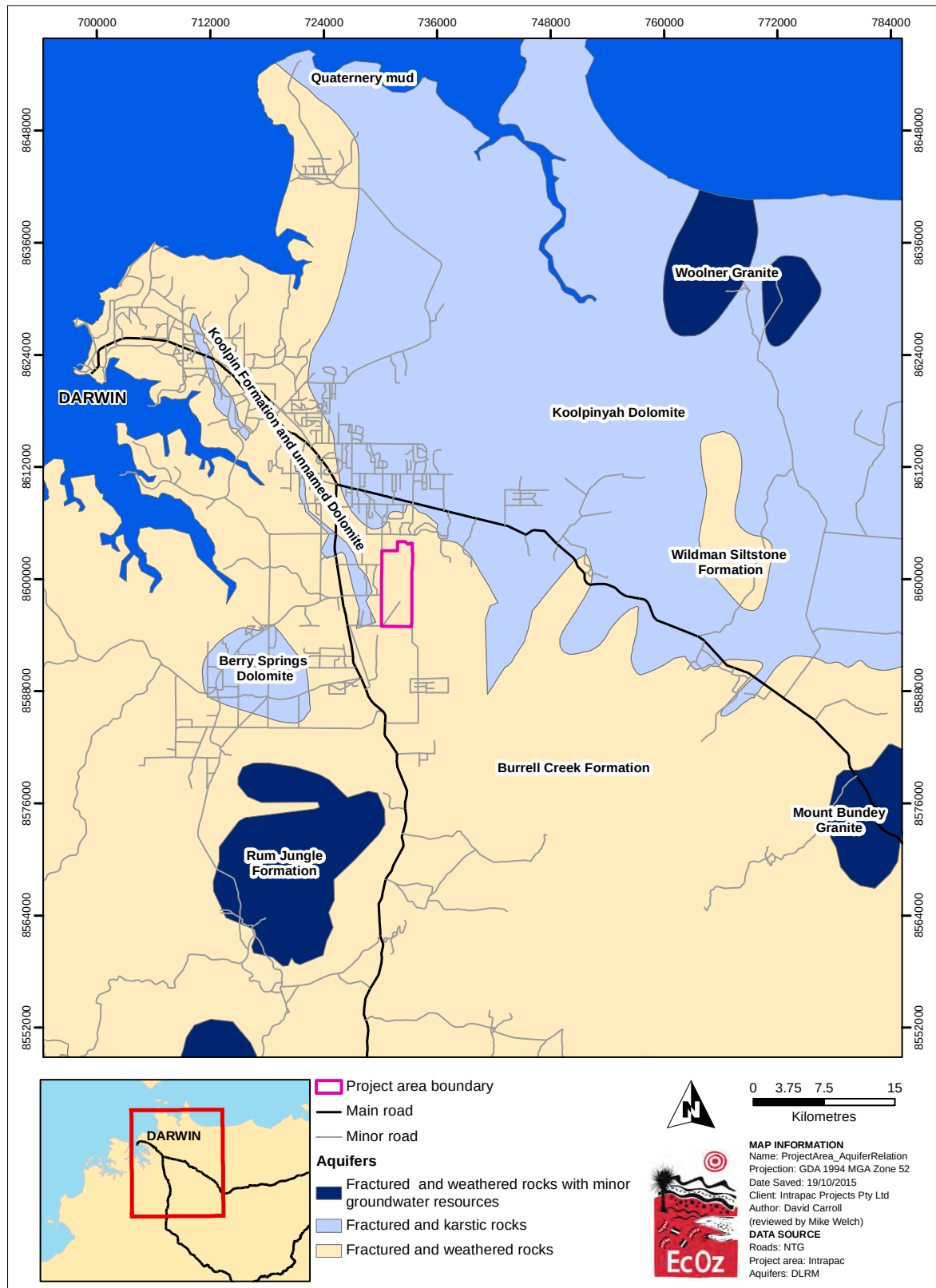
A groundwater study was undertaken in May – June 2015 (see Appendix E). The study included the drilling of six new investigation bores in selected locations across the site (see Figure 3.6). The investigation indicated that at least three types of aquifer underlie the project area – with at least one porous, high-yielding sandstone aquifer occurring adjacent to a major fault zone. Due to the steeply dipping and folded beds, and major interruptions by fault lines, yields were variable (0.5 – 15 L/s) from localised aquifers which may extend offsite in some locations. The highest yields observed in drilled bores are zones where fracturing is well-developed – mostly in siltstones and shales, but also sandstones in some cases. The depths at which the bores drilled within the project area first encountered water was greater than 25 metres below ground level, except in the south-west where there was a modest flow of probably ephemeral groundwater. Groundwater flow directions generally appear to radiate from the project area to surrounding areas (see Figure 3.6) and all groundwater samples met the Australian Drinking Water Guidelines (NHMRC 2011).

Two potential groundwater-dependent ecosystems have been identified on, and adjacent to, the project area. Their locations are shown in Figure 3.6.



3 : Existing Environment

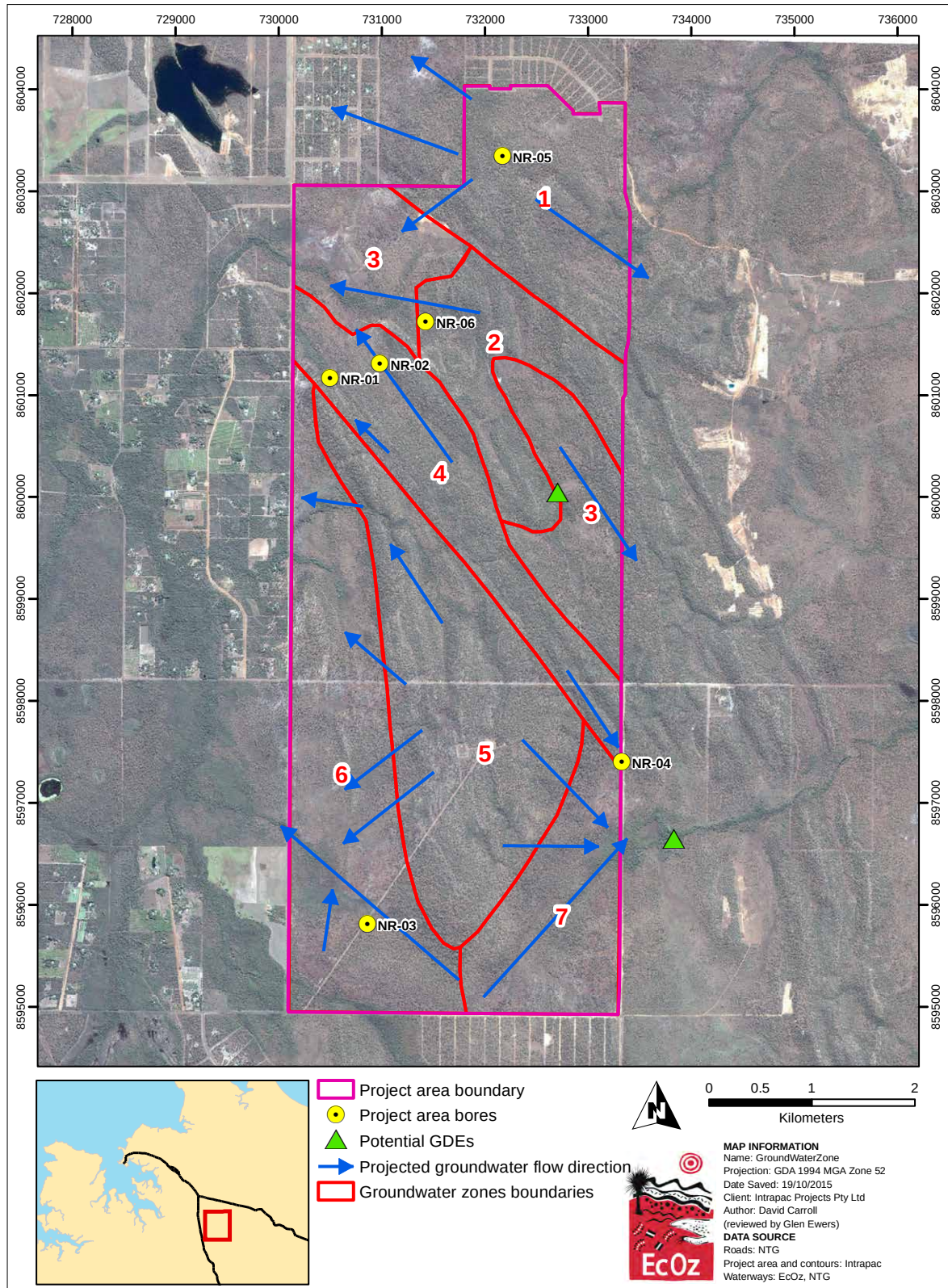
Figure 3.5. Map showing the project area within the regional aquifer context



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ14400 - Noonamah Ridge Estates EIS\01 Project Files\Water Monitoring and SW\ProjectArea_AquiferRelation.mxd

3 : Existing Environment

Figure 3.6. Map of the groundwater characteristics within the project area



3 : Existing Environment

3.3 BIODIVERSITY

3.3.1 VEGETATION

Twelve distinct vegetation communities occur within the project area – see Figure 3.7 – of which 74.2 % is *Eucalyptus tetrodonta* and *E. miniata* woodland. The remaining vegetation types are associated with drainage lines or areas of seasonal inundation.

3.3.2 FLORA

Flora surveys within the project area recorded 196 species – including three species listed as Vulnerable and one listed as Near Threatened under the Territory Parks and Wildlife Conservation (TPWC) Act:

- Spiderflower (*Cleome insolata*)
- Darwin Cycad (*Cycas armstrongii*)
- a Typhonium (*Typhonium praetermissum*)

No EPBC-listed species were identified.

Four declared weeds were recorded within the project area:

- Gamba Grass (*Andropogon gayanus*)
- Mission Grass (*Cenchrus polystachios*)
- Hyptis (*Hyptis suaveolens*)
- Snake weed (*Stachytarpheta spp.*)

These species are all listed as Class B (spread to be controlled by land owners and occupiers) and Class C (not to be introduced) under the Weeds Management Act. Weed density was reported to be low across the project area.

3.3.3 FAUNA

A total of 127 fauna species was recorded during the surveys – 16 amphibians, 29 reptiles, 65 birds and 17 mammals. Of these, four are threatened species under the EPBC Act and/or TPWC Act:

- Howard River Toadlet (*Uperoleia daviesae*)
- Mertens' Water Monitor (*Varanus mertensi*)
- Partridge Pigeon (*Geophaps smithii smithii*)
- Black-footed Tree-rat (*Mesembriomys gouldii*).

Three other fauna species listed as Near Threatened were recorded within the project area – Bush Stone-curlew (*Burhinus grallarius*), Northern Brown Bandicoot (*Isodon macrourus*) and Common Brushtail Possum (*Trichosurus vulpecula arnhemensis*).

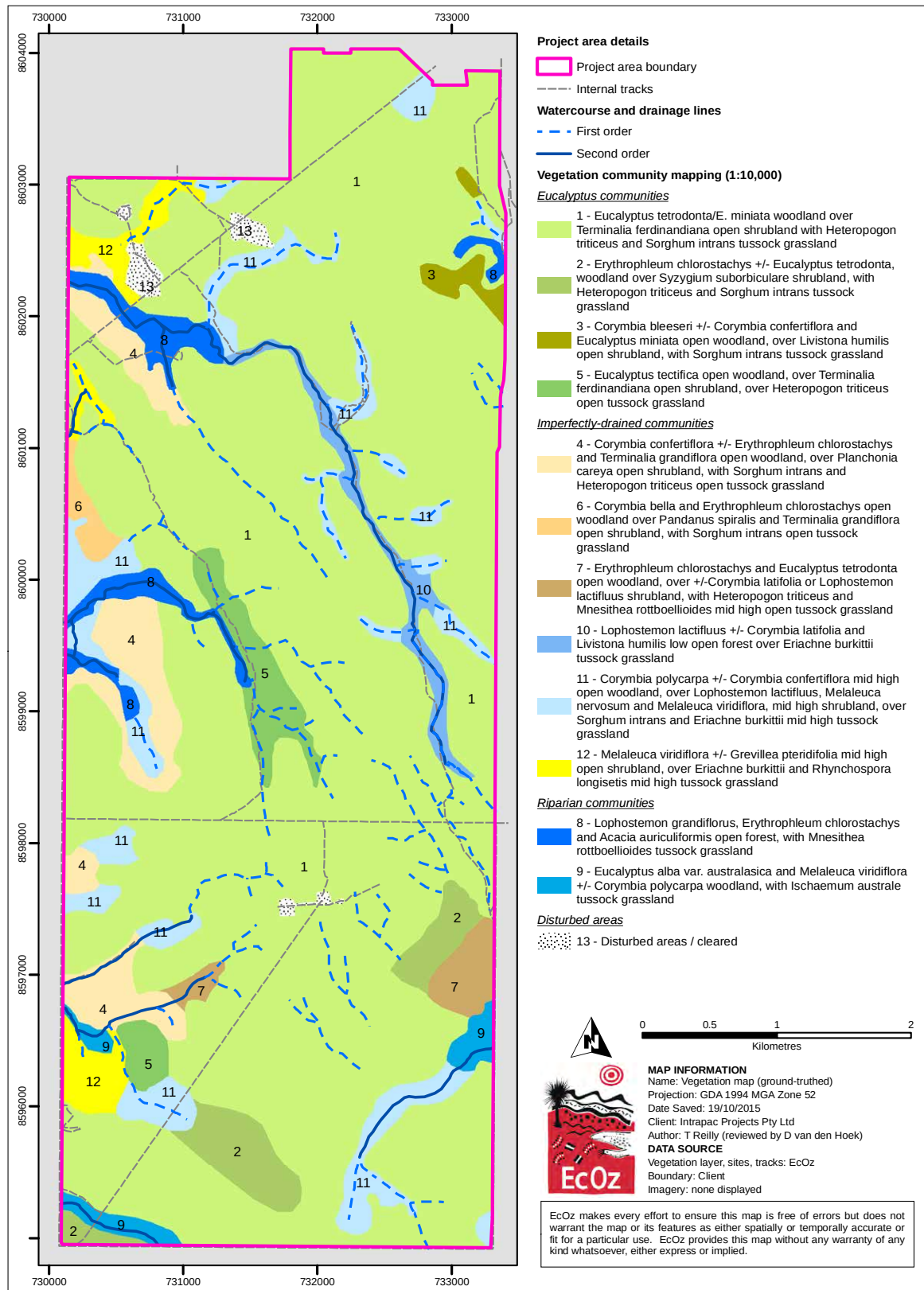
Six feral species (introduced fauna) were recorded within the project area:

- Cane Toad (*Rhinella marina*)
- Feral Cat (*Felis catus*)
- Feral Pig (*Sus scrofa*)
- Water Buffalo (*Bubalus bubalis*)
- Feral Dog / Dingo Hybrid (*Canis sp.*)
- Asian House Gecko (*Hemidactylus frenatus*).

The presence and abundance of these species within the project area are typical of the region.

3 : Existing Environment

Figure 3.7. Map of the ground-truthed vegetation communities within the project area



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ14400 - Noonamah Ridge Estates EIS\01 Project Files\Flora and Fauna Baseline\Vegetation map (ground-truthed).mxd

3 : Existing Environment

3.3.4 HABITAT QUALITY

The habitats found within the project area – predominately Eucalyptus woodland – are common across the Top End. Moreover, the project area sits to the south and east of areas either already developed or that have had substantially modified habitat. Consequently, there are no identified significant wildlife corridors per se within the project area apart from the strips of riparian vegetation mentioned above which form the initial sections of that habitat type which extends to the west.

The project area – which is predominantly savannah woodland – has experienced widespread fires 13 times over the past 14 years. This is the result of both controlled burns undertaken on behalf of the landholders and unauthorised fires deliberately lit by ‘fire-bugs’.

Approximately 0.6 % (17.7 ha) of the project area has been previously cleared for recreational tracks, a telecommunications tower, an abandoned quarry and numerous borrow pits/scrapes. Most of the cleared land is in the north-west corner of the project area (see Figure 3.7). Illegal dumping of rubbish and abandoned cars is common along the internal tracks.

3.3.5 CONSERVATION-SIGNIFICANT VALUES

When assessing the risk of impacts to threatened species that are known or likely to occur within the project area, it is necessary to first establish whether or not local populations are ‘important’ as defined in EPBC Significant Impact Guidelines 1.1 (2013). This is a requirement within the Terms of Reference for the EIS for this project.

According to the guidelines, any occurrence of Critically Endangered and Endangered species within a project area constitutes a population, and all populations are considered ‘important’. For Vulnerable species, an ‘important population’ is a population that is necessary for a species’ long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- Key source populations either for breeding or dispersal
- Populations that are necessary for maintaining genetic diversity
- Populations that are near the limit of the species’ range.

For the purposes of this EIS, ‘important populations’ are considered to be of conservation significance. The survey identified that the project area contains several conservation-significant threatened species that may need consideration during the EIS process – these are depicted in Figure 3.8 and are summarised below.

Sensitive vegetation types

The following areas of sensitive vegetation types within the project area are considered to be of conservation significance:

- One area of sandsheet heath
- All areas of riparian vegetation
- The only patch of dry monsoon forest
- All wetlands.

3 : Existing Environment

Threatened species

The following threatened species occur in 'important populations' within the project area and are therefore considered to be of conservation significance:

- Spiderflower (*Cleome insolata*) – the sole population
- *Typhonium praetermissum* – the populations identified in Figure 3.8
- Howard River Toadlet (*Uperoleia daviesae*) – the populations identified in Figure 3.8
- Black-footed Tree-rat (*Mesembriomys gouldii*) – the entire population
- Partridge Pigeon (*Geophaps smithii smithii*) – the entire population.

The following threatened species were identified within the project area, but not in 'important' populations. Therefore, they are not considered to be of conservation significance within the project area.

- Darwin Cycad (*Cycas armstrongii*)
- Mertens' Water Monitor (*Varanus mertensi*).

The following Near Threatened species were identified within the project area, but not in 'important' populations. Therefore, they are not considered to be of conservation significance within the project area.

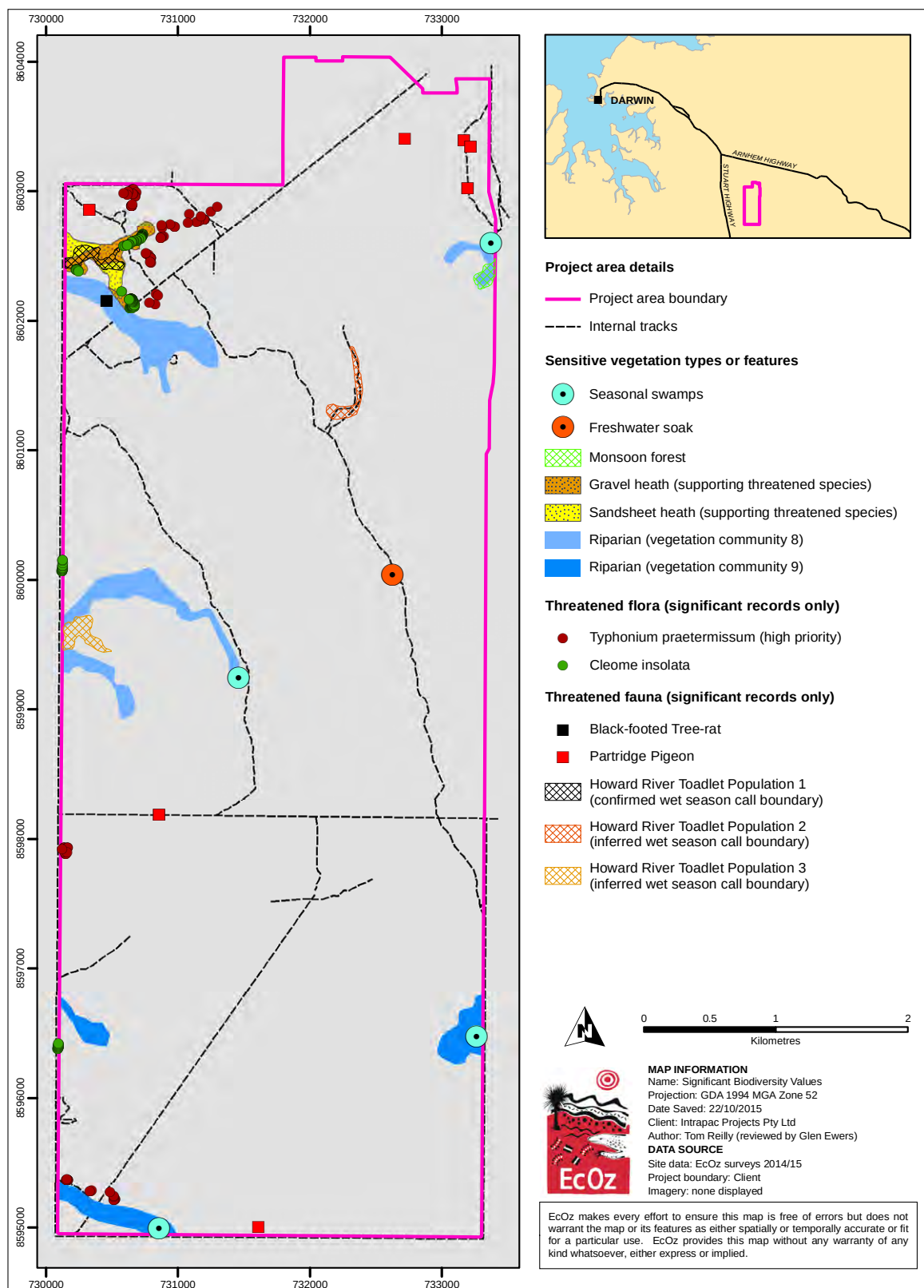
- a Bladderwort (*Utricularia hamiltonii*)
- Bush Stone-curlew (*Burhinus grallarius*)
- Northern Brown Bandicoot (*Isoodon macrourus*)
- Common Brushtail Possum (*Trichosurus vulpecula arnhemensis*).

Spiderflower (*Cleome insolata*)



3 : Existing Environment

Figure 3.8. Map of the conservation-significant values identified within the project area



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\14400 - Noonamah Ridge Estates EIS\01 Project Files\Flora and Fauna Baseline\Significant Biodiversity Values.mxd

3 : Existing Environment

3.4 BITING INSECTS

An assessment of biting insects within the project area was completed by the Medical Entomology division of the Department of Health (see Appendix K) and identified 21 mosquito species, the most abundant of which was the Common Banded Mosquito (*Culex annulirostris*). This mosquito species is the principal vector of mosquito-borne disease in the NT – capable of transmitting Ross River virus, Barmah Forest virus and Murray Valley encephalitis virus. The very high numbers of Common Banded Mosquito trapped in January 2015 indicates that there is a high risk of transmission of Ross River Virus within the project area, particularly during peak season (mid-wet season). Other abundant species included *Culex vishnui* group and the *Culex pullus*.

The widespread incidence of high numbers of the Common Banded Mosquito suggests there are numerous productive breeding sites affecting the proposed development. The major breeding sites appear to be:

- Externally, the large seasonal swamps north of Goode Rd and the seasonally-flooded areas to the west of Redcliffe Rd; particularly within a 1.6 – 2 km radius around these areas.
- Within the project area, the borrow pits in the north, several vehicle-disturbed grassy drainage lines and localised swamps near the south-west corners of the development.

The sandsheet heath drainage area in the northern portion of the project area does not have the characteristics of an important mosquito breeding area. However, this habitat may be a localised source of mosquitoes during the wet season.

3.5 CULTURAL HERITAGE

Cultural heritage refers to Aboriginal sacred and archaeological sites, and post-European settlement historic sites.

3.5.1 SACRED SITES

An Aboriginal Areas Protection Authority certificate (C2015/111) has been acquired for the project area (see Appendix M). It identifies a sacred site (5172-61) immediately to the south-east of the project area, with an associated Restricted Works Area within the project area. The sacred site features a spring.

3.5.2 ARCHAEOLOGICAL SITES

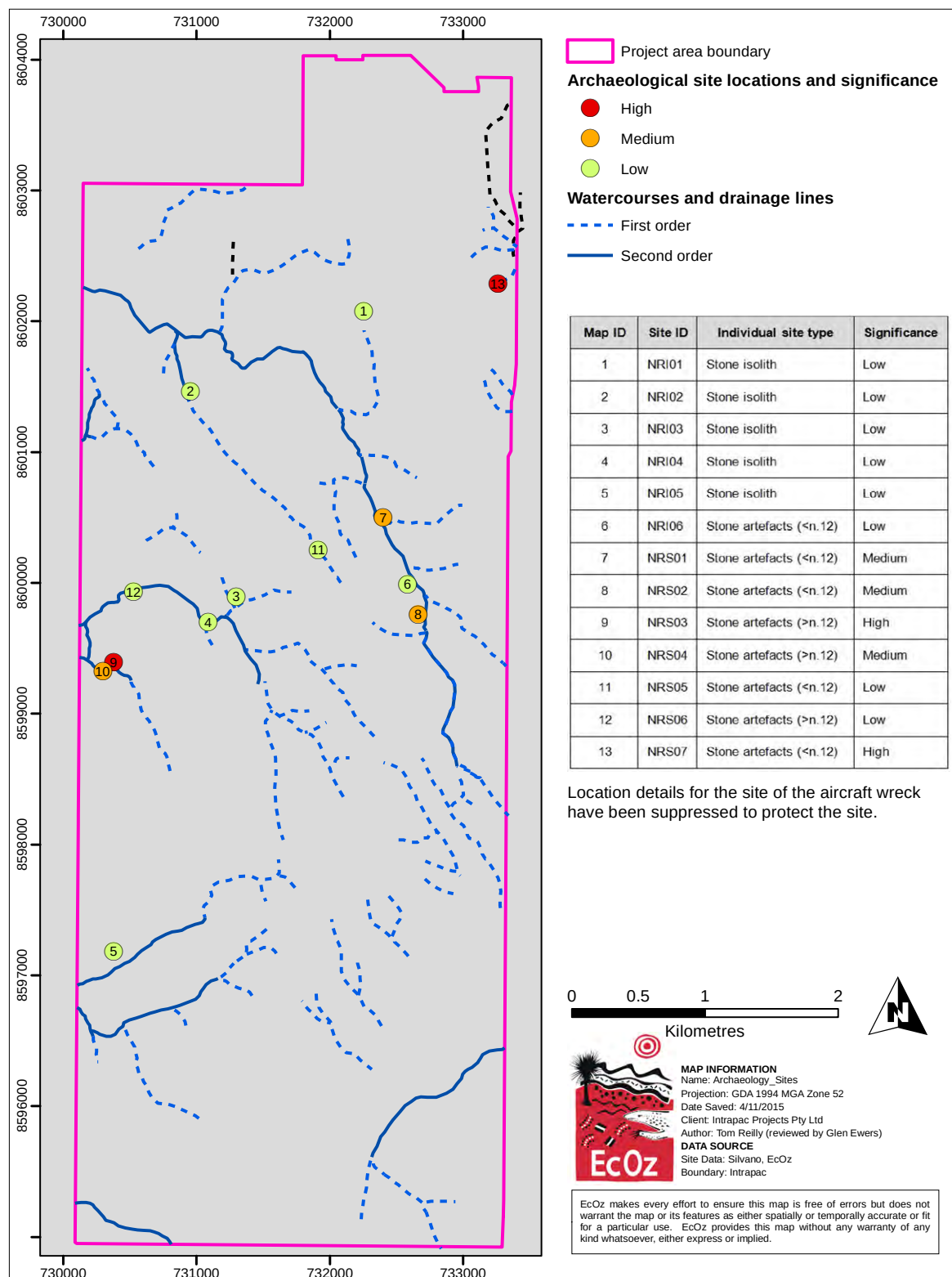
An archaeological survey was conducted in November 2014 (see Appendix L). Seven stone artefact scatters were found, predominately on low laterite ridges adjacent to creeks. One of the scatters was found in a rock shelter sufficiently large enough to hold deep deposits, although no excavation was undertaken to confirm this. The remaining artefact sites are regarded as being of medium or low significance (Figure 3.9).

3.5.3 HERITAGE SITES

There is a World War II bomber crash site located within the project area. To avoid disturbance to the site, the location is being withheld. The wreck is of a 15 tonne B-25D 'Mitchell', a twin-engine medium bomber. The aircraft was attached to No. 18 Squadron (Dutch) Royal Australian Air Force. The pilot, Sergeant C.A.H. Keesmaat, was killed in the crash; the rest of the crew parachuted out. Keesmaat was buried in an Indonesian cemetery; the site is therefore not a war grave. The aircraft, its crew and the crash event are all poorly known, and the site is not listed on the NT Heritage Register.

3 : Existing Environment

Figure 3.9. Map of the archaeological and heritage sites within the project area



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ14400 - Noonamah Ridge Estates EIS\01 Project Files\Flora and Fauna Baseline\Archaeology\Archaeology_Sites.mxd

3 : Existing Environment

3.6 AIR & NOISE

The site is located immediately adjacent to the Darwin airshed where the major air pollutant of concern is particles from bushfire smoke in the dry season (April – October). The ambient air quality within the project area can be considered equivalent to that of any natural environment setting, influenced by natural dust kicked up by wind and smoke from proximate burning-off and bushfires during the dry season. These conditions may be augmented by dust produced from the quarry on the eastern side of the project area.

The noise amenity in the vicinity of the project area comprises natural noise sources (e.g. birds and insects), traffic along Redcliffe and Goode Road, use of motorbikes and quad bikes on the site, and occasional noise associated with residential rural living. On the eastern side of the project area there is also an operating quarry with associated blasting and truck traffic.

4 : Economic & Social Context

4.1 ECONOMIC CONTEXT

According to Deloitte Access Economics' quarterly review for June 2015, the NT economy is expected to grow by 3.9 % in 2014 – 15, and that growth in the NT is expected to be underpinned by private equipment, engineering and commercial investment. This is expected to be partly offset by a decrease in private housing investment.

The Territory Economic Review published by September 2015 by the NT Government Treasury confirms that in 2014 – 15 private capital expenditure in the NT increased by 11.3 % to \$12.8 billion, the highest level on record. This was the highest increase of all states, which varied between a 14.6 % decline in Queensland and a 7.4 % increase in Tasmania. Private capital expenditure in the NT for 2014 – 15 was driven by non-dwelling construction activity which increased by 14.1 % to \$9.5 billion. This was partly offset by a decrease of 12.3 % in new dwelling investment. That decline follows a strong increase in the previous year when a number of large, multi-unit dwelling complexes were constructed; however, the value of dwelling construction in the NT remains at elevated levels.

4.2 SOCIO-ECONOMIC PROFILE

In order to consider the potential social impacts of the development, it is important to understand the social profile of the area in which it would be built, and the demographic characteristics of people in the surrounding area. A demographic profile based on data from the Australian Bureau of Statistics (ABS) 2011 Census of Population and Housing is presented in the main EIS report. There are differences between the region and the Municipality of Litchfield, but none that would alter service delivery.

4.3 EXISTING SERVICES AND FACILITIES

Although there is little in the way of social infrastructure in the immediate vicinity of Noonamah Ridge, there are many local-level facilities in the various rural communities near the site. These can be relatively easily accessed by vehicle. In addition, there are a large number of local, district and regional level facilities and services on offer within Palmerston and surrounding areas, which are within approximately 20 km (a 20-minute drive) of the site. There are also many natural areas for recreational activities within a similar distance.

Local facilities

- Humpty Doo is the nearest rural activity centre to the Noonamah Ridge site – approximately 6 km to the north.
- The nearest two primary schools to Noonamah Ridge are Bees Creek and Humpty Doo Primary Schools. The nearest high school is Taminmin College in Humpty Doo.
- Several childcare centres currently operate at Bees Creek and Humpty Doo.
- The nearest shopping facilities to Noonamah Ridge are at Humpty Doo Shopping Centre. Howard Springs and Coolalinga also have shopping centres – the latter being the largest in the rural area.
- Humpty Doo has Arafura Medical Centre, Humpty Doo surgery and another GP medical practice. At Coolalinga is Coolalinga Medical Centre.
- Within Humpty Doo is the Taminmin Community Library, the Village Green, Didgeridoo Hut art gallery and art centre, a golf course, a hotel and a tavern.
- The area is well located for a wide range of quality outdoor adventure and recreational options – including Humpty Doo Village Green Reserve, Freds Pass Sport and Recreation Reserve, and Humpty Doo and Rural Area Golf Club.

4 : Economic & Social Context

Regional facilities

The location and distribution of existing human services and community facilities within the region are shown in Figure 4.1 and are described below:

- Regional hospital and medical facilities include the Royal Darwin Hospital, Darwin Private Hospital and the new Palmerston Regional Hospital planned for Holtze (to the north of Palmerston).
- Community health facilities are provided at the Palmerston Community Care Centre and through clinics offered within the Palmerston Health Precinct.
- Cultural and conference facilities in the region include Darwin Entertainment Centre, Darwin Convention Centre, and the Museum and Art Gallery of the Northern Territory.
- Government services (such as Medicare and Centrelink) occupy commercial accommodation in a variety of city and local centres.
- Justice and correctional services include courts within the CBD, and Darwin Correctional Centre, which is the main reception prison in the NT (with capacity for 450 prisoners).
- Charles Darwin University has campuses at Casuarina and Palmerston.
- Regional sport facilities include Marrara Sports, Hidden Valley Motor Sports Complex, Darwin Racecourse and golf courses in Darwin and Palmerston.
- Major parks and gardens include the George Brown Botanic Gardens, Charles Darwin National Park, Casuarina Coastal Reserve and East Point Recreation Reserve.
- Swimming attractions that serve the wider region include the Darwin Wave Pool, the Waterfront Lagoon, Leanyer Water Park, Palmerston Water Park and Lake Alexander. The nearest public swimming pool to Noonamah Ridge is Palmerston Aquatic and Lifestyle Centre.

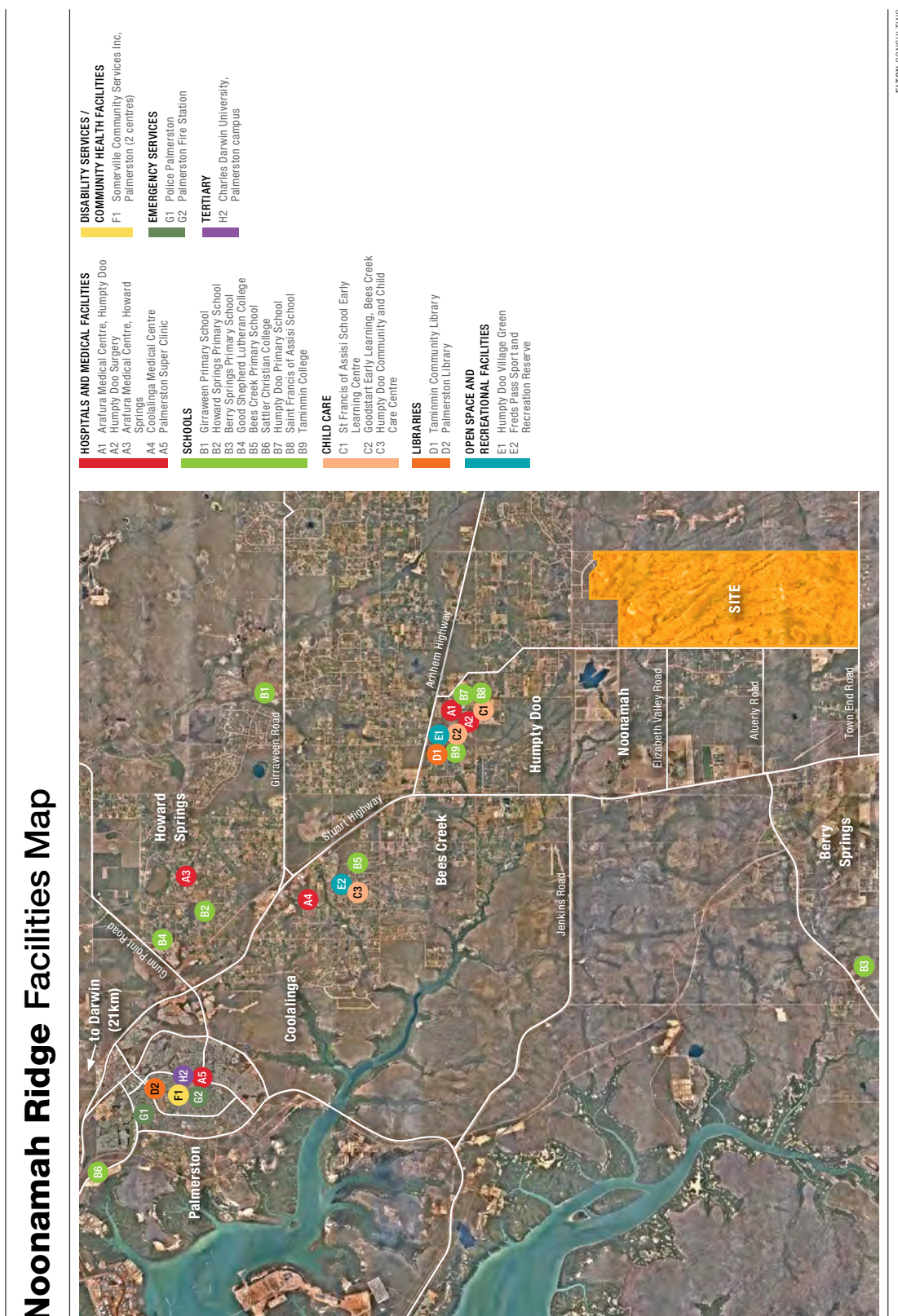
A large number of conservation areas, parks and reserves are within one hour's drive of Noonamah Ridge.

Summary

The range of existing facilities and services is appropriate for the current population and could accommodate some growth over time. However, given the significant increase in local population expected at Noonamah Ridge, there will be a need for new local- and district-level community facilities and services to meet the needs of this new population. Some will be provided within the Noonamah Ridge development, while others will be accommodated within existing facilities in the region.

4 : Economic & Social Context

Figure 4.1. Map of existing human services and community facilities



4 : Economic & Social Context

4.4 SOCIO-ECONOMIC BENEFITS

Considering the economic context described in Section 4.1 – and the ongoing role the construction and building approvals sectors have in underpinning the NT economy – the development is likely to have a significant positive impact on economic development and employment in the region, particularly in association with the construction phase.

For calculating the value of the development – assuming approximately 4,155 new residential properties, associated social and public buildings, and the enterprise area – there will be of 6,000 new purchasable properties. Based on an average intended sale price of \$330,000 per property, this extrapolates to a total project value of approximately \$1,980,000,000 thereby representing an investment of nearly two billion dollars into the NT economy. In addition, there will be peripheral industries and services that benefit from the development; specifically flow-on demand for goods and services resulting from property industry activity.

With a development timeframe of 30 years, this development is likely to have a medium-to-long-term employment benefit to the region. Jobs are likely to be both directly and indirectly generated by the development – with employment onsite, as well as in peripheral industries related to the provision of the abovementioned supporting services, as well as raw materials for use in the construction stage of the development. It is envisaged that there is a sufficient skill-set and adequate personnel located within the greater Darwin region to avoid the need for any recruitment from outside of the region. The timeframe of commencement of the development will also provide the opportunity to provide employment to tradesmen currently employed through major projects in the region that are currently nearing the end of their construction cycle, specifically the Inpex Ichthys project.

The construction and delivery of the project – meaning roads and services to provide developable lots will contribute approximately 300 full-time jobs over a thirty-year period. In addition, building construction of new dwellings will contribute further full-time and part-time jobs, accompanying the rate of development of the new community. At present, construction provides 15,297 jobs in the Darwin region, and even if housing construction at Noonamah Ridge was to only constitute 10 % of these jobs, this would still represent a substantial and sustained job creation of conservatively 1,500 jobs over a 20 to 30 year period. Local

Benefits of the development to the existing local community are expected to include:

- Increased housing availability and affordability, enabling the provision of new housing in a range of sizes, styles and price points.
- Increased local employment opportunities from both the construction and occupancy phases of the development.
- Amenity and community cohesion via the creation of a quality, master-planned community.
- Vehicle, pedestrian and cyclist permeability and access – both within the development, and between the development and surrounding areas.
- New community services and facilities – including public transport, road networks, health services, education and emergency services.
- Improved local government capacity through an increased rates base.

5 : Risk Assessment

The EIS describes and undertakes the process of assessing the environmental, social and cultural risks within the Noonamah Ridge development's sphere of influence.

It is important to differentiate between these types of risks and project risks. The latter are focussed on an objective of the development – for example, whether there is sufficient market interest to sell the anticipated number of a certain lot size. Except where required by the EIS Terms of Reference, project risks are not addressed in this EIS.

For the purposes of this EIS, risk is considered the probability of an activity having an impact on objectives. Assessment of risk examines both the likelihood of an event occurring and what can reasonably be considered the worst possible consequences if that event does occur.

The risk assessment process for this project involved reviewing the objectives provided in the EIS ToR and identifying impacts. The likelihood and consequence of each impact was analysed and an inherent (i.e. unmitigated) risk ranking was assigned using a risk matrix. Design, management and mitigation measures (which are detailed in the EMP) were considered for each impact and then a new likelihood, consequence and ranking of residual risk (i.e. after mitigation) was assigned. Mitigation measures may reduce the likelihood of the residual risks, but not necessarily the consequence. Only when the severity of an impact is reduced by mitigation is the consequence score reduced – for instance, implementing a weed management plan may minimise the abundance of high fuel load invasive grasses, leading to less severe bushfires.

Table 5.1 lists the components of the project and the associated potential impacts that were subject to a risk assessment.

5 : Risk Assessment

Table 5.1. Components and potential impacts assessed in the risk assessment

COMPONENT	POTENTIAL IMPACTS
Transport	• Congestion • Increase in accidents • Traffic noise
Electricity	• Current supply within the area surrounding the development being compromised
Potable water	• Reduced quality and quantity of groundwater due to contaminants • Decreased recharge • Over-extraction
Stormwater	• Altered hydrology • Reduced surface water quality
Sewerage	• Contamination of aquifers and/or downstream surface waters, primarily through increased nutrient concentrations
Biodiversity and Threatened species	• Reduction in habitat due to land clearing • Altered hydrology due to stormwater infrastructure and/or use of groundwater • Altered surface and/or groundwater quality because of sedimentation or pollution • Introduction or proliferation of weed species (particularly during construction) • Introduction or proliferation of feral fauna species due to residential occupancy (e.g. cats and rodents) • Disturbance from dust or noise (particularly during construction) • Disturbance and/or injury from human activities (e.g. traffic and usage of green spaces) • Altered fire regimes (e.g. more frequent or later fires)
Cultural heritage	• Damage to, or loss of, archaeological and cultural sites during construction • Deliberate disturbance/vandalism of heritage sites
Bushfire	• Injury to humans • Damage to property and infrastructure • Loss of biodiversity • Increased burden on existing fire-fighting resources
Biting insects	• Health effects of exposure to mosquito-borne diseases • Reduced social amenity due to pest mosquitoes
Noise	• Construction activities producing nuisance noise levels that impact upon neighbours, residents and/or construction workers.
Air quality	• Effects of dust from construction on human health, safety and amenity • Effects of dust from construction on biodiversity • Reduced amenity due to odour from sewage treatment
Social	• Decreased social amenity • Social isolation • Increased crime • Inadequate social infrastructure and services • Decreased amenity due to increased noise (in the construction phase) • Decreased amenity due to light (in the occupancy phase) • Decreased road safety and amenity due to increased traffic

5.1 RESULTS

It is concluded that no residual risk of any potential impact remains 'intolerable'. Some residual risks remain high – mostly for impacts that have low likelihoods as a result of mitigation measures but still have significant consequences (e.g. biting insects and bushfire). Intrapac argues that these are 'tolerable' as they can be considered a normal part of undertaking such a development in the Top End.

As discussed in Section 3.3.4, there are five species for which one or more 'important' populations have been identified as occurring within the project area. For four of these it is considered unlikely that they will be significantly impacted upon by the development. For the remaining species – Partridge Pigeon – it is unknown whether there will be a significant impact on the local population (which utilises, but is likely not confined to, the project area). Once developed, it is likely that the project area will no longer constitute suitable habitat for the population; however, it is not known whether this will lead to a decline in that population because the degree to which that population is dependent upon that area cannot be determined.

5.2 ASSESSMENT OF CERTAINTY

A high proportion of the mitigation measures that will be employed to reduce the risk of impact to social, cultural and environmental values are:

- Commitments made in this EIS, and have been incorporated into the Specific Use Zone text. As such, all subdivision application will be required to address these conditions, and the Development Consent Authority will assess the application against these conditions prior to issuing a development permit, and/or
- Actions that will be required to be taken within the planning process prior to subdivision approval being granted.

The commitment to buffer significant conservation and cultural values within the green space network – which is enshrined within Area Plan and the SU zoning text (see Section 1.6) – greatly reduces the risk of those values being impacted upon by land clearing. It is contended that there is a high level of certainty that management of fire, weeds and human use within these areas is possible. The requisite management of these threats is not expected to be especially technical; the fire management should be straightforward; weed infestations are small and there are established control methods; and disturbance by human activities such as quad-biking can be minimised through signage and vehicle access restriction. What is not yet certain is which entity will be responsible for undertaking such management actions within green spaces that contain conservation-significant values.

There is also a level of uncertainty associated with the hydrology to some threatened species' habitat – namely those within the 'environmental investigation areas'. Field experience and contour map suggests that the area in the north-west of the development site receives its water from a drainage line originating off the project area in the north-west. The entire length of this drainage line that occurs within the project area will be contained within green spaces and will not be disturbed. The catchment of this drainage line, however, is an undeveloped site not within Intrapac's control and so, despite best efforts the hydrology to this site could be compromised in the future. Contour mapping indicates that the other 'environmental investigation area' likely receives its water from a clearly-defined catchment that is not influenced by the major drainage line.

Intrapac is intent of resolving both of these uncertainties, hence the establishment of 'environmental investigation areas' and the commitment to engage relevant authorities in a workshop to determine the appropriate size of green spaces, the optimum zoning (and, as a consequence, responsibility management), the degree of public accessibility to key areas, management of key areas (including fire and weed management), monitoring programs (and responsibility for undertaking these), and how to promote within the community an understanding and appreciation of the values 'on their doorstep'. These will be addressed prior any development taking place that could impact upon either 'environmental investigation area' (i.e. Stage 4 scheduled to commence in 12 years' time – see staging map in Figure 2.8).

5 : Risk Assessment

5.3 CUMULATIVE IMPACTS

Cumulative impacts on the environment – specifically surface water, groundwater, biodiversity and air quality – have been assessed. It is concluded that Noonamah Ridge is being designed and planned, and will be constructed and managed, such that the contribution of its development to the cumulative impact on the region's natural environment is minimal for three of those four aspects. Because of the commitments undertaken by Intrapac, downstream surface water and regional groundwater quality and quantity should not be compromised. Air quality will likely be improved due to fewer bushfires. The project area is a greenfield site, therefore land clearing and habitat disturbance due to this development will contribute to regional habitat and biodiversity loss. However, this is reduced, by the abundance of the habitat type in the region. Additionally, buffered areas and managed reserves within the project area will protect threatened species and sensitive vegetation types, both of which are currently unmanaged and hence vulnerable to disturbance.

A qualitative assessment of the potential cumulative social impacts of this development has also been undertaken. It concluded that proposed management and mitigation measures will minimise the contribution of this development to cumulative social impacts.

Howard River Toadlet (*Uperoleia daviesae*)



6 : Environmental Management Plan

The EIS contains an Environmental Management Plan (EMP) which is a project-specific document outlining the environmental management practices and principles to be followed for all phases of the project. The EMP does not address any works that are required outside of the project area to connect Noonamah Ridge to existing services and roads networks. Such works will be the responsibility of NT Government agencies that have established processes for the assessment and management of potential environmental impacts relating to their activities.

The aim of the EMP is to ensure that all project objectives and risks are identified, and that management actions, monitoring and reporting requirements are allocated in order to minimise the risks associated with the project. The EMP is based on knowledge of the existing environment and proposed project activities, as presented in the EIS. Management strategies and mitigation measures are provided for each phase of the project – namely Design and Planning, Construction and Occupancy (i.e. the ongoing operational phase of development).

Most design measures, and many management/mitigation measures that are not subdivision-specific, are described in detail in this EMP. For those that are subdivision-specific, general management principles are given. The specifics will be provided in Construction EMP's (CEMP's) for each subdivision.

The preparation of these EMPs will be required for the subdivision approvals process. Most of the environmental management associated with the Occupancy phase – i.e. once the constructed works have been approved, undertaken and placed 'off-maintenance' – will be the responsibility of local or government authorities. Nevertheless, general management measures for that phase are presented as indications of likely measures that will be put in place.

The EMP is designed to be an evolving document and, in some instances, to inform future management plans, such as CEMP's for each subdivision. Where further plans are required, these have been highlighted. The document will be reviewed and updated annually to remain current with site activities.

6.1 IMPLEMENTATION THROUGH THE PLANNING PROCESS

To ensure that the requirements of the EMP are followed through for the life of the project, the commitments described in Chapter 8 (which are the result of the management measures contained within this EMP) are included where feasible in the following documents that will be incorporated within the NT Planning Scheme:

- The Area Plan, which contains principles guiding high-level social and environmental objectives, and ensuring that areas requiring further environmental investigation are clearly identified (see Appendix O).
- The Specific Use Zone, which requires particular actions in relation to the lodgement of a subdivision plan, to achieve the requirements of the EMP within a particular stage application (see Appendix P).

The Specific Use zone will incorporate the environmental commitments within the EIS. This will require that all future subdivision applications address the commitments at the time of application, and place the requirement for the Development Consent Authority to take into account these requirements in their assessment of a subdivision application.

These documents will be submitted as part of Intrapac's application to amend the NT Planning Scheme. This process will embed the EMP and associated commitments into the NT Planning Scheme, providing certainty that the measures will be implemented through the statutory development assessment and approvals' process established by the Planning Act, as described in Section 1.6.

6 : Environmental Management Plan

After NT Planning Scheme amendment (rezoning) approval is obtained, and before development can commence, a development application is required for subdivision of the site. Each development application is subject to comment by the public and relevant authorities (government departments, service providers etc.), and a technical assessment is provided to the Development Consent Authority (DCA). The DCA assesses the application and, if consenting, issues a permit. The permit usually contains conditions that incorporate the advice received during the comment period.

6.2 KEY MANAGEMENT MEASURES

6.2.1 DESIGN & PLANNING

Table 6.1 summarises the key design and planning measures that will be employed to reduce the potential impacts that were identified in the risk assessment.

Table 6.1. Components and key design measures

COMPONENT	KEY DESIGN AND PLANNING MEASURES
Transport	• Design the development to be relatively self-contained in the provision of residents' daily needs, thereby reducing the number of vehicle trips required leaving the development. • Design the proposed street network within the development to be highly interconnected and to allow for direct access to neighbourhoods, reducing the need for traffic on local collector roads and dispersing traffic into more than one collector road. • Collaborate with road and transport authorities as the project proceeds to ensure that staged upgrades and new road developments minimise congestion, ensure accessibility and address potential road safety issues. • Reduce reliance on car-based travel internally by: - o Implementing an interim park-and-ride facility within the site that will eventually become a bus interchange. - o Designing a connected network of footpaths providing access to key land uses and centres. - o Designing a core on-road cycle path network connecting to employment precincts. - o Designing an off-road bicycle path network.
Electricity	• Investigate generating some electricity using solar power and/or the sewerage treatment process.
Potable water	• Undertake a Groundwater Sustainability Study prior to commissioning a bore-field in order to understand and predict the response of the aquifer to extraction. • Gauge bore-fields and limit the extraction of groundwater from bore-fields and individual lots to within specified sustainable levels (i.e. 20 % of annual recharge). • Investigate ways to manage and monitor water extraction by individual lots, including the possibility of having multiple lots connected to a single bore (i.e. five lots to a bore). • Minimise water use by recycling of wastewater (e.g. irrigation of recreation areas). • Undertake further investigations of the viability of the Koolpinyah aquifer as a long-term water supply for the project. • Investigate the potential for active recharge of aquifers using excess stormwater.

6 : Environmental Management Plan

COMPONENT	KEY DESIGN AND PLANNING MEASURES
Stormwater	• Undertake prior to each stage of development hydrological modelling to predict potential changes in run-off characteristics (in each instance taking into account cumulative impact from any existing development). • Incorporate results of hydrological modelling and investigations into a Stormwater Management Plan that provides details of infrastructure design that limit off-site discharges to pre-development flows. • Integrate within the subdivision design relevant principles of water-sensitive urban design. • Design subdivisions and associated drainage to take into account 1% AEP flood levels. • Design each subdivision to retain riparian vegetation as buffers and filters for stormwater run-off. • Use the Land Suitability Assessment (Appendix C) to ensure that the design and planning of each subdivision minimises erosion and sedimentation is minimised.
Sewerage	Individual systems (e.g. septic tanks) • Locate septic systems away from groundwater bores (i.e. at least 100 m) and in suitable soils (as identified in the preliminary Land Capability Assessment in Appendix H, as well as in the subsequent LCA's undertaken for every subdivision that contains lots that will have a residential septic system). • Require appropriate design (i.e. in accordance with DoH guidelines) and construction of septic systems (e.g. by licenced plumbers), including installation of non-conventional systems where soil limitations exist. Community-scale treatment plants • Require appropriate design (i.e. in accordance with DoH guidelines) and construction of community-scale wastewater treatment systems to tertiary standards. • Locate treated wastewater irrigation disposal areas away from groundwater bores (i.e. at least 100 m). • Locate treated wastewater irrigation disposal areas in suitable soils (as identified in the preliminary Land Capability Assessment in Appendix H, as well as in the subsequent LCA's undertaken for each community-scale plant). • Ensure that the design and operation of irrigation system is appropriate, and has monitoring and management safeguards.
Biodiversity and Threatened species	• Contain all sensitive vegetation types of conservation within buffered green spaces (see Figure 6 1). • Apply the standard land clearing requirements for lots 2 ha and larger which are contained in the NT Planning Scheme. These exist to minimise unnecessary clearing. For lots smaller than 2 ha, a permit will be required by the landholder to clear more than 1,000 m² of native vegetation (exclusive of the assigned building envelope).
Cultural heritage	• Conserve in situ high value archaeological sites within reserves that are part of the green space network. • Install information signs and/or bollards in vicinity of archaeological sites to minimise accidental interference or damage to sites. • Preserve the bomber site in-situ and investigate listing the bomber wreck on the NT Heritage Register.
Bushfire	• Design subdivisions to avoid creating large tracts of land for which there is not a clear fire management responsibility. • Design subdivisions to include emergency evacuation routes. • Design subdivisions with firebreaks around higher density areas. • Lobby to have the emergency response area extended to include the project area. • Provide land for the establishment of a new volunteer fire brigade within Village One.

6 : Environmental Management Plan

COMPONENT	KEY DESIGN AND PLANNING MEASURES
Biting insects	- Rectify drainage in all onsite mosquito-breeding areas within 1.6 km of the village centres (as identified in the Biting Insect Assessment in Appendix K); specific actions will be to drain and/or fill borrow pits and scrapes and disturbed seasonally-waterlogged areas to reduce mosquito breeding habitat. - Install drainage that does not pool or create mosquito-breeding habitat. - Design future ponds, retention basins and wetlands as per DoH guidelines to ensure drainage to them is free, and that lakes are sufficiently sized and constructed to reduce mosquito breeding habitat (steep sides and creation of fish habitat) - Subject dwellings located within an identified buffer from a potential mosquito breeding area to architectural guidelines requiring the installation of appropriate mosquito screening on all external doors and windows, as well as recommendations to screen outdoor entertainment areas.
Noise	None
Air quality	Detailed design and planning of the sewage treatment system will include assessment and mitigation of potential odour impacts during the design and siting phase. The final system design and location will require approval by DoH and also through the subdivision development approval process.

6.2.2 CONSTRUCTION

The primary mechanism for minimising the impacts of construction activities on environmental and cultural values will be the CEMP that are a requirement for each subdivision. Each site-specific CEMP will include the following:

- Traffic Management Plan (including a survey of the existing road surface conditions prior to construction and implement an ongoing monitoring program)
- Storage and handling requirements for hazardous materials
- Water quality management measures
- Erosion and Sediment Control Plan (ESCP)
- Vegetation Clearing Management Procedure
- Wildlife Rescue Procedure (including the use of a fauna spotter-catcher during land-clearing)
- Weed Management (including a map of existing weed infestations)
- Heritage Management Plan (including the procedure for an archaeologist to collect and bury all low-significance artefacts at a keeping place within the project area)
- Measures to comply with fire and emergency regulations (including an Emergency Response Plan)
- Biting insect management measures
- Noise management measures
- Air quality management measures.

6 : Environmental Management Plan

6.2.3 OCCUPANCY

Most impact management measures are incorporated in the design and planning, and the construction phases. Some ongoing management will be required during the occupancy phase, although the responsibility for much of that will lie with Litchfield Council and service providers.

A Water Monitoring Plan has been developed to monitor:

- Water quantity in key bores surrounding the development
- Creek flows using auto-loggers at stream gauging stations
- Water quality at key locations in drainage lines downstream of the development.

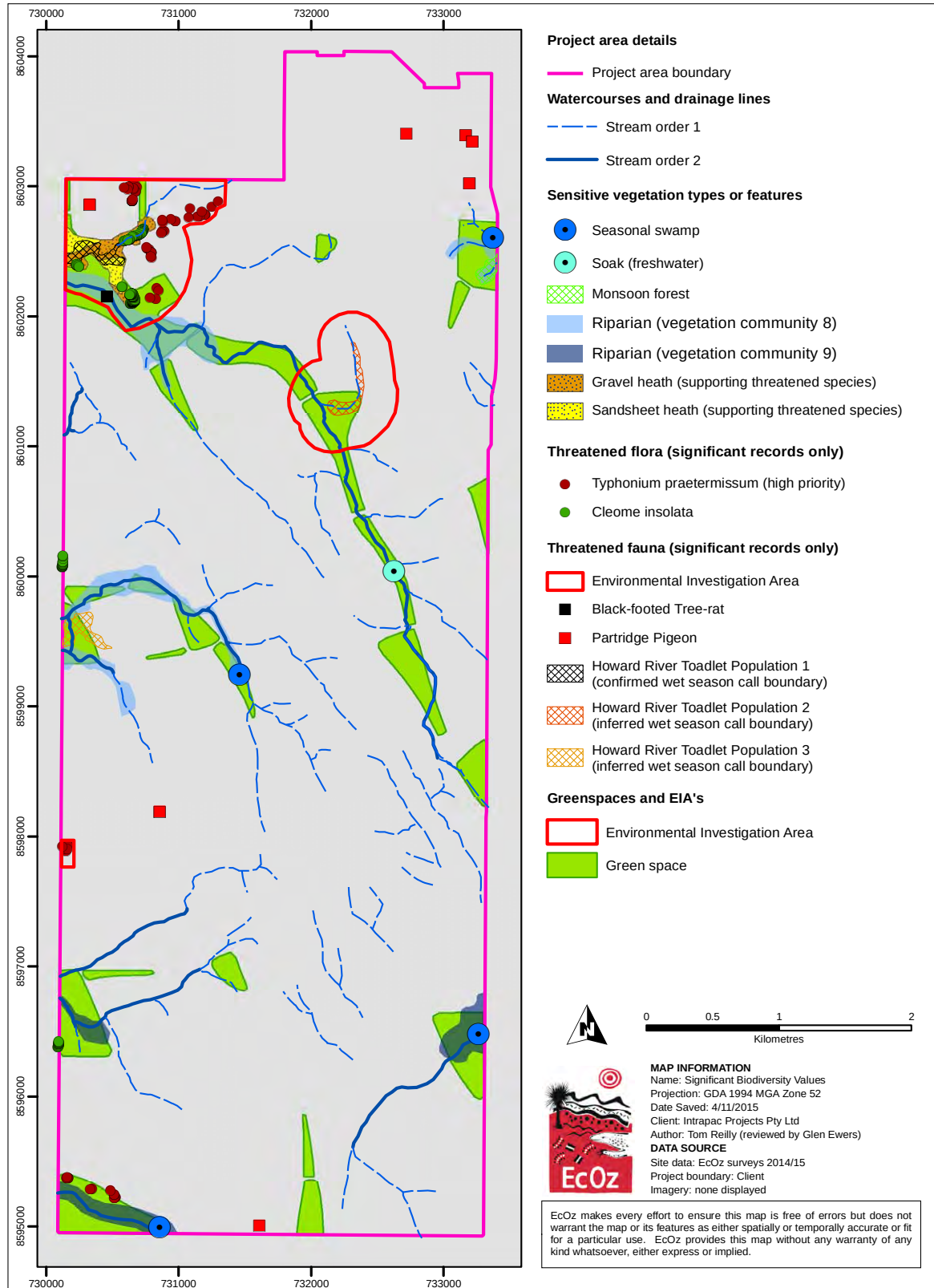
It will be Intrapac's responsibility to implement this monitoring.

Typhonium (*Typhonium praetermissum*)



6 : Environmental Management Plan

Figure 6.1. Map of the conservation significant values within the green space network.



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ14400 - Noonamah Ridge Estates EIS\01 Project Files\Flora and Fauna Baseline\Significant Biodiversity Values.mxd

7 : Social Impact Management Plan

The EIS contains a Social Impact Management Plan which is a project-specific document outlining the social management practices and principles to be followed for all phases of the project.

7.1 MANAGEMENT

7.1.1 DESIGN AND PLANNING

Retaining rural character

Development of a greenfield site creates an increased density of blocks and increase in local population. During community consultation, some residents have expressed concerns about potential changes to the existing character of the area leading to reduced amenity. Mindful of these concerns, Intrapac is committed to providing a high quality, master-planned, rural character estate with a range of lot sizes and an emphasis on rural living options. To facilitate this at the design and planning phase, Intrapac will:

- Undertake community consultation from project conception to identify existing residents' concerns and needs, and to incorporate concerns and ideas into the master plan.
- Deliver social infrastructure that meets the needs of the existing population, as well as the new population.
- Commit to the minimum lot size of 800 m² for single dwelling properties.
- Introduce into the NT Planning Scheme a relevant controlling clause to ensure that, once developed, no further subdivision of individual properties will be permitted.
- Ensure with the Area Plan that lot sizes along Redcliffe Road and to the northern boundary are complementary to existing lots/homes, creating an interface with existing adjacent landholdings.
- Provide within subdivisions setbacks in accordance with the requirements of the NT Planning Scheme and endorse these through the application of building envelopes.
- Develop and incorporate high-level architectural design guidelines into each sale agreement.
- Place a covenant on the title of each property requiring an assessment of building plans against the guidelines, and approval before construction can commence.
- Ensure within the Area Plan that the proportion of public green space within the project area is no less than 15 %.

Avoiding social isolation

The potential for isolation due to large distances from established communities can be minimised by building a strong and well-integrated local community through the creation of physical connections (roads, pathways, public transport and community facilities) at the design and planning stage, including:

- Designing the development such that social infrastructure is centrally-located, easily accessible and linked into public transport routes – reducing reliance on car-based travel internally.
- Ensuring public transport is available from Stage 1.
- Ensuring roads associated with Stage 1 are constructed and completed prior to occupation.
- Delivering social infrastructure such as a school and day care within Stage 1, or as required, to support both existing needs and needs arising from the proposed development.
- Designing the development such that casual/incidental contacts between people are facilitated in open spaces and shopping areas.
- Establishing a community facility that runs activities and programs (e.g. classes, courses, exercise programs and educational sessions).

7 : Social Impact Management Plan

Planning for crime prevention

Crime Prevention Through Environmental Design (CPTED) principles (see, e.g., Queensland Government 2007) will be incorporated into the design of each stage of the development.

Noise and light intrusion

Ongoing light intrusion will be managed through the adoption of rural road standards that do not include street lighting, and through considering alternate street lighting – including low-level lighting and motion sensor-activated lighting in the more built-up parts of the development (see Section 2.5).

Provision of new community services and facilities

A forecast of population of around 11,000 people would provide a catchment of sufficient size to support a small number of local-level facilities. The proposed rezoning and concept master plan allow social infrastructure to be provided to meet the community needs (as described in Section 2.2). In the design and planning phase, the focus will be on facilities that will have land requirements within the proposed residential zones, to ensure that sufficient land is identified in appropriate locations to meet future need – particularly facilities and services provided by local government and Territory agencies (such as schools). A stage-by-stage demographic review will be undertaken to determine whether existing and proposed social infrastructure is appropriate and/or adequate.

Community needs for higher order services and facilities will be met by accessing those available in nearby urban centres, such as Palmerston and Darwin.

7.1.2 CONSTRUCTION

Traffic management and the management of noise from construction are addressed in the EMP. The stakeholder engagement strategy discussed in Section 7.2 outlines the approach in terms of notifying stakeholders of construction activity that may impact on them, as well as the management of complaints.

7.1.3 OCCUPANCY

Most impact management measures are incorporated in the design and planning, and the construction phases. Some ongoing management will be required during the occupancy phase, namely:

- Investigating the incorporation of a neighbourhood watch or some similar community organisation.
- Employing a community development worker in the early stages of settlement charged with introducing new residents to their neighbours and organising social events to encourage interactions and social cohesion.
- Liaising with NT Government and Litchfield Council to ensure the timely provision of social infrastructure and services the provision of which they are responsible.

7 : Social Impact Management Plan

7.2 STAKEHOLDER ENGAGEMENT & MONITORING

To date Noonamah Ridge has employed a comprehensive stakeholder engagement strategy. Intrapac has committed to continuing this.

An ongoing monitoring plan will be put in place at the development application stage to monitor and assess social impacts and needs, and to reflect this in the provision of social infrastructure as well as social impact mitigation.

The purpose of the plan is to:

- Provide evidence of the outputs and outcomes of the stakeholder engagement strategy for accountability and reporting purposes. This could include a range of tools, such as random sampling to gauge understanding of the project at approval of each subdivision application.
- Ensure community engagement activities are as effective as possible.
- Ensure social needs are being met or exceeded.
- Adapt the plan where outcomes are not being achieved.
- Share and reflect experiences and learnings to help Intrapac understand how to better deliver good social outcomes and facilities.

The plan will include the monitoring for the occupancy stage discussed in Section 7.1.3.

8 : Commitments

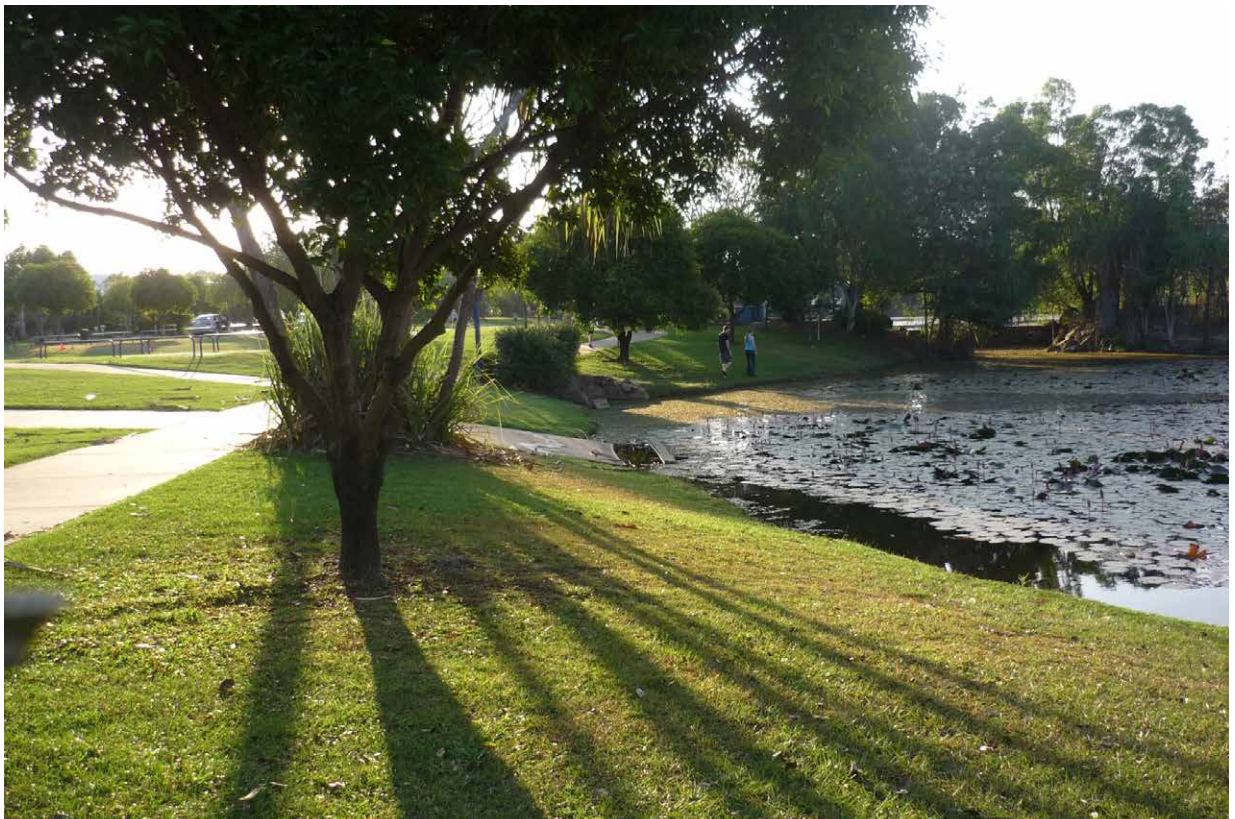
Intrapac has made commitments within the EIS to ensure that the measures described in the EMP will be put into place in order to minimise social and environmental risks. These commitments directly relate to the amendments proposed by Intrapac for incorporation within the NT Planning Scheme to regulate development of the site.

To ensure that commitments listed below are followed through for the life of the project, where feasible they are included in:

- The Area Plan, which contains principles guiding high-level social and environmental objectives, and ensuring that areas requiring further environmental investigation are clearly identified (see Appendix O).
- The Specific Use Zone, which requires particular actions in relation to the lodgement of a subdivision plan, to achieve the requirements of the EMP within a particular stage application (see Appendix P).

The Specific Use zone will incorporate the environmental commitments within the EIS. This will require that all future subdivision applications address the commitments at the time of application, and places the requirement for the Development Consent Authority to take into account these requirements in their assessment of a subdivision application.

This will embed the commitments within this chapter into the NT Planning Scheme to ensure that compliance is contained within a statutory process defined by the Planning Act (as described in Section 1.6).





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