Prepared for
Powerlink Queensland
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Appendix H

Corridor Selection Report

Oct-2021
Genex Kidston Connection Project - Ministerial Infrastructure Designation Assessment Report

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PROPOSED GENEX KIDSTON CONNECTION PROJECT

Corridor Selection Report

PREPARED BY

QUEENSLAND ELECTRICITY TRANSMISSION CORPORATION LIMITED

(ACN 078 849 233) trading as “POWERLINK”

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Contents

1 PREFACE

Genex Power (Genex) is seeking to establish a combination solar and hydro pump storage power generation facility in the Far North Queensland region at Kidston, approximately 270km north-west of Townsville. The Kidston Solar Project is proposed to be co-located with the Kidston Pumped Storage Project and will be built on the tailings storage facility of the old Kidston gold mine.

Stage one of the project involves installation of a solar photo voltaic farm with a capacity of 50MW. Once a new transmission line has been built to the site, stage two of the solar project will be developed, which will expand the total capacity of the solar farm to 270MW[1]. Additionally, the Hydro Pump Storage Scheme seeks to have a generation capacity of 250MW[2], providing a cumulative peak total generation capacity in excess of 500MW.

Powerlink has been commissioned by Genex to prepare a Corridor Selection Report (CSR), which identifies a preferred corridor and a preliminary alignment for the construction and operation of a new 275kV transmission line to connect the Kidston facility to Powerlink's existing transmission network, with a connection point being located near the existing Mt Fox communications site along the Ross to Chalumbin 275kV transmission line.

The goal of the CSR is to identify a preferred study corridor within the study area that, on balance, offers the most appropriate location for the proposed 275kV transmission line, taking into account social, economic and environmental factors. The preferred study corridor will be broad and of variable width. The CSR also identifies a preliminary alignment for the potential transmission line within the study corridor to guide further investigation and consultation in subsequent project stages as required.

Should the project to develop a new transmission line proceed, a comprehensive Environmental Impact Assessment and associated stakeholder and landholder consultation process would be required before any final decision on an alignment could be taken. Future consultation would build on the work undertaken and relationships established in the development of this CSR.

[1] *Genex Power, The Kidston Solar Project*, 2017, http://www.genexpower.com.au/the-kidston-solar-project.html (accessed 9 Jan 2017)
[2] *Genex Power, The Kidston Hydro Project*, 2017, http://www.genexpower.com.au/the-kidston-hydro-project.html (accessed 9 Jan 2017)

2 GLOSSARY

2.1 TERMS

Acronym	Definition
AHD	Australian Height Datum
ASS	Acid Sulfate Soils
CID	Community Infrastructure Designation
CLR	Contaminated Land Register
CSR	Corridor Selection Report
DCSR	Draft Corridor Selection Report
EIS	Environmental Impact Statement
EMR	Environmental Management Register
IDAS	Integrated Development Assessment System
km	Kilometres
kV	Kilovolts
LGA	Local Government Area
m	Metres
MNES	Matters of National Environmental Significance
MVA	Mega Volt Amp
MW	Megawatts
QLD	Queensland
RE	Regional Ecosystem
ToR	Terms of Reference

2.2 ORGANISATIONS / AGENCIES

Acronym	Definition
Genex	Genex Power
Powerlink	Powerlink Queensland
DAF	Department of Agriculture and Fisheries
DEWS	Department of Energy and Water Supply
DEHP	Department of Environment and Heritage Protection
DNPSR	Department of National Parks, Sport and Racing
DNRM	Department of Natural Resources and Mines
DTMR	Department of Transport and Main Roads
Ergon	Ergon Energy
OCOG	Office of Coordinator General
BQ	Building Queensland

3 EXECUTIVE SUMMARY

This report has been prepared in response to a request from Genex Power (Genex) to identify a suitable study corridor for a high voltage electricity transmission connection to its proposed combined solar/hydro pumped storage generation facility at Kidston, approximately 270km north-west of Townsville. To meet the load requirements, the proposed connection solution is a 275kV double circuit transmission line nominally to be constructed using steel towers. A substation with switching capability would be required along Powerlink's existing 275kV Ross to Chalumbin transmission line near Mt Fox (approximately 40km west of Ingham).

This CSR builds on the outcomes of a Draft Corridor Selection Report (DCSR) completed by Powerlink for Genex in May 2016, which assessed three possible corridor options between Mt Fox and Kidston. Based on the outcomes of the DCSR, one study corridor option has been excluded from for further assessment, having the highest potential environmental impact of the options assessed. This CSR therefore explores a study area based generally on the two study corridor options remaining from the DCSR.

In accordance with Powerlink's Project Engagement Model and seeking to achieve best practice project engagement, early and targeted consultation with stakeholders and landholders has been undertaken in development of this CSR. Engagement occurred during late 2016 and early 2017 and has provided meaningful insight into the study area to complement the desktop assessment. The process of undertaking engagement involved extensive travel through the study area, further enhancing Powerlink's understanding of the region. Powerlink also gained access to Ergon aerial survey data and undertook a helicopter fly over to better understand the project area.

The assessment undertaken in this CSR has indicated that study corridor option C is preferred (Figure 3). Study corridor option C is defined largely by existing Ergon transmission lines and reduces overall impact to the environment and landholders by virtue of co-locating linear infrastructure.

This CSR has not identified any constraints that would prevent the development of a potential 275kV connection within study corridor option C. The preference for study corridor option C was also confirmed by third party ecological advice, which assessed option C as having the lowest overall impact on matters of State and Federal environmental significance.

Within study corridor option C a preliminary alignment has been identified, which will serve as the basis for further assessment in subsequent project phases should the project proceed and Powerlink be appointed to undertake this work. The preliminary alignment is a 120m wide band around the existing Ergon transmission lines (60m either side of the existing Ergon assets), allowing flexibility for the future 275kV line to co-locate north or south of the existing Ergon lines on a 60m wide easement. A preference for locating the 275kV line north or south of existing lines is not possible at the current level of investigation.

Between approximately Greenvale and Conjuboy Ergon does not have existing lines. In this area the preliminary alignment is dictated by the location of an existing mining interest and the optimal path through large escarpments. The alignment width is maintained at 120m in this area for consistency and flexibility.

This CSR has also investigated the feasibility of a new substation at Mt Fox. It is outside the scope of this report to acquire a site or site option and the available terrain data is not detailed enough to define a firm site preference. However, initial landholder feedback and preliminary investigations indicate that a suitable site is likely to be available. This CSR therefore defines an area of interest for the substation which would be further assessed through a targeted site selection process supported by a terrain survey and more detailed landholder engagement.

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4 DESCRIPTION OF THE PROJECT AREA

The study area commences near Mt Fox, approximately 100km north-west of Townsville and extends in a westerly direction for approximately 180km to the township of Kidston within the Etheridge Shire. The study area intersects three individual local government areas (LGAs) – Hinchinbrook Shire Council, Charters Towers Regional Council and Etheridge Shire Council.

The proposed substation near Mt Fox would likely be located within the Hinchinbrook Shire Council LGA. The nearest town to the substation would be Mt Fox and the nearest population centre would be Ingham (approximately 40km north-east of Mt Fox). The proposed Kidston substation would be located within Etheridge Shire Council with the nearest town being Einasleigh (approximately 40km north of Kidston, population 202). Approximately 115km of the proposed transmission line would be located within Charters Towers Regional Council with the nearest town being Greenvale (population 150).

The topography within the project area ranges from flat low lying land to steep crossings of multiple ranges, including part of the Pelican Range (70km west of Mt Fox) and the Great Dividing Range (100km west of Mt Fox). Elevation throughout the project area generally ranges from 400-800m AHD. Constructability through these areas is a key consideration in the development of feasible options.

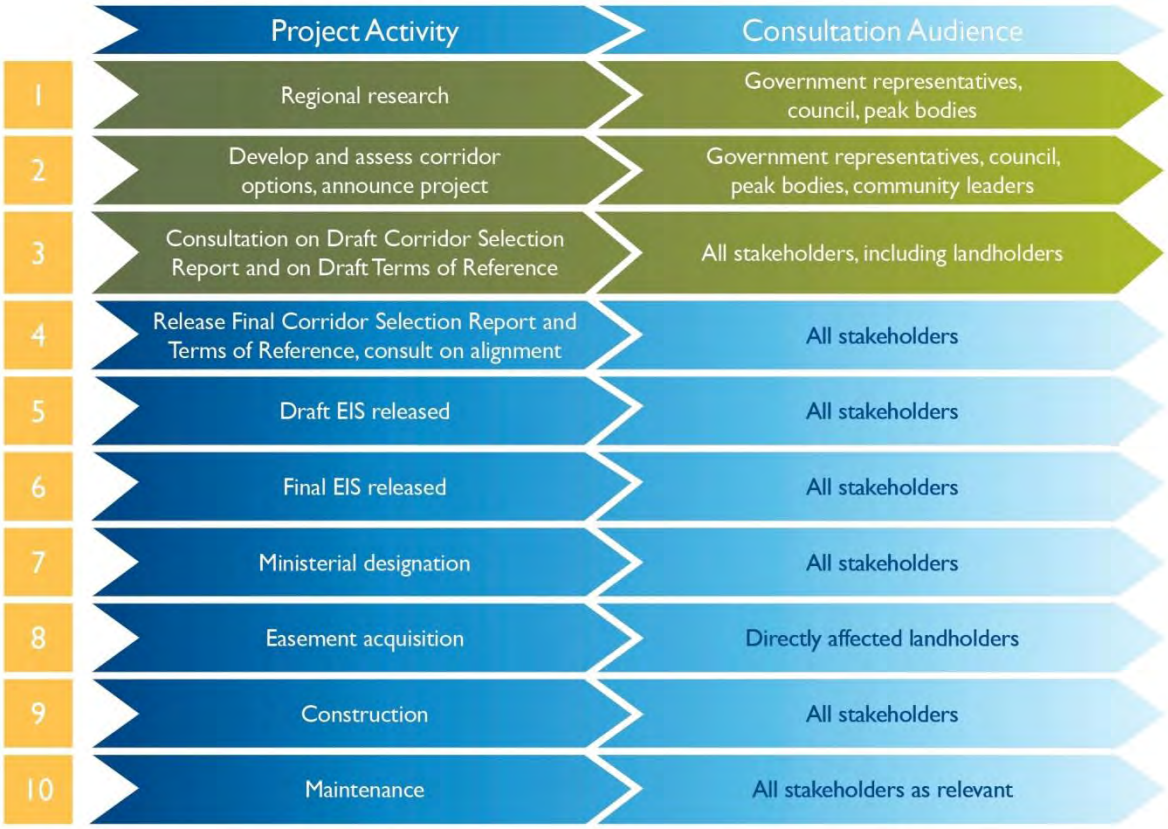
Existing infrastructure within the area includes an Ergon 66kV transmission line that runs 100km west from Mt Fox to Greenvale and another Ergon 132kV transmission line that runs from Ross to Kidston. Consideration of co-location opportunities with existing infrastructure corridors is a key consideration in the development of study corridor options within this report.

5 APPROACH AND METHODOLOGY

5.1 CORRIDOR DEVELOPMENT PROCESS

This CSR is one step in a broader development process for high voltage transmission projects which in turn is a subset of the project development for the combined hydro / solar at Kidston. The general development process is outlined in Figure 1.

Figure 1 – Corridor Development Process



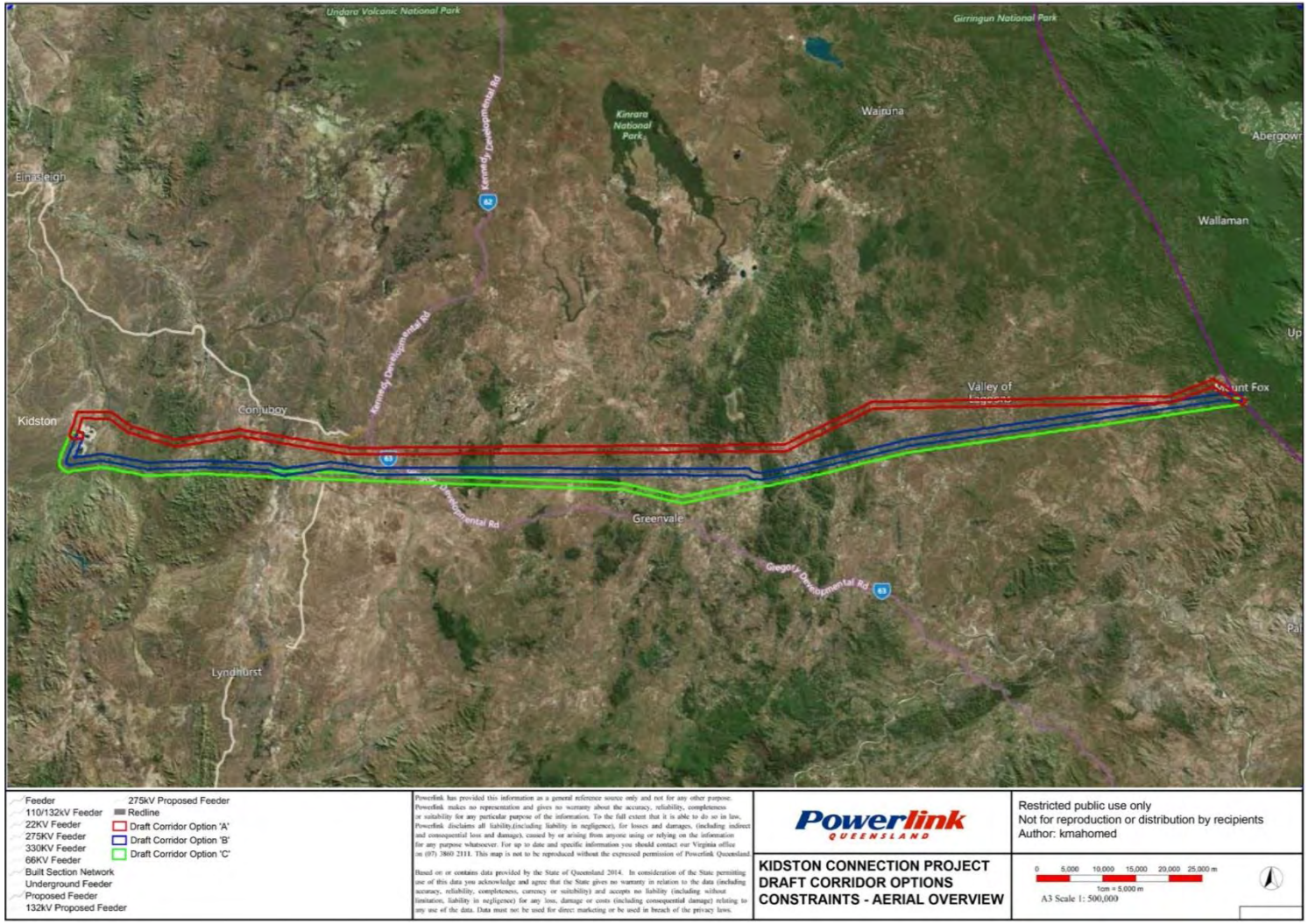
This CSR falls generally into steps 2 to 4 of Figure 1. It is important to note that Figure 1 represents a general process flow and the development process is tailored to individual projects.

In the case of Genex, the development processes is being undertaken in a staged manner. Each stage of the process represents a refinement of project scope and risk; allowing an opportunity to reassess the feasibility of the broader development. Sections 5.1.1 to 5.1.5 describe the stages of the corridor development process to date, including specific amendments to the study area during the development of this CSR. It is important to describe the approach to corridor development and refinement up front.

5.1.1 DRAFT CORRIDOR SELECTION REPORT

The DCSR was the first major step in the development process for Genex. The DCSR was completed in May 2016 and utilised publicly available datasets to identify three high level study corridor options for further assessment. The three study corridor options identified in the DCSR are shown in Figure 2.

Figure 2 – DCSR Study Corridor Options



The three study corridor options were discussed and developed with input from a range of stakeholders, including local and State government. Feedback from these stakeholders ensured the outcomes of the desktop studies in the DCSR included local knowledge and that major opportunities and constraints in the region were identified. The DCSR concluded that study corridor option A was the most constrained and for this reason it was excluded from further assessment as part of this CSR.

Study corridor option A was the most constrained of the three corridors identified in the DCSR due to:

- Intersection of the Mt Fox section of Girringun National Park
- Intersection of the Newcastle Range – Oaks Nature Refuge
- Proximity to Mt Fox Primary School
- Proximity to Kidston airstrip
- Highest relative intersection of steep terrain, major watercourse crossings, 'of concern' vegetation and potential habitat for protected species, including cassowary habitat near Mt Fox.

This CSR further explores study corridor options B and C as identified at the DCSR stage.

5.1.2 CORRIDOR SELECTION REPORT

The study area for this CSR is broadly defined by the outer bounds of study corridor options B and C from the DCSR, representing an iterative refinement of the study area. The study area for the CSR with study corridors B and C is depicted in Figure 3.

Figure 3 shows the study area expanded beyond the extent of the study corridors from the DCSR between Greenvale and Conjuboy. This is due to an amendment to the study area made during delivery of this CSR. A second amendment was also made at Mt Fox, refining the study area as greater understanding of the region was gained. The amendments are described in Sections 5.1.4 and 5.1.5.

This CSR has been developed based on a range of detailed desktop assessments, interrogation of existing agency data, aerial reconnaissance and stakeholder and landholder engagement. The following matters have been considered and informed by feedback from local representatives and landholders:

- Topography
- Hydrology
- Environment
- Native Title
- Cultural Heritage
- Tenure
- Local Government areas
- Residences
- Proximity to population

- Land use
- Existing infrastructure
- State planning interests and other State policy.

It is also important to note that because the project development process for Genex is being undertaken in stages, Powerlink's scope of work is to compile the CSR only at this stage. Terms of Reference (ToR), EIS, easement acquisition or construction activities are not currently scoped. Powerlink has significant experience scoping transmission projects and is available to assist Genex with these activities if required.

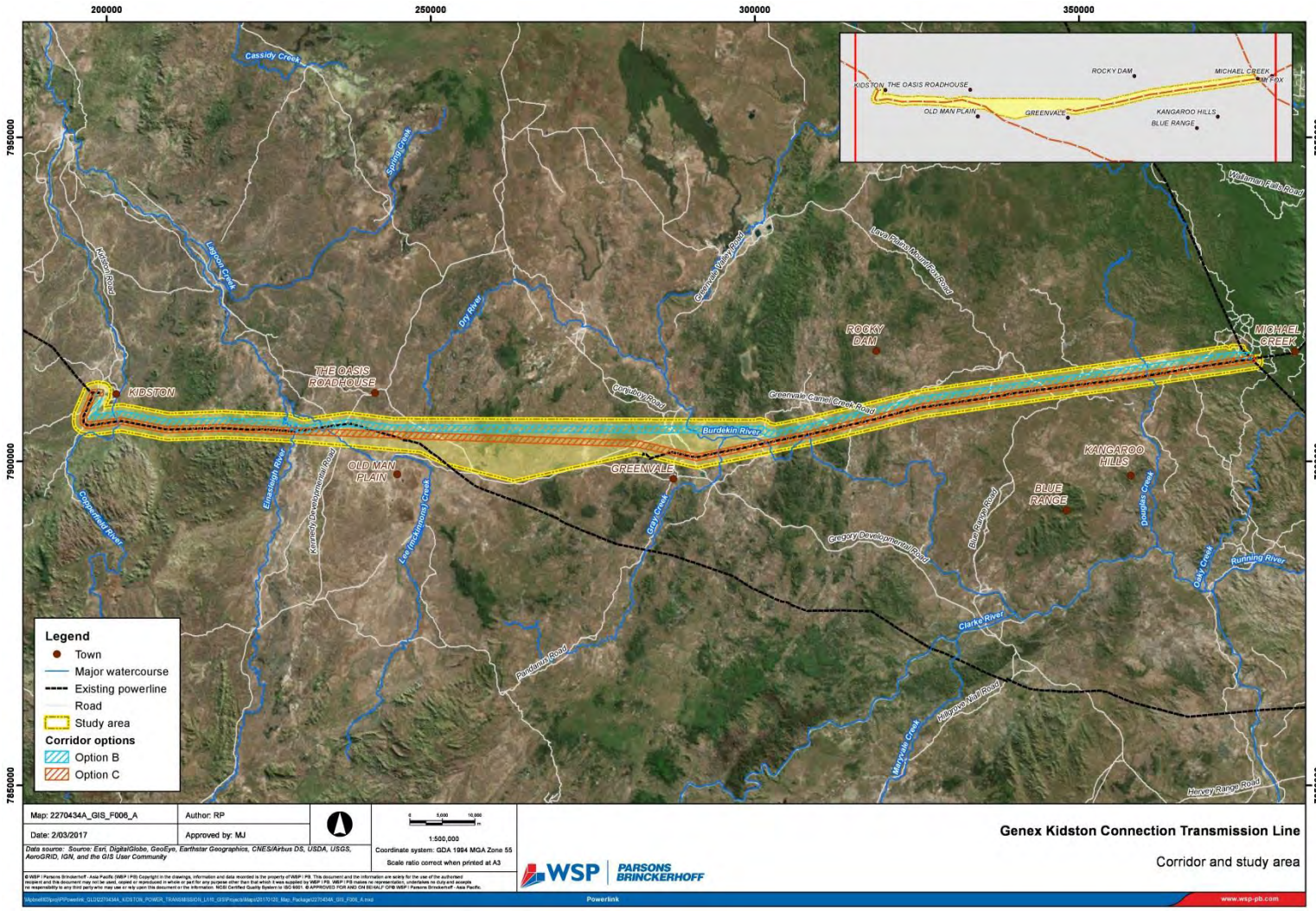
5.1.3 CONNECTION POINT

Irrespective of the corridor selected, a substation with switching capacity near Mt Fox will be required along with a 275kV substation at Kidston. The switching functionality is required to maintain the high reliability of the 275kV network. Without the switching capability, any fault/outage on the Kidston feeder section would remove one of the Ross to Chalumbin feeders from service and severely restrict the power flow and reliability of high voltage electricity supply to Far North Queensland. Mt Fox is considered an appropriate location for the proposed substation as it is the closest viable point to Kidston along Powerlink's existing 275kV Ross to Chalumbin transmission line.

Other locations for the substation were considered, but discounted because they were much further away or were constrained in other ways, such as potential impacts to National Park along Powerlink's existing 275kV Ross to Chalumbin transmission line (including the existing Chalumbin Substation). A study area commencing at Mt Fox also provides opportunity to co-locate with the existing Ergon transmission lines, which most other locations would not.

One of the other options considered was a connection to the existing Ross to Chalumbin line where it meets the existing Ergon 132kV line to Kidston at around Hervey Range. This location does offer the benefit of co-location opportunities, but is up to 40km longer overall than a connection to Mt Fox resulting in potentially greater social and environmental impacts, as well as increased construction costs.

Figure 3 – CSR Study Area and Study Corridors



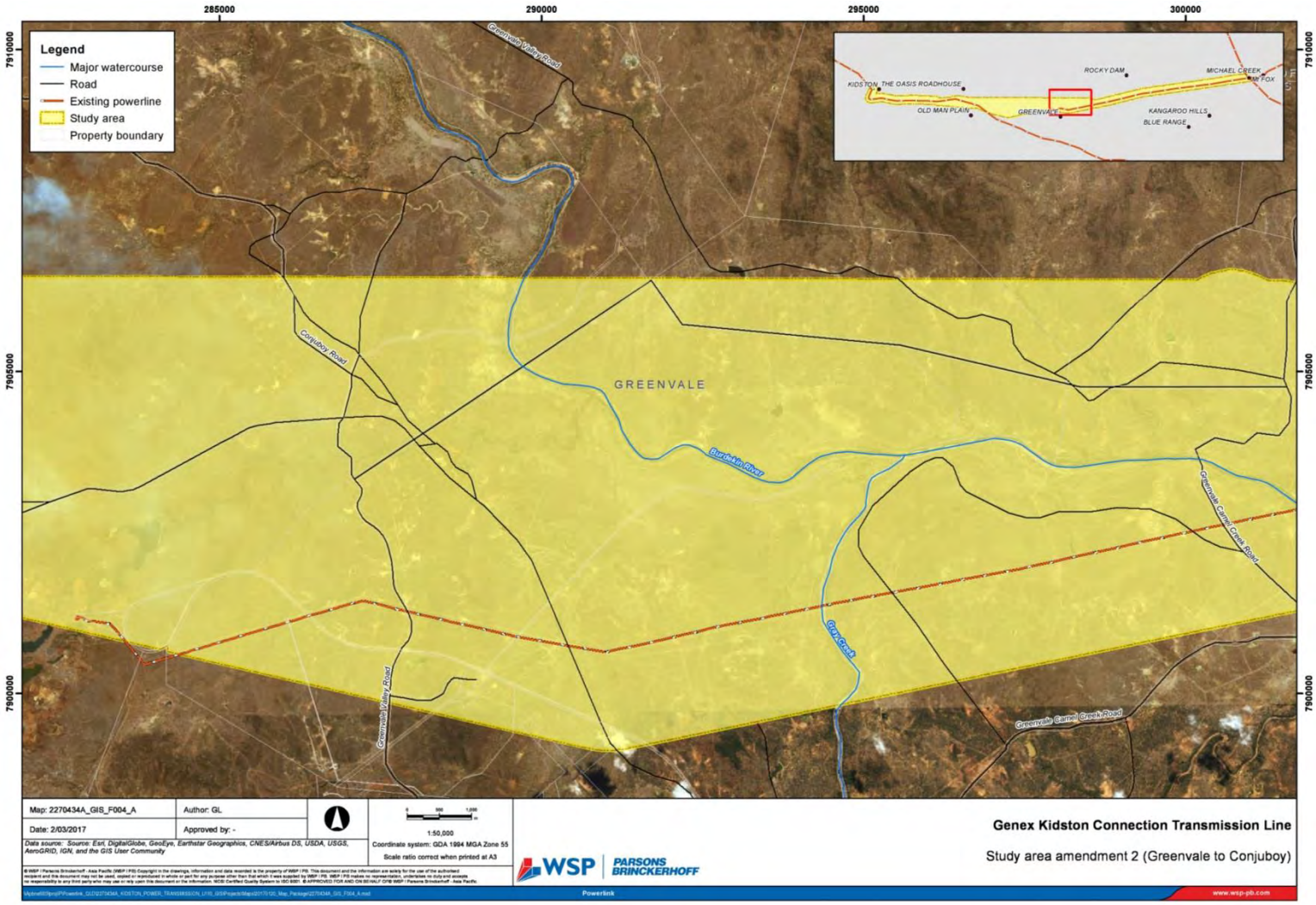
5.1.4 STUDY AREA AMENDMENT (WEST OF GREENVALE)

During investigations and visits to the proposed study area and with landholders as part of preparing this CSR, it became evident that terrain approximately 25km west of Greenvale is challenging from a construction perspective and that the study area needed to be broadened to offer greater opportunity to avoid these areas.

In this location the study area has been broadened significantly, as far south as the Gregory Development Road. Figure 4 shows the expanded study area. Importantly, the extension of the study area did not impact any additional new properties, with potential impacts limited to lots that were already intersected by the previous study area.

A preliminary alignment that avoided the most difficult terrain was also developed. The preliminary alignment deviates south of the initial extent of study corridor option C in this location, responding to the constraints identified in the field before reconnecting to the initial study corridor areas at Conjuboy. The preliminary alignment is discussed in Section 14.2.

Figure 4 - Study Area Amendment 25km West of Greenvale



5.1.5 STUDY AREA AMENDMENT (MT FOX)

The same refinement process was applied to the proposed study area around Mt Fox. As Powerlink travelled through the area and spoke with stakeholders and landholders it was evident that several of the properties impacted by the initial study area could be removed from the study area. The properties were removed for a range of reasons, including:

- The study area affected only a small part of the property and there was no real potential for Powerlink to identify a suitably sized substation site on the property
- The property backed directly onto Mt Fox Primary School (applies to 46 WU44).

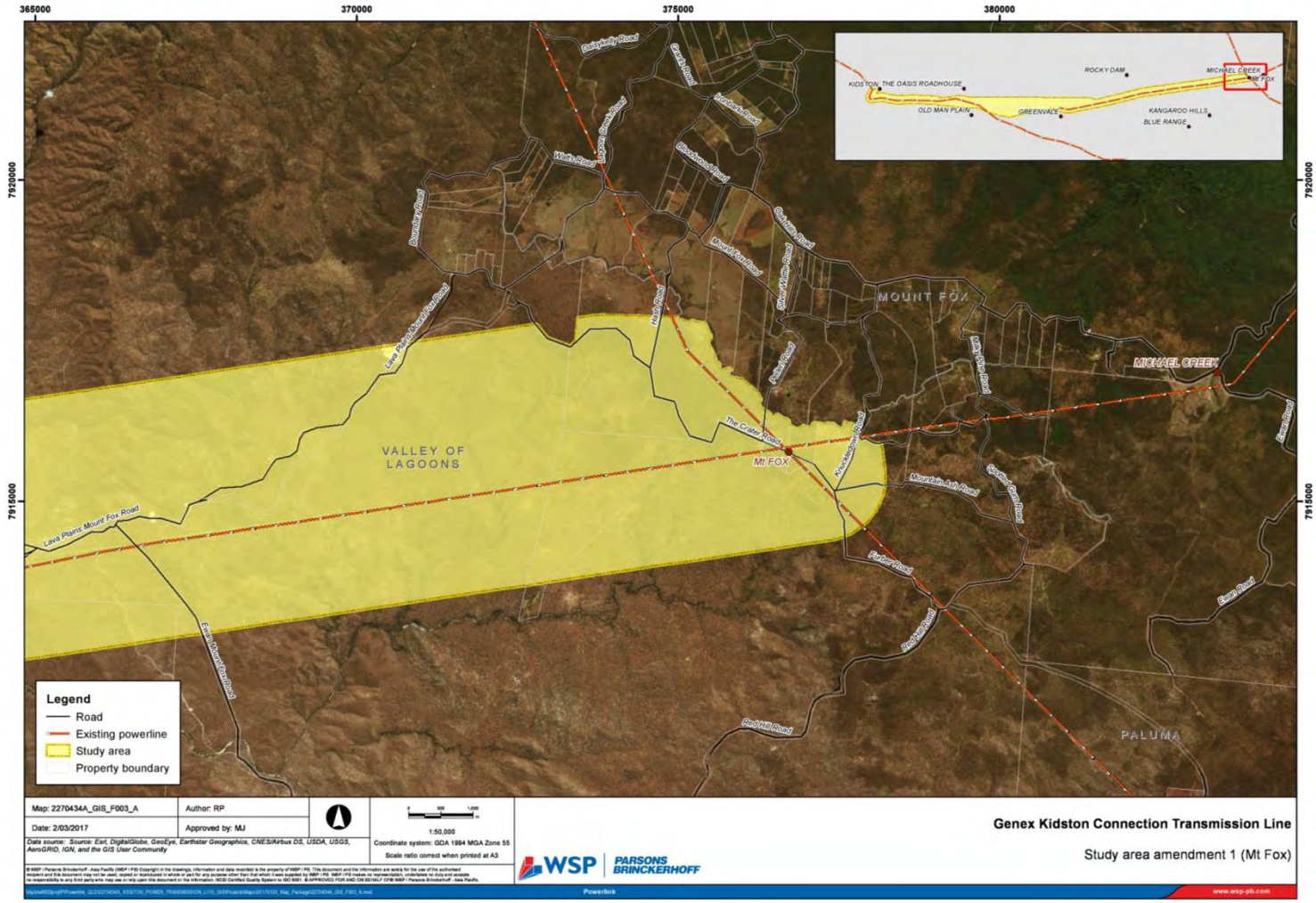
Multiple properties located to the east of Powerlink's existing Ross to Chalumbin 275kV transmission line were also removed from the study area. Several factors contributed to this amendment:

- Additional investigations identified topographic and environmental constraints at Mt Fox that would make extending the line to the east of Powerlink's existing Ross to Chalumbin transmission line more challenging from a construction perspective
- The Liefway Nature Refuge occurred in the area and would not represent a viable location for a substation
- Reducing the size of the study area minimises social impacts
- Several opportunities for a substation site exist in more preferential locations under and west of Powerlink's existing Ross to Chalumbin transmission line.

The proposed study area was therefore refined to be coincident with an unnamed creek immediately east of the existing Ross to Chalumbin transmission line. The creek line forms a logical natural boundary for the study area. Avoidance of a creek crossing is also considered beneficial where possible.

Figure 5 depicts the amended study area at Mt Fox. Properties removed from the study area were also contacted by phone and sent a letter to notify them of the change, and offer opportunities for further engagement if desired.

Figure 5 – Amended Study Area at Mt Fox



5.1.6 NEXT STEPS

This CSR will provide the basis for detailed investigations of the preferred study corridor and preliminary alignment by Powerlink in a future impact assessment process should the project proceed.

Genex has multiple process options available to progress the proposed connection project. Environmental and technical field investigations and further opportunities for stakeholder and landowner engagement will be integral parts of the process, irrespective of the approval path chosen.

Powerlink has significant experience in transmission line development in Queensland, including impact assessment, land acquisition, stakeholder and landholder engagement to support Genex in subsequent phases, whichever process is deemed preferable.

5.2 LIMITATIONS AND ASSUMPTIONS

This report has been prepared based on the following assumptions:

- The preferred study corridor and preliminary alignment are of variable width and are subject to localised amendment as constraints are further understood in subsequent assessment processes
- No ecological, geotechnical, resistivity, hydrological, water quality or other detailed field based technical assessment has been undertaken
- A 60m wide easement will be required for any future final corridor selected to accommodate a 275kV double circuit transmission line
- Access, laydowns and off easement property requirements are not known at present and therefore not assessable at this level of investigation.

Other assumptions and limitations are provided throughout the document where they are relevant to specific sections.

6 INFRASTRUCTURE REQUIREMENTS

6.1 TRANSMISSION LINE

This study has been based on a potential requirement to provide a 275kV double circuit transmission line from Powerlink's existing high voltage network to Genex's generation facility at Kidston. Based on draft corridors developed to date, approximately 188km of transmission line would be required. Configuration of the transmission line would likely be double circuit steel lattice tower design constructed within a new 60m wide easement.

Underground construction is not considered viable where sufficient space for overhead infrastructure exists. Underground construction is not only significantly more costly than overhead construction, but the easement must be kept clear of vegetation. Overhead infrastructure can be carefully sited to span sensitive environmental and cultural features. In the event of a fault it also often takes longer to restore service on underground transmission lines, with fault identification more difficult than equivalent overhead transmission lines.

No network limitations have been identified that would prohibit connection of the generation facility at Kidston. Temporary workers camps, accommodation and offices are also likely to be necessary. The location and scale of those facilities will be defined during subsequent detailed impact assessment processes.

6.2 SUBSTATION – MT FOX

A substation with switching capability is necessary for the connection to the Ross to Chalumbin transmission line as it allows for electricity to be transferred to either Ross Substation (south of Mt Fox) or Chalumbin Substation (north of Mt Fox) as required. The switching functionality is required to maintain the high reliability of the 275kV network. Without the switching capability, any fault/outage on the Kidston feeder section would remove one of the Ross to Chalumbin feeders from service and severely restrict the power flow and reliability of high voltage electricity supply to Far North Queensland.

The proposed Mt Fox Substation would be located along Powerlink's existing double circuit 275kV Ross to Chalumbin transmission line. Actual site configurations and technical arrangements will need to be developed as part of any future design and consultation activities, but this CSR discusses high level site opportunities.

6.3 SUBSTATION – KIDSTON

A 275kV substation at Kidston, located at the Genex generation site, is required to transform the solar and hydro energy generated to a voltage suitable to transmit to the grid connection point at Mt Fox. Powerlink understands that the Kidston substation will be located on Genex owned land at Kidston, as close as possible to the generation facility.

The study area enters the western side of the Genex owned land at Kidston. Doing so maximises co-location with the existing Ergon transmission lines, increases the distance to residences east of the Genex facility, and avoids a nature refuge north-east of the Genex facility.

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7 ENGAGEMENT PROCESS

Powerlink undertook early and targeted consultation with stakeholders and landholders to inform this CSR, leveraging a depth of experience in project engagement. This consultation builds on that initially undertaken for the DCSR and seeks to ensure local knowledge helps inform this CSR.

7.1 STAKEHOLDER ENGAGEMENT

This CSR is underpinned by engagement with relevant Federal, State and Local government departments and elected representatives departments within the project area. The objective of stakeholder engagement at this point in the process is to gain meaningful understanding of opportunities, constraints and key issues in the study area.

Table 1 outlines the stakeholder groups consulted. The list of stakeholders is not intended to be definitive or exhaustive and it is highly likely that other stakeholders exist in the region that could add valuable insight to future project development processes as part of future, more detailed planning. Table 1 represents Powerlink's best endeavours during the CSR phase to identify interested stakeholders and seek out local knowledge.

Table 1 – Key Stakeholders

Stakeholder	
FEDERAL GOVERNMENT DEPARTMENTS	**FEDERAL AND STATE ELECTED REPRESENTATIVES**
Environment and Energy (DoEE)	Mr Andrew Cripps MP, State Member for Hinchinbrook
STATE GOVERNMENT DEPARTMENTS/ AGENCIES	Mr Shane Knuth MP, State Member for Dalrymple
Energy and Water Supply (DEWS)	Mr Robbie Katter MP, State Member for Mt Isa
Treasury	Mr Bob Katter MP, Federal Member for Kennedy
Building Queensland	**PEAK BODIES**
Office of the Coordinator-General (OCOG)	Queensland Farmers Federation
Infrastructure, Local Government and Planning (DILGP)	AgForce
Natural Resources and Mines (DNRM)	Queensland Resource Council
Environment and Heritage Protection (DEHP)	NQ Conservation Council
National Parks, Sport and Racing (DNPSR)	Northern Gulf Resource Management Group
Agriculture and Fisheries (DAF)	Townsville Enterprise
LOCAL GOVERNMENTS	**ABORIGINAL PARTIES**

Stakeholder	
Hinchinbrook Shire Council	Gugu Badhun Aboriginal Corporation
Charters Towers Regional Council	Tatampi Puranga Aboriginal Corporation
Etheridge Shire Council	

Powerlink hosted a stakeholder workshop in Townsville on 21 November 2016. The workshop provided an opportunity for stakeholders to collaboratively explore the study area and provide insight on opportunities, constraints and key issues. Powerlink employed the services of an independent facilitator to guide discussion and record the outcomes of the workshop, which are summarised in Section 13.1. The outcomes of the broader stakeholder engagement process are also described in Section 13.2.

7.2 LANDHOLDER ENGAGEMENT

This CSR is also underpinned by valuable landholder engagement. All landholders potentially directly impacted by the study area were contacted and offered an opportunity to meet with a Powerlink representative at a time and location most convenient to them. Landholder engagement for the project commenced in late November 2016 and continued into late January 2017.

Landholder engagement at the CSR stage aims to engage the community potentially affected by a proposed project as early as possible. Early engagement provides valuable insights into the local area, affords landholders the opportunity to provide input as early as possible and has resulted in a number of refinements to the study area for the proposed Genex Kidston Connection Project (see Section 5.1).

A consultation blackout period of 20 December 2016 to 5 January 2017 was observed in accordance with Section 298 of the *Sustainable Planning Act 2009*, with the exception of one landholder meeting already organised on 21 December 2016. The blackout period is not considered mandatory for major projects but represents general good practice to minimise disturbance to landholders during the Christmas/New Year period.

More than 30 landholders were initially identified as potentially directly impacted by the initial proposed CSR study area (as defined by the process described in Section 5.1); however iterative refinement of the study area later removed a number of properties around Mt Fox.

All potentially impacted landholders in the study corridor took up the opportunity to meet with Powerlink and provide early input into the CSR. The majority of landholders met with Powerlink at face to face meetings and all known property representatives were able to be contacted by some means.

Key features of the landholder engagement process included:

- The majority of landholders in the study area assisted Powerlink by providing input to the CSR
- The scope of consultation was to seek landholders knowledge and input to the operation of their properties and conditions that could constitute constraints, opportunities and other information relating to the proposed Genex Kidston Connection Project
- Speaking with Powerlink and providing input to the CSR does not indicate landholder support for the project
- Powerlink provided landholders with opportunities to provide input through face-to-face meetings, phone conversations and email in an effort to minimise disruption

- Most landholders agreed to face-to-face meetings to receive project information and provide their input to the CSR

- Meetings, email and phone were methods used to provide follow up information to landholders in response to requests for further information or responses to questions.

A summary of landholder feedback is presented in Section 13.7. No personal information has been included in this report due to privacy considerations. An overview of key landholder engagement statistics is provided in Table 2.

As a result of engagement, Powerlink also gained an enhanced understanding of the study area, both through local knowledge and by travelling the area extensively. In response to an improved understanding of the region and landholder input, several refinements were made to the proposed study area. These amendments are described in Section 5.1.

Table 2 – Key Engagement Statistics

Purpose of Engagement Activity	Method of Engagement			Total Number of Engagement Activities
	Face-to-face meeting	Phone contact	Email contact	
Provide project information and obtain landholder input to CSR	14	27	2	43
Follow-up information and follow-up in response to landholder request	0	4	5	9
Make arrangements for future engagement opportunities including meetings	0	27	0	27
Provide advice and obtain landholder input on helicopter flythrough activities	1	8	5	14

8 RELEVANT BACKGROUND

8.1 PREVIOUS PROJECTS

Existing Powerlink infrastructure in the project area includes the 275kV Ross to Chalumbin Transmission Line and Mt Fox Communications Site. Powerlink does not currently have any other new projects in this area.

8.2 CURRENT / ONGOING ACTIONS / STUDIES / PROJECTS

It is understood that Genex is well advanced in its planning and preparation for the development the Kidston site. At time of writing, a number of key activties have occurred or are underway:

- The 50MW Kidston Solar Project (Phase 1) has secured funding, is under construction and will connect to Ergon Energy's existing distribution network
- The 250MW Kidston Pumped Storage Hydro Project is currently the subject of a Bankable Feasibility Study
- The 270MW Kidston Solar Project (Phase 2) is currently the subject of technical feasibility studies.

The proposed 275kV transmission line proposal, to which this report relates, is just one element of Genex's overall scheme. A 275kV connection would be required for the development of the Kidston Pumped Storage Hydro Project, as the existing Ergon Energy lines would not have adequate capacity to enable transmission of generated electricity to the National Electricity Market. The proposed 275kV transmission line will facilitate connection of the Kidston Solar Project (Phase 2) to the National Electricity Market if it proceeds.

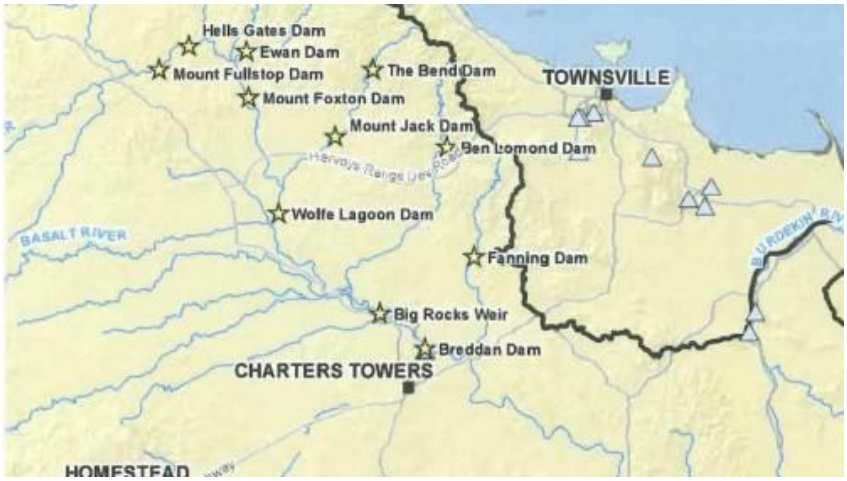
8.3 HELLS GATE AND MT FULLSTOP DAM

Powerlink became aware through the CSR consultation process of a concept plan for a new dam at Hell's Gate, with associated pipeline and treatment infrastructure and management plans. Minimal information regarding the location of the proposed dam is available in the public realm, limited to overview maps that show it as a single point at a regional scale. The maps available also show another potential dam nearby, being Mt Fullstop.

Powerlink understands the concept for the Hells Gate Dam is being investigated by Townsville Enterprise, who has released a tender for a feasibility study which gives a broad indication of the likely location (see Figure 6).

Given the limited information available, it is difficult at this stage to assess the potential for any incompatibilities between the proposals for these dams and the Genex Kidston connection, but further investigations are required to continue monitoring information about the dam's likely size and location.

Figure 6 – Hells Gate Dam Regional Map



9 REGULATORY FRAMEWORK

A range of planning and environmental approvals at the Commonwealth, State and local level will be required to develop the proposed transmission line. Applicable planning and environmental legislation and the approvals likely to be required are discussed in the following sections. The number of applicable legislative instruments is large, but the level of effect of each one varies. An overview of relevant legislation and its likely level of influence is provided in Table 3.

This CSR does not discuss or consider other regulatory approvals which may be required that are not associated with planning or environmental matters, for example investment approvals which may be required under the *Building Queensland Act 2015* or any relevant requirements under the National Electricity Rules.

Regulatory approval obligations vary depending on project value, the proponent and many other factors and will be discussed directly with Genex. Regulatory approvals not associated with planning or environmental matters do not differentiate corridor options and are not discussed further in this CSR.

Table 3 – Approvals Overview

Commonwealth	State	Local
Native Title Act	**Sustainable Planning Act 2009/ Planning Act 2016**	Etheridge Shire Council
Environment Protection & Biodiversity Conservation Act 1999	**State Development & Public Works Organisation act 1971**	Charter Towers Regional Council
	Electricity Act 1994	Hinchinbrook Shire Council
	Electrical Safety Act 2002	**Local Laws**
	Nature Conservation Act 1992	
	Forestry Act 1959	
	Environmental Protection Act 1994	
	Environmental Protection Regulation 2008	
	Environmental Protection (Water) Policy 2009	
	Environmental Protection (Air) Policy 2008	
	Environmental Protection (Noise) Policy 2008	
	Aboriginal Cultural Heritage Act 2003	
	Vegetation Management Act 1999	
	Water Act 2000	
	Land Act 1994	
	Acquisition of Land Act 1967	

	Biosecurity Act 2014	
	Stock Route Network Management Bill 2016	
	Transport Infrastructure Act 1994	
	Fisheries Act 1994	
	Regional Planning Interests Act 2014	
	Regional Plan	
	State Planning Policy	
	Infrastructure Plan 2016	
	State Development Assessment Provisions	

	An approval under the Act is required/ likely to be required
	A process must be undertaken in accordance with, and to demonstrate compliance with the provisions of the Act
	Approval is possibly required (dependant on parameters that are currently unknown/ undecided)

9.1 COMMONWEALTH

9.1.1 *ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC 1999) regulates actions that have potential to impact on Matters of National Environmental Significance (MNES). MNES may include fauna and flora species, specific vegetative communities/ assemblages or geographic features. Triggers for assessment under the EPBC 1999 have the potential to occur within each of the two identified study corridor options within this CSR.

Where MNES may be impacted, a proponent refers the project to the Commonwealth Department of Environment & Energy (DoEE) for assessment of potential impacts. DoEE will make a declaration that the project is either:

- Not a controlled action – meaning that DoEE has no requirement to assess the project further
- Not a controlled action 'particular manner' – meaning that DoEE has no requirement to assess the project further providing that the action is untaken in accordance with conditions that DoEE will supply with the decision
- Controlled action – meaning that DoEE wish to assess the project against the EPBC Act. There are several mechanisms available for that assessment dependent on the type of project.

Powerlink has procured third party ecological advice to better understand potential impacts to MNES. The assessment is described in detail in Section 11. A significance assessment will need to be undertaken in subsequent project phases to further refine risks around MNES and to inform a decision around referring the project to DoEE.

9.1.1.1REFERRAL

Powerlink has significant experience and relationships in managing the EPBC referral process and designing solutions to minimise potential impacts to MNES. Powerlink projects have generally not been declared controlled actions due to our ability to optimise infrastructure siting to minimise terrestrial impacts.

Based on Powerlink's experience, it is recommended that referral of the project to the DoEE for further approvals in relation to the EPBC Act should occur early in subsequent stages of the project (e.g. Draft EIS phase).

This approach is recommended as field surveys will be necessary to provide adequate detail for DoEE assessment managers to develop sufficient understanding of any potential issues and, if necessary, develop and apply risk-appropriate controls.

Whilst every reasonable effort has been undertaken to assess potential impacts to MNES flora and fauna at the desktop level for this CSR, the broad scale nature of mapping over the largely undeveloped project area means field surveys will be important in future stages of the project to confirm any potential impacts and allow appropriate mitigation methods to be developed.

Preliminary scheduling by Powerlink indicates that sufficient time is available in Genex's schedule to refer the project and receive a decision under the EPBC Act, even if the project is declared a Controlled Action.

Importantly, field surveys and a better understanding of the presence of threatened habitats and species, may also support an application for a lower level of assessment, such as a declaration of Not a Controlled Action - Particular Manner.

The optimal approach for the project is therefore to undertake field surveys prior to referring the project to DoEE, ensuring that potential impacts to MNES flora and fauna are understood and a proposal for an appropriate level of assessment under the EPBC Act can be formulated.

9.1.2 *NATIVE TITLE ACT 1993*

Native title recognises the traditional rights and interests to land and waters of Aboriginal and Torres Strait Islander people. Native title can be extinguished or suppressed by certain acts under the *Native Title Act 1993*.

Where Native Title has not previously been extinguished or suppressed, Powerlink typically undertakes a process under Section 24ka of the *Native Title Act 1993* before construction commences. Section 24ka suppresses the Native Title interest in the subject land for the lifetime of the infrastructure to be established and over the extent of the property interest established (easement).

The 24ka process forms part of the wider land/easement acquisition process and involves notification to applicable registered Native Title holders, claimants or suitable alternate parties. The timeframes involved in the process are generally managed within the broader approvals and acquisition schedule.

Notified parties are afforded objection and/ or a claim for compensation rights under the process. A similar process will be undertaken for the substation at Mt Fox, though native title would likely be extinguished over the site which requires exclusive possession rather than an easement.

Powerlink has well-established processes for, and significant experience in the management of Native Title in transmission line development and has established initial contact with the relevant Aboriginal Parties during the development of this CSR. The processes of other parties or organisations are not discussed in this CSR.

9.2 STATE

9.2.1 *SUSTAINABLE PLANNING ACT 2009*

The *Sustainable Planning Act 2009* (SPA 2009) coordinates the planning and development system in Queensland. It manages the processes by which most development takes place, the effects of development on the environment, and the coordination of planning and development across local and State Governments.

The SPA 2009 provides the approval process typically used by Powerlink for its transmission lines via the Community Infrastructure Designation (CID) process. It also provides the framework for a range of permits and approvals that may be required in addition to CID for certain activities, and where exemptions do not apply. It is noted that the SPA 2009 is due to be replaced by a new Act in mid-2017, which is discussed in Section 9.2.2.

9.2.1.1COMMUNITY INFRASTRUCTURE DESIGNATION (CID)

CID under the SPA 2009 is the typical overarching project approval pathway used successfully by Powerlink for many years. This process is best suited to transmission projects for a number of reasons.

CID is quite flexible in terms of scheduling, owing principally to the fact that the SPA 2009 does not prescribe timeframes for most parts of the process and that process control is largely with the proponent. Most other processes in contrast are led by an assessment manager who controls the administration of the process in accordance with legislated timeframes.

CID offers a high degree of scalability and also offers some unique benefits, including but not limited to:

- No other approval under the relevant Planning Schemes is required
- If development under a designation is carried out by a public sector entity there are no infrastructure charges applicable
- Exemption from permits under the *Vegetation Management Act 1999* for clearing on designated land
- Exemption from some offset requirements by virtue of existing permit exemptions which Powerlink has negotiated over time through consistent demonstration of best practice
- Approval is secured in perpetuity when easements are acquired
- Typically carries few or no conditions.

9.2.1.2INTEGRATED DEVELOPMENT ASSESSMENT SYSTEM (IDAS)

IDAS is the process by which most development in Queensland is approved. Local governments publish Planning Schemes that contain most of the provisions for assessment under the IDAS process. For a project of this nature extending over three local government areas, the CID process is favoured over the IDAS process as it ensures a single, consistent and overarching project approval is achieved.

IDAS permit requirements may still apply for specific aspects of development and would be additional to the CID process. IDAS requirements arise from specific triggers in the SPA 2009, and not from exclusions in the major approvals process. For clarity, the IDAS permits would not be triggered by the relevant Planning Schemes, but by the SPA 2009 directly.

It is not feasible at this stage to define specific IDAS development permit requirements. The exact requirement for permits will depend on the constraints revealed during subsequent investigations and the construction solutions available for specific localities.

It is noted that multiple permits (where required) are typically sought under a single IDAS application. It is also important to note that these development permits are likely to be code assessable only, meaning that they do not require public consultation. Due to the low number of possible IDAS permit triggers and the likelihood that they will be code assessable only there is negligible risk to the projects schedule.

It is also noted that the emerging Planning Act 2016 (Section 9.2.2) will alter the requirement for IDAS permits where designation has been achieved. It is likely that the requirement for some IDAS permits will be removed entirely because the designated project will be made accepted development, exempt from all other permits rather than the planning scheme.

Powerlink has significant previous experience in the IDAS permit process and working closely with local councils.

9.2.2 *PLANNING ACT 2016*

The SPA 2009 is currently under review and as at February 2017, three new Acts have been passed:

- *Planning Act 2016*
- *Planning and Environmental Court Act 2016*
- *Planning (Consequential) and Other Legislation Amendment Act 2016.*

A range of supporting instruments are currently open for consultation and the new Acts and supporting instruments are expected to come into force in mid-2017. The SPA 2009 will cease on the commencement of the new Acts.

Powerlink has been actively involved in consultation activities relating to the new Acts and supporting instruments and has provided detailed submissions to each stage of the consultation process to ensure it can continue to provide services which facilitate the efficient development of the electricity transmission network.

Certain procedural changes will occur in the CID process when the new Act comes into effect. These changes are however mostly administrative in nature and do not materially affect the broader assumptions behind the CID.

9.2.3 *STATE DEVELOPMENT AND PUBLIC WORKS ORGANISATION ACT 1971*

The *State Development and Public Works Organisation Act 1971* (SDPWOA) provides for State planning and development through a coordinated system of public works organisation, for environmental coordination, and for related purposes.

The SDPWOA provides an alternative approvals pathway for the transmission line project. Powerlink continues to work with Genex and the Office of the Coordinator-General to identify best-for-project approvals solutions.

9.2.4 *ELECTRICITY ACT 1994*

The *Electricity Act 1994* sets out the requirements which all electricity industry participants must follow to ensure a safe, efficient and reliable supply of electricity. It also requires that the supply of electricity is undertaken in an environmentally sound manner. Under Section 31(b) of the *Electricity Act 1994*, a transmission entity is required to properly take into account the environmental effects of its activities under the transmission authority.

The *Electricity Act 1994* and subordinate regulation specifies requirements for construction and operation of the electricity network (which includes substations). The *Electricity Act 1994* also identifies the types of activities associated with the construction and operation of a substation site that are exempt from approval.

Section 112A of the *Electricity Act 1994* makes clearing of native vegetation on freehold land exempt development if the clearing is for operating works for a transmission entity on land designated for the operating works by a Minister under the SPA 2009.

The provisions of the *Electricity Act 1994* apply to each corridor option in the same manner and therefore do not serve to differentiate corridor options in this report.

9.2.5 ELECTRICAL SAFETY ACT 2002

The *Electrical Safety Act 2002* seeks to prevent through regulation, the death, injury and destruction that can be caused by electricity. Accordingly, the purpose of this Act is to establish a legislative framework for:

- Preventing persons from being killed or injured by electricity; and
- Preventing property from being destroyed or damaged by electricity.

Any future design for the proposed transmission line and substations must satisfy the requirements of the *Electrical Safety Act 2002*. The provisions of the *Electrical Safety Act 2002* apply to each corridor option in the same manner and therefore do not serve to differentiate corridor options in this report.

9.2.6 NATURE CONSERVATION ACT 1992

Much of Queensland's native wildlife is protected by legislation to ensure its survival and to protect biodiversity. All native birds, reptiles, mammals and amphibians are protected in Queensland under the *Nature Conservation Act 1992* (NCA), along with a limited range of invertebrates, freshwater fish and the grey nurse shark. All plants that are indigenous to Australia are protected.

A permit is required to clear near threatened, vulnerable or endangered (commonly known as EVNT) protected plants and their supporting habitat. This permit is separate to the CID and IDAS processes. It cannot be definitively known if EVNT flora will be impacted until field studies are complete. If EVNT flora are identified in the area impacted by the alignment, a separate approval to CID and IDAS will be required from the Department of Environment and Heritage Protection.

Due to the preliminary nature of this report, the provisions of the NCA do not serve to differentiate corridor options. Powerlink has existing relationships with DEHP and significant experience managing impacts to flora and fauna regulated by the NCA.

9.2.7 FORESTRY ACT 1959

The *Forestry Act 1959* regulates the use of forest products such as timber on all State land including State forests, leasehold land and unallocated State land. It is unlikely that any State forest areas will be impacted by the project, with all State forest areas located to the east of Mt Fox. The *Forestry Act 1959* is therefore not discussed further.

9.2.8 ENVIRONMENTAL PROTECTION ACT 1994

The *Environmental Protection Act 1994* (EP Act) provides the key legislative framework for environmental management and protection in Queensland. The EP Act utilises a number of mechanisms to achieve its objectives.

Section 319 places a general environmental duty on an organisation undertaking an activity not to cause, or be likely to cause, environmental harm unless all reasonable and practicable measures to prevent or minimise the harm are taken.

By undertaking this study and subsequent environmental impact assessment studies, and through the development and implementation of environmental management plans, the duty of care will be demonstrated. A general environmental duty of care will be applied to the project irrespective of the preferred corridor and the EP Act therefore does not serve to differentiate corridor options.

9.2.9 ENVIRONMENTAL PROTECTION REGULATION 2008

The *Environmental Protection Regulation 2008* outlines Environmentally Relevant Activities (ERAs) that have potential to release contaminants to the environment or cause environmental harm. ERAs are assessable development under the SPA 2009 and require a permit (generally under the IDAS framework) before proceeding.

Transmission line development typically does not constitute an ERA. If an ERA is revealed during subsequent assessments a permit will be sought for the activity as part of the IDAS process. No ERA is expected to occur on any of the available corridor options and the *Environmental Protection Regulation 2008* therefore does not serve to differentiate corridor options.

9.2.9.1ENVIRONMENTAL PROTECTION (WATER) POLICY 2009

This policy describes and seeks to protect the ecological and social values of waterways across the State. The policy will be regarded during subsequent assessments and appropriate design solutions and management measures adopted to ensure compliance with the policy. The policy does not serve to differentiate corridor options based on the current level of assessment.

9.2.9.2ENVIRONMENTAL PROTECTION (AIR) POLICY 2008

This policy describes and seeks to protect air quality values across the State. It outlines specific thresholds for contaminant release that are particularly relevant for construction phase activities associated with a transmission line.

The policy will be taken into consideration during subsequent assessments when appropriate design solutions and management measures can be identified and adopted to ensure compliance with the policy. The policy does not serve to differentiate corridor options based on the current level of assessment.

9.2.9.3ENVIRONMENTAL PROTECTION (NOISE) POLICY 2008

This policy describes outcomes for the acoustic environment across the State. It outlines specific thresholds for noise that are particularly relevant for construction phase activities associated with a transmission line.

The policy will be regarded during subsequent assessments when appropriate design solutions and management measures can be identified and adopted to ensure compliance with the policy. The policy does not serve to differentiate corridor options based on the current level of assessment.

9.2.10 ABORIGINAL CULTURAL HERITAGE ACT 2003

The *Aboriginal Cultural Heritage Act 2003* provides for the recognition, protection and conservation of Aboriginal cultural heritage, including the establishment of a register and database of Aboriginal cultural heritage, and processes for the management of activities that may harm Aboriginal cultural heritage. The Queensland Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP) is responsible for administering the *Aboriginal Cultural Heritage Act 2003*.

A search of the Cultural Heritage Register for Aboriginal cultural heritage identified numerous records of indigenous cultural heritage significance located within the study area. Specific Aboriginal parties relevant to the respective corridor are identified within Section 10.2 of this report.

Powerlink is responsible for carrying out activities in accordance with the Duty of Care under the *Aboriginal Cultural Heritage Act 2003* by taking all reasonable and practicable measures to ensure its activities do not harm Aboriginal cultural heritage.

Powerlink has established processes and frameworks for, and significant experience in the management of cultural heritage in transmission line development. The processes of other parties or organisations are not discussed in this CSR.

9.2.11 *VEGETATION MANAGEMENT ACT 1999*

The *Vegetation Management Act 1999* (VM Act) is the principle legislation governing the management of native vegetation in Queensland (except for non-woody vegetation governed by the *Nature Conservation Act* 1992).

The VM Act is administered by Department of Environment and Heritage Protection (DEHP) and rests on the Regional Ecosystem (RE) mapping created by the Queensland Herbarium. Remnant vegetation is used as the trigger under the VM Act for determining when clearing of native vegetation is considered assessable development and requires a permit.

Exemptions from the need to obtain a permit to clear native vegetation are afforded where clearing is on land designated for community infrastructure. Clearing of native vegetation on land other than that designated for community infrastructure is likely to require a development permit.

Powerlink also is afforded some exemptions for clearing vegetation under provisions contained within the *Electricity Act 1994.*These exemptions may not apply to other development or constructing organisations.

9.2.12 *WATER ACT 2000*

The purpose of the *Water Act 2000* is to provide for the sustainable management of water and other resources. Under section 266 of the *Water Act 2000*, a riverine protection permit is required to:

- Destroy vegetation in a watercourse, lake or spring;
- Excavate in a watercourse, lake or spring; or
- Place fill in a watercourse, lake or spring.

The State publishes a range of self-assessable codes that exempt certain activities from the need for a permit. It is not feasible at this level of assessment to determine whether a permit is, or is not required for any specific aspect of the project. The detailed requirement for a permit under the Water Act 2000 will be determined in more detailed assessment and permits gained as required. The Water Act 2000 does not serve to differentiate corridor options based on the current level of assessment.

9.2.13 *LAND ACT 1994*

The *Land Act 1994* provides a framework for the allocation of State land as leasehold, freehold or other tenure and its subsequent management. Unallocated State land can also be purchased under the *Land Act 1994* where applications for such are approved by the DEHP.

Sections 101 and 102 of the *Electricity Act 1994* provide exemptions to the *Land Act 1994* allowing electricity entities such as Powerlink to undertake necessary actions on road reserves and publicly controlled places

such as Unallocated State land. The *Land Act 1994* does not serve to differentiate corridor options based on the current level of assessment.

9.2.14 *ACQUISITION OF LAND ACT 1967*

The Acquisition of *Land Act 1967* enables Powerlink to acquire freehold land or an easement over land for electricity works. Powerlink may acquire land:

- By agreement – if an agreement can be reached on compensation to be paid, land or an easement can be acquired as soon as the necessary transfer documents have been executed, or
- Compulsorily – resumptions are made subject to the provisions of the *Acquisition of Land Act 1967*.

Powerlink's first preference is to negotiate acquisitions wherever possible and will make all reasonable attempts to reach voluntary agreement for easements and other tenure requirements. Depending on the individual circumstances, and in order to ensure the timely delivery of projects, Powerlink may also begin compulsory resumption processes in parallel.

Powerlink has significant experience and established processes for the acquisition of land and easements by both negotiation and compulsory means and seeks to provide fair and reasonable support for landholders impacted by these processes, including access to independent expert advice relating to their compensation claim as early in the process as possible (i.e. on release of Draft EIS when there is greater certainty about the location of new infrastructure).

The land acquisition processes of other parties and organisations are not described by this report.

Land tenure across the project is principally leasehold and freehold. Due to the large nature of the land holdings traversed by the various corridor options there is insufficient variation in potential requirements under the *Acquisition of Land Act 1967* to differentiate corridor options.

9.2.15 *BIOSECURITY ACT 2014*

The Biosecurity Act 2014 commenced on 1 July 2016. It ensures a consistent, modern, and risk-based approach to biosecurity in Queensland. The Act provides comprehensive biosecurity measures to safeguard the economy, agricultural and tourism industries, environment and way of life, from:

- Pests (e.g. Wild dogs and weeds)
- Diseases (e.g. Foot-and-mouth disease)
- Contaminants (e.g. lead on grazing land).

The Act replaced the many separate pieces of legislation that were previously used to manage biosecurity. Powerlink's internal policies and procedures are being aligned with the provision of the new Act and subsequent impact assessment phases will consider the requirements of the Act in greater detail. The provisions of the Act do not serve to differentiate study corridor options.

9.2.16 *STOCK ROUTE NETWORK MANAGEMENT BILL 2016*

The *Stock Route Network Management Bill 2016* was introduced to Parliament in November 2016, proposing a single, contemporary Act to better support the long term management of Queensland's stock

route network. Several declared stock routes may be traversed with the study area, depending on the final corridor selected. All of the declared stock routes within the study area are likely to be road reserves.

The Act requires all reasonable steps to be taken to minimise impacts to the resources of the stock route network as described in local government stock route network management plans. A stock route management plan has been identified for Charters Towers Regional Council. Powerlink engaged with both Charters Towers Regional Council and Etheridge Shire Council regarding potential impact to stock routes in the stakeholder engagement workshop on November 21, 2016. The ability for transmission lines to span stock routes was generally agreeable to all parties and will serve as the basis for more detailed impact assessments in subsequent project stages. Where stock routes are of a width that cannot be spanned, careful structure placement will be important to avoid impacting the utility of the stock route.

9.2.17 *TRANSPORT INFRASTRUCTURE ACT 1994*

During construction, temporary road closures and temporary accesses (relating to State controlled roads) may be required to permit activities such as delivery of construction materials on long and/or wide haulage vehicles. State controlled roads within the study area include the Gregory Developmental Road and Kennedy Developmental Road.

The primary permit generally required under the Act is a road corridor permit, granted by the Queensland Department of Transport and Main Roads. The nature of all permits and licenses will be confirmed with the Department during subsequent detailed impact assessment and consultation processes. Because interactions with State roads are largely administrative in nature (with limited or no terrestrial impacts) the *Transport Infrastructure Act* does not aid in the differentiation of corridor options in this report.

9.2.18 *FISHERIES ACT 1994*

The *Fisheries Act 1994* provides a framework, in conjunction with the SPA 2009, for the regulation of fisheries, declared fish habitat areas and marine plants. A review of the State declared fish habitat area plans did not identify any declared fish habitat areas within the study area. The inland location of the study area means that it is very unlikely that any aquaculture sites or marine plants will be impacted by the project.

Requirements of the *Fisheries Act 1994* may apply to the project during the construction phase, as works or disturbances may be required within watercourses traversed by the transmission line easement, such as waterway barriers and crossings. These matters will be identified and discussed with key regulatory stakeholders in subsequent environmental impact assessment studies. At the current level of assessment, the *Fisheries Act 1994* does not serve to differentiate corridor options.

9.2.19 *REGIONAL PLANNING INTERESTS ACT 2014*

The *Regional Planning Interests Act 2014* identifies and protects areas of Queensland that are of regional interest. In doing this, the Act seeks to manage the impact and support co-existence of resource activities and other regulated activities in areas of regional interest. The Act includes Strategic Cropping Land.

The proposed transmission line does not qualify as either a resource activity or regulated activity under the Act. The provisions of the Act therefore do not apply.

9.2.20 REGIONAL PLAN

The Etheridge Shire area is part of the Gulf Regional Development Plan (GRDP). The GRDP focuses on management of growth and development in the region. It is noted that whilst in place since 2000, the GRDP is not a statutory regional plan.

Notwithstanding, the Genex Kidston Connection Project is likely to be considered consistent with the GRDP, supporting the growth of sustainable industries in the region. Comprehensive impact assessment and consultation during future assessment processes will ensure an alignment that best balances social, environmental and economic considerations is selected, upholding the balanced development outcomes sought by the GRDP.

Compliance with the specific strategies in the GRDP should be investigated during future assessment processes. It is not feasible however to undertake this level of assessment for the purposes of this document, where site specific impacts and the alignment are not known. Due to the broad nature of the Regional Plan it is unlikely that any provisions will differentiate corridor options.

The Hinchinbrook Shire Council and Charters Towers Regional Council areas are presently not subject to a regional plan, however feedback received from the Department of Infrastructure, Local Government and Planning has indicated that both LGAs are proposed for inclusion within a proposed North Queensland Regional Plan, which is being prepared and scheduled for consultation in mid-2017.

9.2.21 STATE PLANNING POLICY

The State Planning Policy (SPP), which commenced on 1 July 2014, contains 16 State interests that are important to protect and enhance through Queensland's continued development. It is a key component of the State's land use planning system that enables responsible development, contributing to a liveable, sustainable and prosperous Queensland.

Energy supply is a State interest in the SPP, supporting economic development across Queensland. The Genex Kidston Connection Project will meet community expectations for the supply of energy infrastructure and the promotion of renewable energy projects. Compliance with the other State interests in the SPP, such as biodiversity, planning for hazards, protection of agriculture and others will be assessed during future assessment processes.

It is noted that the SPP is currently in a consultation phase as part of the reform process for the *Planning Act 2016*. Powerlink is actively engaged in the consultation process and , seeking to ensure any proposed amendments do not compromise its ability to develop the transmission network in a safe and efficient manner to support renewable energy projects. The provisions of the SPP do not serve to differentiate corridor options.

9.2.22 INFRASTRUCTURE PLAN 2016

The State Infrastructure Plan (SIP), released on 13 March 2016, outlines a new strategic direction for the planning, investment and delivery of infrastructure in Queensland. The SIP identifies what the State Government ultimately seeks from its infrastructure and how this can best be achieved. Importantly, it is designed to provide confidence and certainty to business, industry and the community by confirming the government's investment program over the next four years.

The SIP recognises the importance of energy supply to the ongoing development of the State and places significant focus on the development of renewables and diversification of the energy sector. The project will

support this focus. Compliance with the other infrastructure classes in the plan will be assessed during future assessment processes, though it is unlikely to differentiate corridor options.

9.2.23 STATE DEVELOPMENT ASSESSMENT PROVISIONS

The State Development Assessment Provisions (SDAP) set out the matters of interest to the State for development assessment, where the Chief Executive administering the SPA 2009 is responsible for assessing or deciding development applications. They are statutory in nature but are not used by local government.

The SDAP is prescribed in the *Sustainable Planning Regulation 2009*, and contains the matters the Chief Executive administering SPA 2009 (the chief executive) may have regard to when assessing a development application as either an assessment manager or a referral agency.

The SDAP is divided into modules. Given the inland nature of the project area it is likely that many of the modules will not be relevant. Compliance with those modules that are relevant will depend greatly on the specific alignment and construction solutions identified for the project. These matters will be assessed during future assessment processes and do not differentiate corridor options at the current level of assessment.

It is noted that the SDAP is currently in a consultation phase as part of the reform process for the *Planning Act 2016*. Powerlink is actively engaged in the consultation process and seeking to ensure any proposed amendments do not compromise its ability to develop the transmission network in a safe and efficient manner to support renewable energy projects. The SDAP do not serve to differentiate corridor options.

9.3 LOCAL

9.3.1 PLANNING SCHEMES

9.3.1.1 HINCHINBROOK SHIRE COUNCIL

The Hinchinbrook Shire Planning Scheme took effect in 2005 and remains in force. The Planning Scheme does not list a transmission line as a defined use, with no defined use for infrastructure of any scale provided. The default level of assessment for any use that is not defined by the scheme is impact assessment. No overlays are noted other than bushfire mapping, which is ubiquitous across the shire. The likely overarching project approval framework would provide exemptions to the project from specific approvals under the respective local government planning schemes. However, compatibility with planning scheme intent would be assessed through any future Environmental Impact Statement and ongoing consultation with the Council.

The underlying zoning for the area impacted by the project is rural. The rural zone code contains a range of provisions for development in the rural zone, including probable solutions for intended uses in the zone. It is likely the project will need to demonstrate alternative solutions for many of these criteria because the code was not written with major linear infrastructure or substations in mind.

A full assessment against local codes is not feasible at the current level of assessment, with site specific impacts and alignments unknown. The broad mapping that underpins the Planning Scheme does not assist in differentiation of corridor options.

Powerlink engaged directly with Hinchinbrook Council during late 2016 and early 2017 with consultation at this early stage not identifying any major issues of concern. Powerlink will continue to work closely with Council to address planning scheme requirements and other matters should it be engaged to progress the

Genex transmission line connection project further. Feedback from the consultation undertaken to date is provided in Section 13.

9.3.1.2 CHARTERS TOWERS REGIONAL COUNCIL

The Dalrymple Shire Council Planning Scheme took effect in 2005 and remains in force in the project area. Dalrymple Shire was amalgamated with the City of Charters Towers in 2008 to form Charters Towers Regional Council.

The Planning Scheme defines the project as a Major Utility and the underlying zoning in the project area is rural. The level of assessment for a Major Utility in the rural zone is impact assessment. No overlays are noted other than nearby resource tenures. The likely overarching project approval framework would provide exemptions to the Genex Kidston Connection Project from specific approvals under the respective local government planning schemes. However, compatibility with planning scheme intent would be assessed through any future Environmental Impact Statement and ongoing feedback sought from Council.

The rural zone code contains a range of provisions for development in the rural zone, including acceptable solutions for intended uses in the zone. It is likely that the project will need to demonstrate alternative solutions for many of these criteria because the code was not written with major linear infrastructure or substations in mind.

A full assessment against local codes is not feasible at the current level of assessment, with site specific impacts and alignments unknown. The broad mapping that underpins the Planning Scheme does not assist in differentiation of corridor options.

Powerlink engaged directly with Charters Towers Regional Council during late 2016 and early 2017, with consultation at this early stage not identifying any major issues of concern. Powerlink will continue to work closely with Council to address planning scheme requirements and other matters should it be engaged to progress the Genex transmission line connection project further. Feedback from the consultation undertaken to date is provided in Section 13.

9.3.1.3 ETHERIDGE SHIRE

The Shire of Etheridge Planning Scheme took effect in 2005 and remains in force. The Planning Scheme defines a transmission line as Community Infrastructure. The level of assessment for Community Infrastructure in the rural zone is code assessment. Bushfire and Good Quality Agricultural Land overlays are noted, which trigger code assessment or lower under the scheme provisions. The likely overarching project approval framework would provide exemptions to the project from specific approvals under the respective local government planning schemes. However, compatibility with planning scheme intent would be assessed through any future Environmental Impact Statement and ongoing feedback sought from Council.

The rural zone code and overlay codes contain a range of provisions for development, including probable solutions for intended uses. It is likely the project will need to demonstrate alternative solutions for many of these criteria because the codes were not written with major linear infrastructure or substations in mind.

A full assessment against local codes is not feasible at the current level of assessment, with site specific impacts and alignments unknown. The broad mapping that underpins the Planning Scheme does not assist in differentiation of corridor options.

Powerlink engaged directly with Etheridge Shire Council during late 2016 and early 2017, with consultation at this early stage not identifying any major issues of concern. Powerlink will continue to work closely with Council to address planning scheme requirements and other matters should it be engaged to progress the

Genex transmission line connection project further. Feedback from the consultation undertaken to date is provided in Section 13.

9.3.2 LOCAL LAWS

Queensland local governments have adopted a diverse range of local laws, administered through the *Local Government Act 2009,* to assist them to effectively govern their respective areas. While the project is potentially subject to a range of State and Commonwealth legislative and regulatory exemptions, it is not exempt from local laws and a range of permits may be required.

Local laws likely to apply to the project include:

- Etheridge Shire Council Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2011
- Etheridge Shire Council Local Law No. 3 (Community and Environmental Management) 2011
- Charters Towers Regional Council Local Law No. 3 (Community and Environmental Management) 2011
- Charters Towers Regional Council Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2011
- Charters Towers Regional Council Local Law No. 7 (Aerodromes) 2011
- Charters Towers Regional Council Local Law No. 24 (Grids)
- Charters Towers Regional Council Local Law No. 5 (Parking) 2011
  Hinchinbrook Shire Council Local Law No. 3 (Community and Environmental Management) 2012
- Hinchinbrook Shire Council Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2012
- Hinchinbrook Shire Council Local Law No. 5 (Parking) 2012
- Hinchinbrook Shire Council Local Law No. 7 (Aerodromes) 2012.

Local laws will be included in subsequent detailed impact assessments, where site specific impacts are known and the requirement for local law permits can be more thoroughly assessed.

PROPOSED GENEX KIDSTON CONNECTION PROJECT

Corridor Selection Report

PREPARED BY

QUEENSLAND ELECTRICITY TRANSMISSION CORPORATION LIMITED

(ACN 078 849 233) trading as “POWERLINK”

10 CONSTRAINTS AND OPPORTUNITIES

10.1 EXISTING TENURE & LAND USE

10.1.1 TENURE

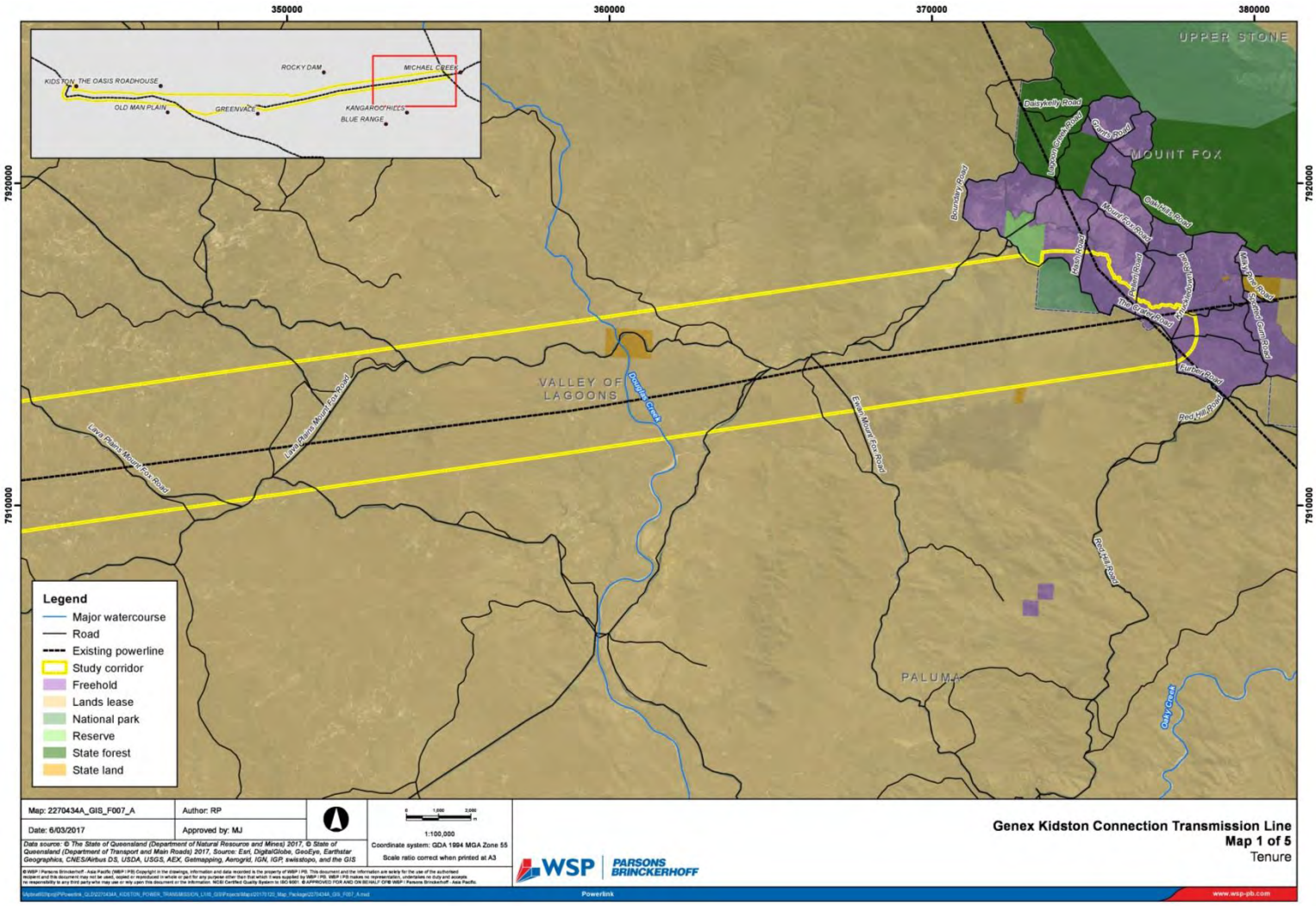
Land tenure in the project area is principally leasehold. This land is held by the State of Queensland and leased for specific purposes (grazing, agriculture, telecommunications etc.) for a specified period. These leases are generally for a long period, registered on title and, in many cases, offer the lessee exclusive rights over the land. There are also scattered freehold lots throughout the project area.

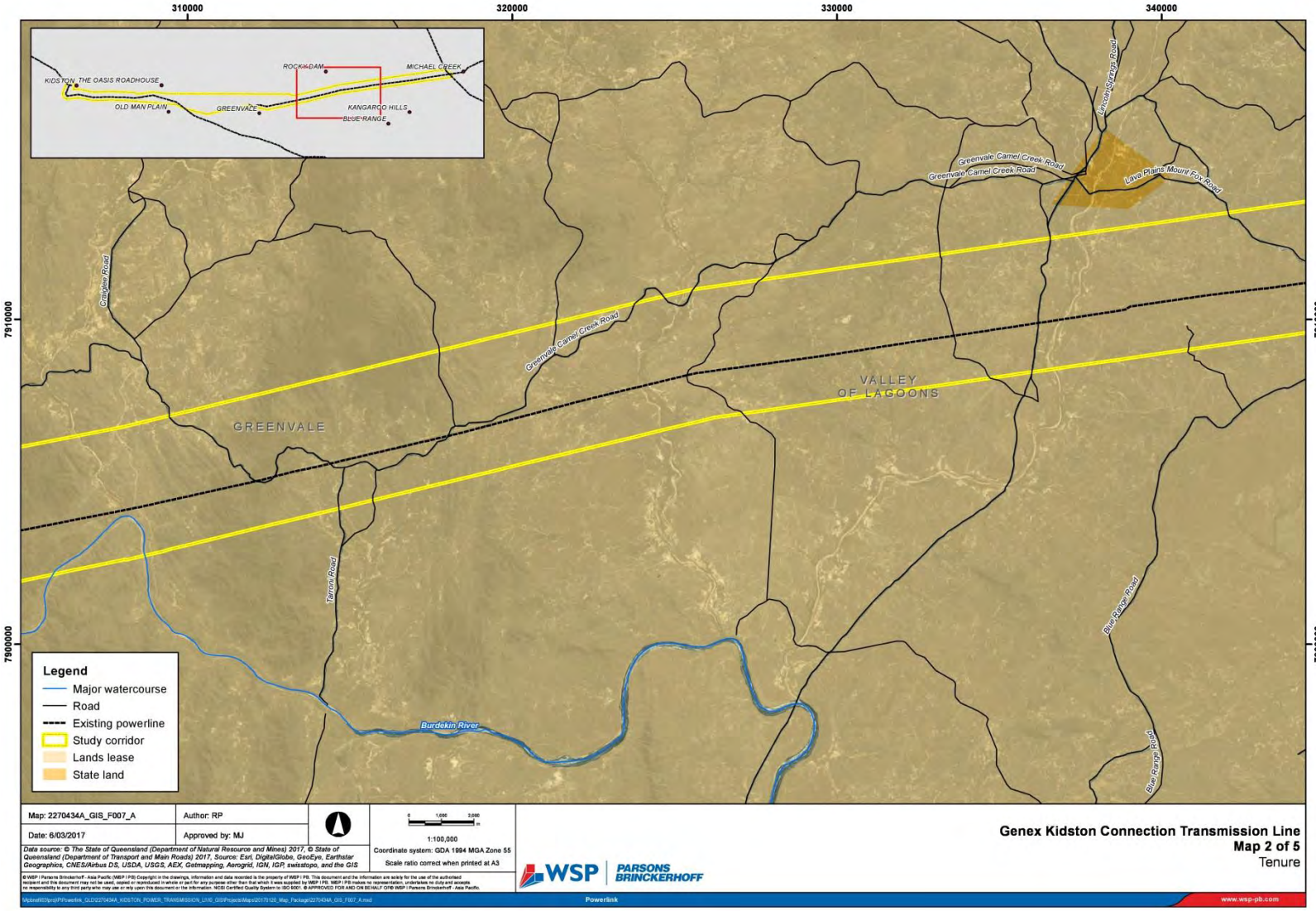
Land use is rural in nature, predominately grazing, though specific management practices are not known at the current level of assessment. More details will be discovered through future field reconnaissance and engagement with authorities and landholders in the region. The Planning Schemes note the land as rural in nature and no intent to depart from rural uses is evident.

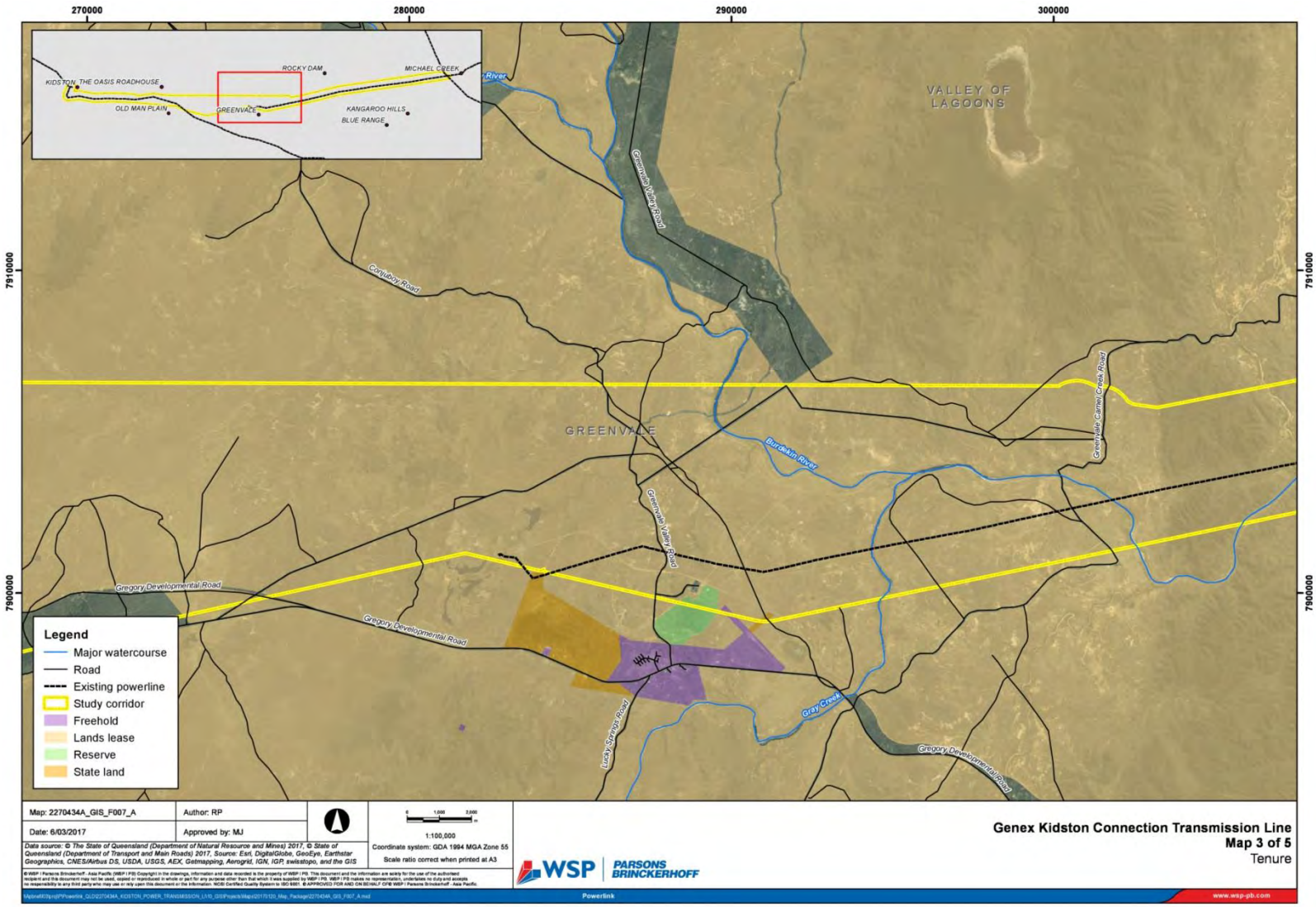
The project is not likely to impact heavily on existing tenure and land uses, which occur over broad areas and appear to be generally of low intensity. Potential conflicts with existing land use and tenure will be discovered through engagement with relevant authorities, with feedback utilised to refine corridor options. It is not possible to differentiate corridor options based on land management practices at the current level of assessment.

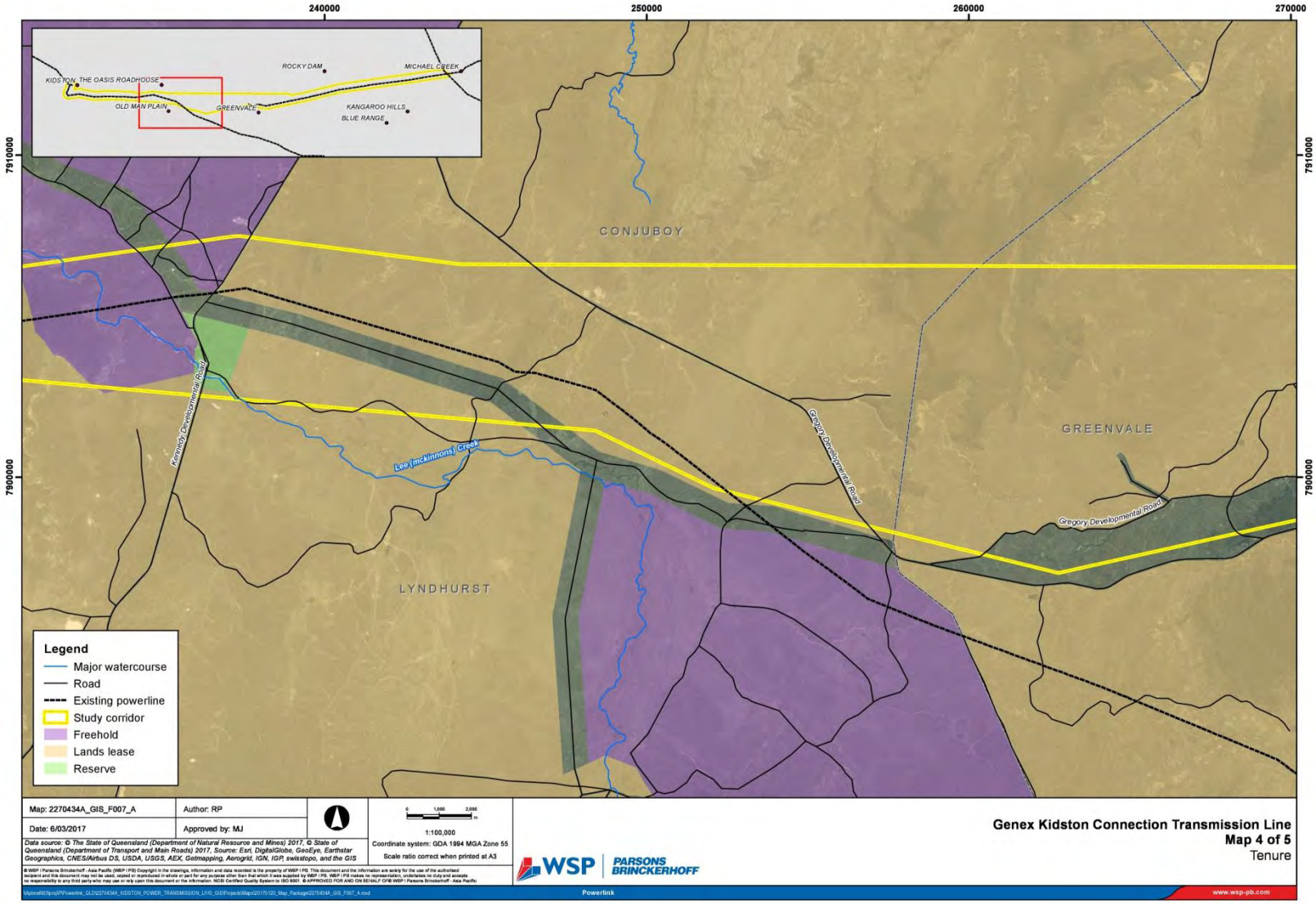
Maps depicting tenure and pastoral holdings are provided in Figure 7 and Figure 8.

Figure 7 – Tenure









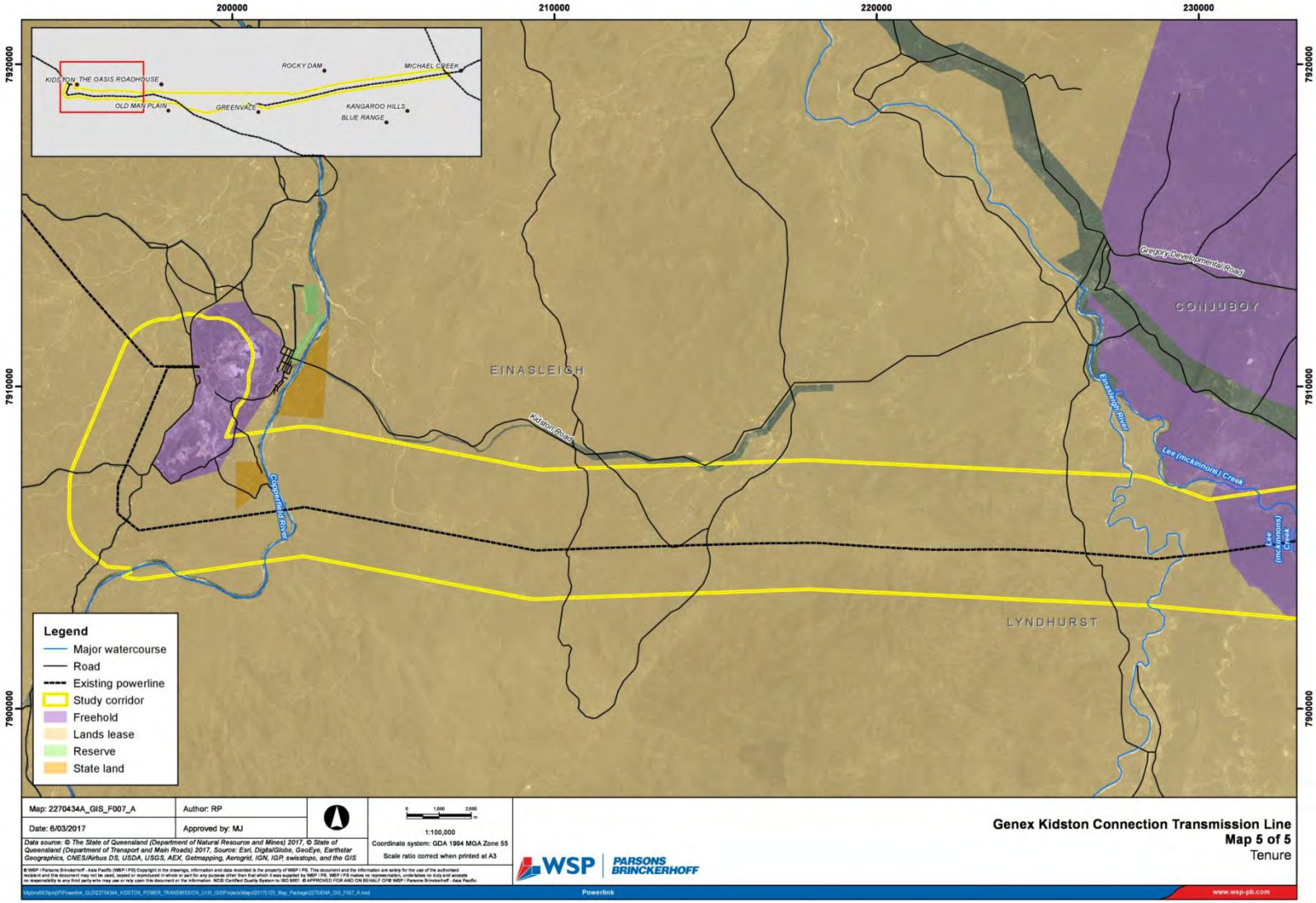
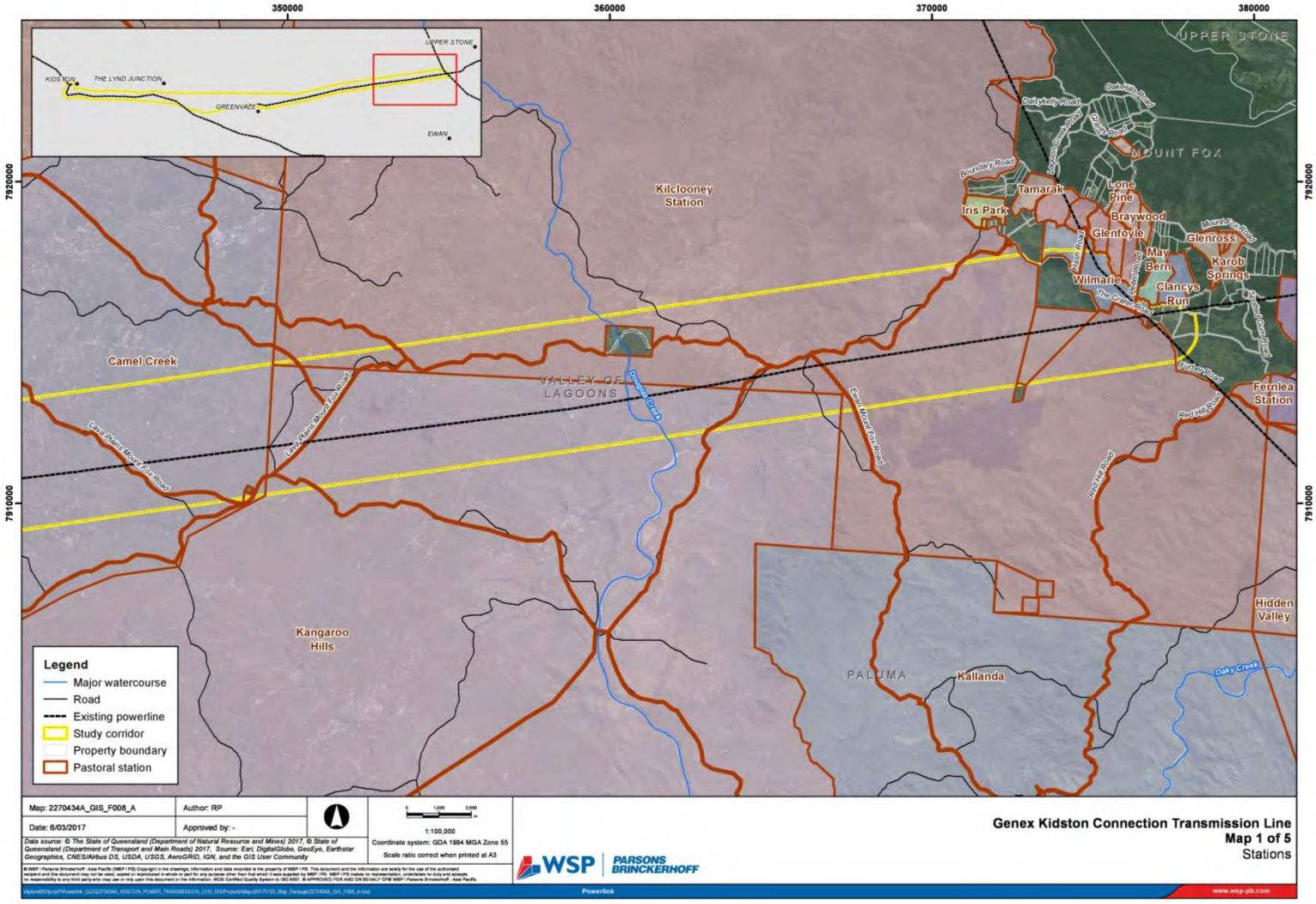
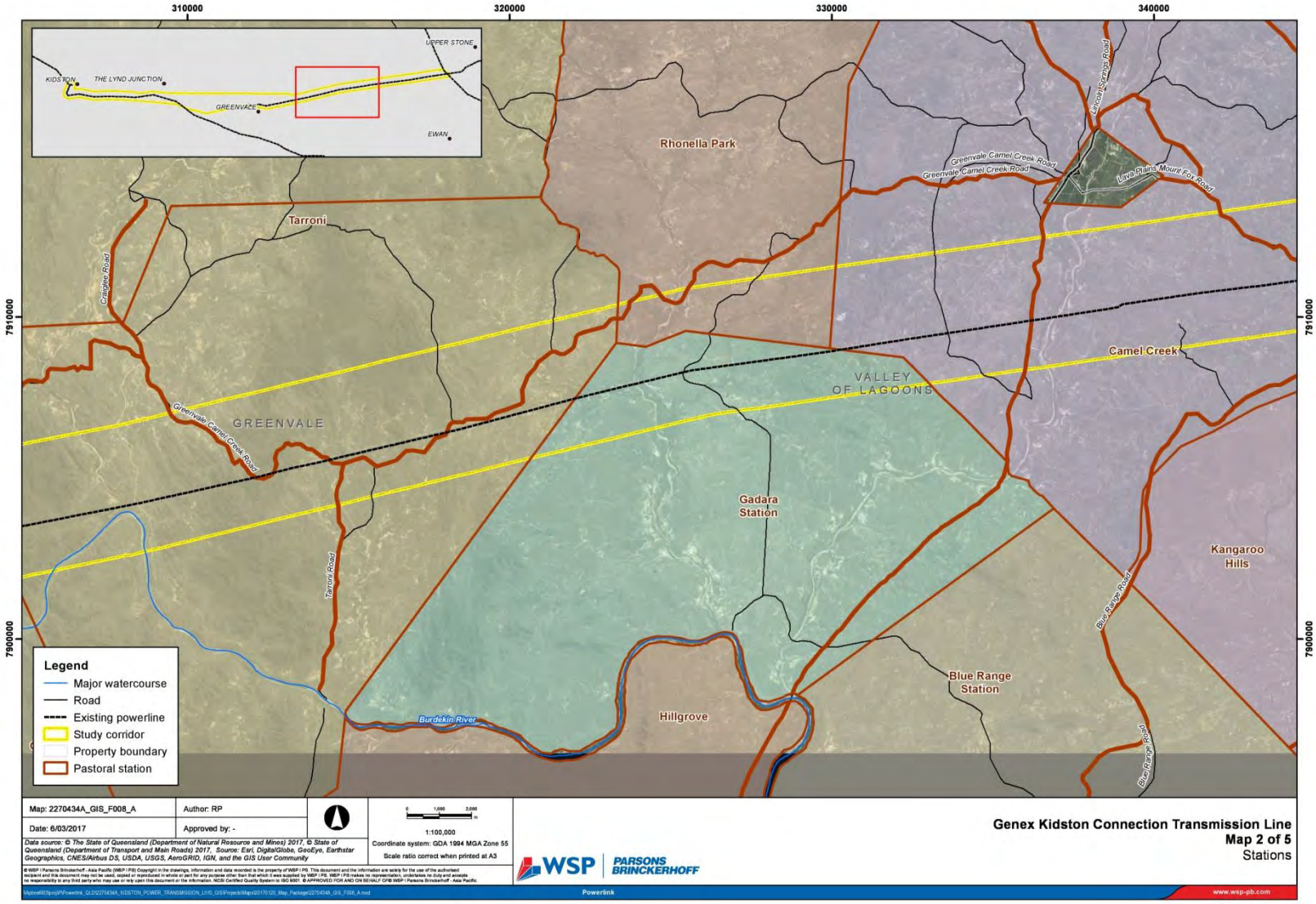
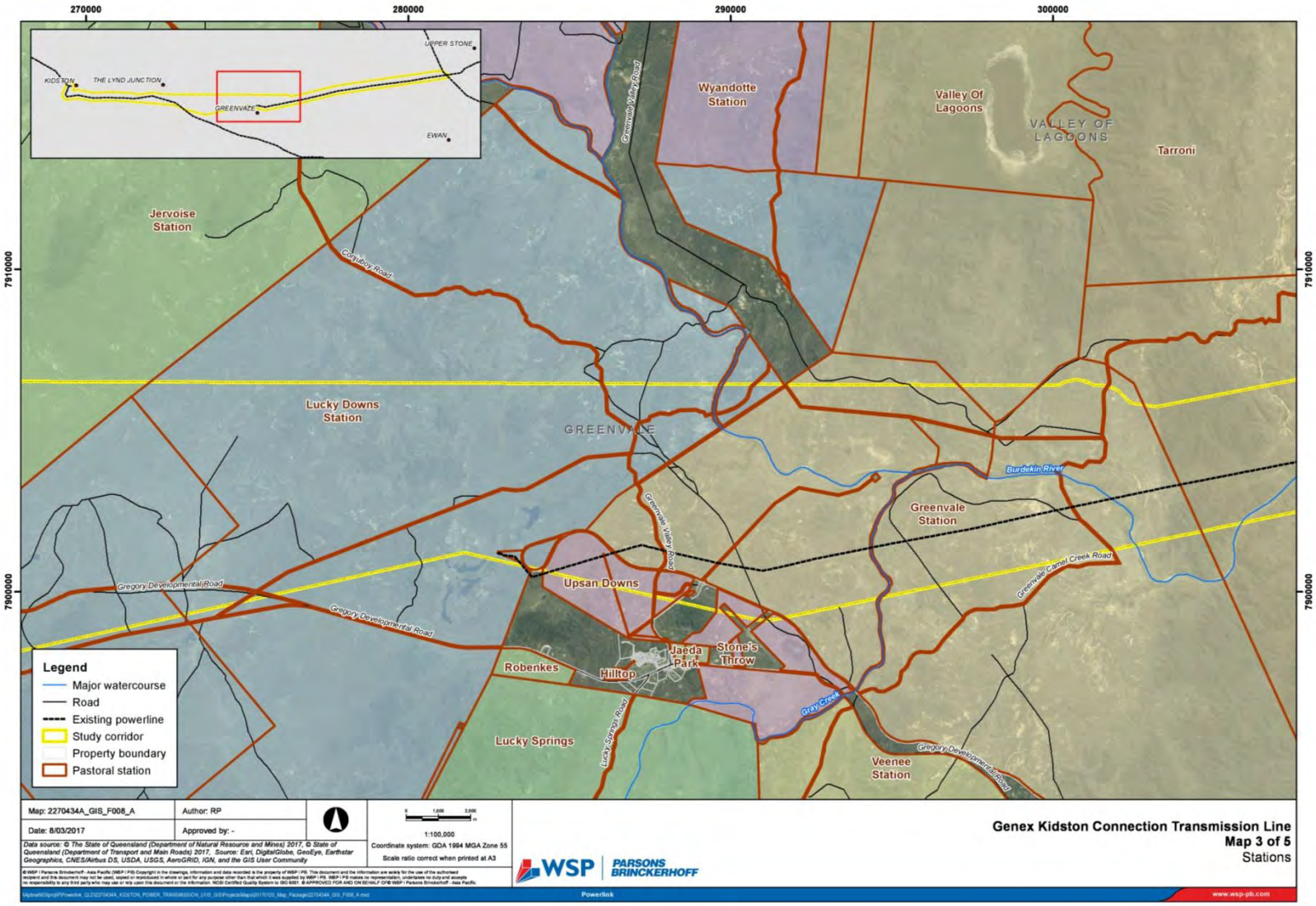
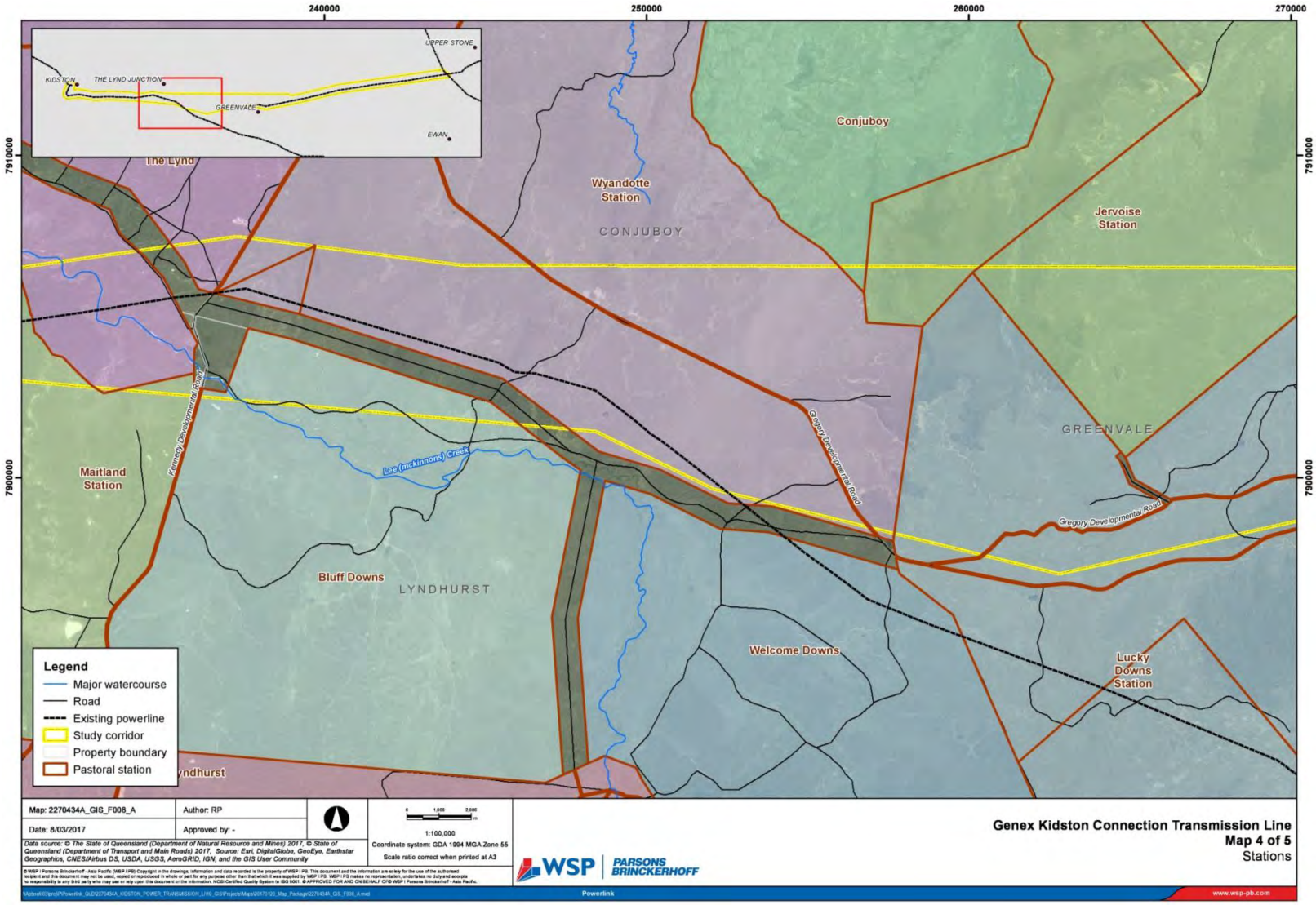


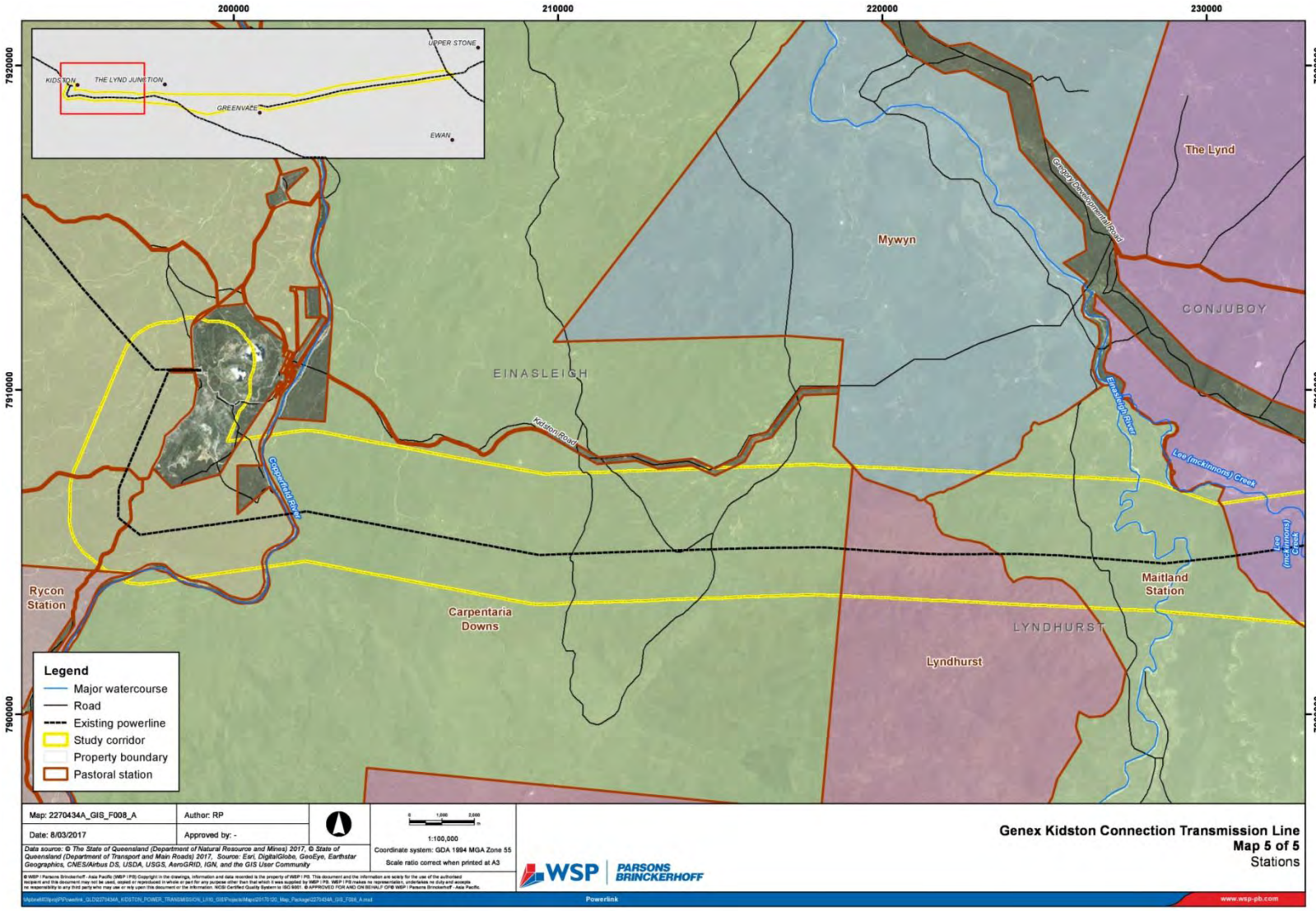
Figure 8 – Pastoral Stations











10.1.2 RESOURCE INTERESTS

Resource interests in Queensland are generally governed by the *Petroleum and Gas (Production and Safety) Act 2004* and *Mineral Resources Act 1989*. These acts afford resource explorers and producers certain rights above and below land. The resource interest holder is not required to also be the owner of the land over which the resource right exists. The rights are granted under various mechanisms dependent on the type of activity and maturity of any resource operation development.

Where infrastructure is proposed to cross or traverse a resource interest, consent from the respective authority holders pursuant to the respective governing legislation as discussed above will be required for the construction of transmission line, as well as any heavy vehicle and plant movements which have the potential to impact any existing infrastructure. Additionally, resource interest holders may be entitled to compensation as part of any land/easement acquisition process.

No interests under the *Petroleum and Gas (Production and Safety) Act 2004* have been identified within the study area. Several resource interests as governed by the *Mineral Resources Act 1949* have been identified. Consents from resource interest holders are not linked to the EIS or IDAS approvals processes and can be sought once a design and construction activities are more certain. Powerlink has significant experience in negotiating these consents through its previous work in the Surat and Bowen Basin regions.

It is noted that the primary resource interests identified are for exploration purposes. This is less likely to have a bearing on future alignment selection, unless exploration activities are well advanced and a possible footprint of mining development is known. Where a corridor interacts with Mining Leases, consideration will be given to specific activities of those operations.

Table 1 identifies the resource interests in the study area. Sections 10.1.2.1 to 10.1.2.3 provide some specific details for the mining leases identified. The Kidston mining lease is not discussed because it occurs on the Genex site.

At the current level of investigation there appears to be minimal impact to resource interests and ample opportunity to mitigate impacts through route selection given the vastness of the project area. Resource interests therefore do not differentiate study corridor options at the current level of investigation.

Table 4 - Study Area – Resource Interests

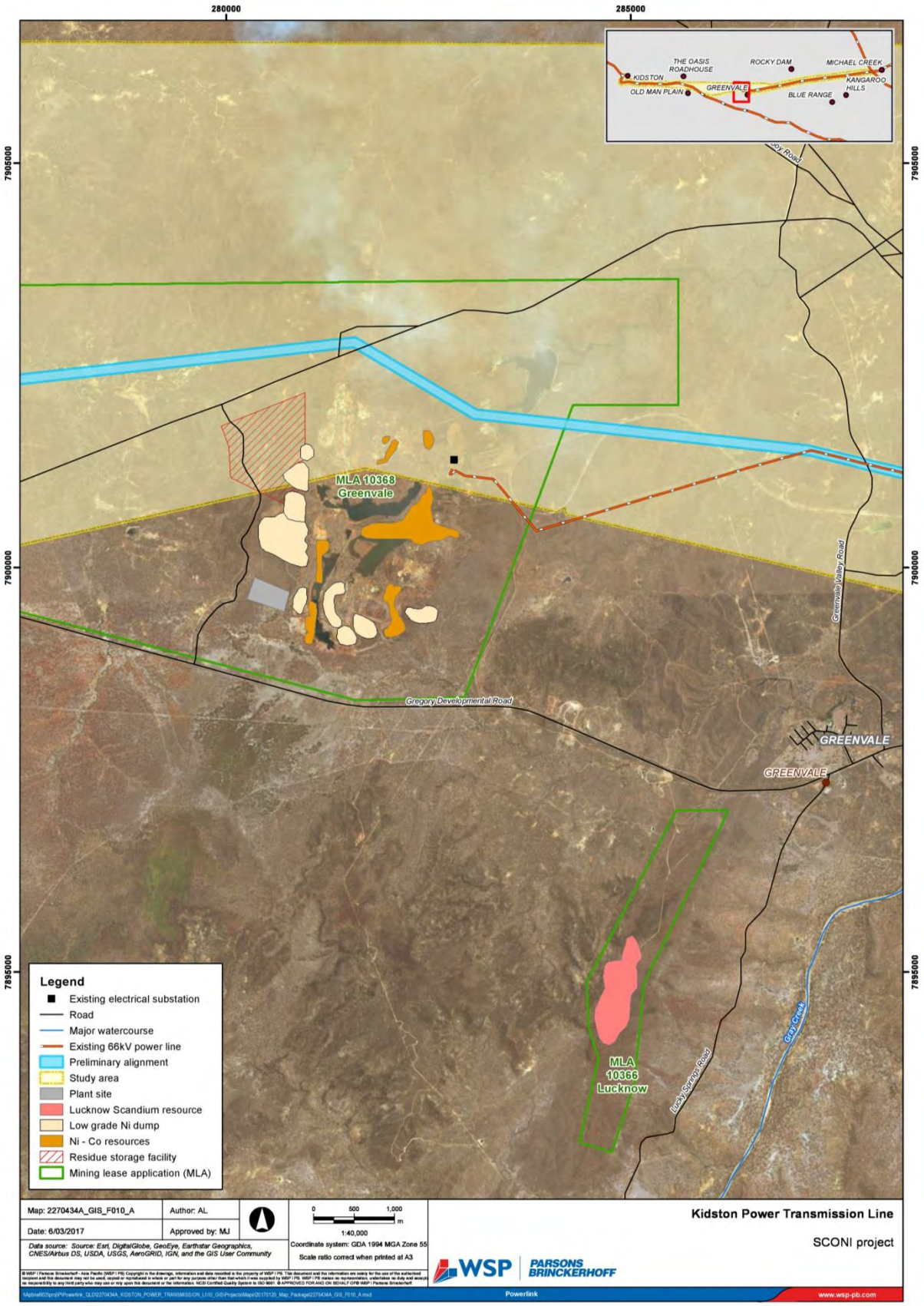
Permit Number	Status	Expiry	Principle Holder
MINERAL EXPLORATION PERMITS			
EPM 12513	Granted	04/01/2019	SNOW PEAK MINING PTY LTD
EPM 14107	Granted	25/08/2019	SNOW PEAK MINING PTY LTD
EPM 14576	Granted	21/06/2017	CURTAIN
EPM 17077	Granted	30/05/2019	ECHO RESOURCES LIMITED
EPM 18877	Granted	13/02/2017	COPPER STRIKE LTD
EPM 18987	Granted	24/09/2018	SUPERIOR RESOURCES LIMITED
EPM 25259	Granted	07/04/2019	SNOW PEAK MINING PTY LTD
EPM 25498	Granted	10/11/2019	SNOW PEAK MINING PTY LTD
EPM 25659	Granted	20/04/2020	SUPERIOR RESOURCES LIMITED
EPM 25691	Granted	07/04/2020	SUPERIOR RESOURCES LIMITED

Permit Number	Status	Expiry	Principle Holder
EPM 25834	Granted	05/01/2021	NORNICO PTY LTD
EPM 25865	Granted	14/12/2020	GREENVALE OPERATIONS PTY LTD
EPM 25934	Granted	08/06/2021	CORONATION RESOURCES LIMITED
EPM 26163	Application		LYZA MINING PTY LTD
EPM 26165	Application		SUPERIOR RESOURCES LIMITED
EPM 26326	Application		CAESAR GOLD MINES PTY LTD
EPM 26353	Application		LITHIUM AUSTRALIA NL
EPM 26356	Application		OAKDALE RESOURCES LIMITED
EPM 26360	Application		STURT EXPLORATION AND MINING PTY LTD
EPM 9323	Granted	12/04/2016	SNOW PEAK MINING PTY LTD
MINING LEASES			
ML 10368	Application		GREENVALE OPERATIONS PTY. LTD.
ML 1363	Granted		KELSO
ML 3347	Granted		KIDSTON GOLD MINES LIMITED
ML 6750	Granted		SUPERIOR RESOURCES LIMITED

10.1.2.1 MLA10368 SCONI PHASE 1 PROJECT

Approximately 6km west of Greenvale Township is the historical Greenvale Nickel mine, now operated by Metallica Minerals Pty Ltd as the SCONI project, with scandium, cobalt and nickel resources. An ASX release from March 2013 identified the following indicative layout for the operation (Figure 9).

Figure 9 – SCONI Phase 1 Project



The existing 66kV Ergon transmission line can be seen in Figure 9, representing the general path of study corridor option C. Metallica Minerals commenced the EIS process, lodging an initial advice statement and drafting a Terms of Reference consistent with the *Environmental Protection Act 1994 in 2012 and 2013 respectively*. The process has not been continued and is now registered as a withdrawn EIS process on the Department of Environment and Heritage Protection website, with the proponent voluntarily concluding the EIS process in 2015[3].

There appears to be sufficient room between the resource areas to site a transmission line. Powerlink provided written project information to Metallica Minerals about its study corridor investigations in early 2017 and invited Metallica to participate in further discussions if desired.

10.1.2.2 ML6750 'ONE MILE'

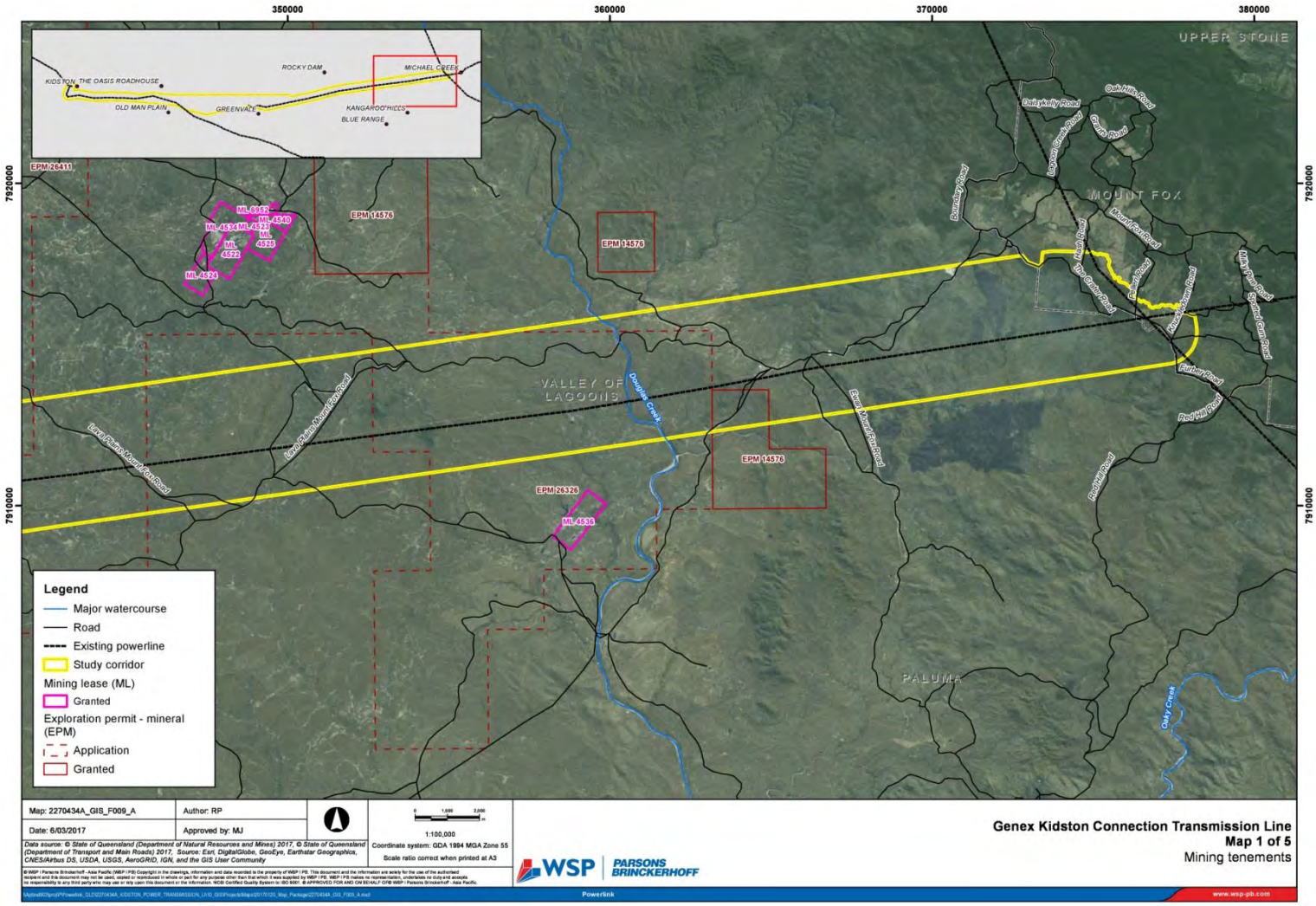
ML6750 is known as One Mile and based on exploratory drilling that contains low-grade copper, gold, zinc and silver values. Powerlink provided written project information to the One Mile about its study corridor investigations in early 2017 and invited them to participate in further discussions if desired.

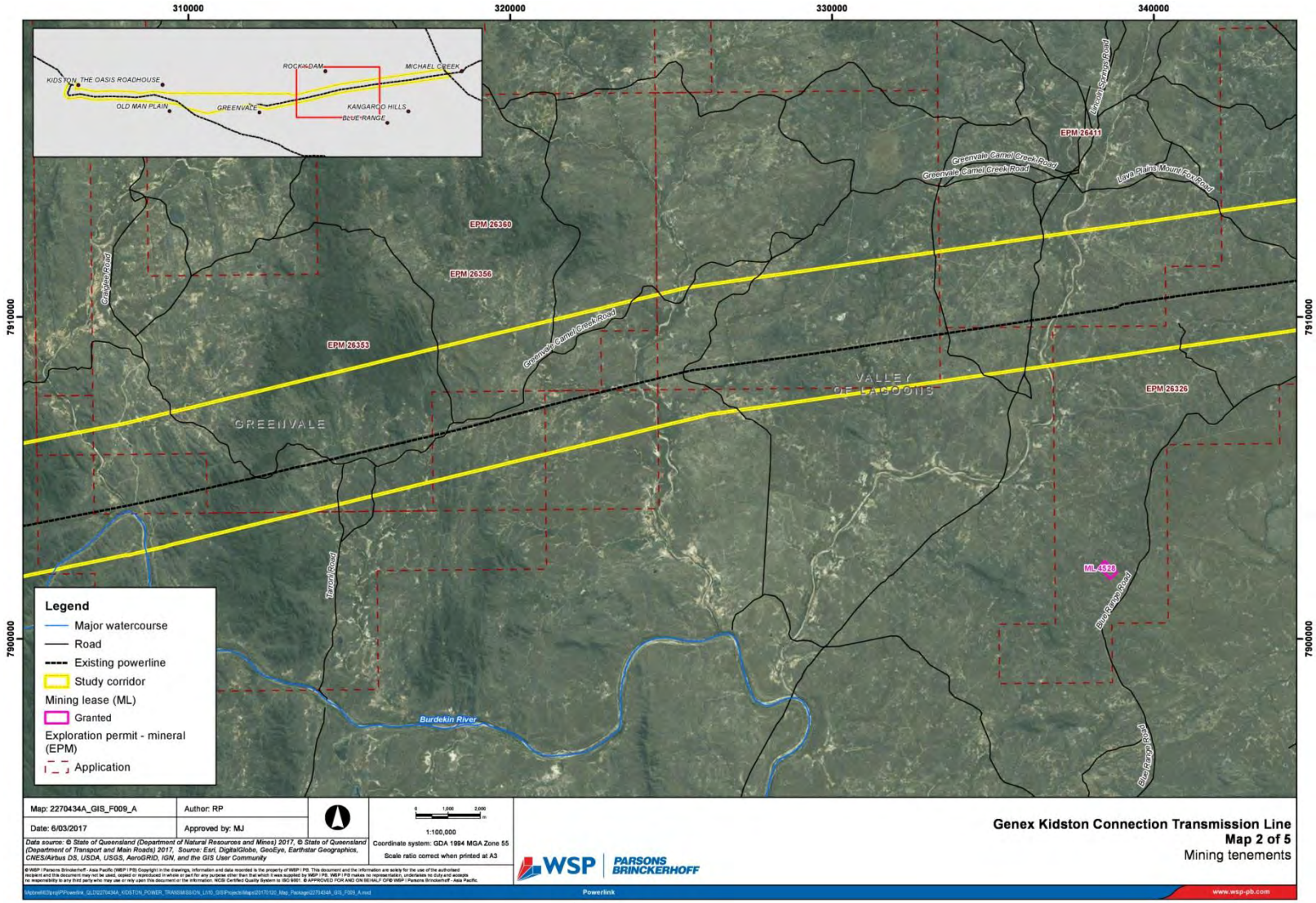
10.1.2.3 ML1363 'LUCKY DIP'

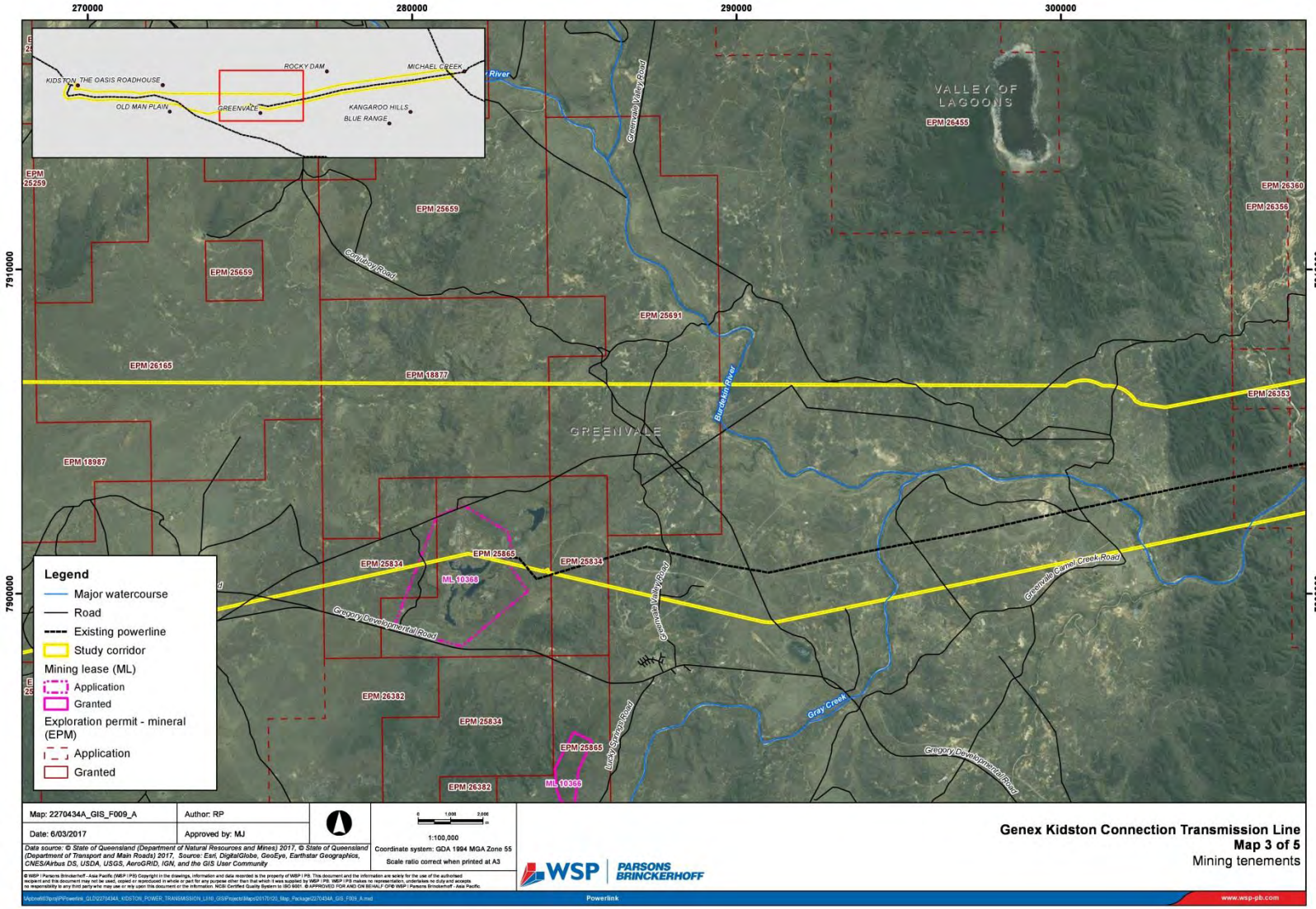
ML1363 is an older permit, lodged in 1966. Few details are recorded against the permit and it is very small at only 2 hectares. No contact details could be identified for the permit. Given its diminutive size and the vastness of the surrounding project area, the permit is readily avoided if necessary.

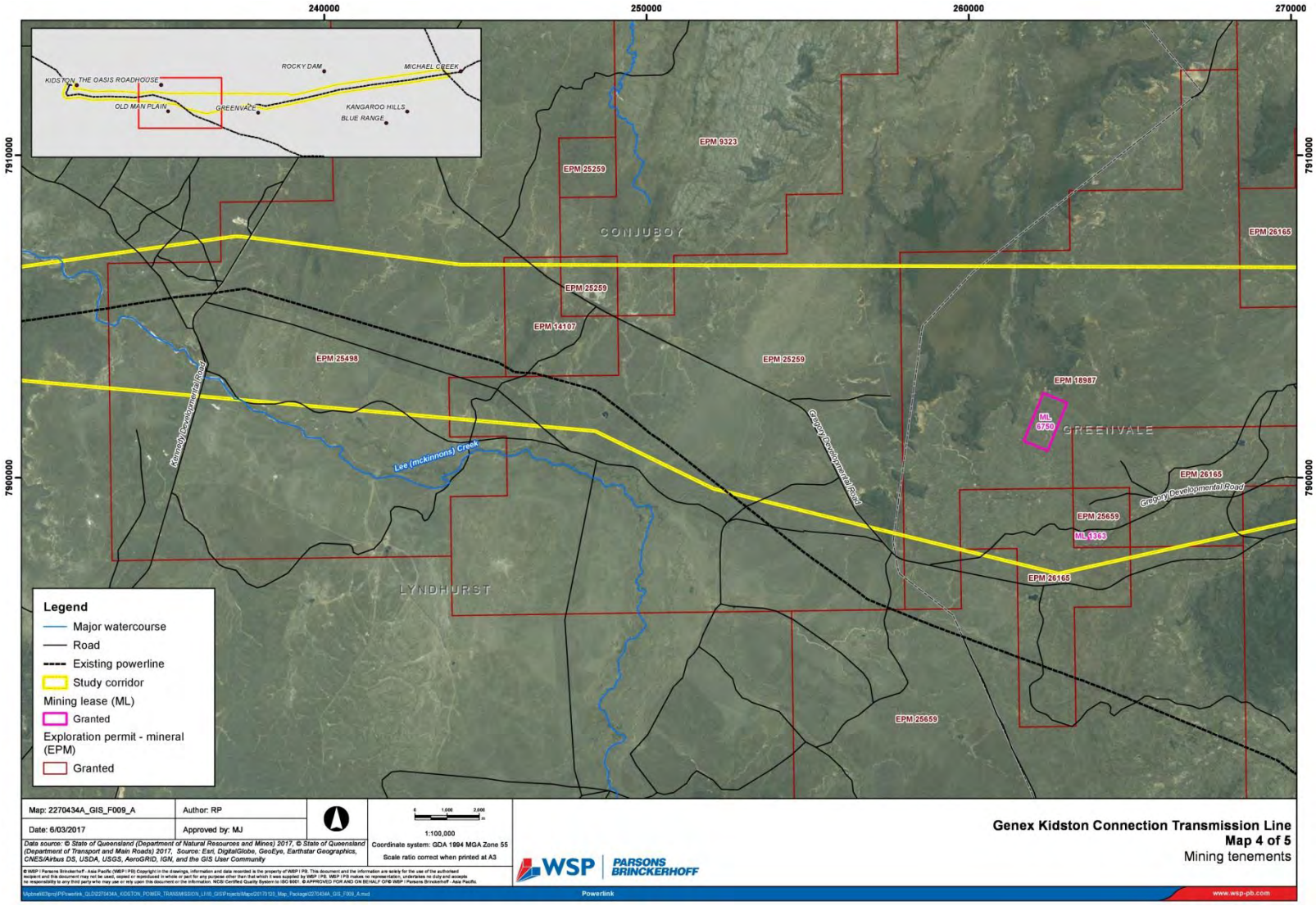
[3] https://www.ehp.qld.gov.au/management/impact-assessment/eis-processes/concluded.html

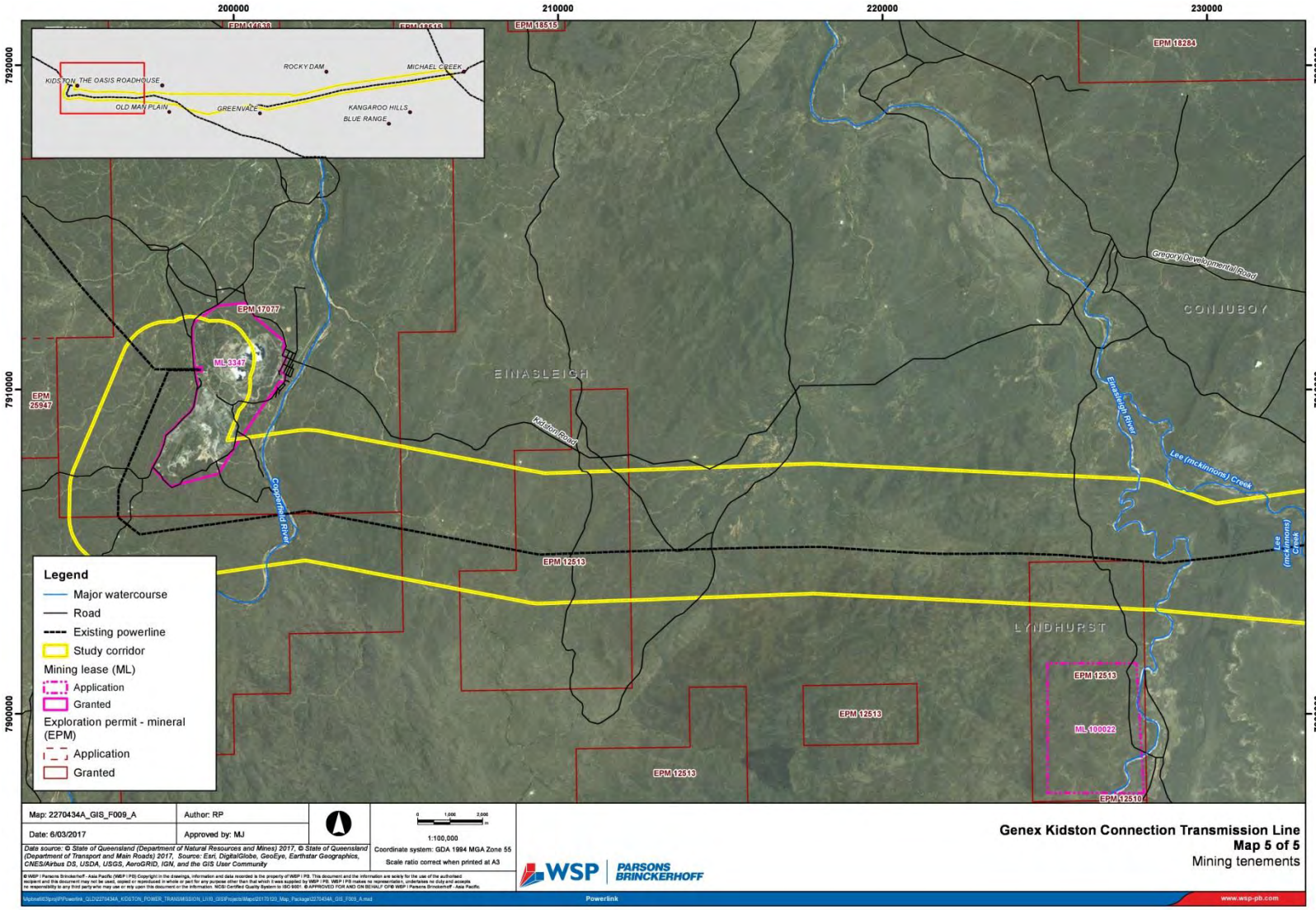
Figure 10 – Mining Interests











10.1.3 DEVELOPMENT APPLICATIONS

A list of active development applications is published online by the Hinchinbrook Shire and Charters Towers Regional councils. The address of each of the development applications was searched to determine whether any are likely to occur in the project area. No applications were identified in or near to the study area.

Existing development applications are not published on the Etheridge Shire Council website. Etheridge Shire Council attended the stakeholder workshop in November 2016 and no conflicting developments were noted at that time or in subsequent engagement with Council.

10.1.4 ENCUMBERANCES

Few easements exist in the vicinity of the project, limited to existing Powerlink and Ergon power lines. These easements do not pose a constraint to the project. A number of strata rights exist across the project area. The exact nature of the land uses associated with these rights is unknown, though they appear to occur over state lands and stock routes.

Engagement during the impact assessment stage will be required to determine the specific nature of the many strata rights observed. These encumbrances do not serve to differentiate study corridor options at the current level of assessment and are considered low risk to the overall development of the proposed Genex Kidston Connection transmission line.

10.1.5 EXISTING INFRASTRUCTURE

The project area contains little existing major infrastructure. Major roads include the Gregory and Kennedy Developmental Roads, which are intersected in the vicinity of Conjuboy. The proposed transmission line will be able to safely span over these roads.

Similarly the roads are unlikely to offer significant opportunity for co-location because they emanate from locations that offer insufficient access to the electrical transmission network and traverse through the populated areas in the region, such as Greenvale.

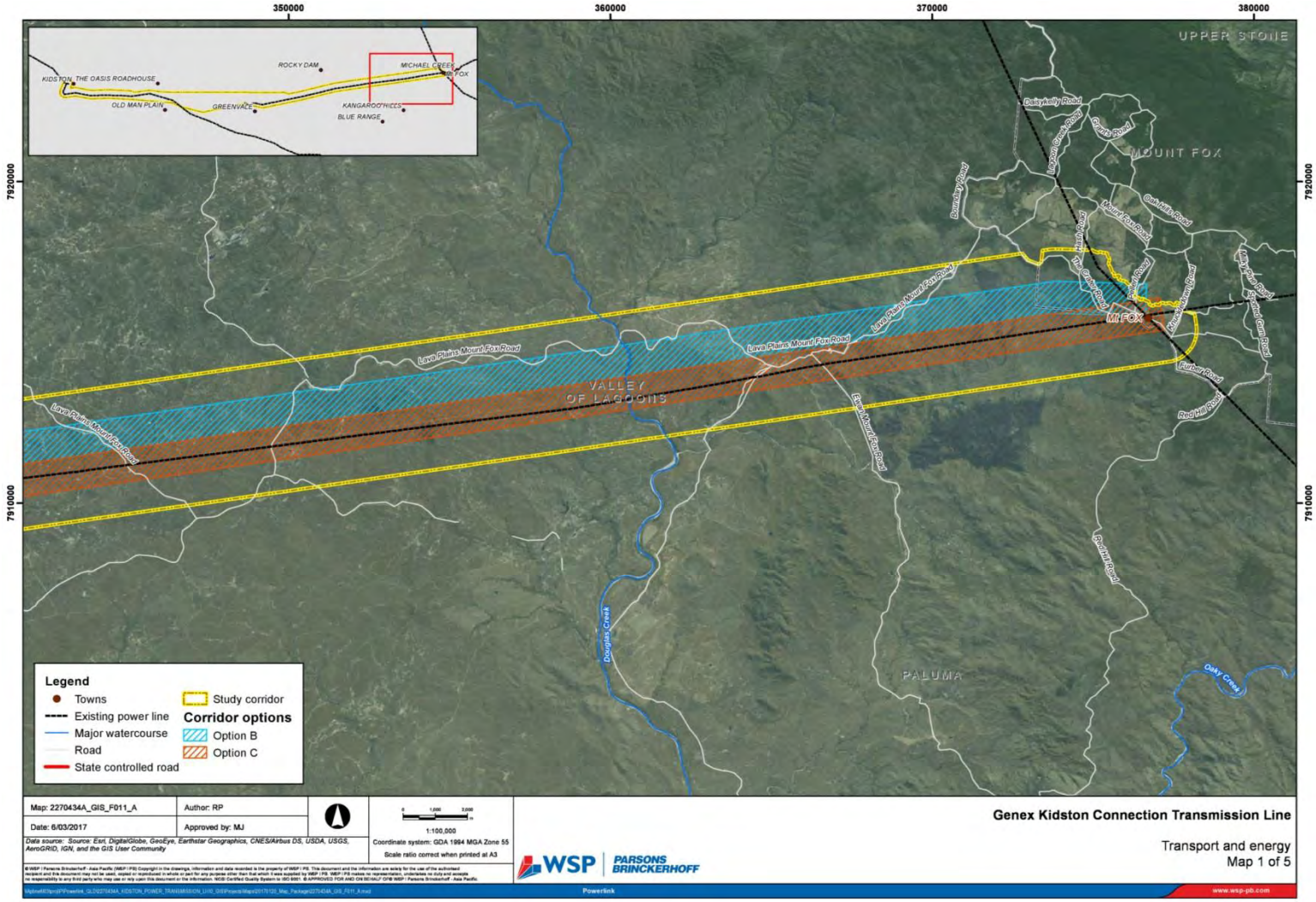
Existing Ergon transmission lines are noted, running parallel to the southernmost corridor option from Mt Fox to Greenvale and from an area around Conjuboy to Kidston. These lines operate at transmission voltages (66kV and 132kV). Existing cleared corridors for the Ergon lines may offer co-location opportunities for a new transmission corridor.

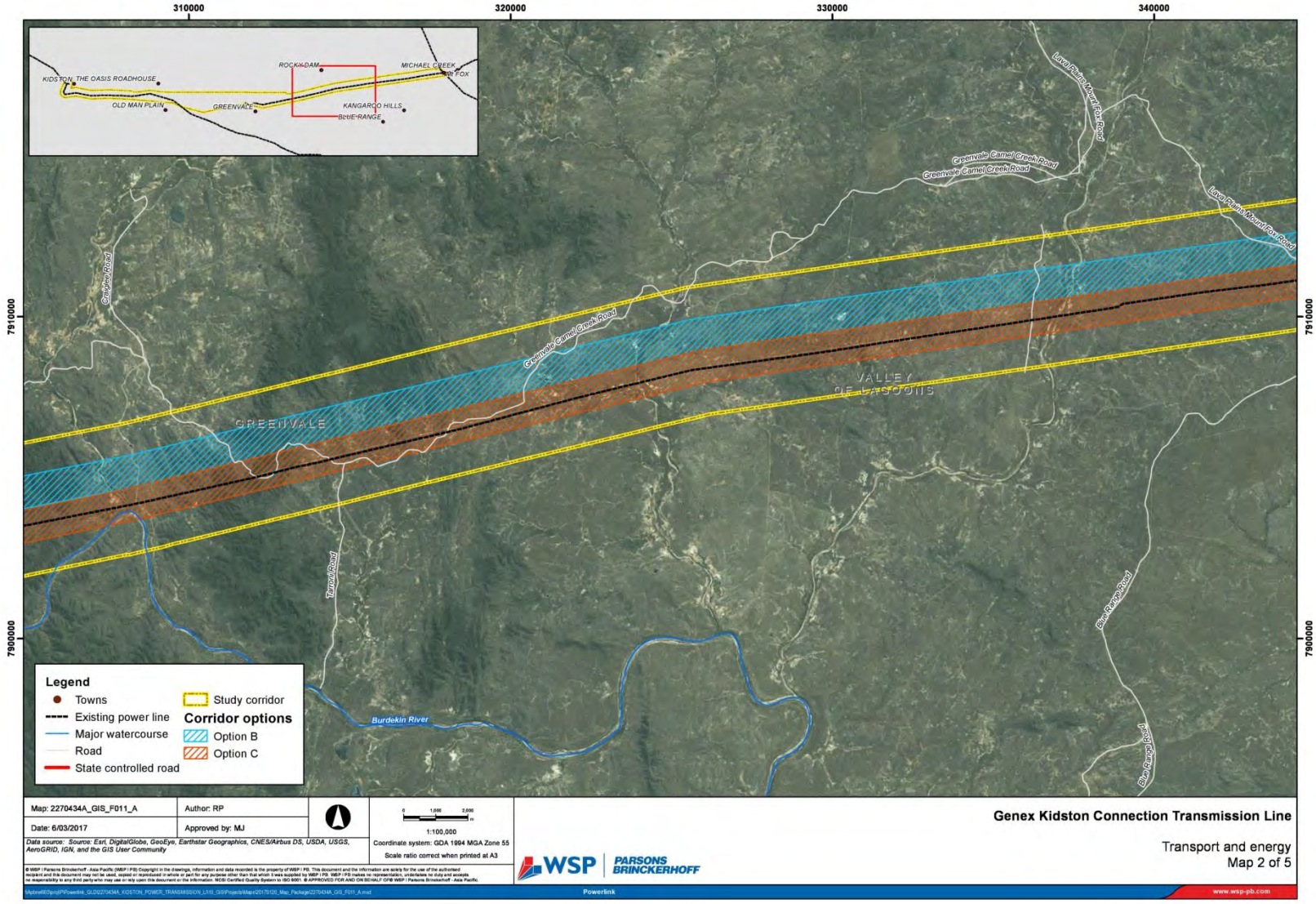
Co-location is beneficial in grouping together large, linear disturbances to the natural landscape. Fragmentation of vegetation is kept to a single area, minimising breaks in ecological connectivity in the area. Further benefits are derived in the potential for common access tracks, minimising both physical and social disturbance in the region.

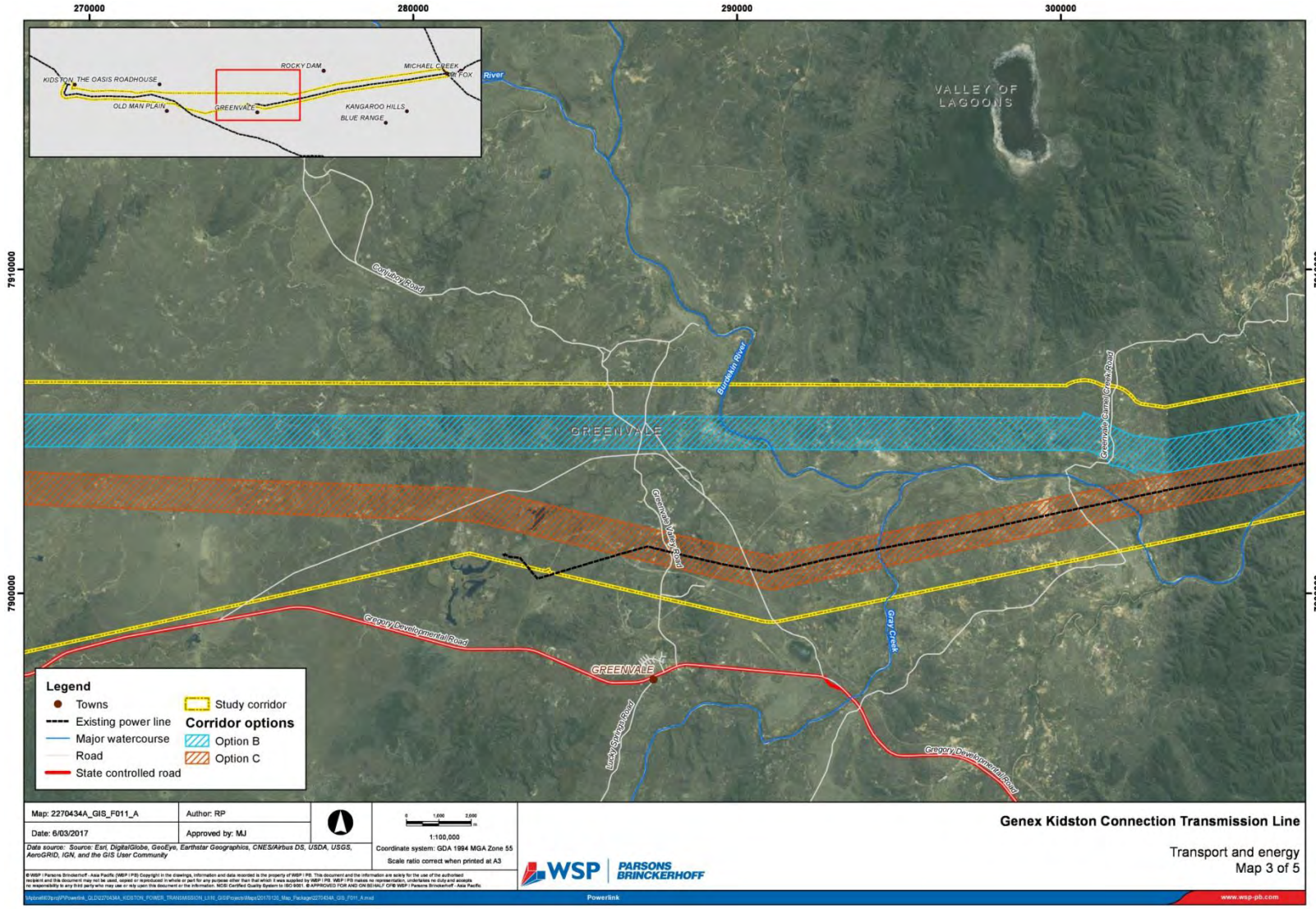
A number of small private airstrips, as well as larger facilities at Greenvale and Kidston were noted during travel through the study area. All corridor options are likely to be proximal to airstrips and potential impacts to airstrips and aerial activities such as mustering will be an important consideration in subsequent impact assessments. Airstrips do not serve to differentiate corridor options at the current level of investigation.

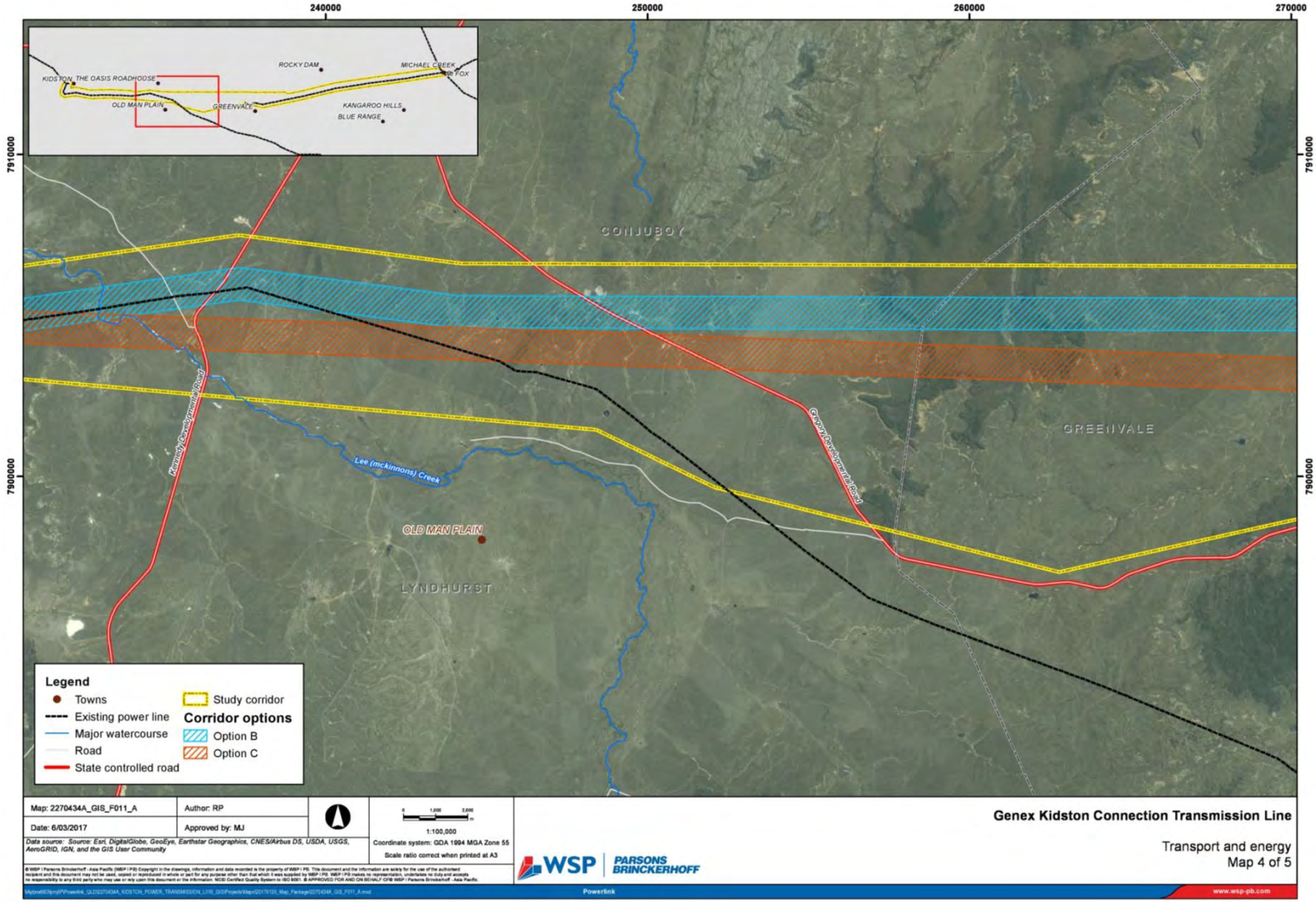
Figure 11 identifies existing infrastructure throughout the project area.

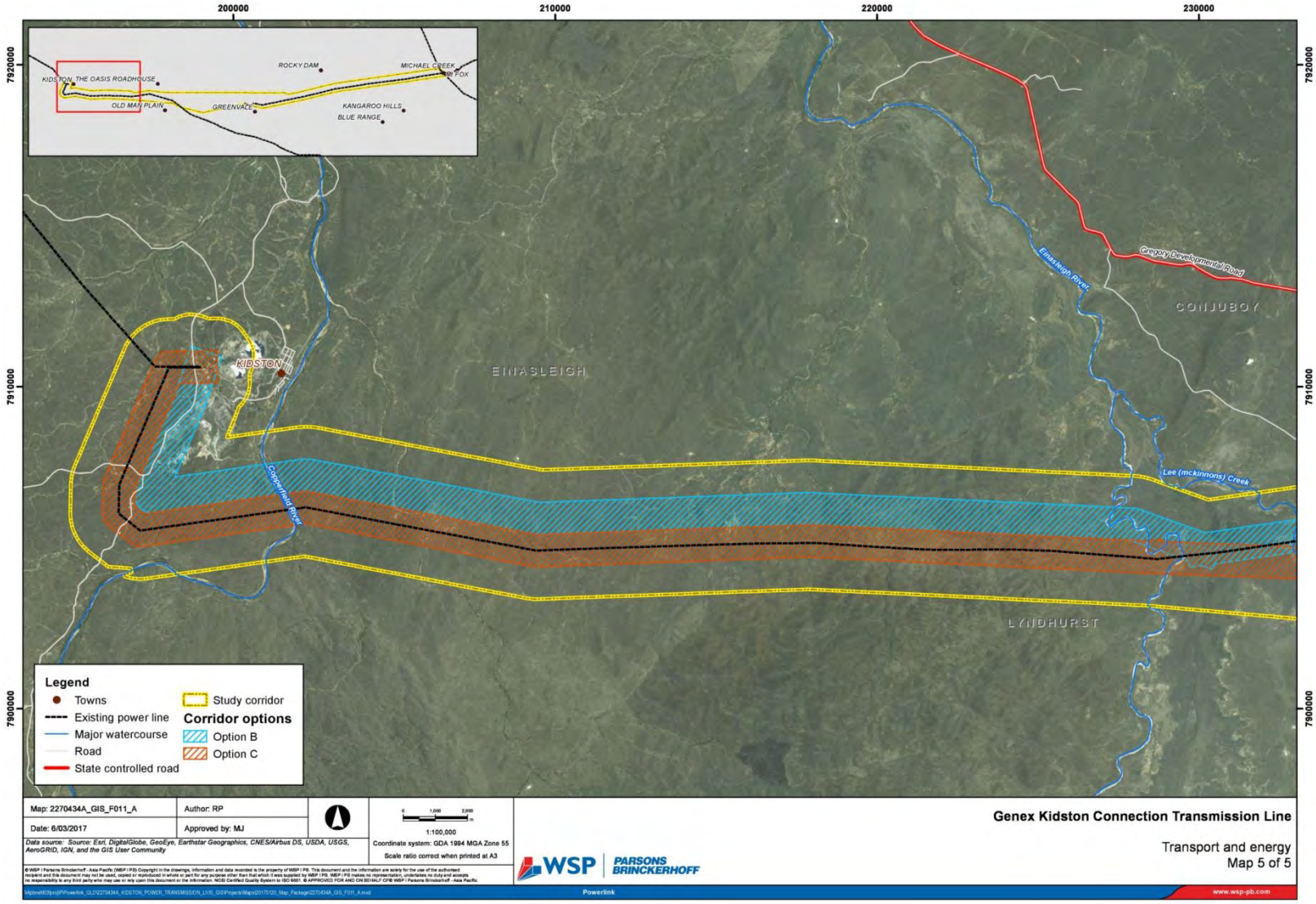
Figure 11 – Transport and Energy Infrastructure











10.1.6 COMMUNITY BENEFITS

The project potentially provides a range of benefits, including:

- Supporting a major renewable energy project
- Supporting both the Commonwealth Renewable Energy Target and State planning intent
- Supporting the diversification of Queensland's electricity generation mix
- Creation of jobs during the construction period and for ongoing operation.

The benefits of renewable energy projects are widespread and supported by legislation and policy. Employment generated during the construction period is likely to be of regional and local benefit. Because the proposed transmission line is approximately 200km long, it is likely the opportunity for project-related employment will occur across a broad geographic area and flow-on effects to small business will be equally wide spread.

Consultation will occur with relevant authorities regarding strategies to maximise community benefits should the project proceed to the next phase in the assessment process. All corridors provide similar community benefits.

10.2 CULTURAL HERITAGE AND NATIVE TITLE

10.2.1 ABORIGINAL CULTURAL HERITAGE

A search of the Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP) database identifies three Aboriginal Parties whose Native Title determination areas are intersected by the study corridor.

- Gugu Badhum People #3
- Ewamian People #2
- Ewamian People #3.

Activities to be carried out during the clearing and construction phase for transmission lines are typically assessed as Category 5 of the Duty of Care guideline under the *Aboriginal Cultural Heritage Act 2003* (ACHA) i.e. ground disturbing activities within a greenfield site.

Powerlink's strategy to meet its Duty of Care (s23 ACHA) is through the negotiation of a formal agreement or Cultural Heritage Management Plan (CHMP) with each of the relevant Aboriginal Parties and conducting its land clearing and construction activities in accordance with that agreements or CHMP. This typically includes a detailed cultural heritage survey.

Powerlink has established processes for, and significant experience in the management of cultural heritage in transmission line development and working closely with Aboriginal parties. The processes of other development or constructing organisations are not discussed in this CSR.

10.2.2 EUROPEAN CULTURAL HERITAGE

A search of the Queensland Heritage Register (DEHP) found one listing within proximity to the project. The Kidston State Battery and Township is classified as a State heritage place, however is not located within any of the three corridors. Historical heritage is therefore not an influencing factor in differentiating between possible corridors at the present level of assessment.

10.2.3 NATIVE TITLE

The study area discussed in this report intersects the following Native Title determinations:

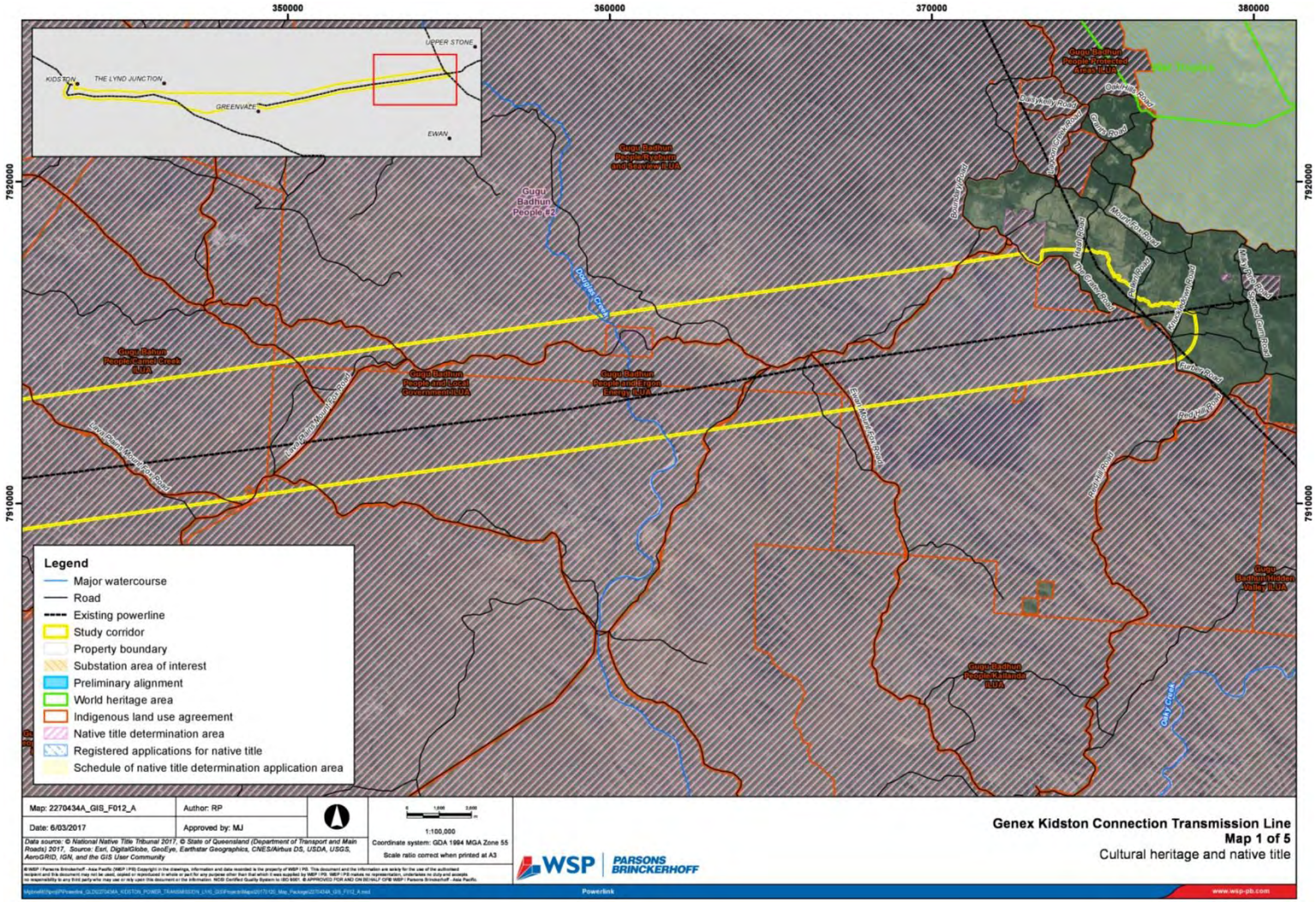
- Gugu Badhum People #3
- Ewamian People #2
- Ewamian People #3.

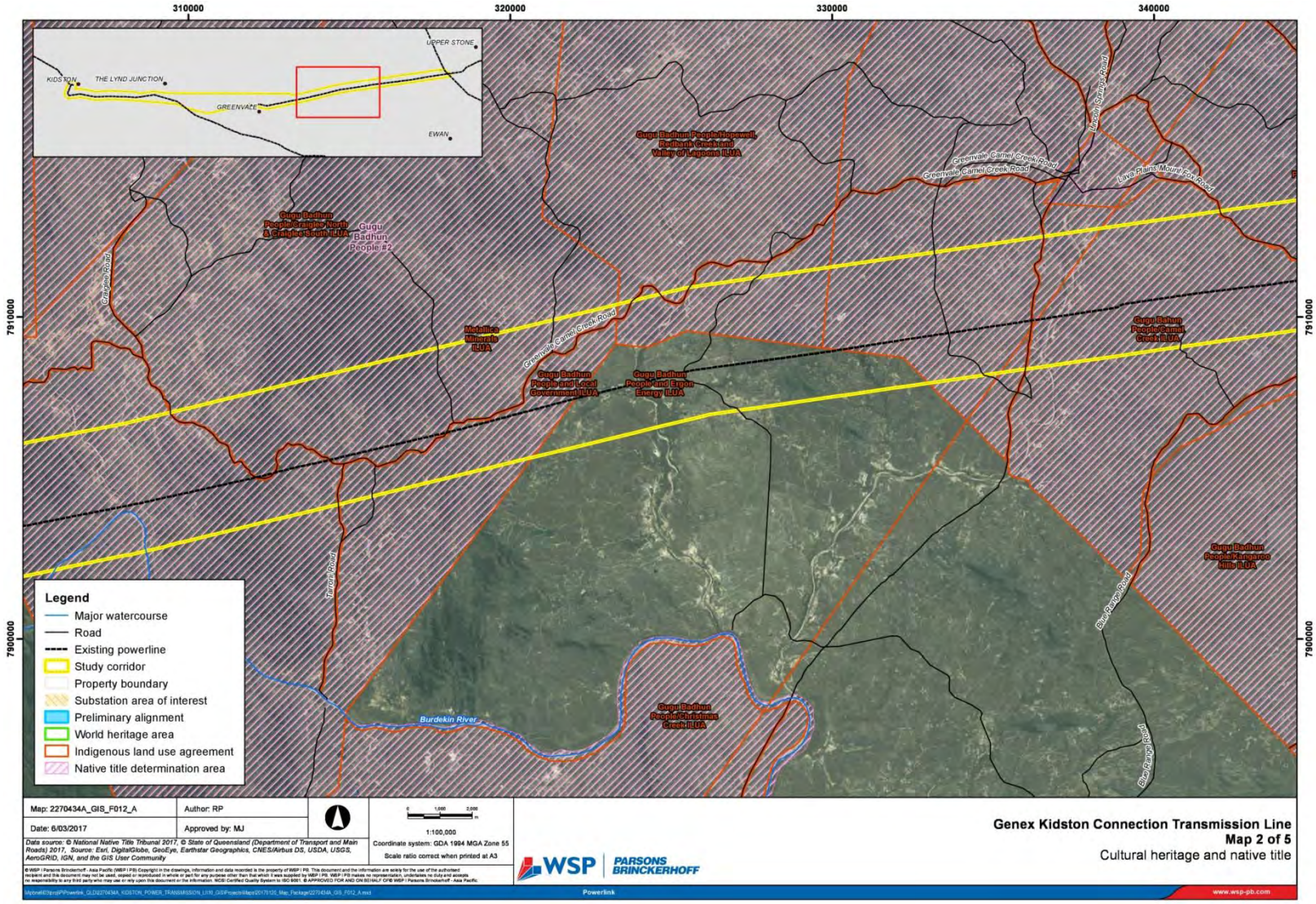
The acquisition of an easement for the transmission line would be a 'future act' under the Native Title Act 1993 (C'th) and therefore requires that Native Title interests are addressed. To the extent that an easement acquisition and construction of infrastructure affects Native Title, Powerlink typically utilises section 24KA of the Native Title Act 1993 (C'th), which applies to facilities for services to the public, to validate the act and 'supress' Native Title over the easement for the 'lifetime' of the infrastructure.

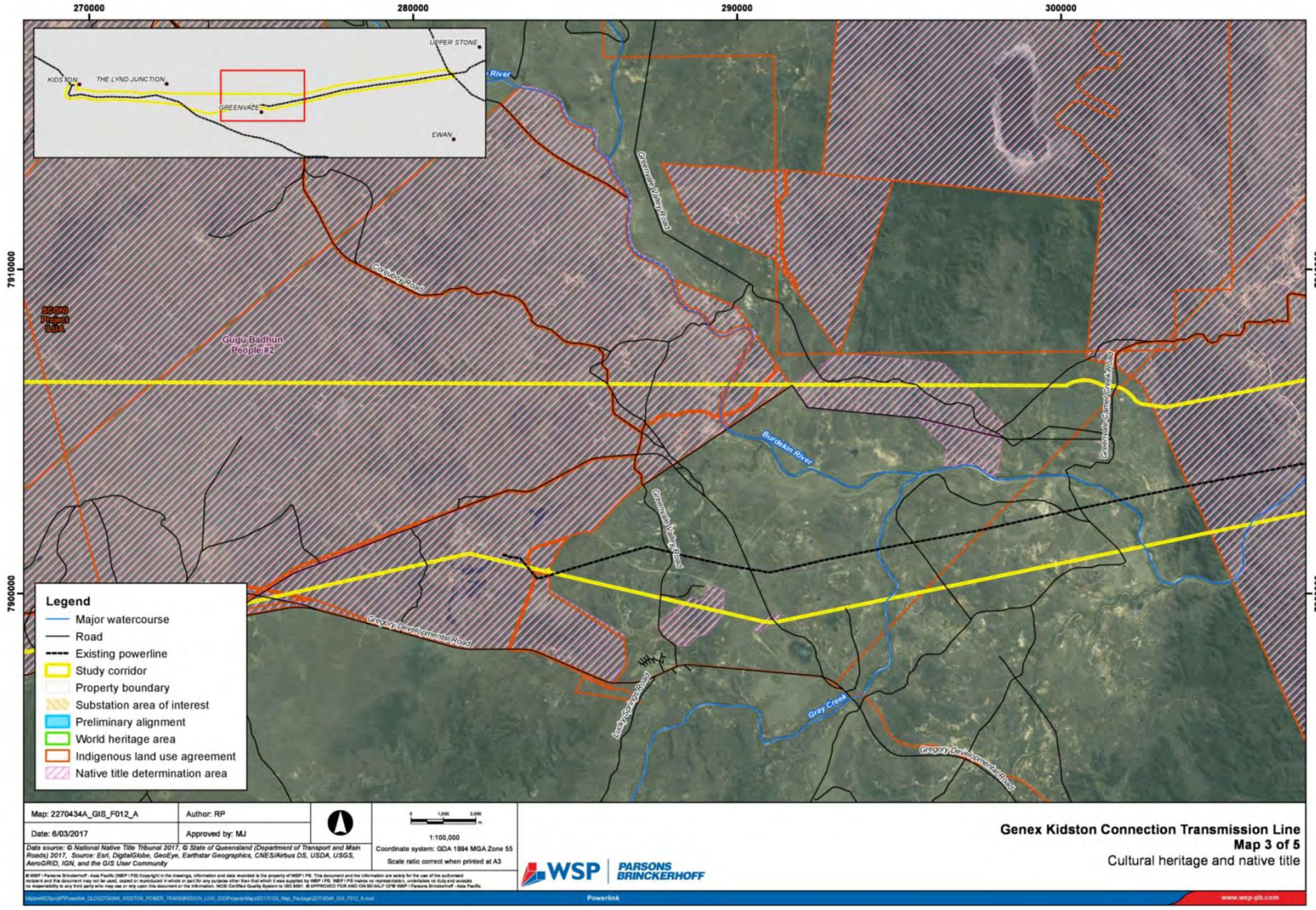
On the basis that any proposed alignment within the project area would intersect the above determination areas, Native title compliance would not significantly differentiate between corridor options at present. Powerlink has established processes for, and significant experience in the management of Native Title in transmission line development. The processes of other development or constructing organisations are not discussed in this CSR.

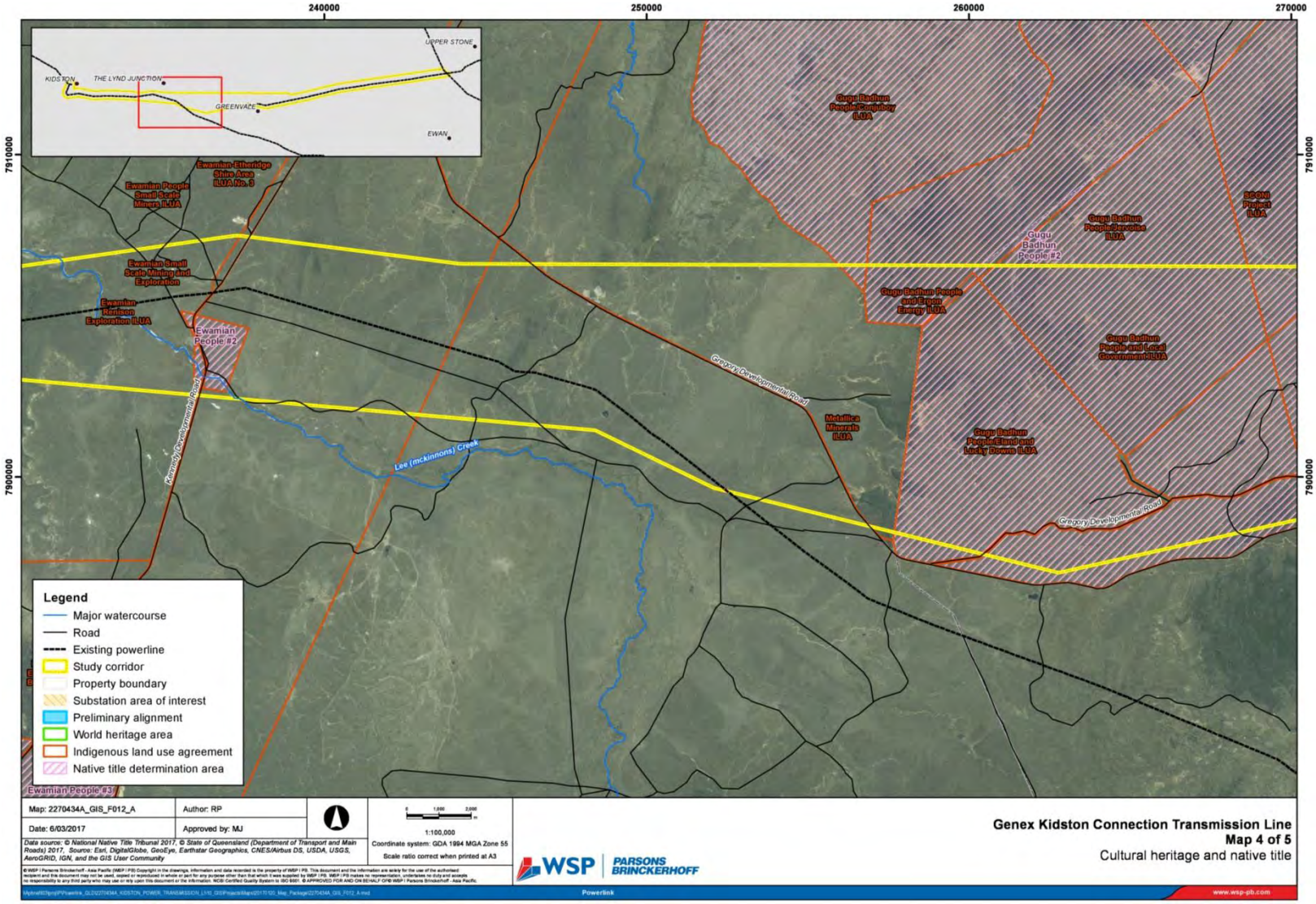
Figure 12 depicts the Native Title determinations that intersect the project area.

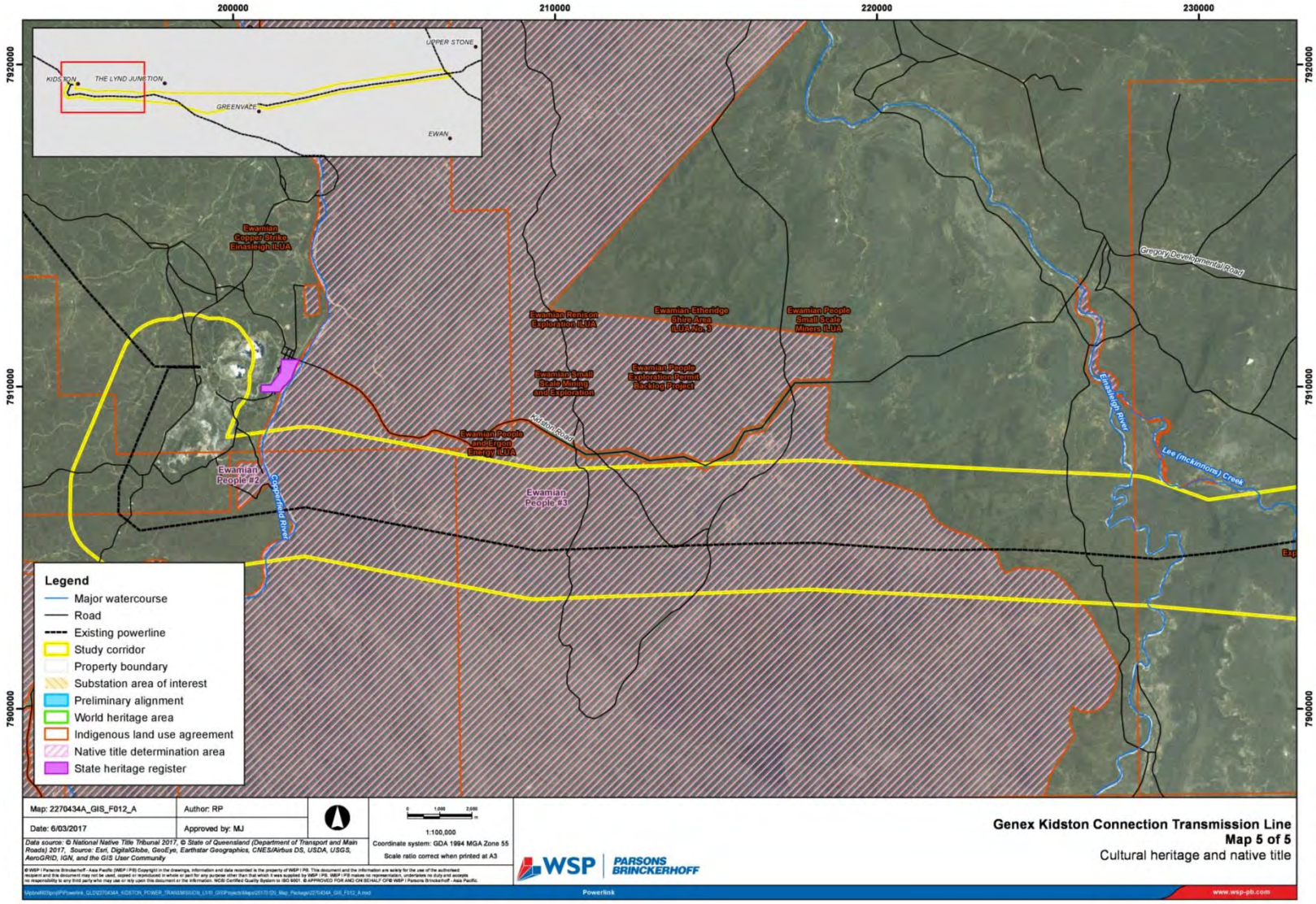
Figure 12 – Cultural Heritage & Native Title











10.3 VISUAL AMENITY

The transmission line has the potential to be visible from some residences, local government controlled roads, State controlled roads and Girringun National Park. The infrastructure has the potential to be visible from the following locations:

- Local residences
- Mt Fox Crater
- Girringun National Park
- The Crater Road
- Lava Plains Mt Fox Road
- Kangaroo Hills Road
- Ewan Mt Fox Road
- Valley of Lagoons Road
- Craiglee Road
- Conjuboy Road
- Runs along Gregory Development Road
- Kennedy Development Road
- Unnamed Roads.

Visual amenity can be described as comprising two elements: a near field view, comprising the immediate and permanent amenity as visible from a fixed point (e.g. residences); and a far field view, comprising a more transient visual impact from a further distance (e.g. seen from a vehicle at a road crossing point). The severity of the impact depends on the proximity to the subject (in this instance the substation structure) and the amount of time that the structures are visible.

Visual amenity impacts will be assessed in detail in subsequent approval processes. Further engagement with potentially affected stakeholders and landholders would also occur, informed by the engagement undertaken as part of this CSR.

Visual exposure to the transmission line may be either avoidable or of minimal impact given the vast and expansive nature of the surrounding environment and the ability to carefully site transmission structures. Where exposure is not avoidable and a measurable impact is likely to occur, alternative mitigations will be investigated.

Powerlink has significant experience in the assessment, mitigation and management of visual amenity associated with transmission lines.

10.4 ELECTRIC AND MAGNETIC FIELDS (EMF)

EMF readings at the edge of an easement for a 275kV transmission line are generally similar to those encountered by people in their daily activities at home or at work (e.g. a similar reading to what experienced using a typical electrical appliance or power tool). At about 100 metres from the line, the level of EMF is so small that it typically cannot be measured.

Powerlink has undertaken an EMF assessment for the proposed Genex Kidston Connection transmission line, taking into consideration the expected maximum capacity of the line based on both the hydro and solar generation facility in full operation. This technical assessment has confirmed that both the electric field and magnetic field strength for the proposed line will be below international guidelines.

10.5 AIR AND NOISE

The nearest town to any of the draft corridor options is Greenvale (population 150), some 2km from the nearest corridor. The nearest population centre to the project area is Ingham (approximately 40km north-east of Mt Fox, population 4,706). With regard to air and noise, minimal to negligible impacts on population centres would be expected. Any impact to individual residences will require detailed consideration in any subsequent impact assessment phases, with only a very small number of properties proximal to all corridor options.

Additionally, during construction and operation of any transmission line, the environmental duty of care and compliance with the respective Environmental Protection Policies for Air and Noise management must be demonstrated. Measures contained within these policies would be applicable to any project and do not serve to differentiate corridors.

10.6 TRAFFIC

Given the low-density nature of the surrounding environment, it is unlikely that major disruptions to the road network will be required. The requirement for road interruptions (or disturbance to other transport modes) and road improvements will be investigated during subsequent impact assessments and in consultation with relevant authorities.

Traffic impacts do not differentiate corridor options at the current level of assessment.

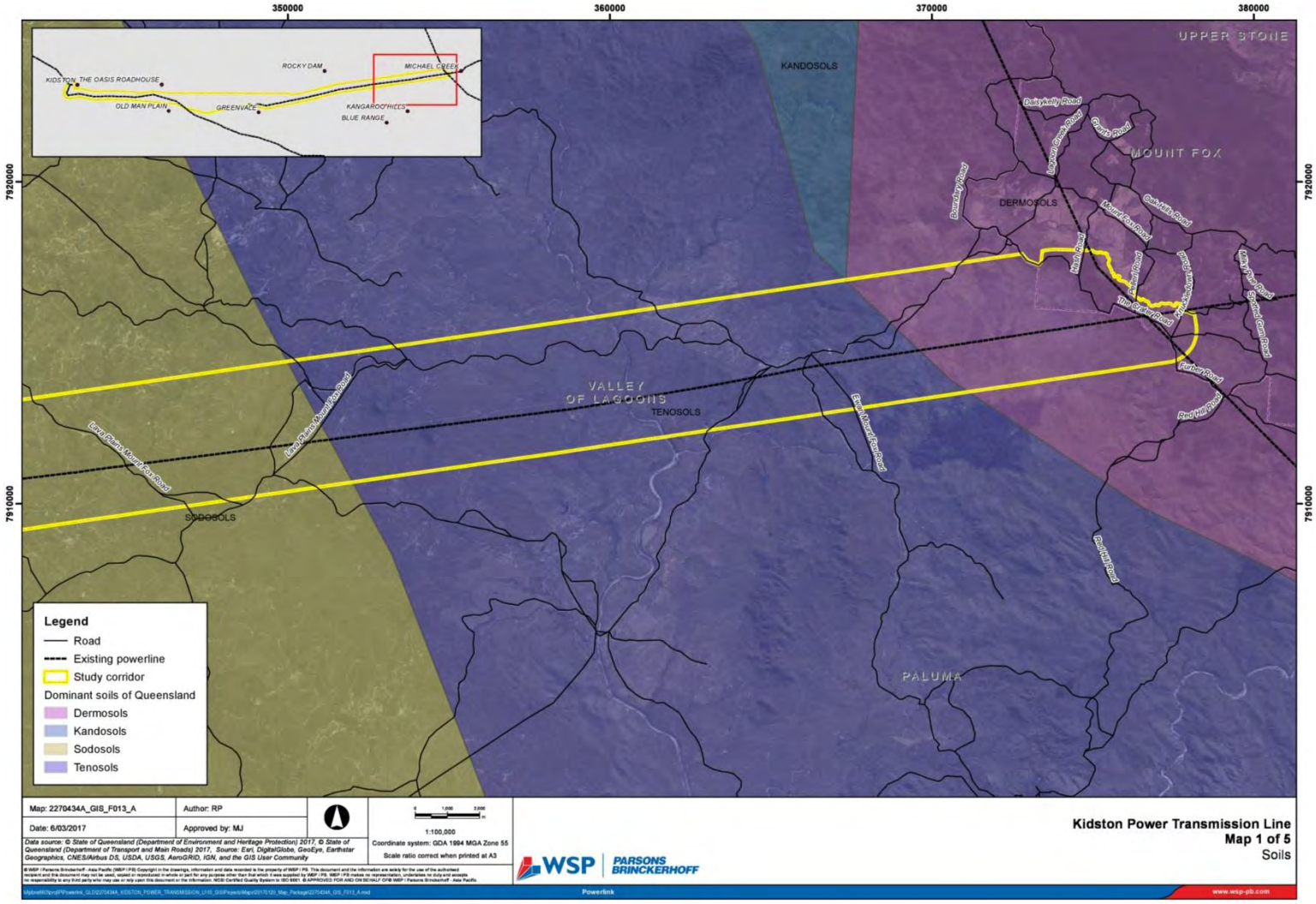
10.7 TOPOGRAPHY, GEOLOGY & SOILS

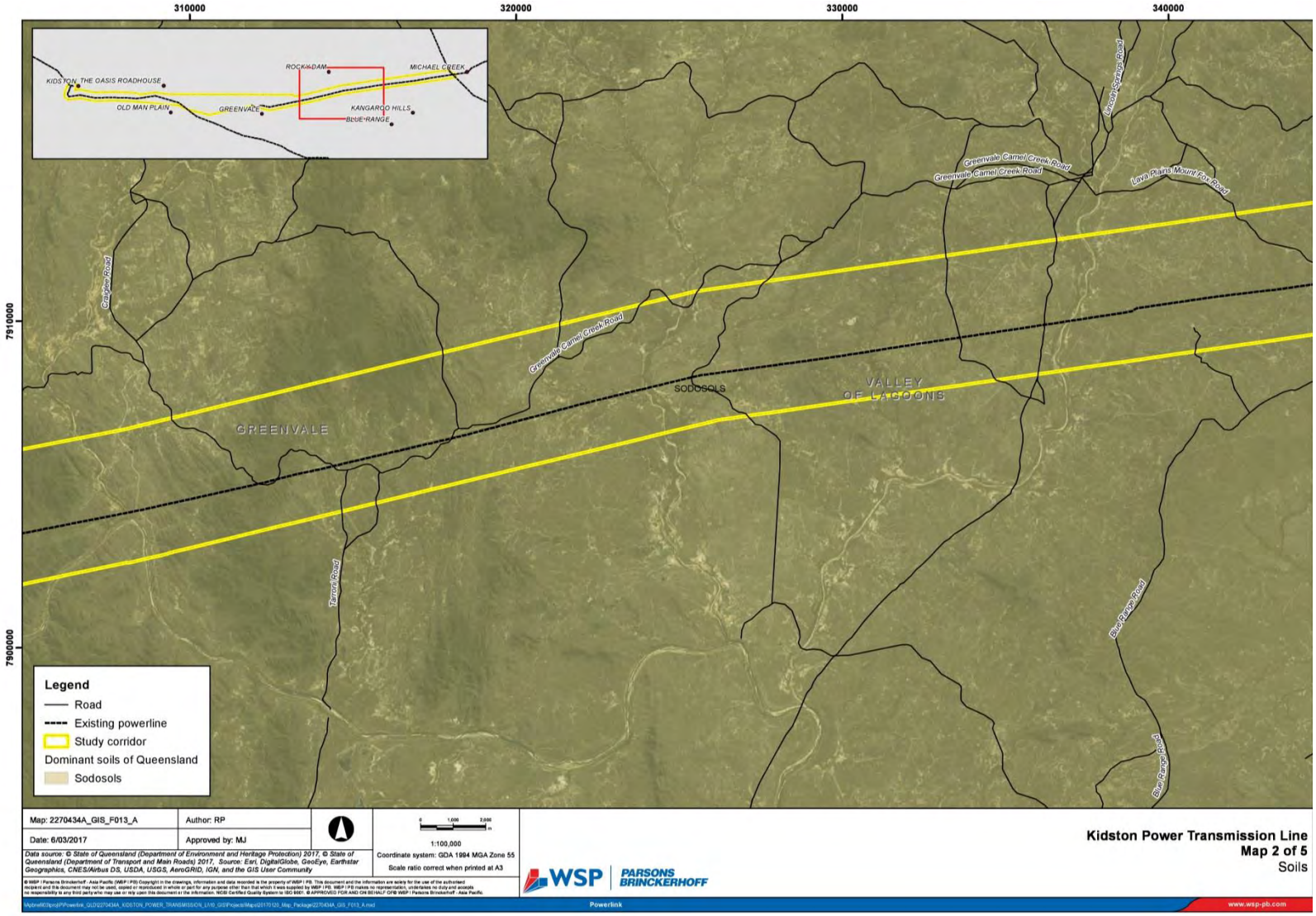
The topography of the project area ranges from flat low-lying land to steep crossings of multiple ranges (including the Great Dividing Range). Elevation ranges from 400-800m AHD. All corridor options will be required to cross the Great Dividing Range (100km west of Mt Fox). Range crossings have been identified as a key constraint and guide the general direction of the corridor options to minimise associated constructability issues.

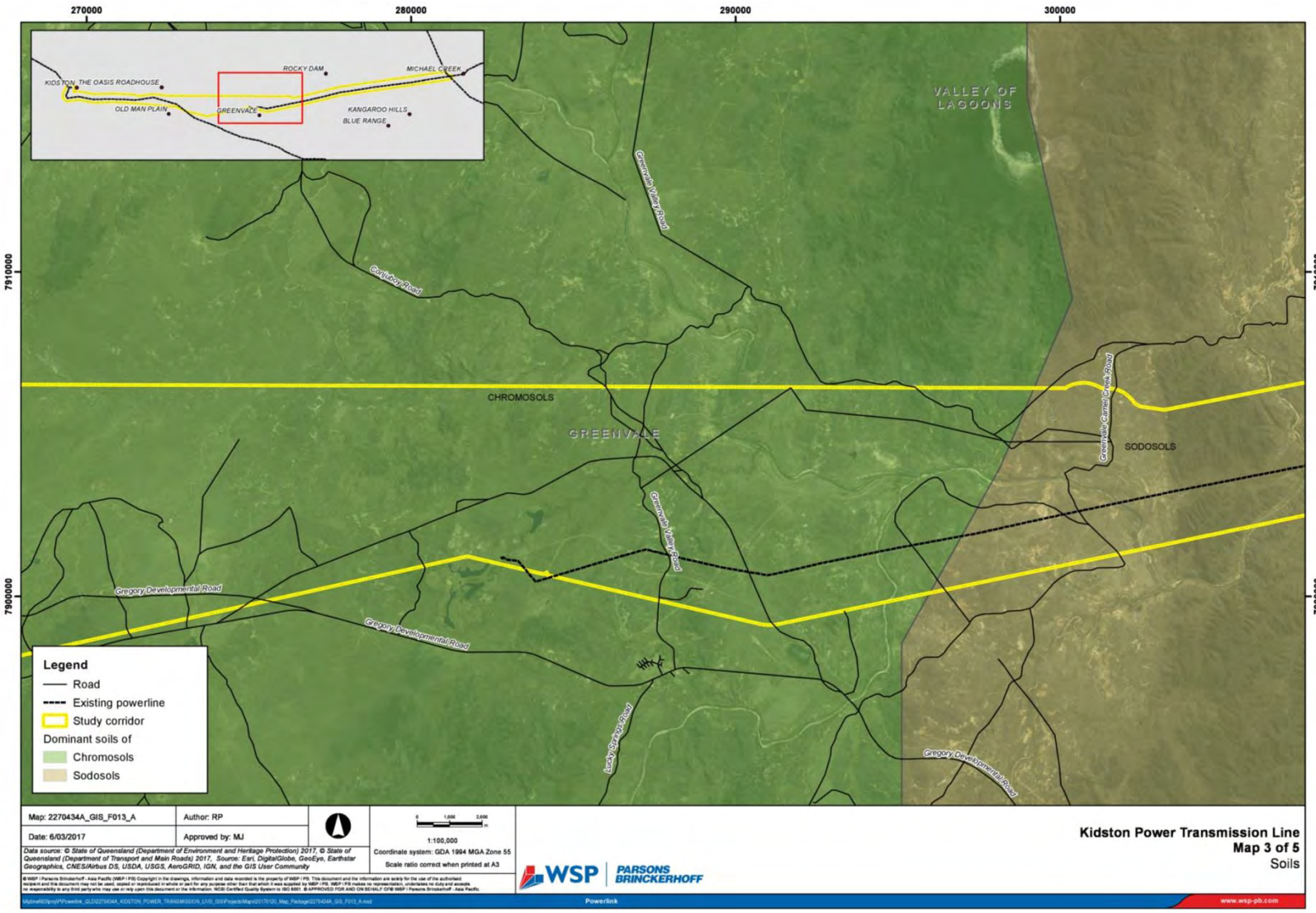
All draft corridor options traverse mainly chromosol and sodosol soil types (Figure 13). There is a very low probability of encountering acid sulphate soils (ASS) along any of the corridors as they mainly occur on coastal land that has elevations below 5m AHD. ASS are also required to be considered on land that is below 20m AHD. Both conditions are not relevant to this project.

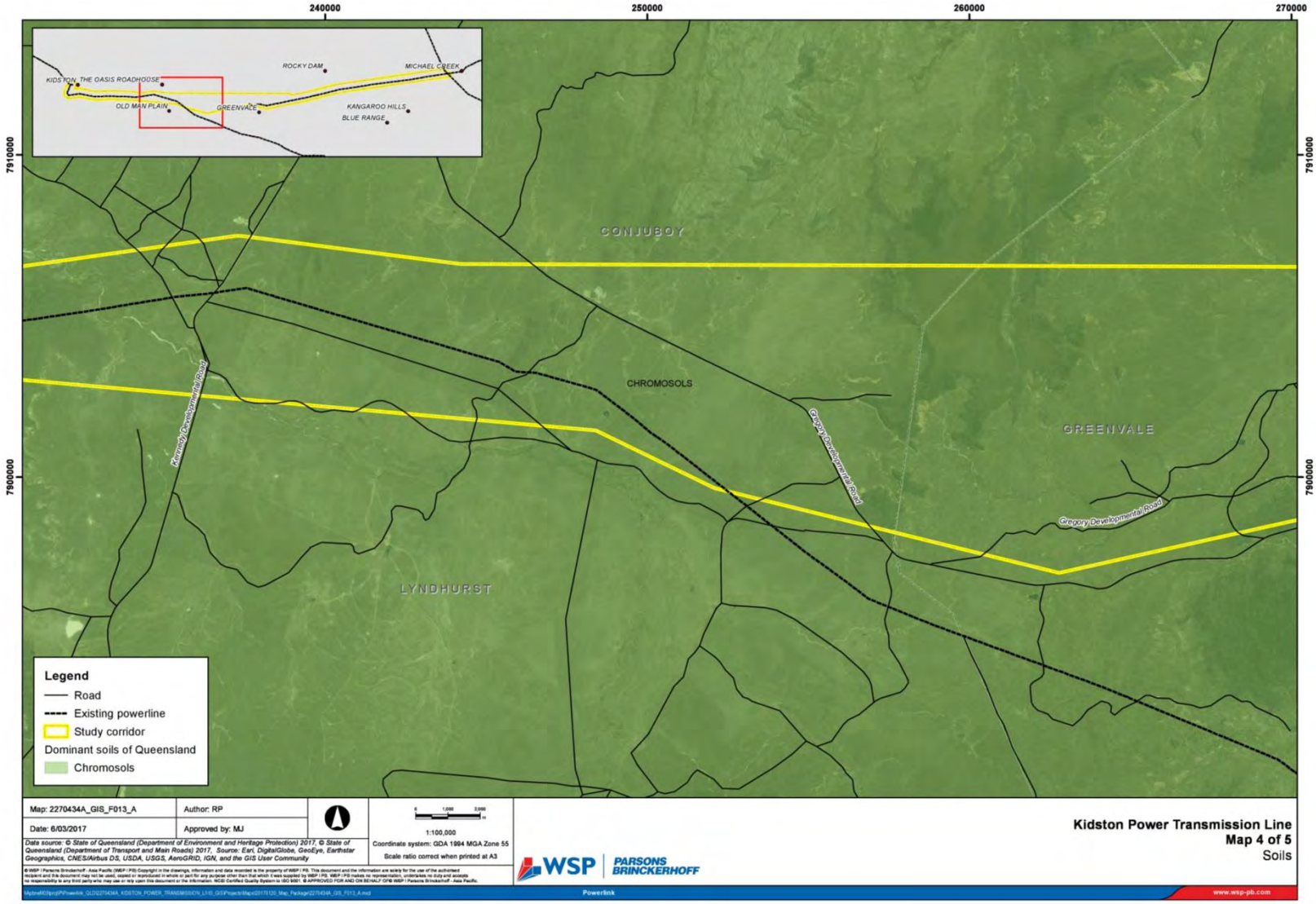
A detailed assessment of acid sulphate soils and other highly reactive soils will be undertaken as part of future approvals processes and geotechnical investigations undertaken as part of the design phase.

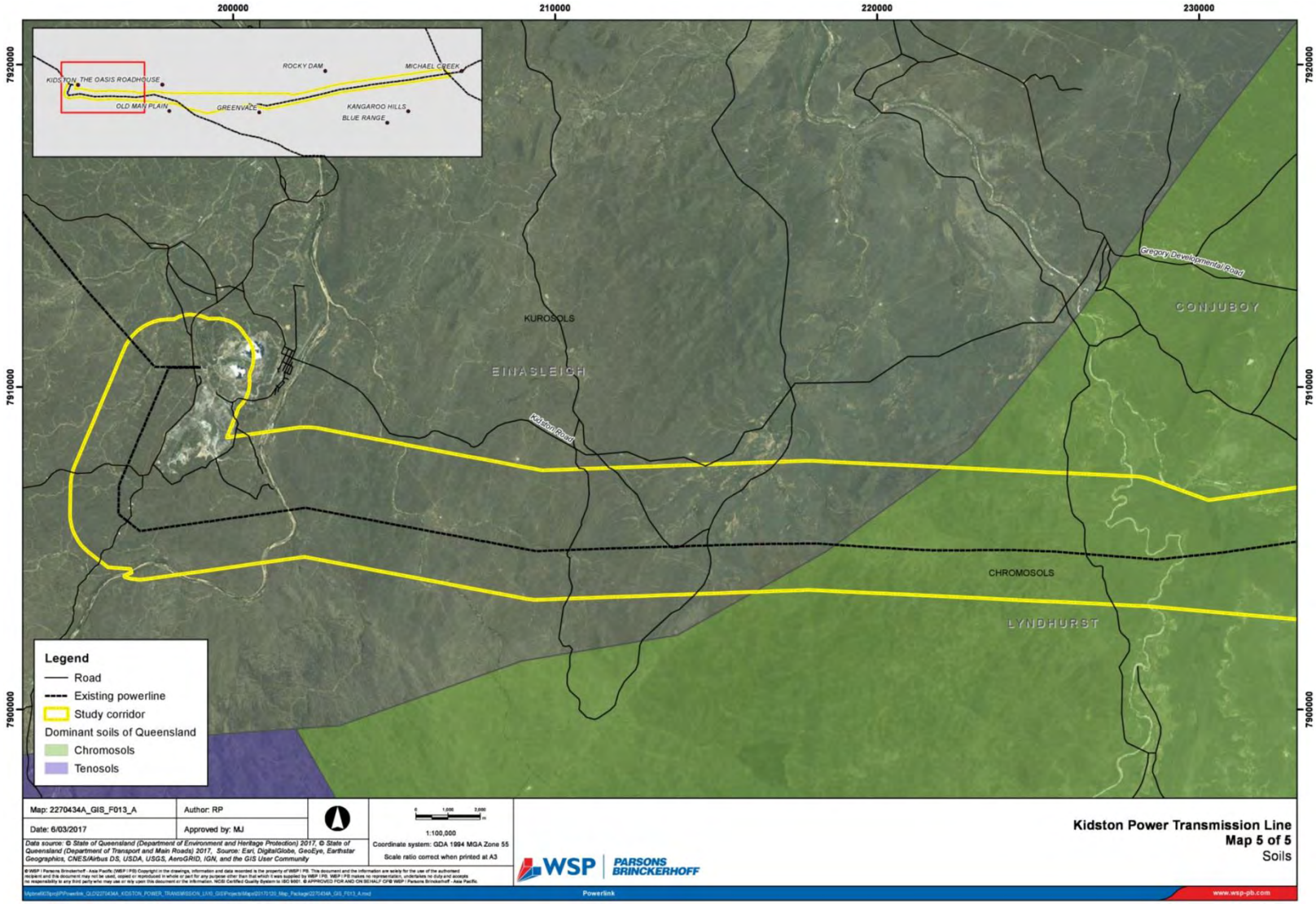
Figure 13 – Soils











10.8 CONTAMINATED LAND

A search of DEHP's Contaminated Land Register (CLR) and Environmental Management Register (EMR) was undertaken for parcels intersected by each of the corridors in early 2016 as part of the DCSR. No properties were listed on the CLR, whilst a number of properties listed are listed on the EMR for a notifiable activity which are provided in the table below.

The EMR listings are mostly for properties surrounding Kidston and activities were most likely associated with the previous mining undertaken there. It is also noted that some of these activities may no longer be occurring but may however still remain on the register. The listing is not considered a constraint, but is noted as an input to latter phases of the project.

Additionally, a notifiable activity on the EMR does not necessarily mean that the parcel (or part of) contains contaminated land, but rather that the activities have the potential to cause contamination. Furthermore, the register attaches an activity to a whole parcel, whilst specific activities may be confined to part thereof.

Further consultation and field investigations in subsequent detailed assessment processes will assist in revealing more detail about the extent of these activities. Consideration would likely be given to the footprint of operations, access and compatibility of electricity infrastructure with specific notifiable activities. At present there is negligible difference between the study corridor options in relation to potentially contaminated land.

Table 5 - Notifiable Activities

Notifiable Activity	Number of Parcels Listed on EMR	
	Corridor B	Corridor C
Abrasive Blasting	3	3
Chemical Manufacture or Formulation	3	3
Chemical Storage	3	3
Engine Reconditioning Works	3	3
Explosive Production or Storage	3	1
Gun Pistol or Rifle Range	1	1
Landfill	4	4
Livestock Dip or Spray Race	8	11
Metal Treatment or Coating	3	3
Mine Wastes	3	4
Mineral Processing	6	6
Petroleum Product or Oil Storage	5	6

Notifiable Activity	Number of Parcels Listed on EMR	
Smelting or Refining	3	3
Waste Storage Treatment or Disposal	1	1

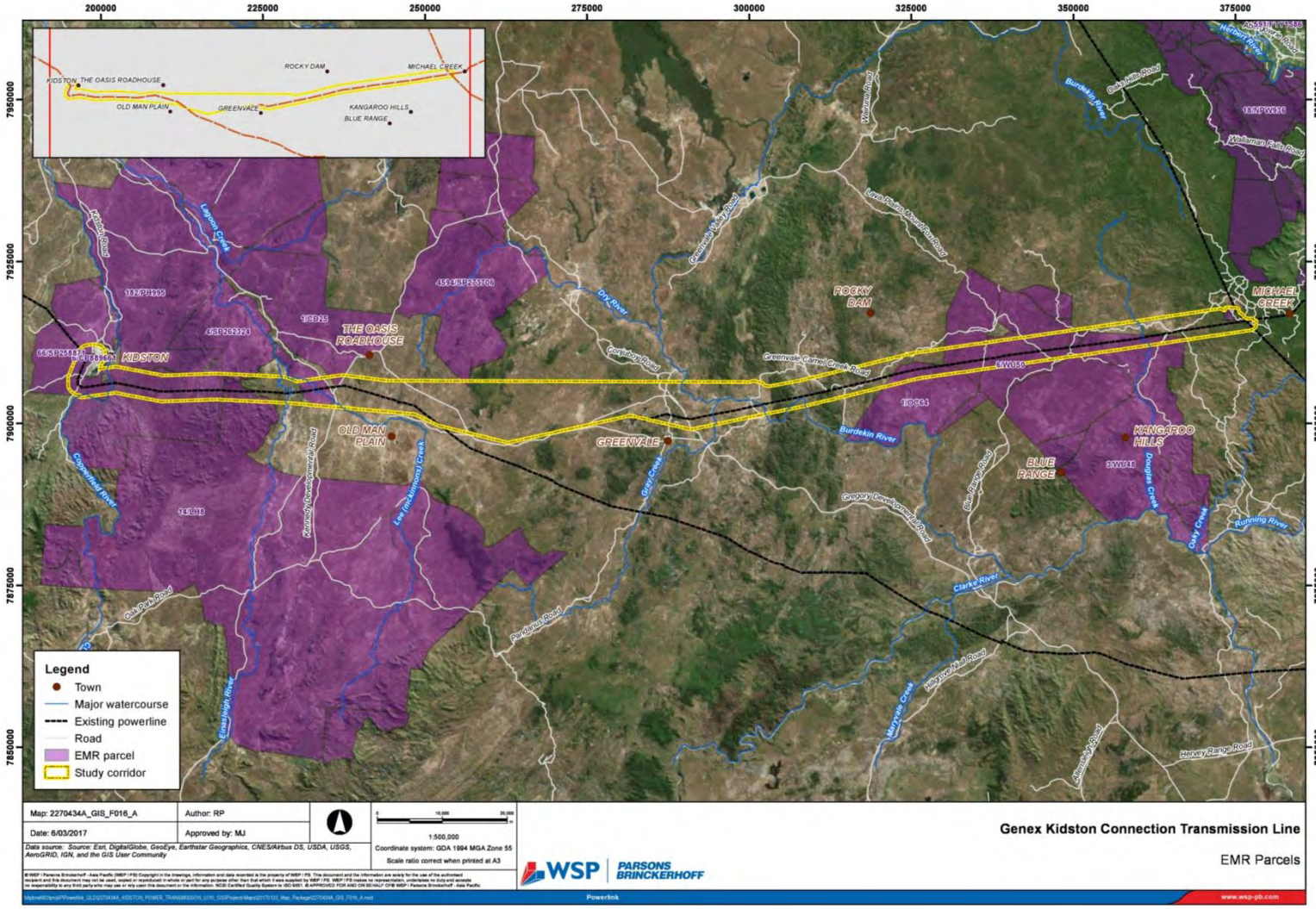
**Note: A single parcel may contain one or more notifiable activities.*

In addition, it should be noted that due to the rural location of the project there is potential for illegal waste burial (e.g. poison drums) to be present.

Powerlink's geotechnical engineers undertake investigations prior to construction and will therefore be able to advise on the presence of any unforeseen actual or potential contamination prior to excavation or other earthworks if Powerlink proceeds to further stages of project development. Should any risks be identified during these investigations then appropriate risk management procedures will be incorporated into an Environmental Management Plan (EMP) and implemented during construction. If contaminated material is discovered it will be managed in accordance with DEHP requirements.

Parcels registered on the EMR are shown in Figure 14.

Figure 14 – EMR Parcels



10.9 UNEXPLODED ORDINANCE

Unexploded ordinance mapping is noted in the far eastern extent of the study area at Mt Fox. The mapping notes the use of the area for training purposes post World War II.

Unexploded ordinance mapping is broad and will not differentiate corridor options at the current level of assessment. The potential presence of unexploded ordinance will be assessed in more detail in subsequent phases of the project, supported by field verification studies as required.

10.10 HYDROLOGY AND WATER QUALITY

The topography within the project area ranges from flat low-lying land to steep crossings of multiple ranges (including the Great Dividing range) with elevation ranging from 400-800m AHD.

Each of the study corridor options cross the following major watercourses within the Burdekin River Basin:

- Douglas Creek
- Camel Creek
- Burdekin River.

Each of the study corridor options cross the following major watercourses within the Gilbert River Basin:

- Einasleigh River
- Lee (McKinnons) Creek
- Gray Creek (Option C only)
- Copperfield River.

All study corridor options cross potential flood-prone areas west of the Gregory Development Road to Kidston. These areas are associated with the Copperfield and Einasleigh Rivers.

The likelihood of impacting hydrology and water quality characteristics of waterways within the project area is considered low as the infrastructure can usually be designed to span over constraints without the need to clear or disturb beds and banks. Alluvial soils on the banks and approaches to watercourses are generally of a loamy sand nature, prone to erosion and dispersion when disturbed.

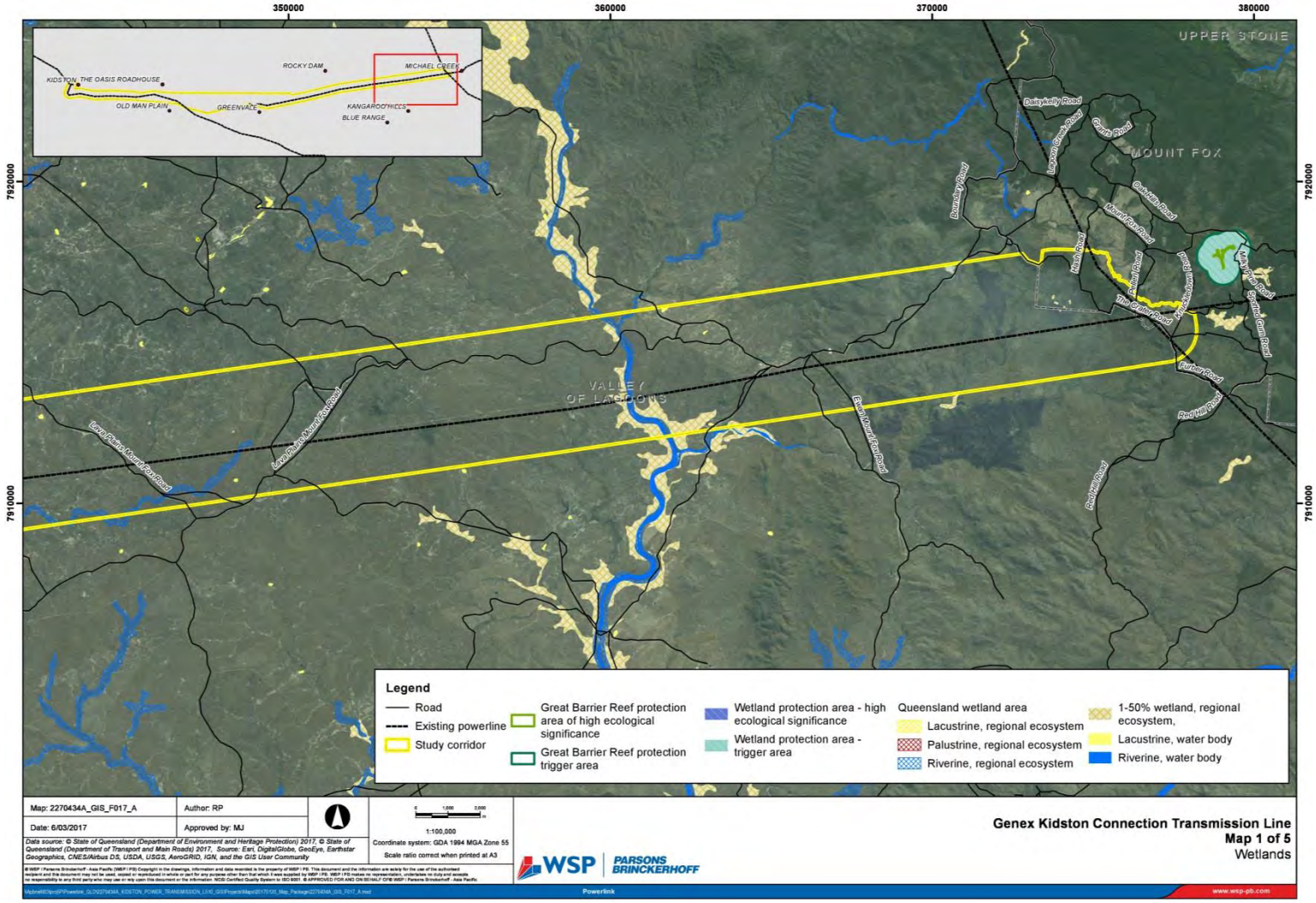
Riparian vegetation performs a vital role in times of flood, reducing flow velocities, resisting channel erosion, anchoring streamside top soil, and helping to trap and retain water borne top soil washed from upstream. Through transmission line design and careful use of topography it is possible to locate the infrastructure on high points to elevate the lines over streamside vegetation and minimise clearing of riparian vegetation.

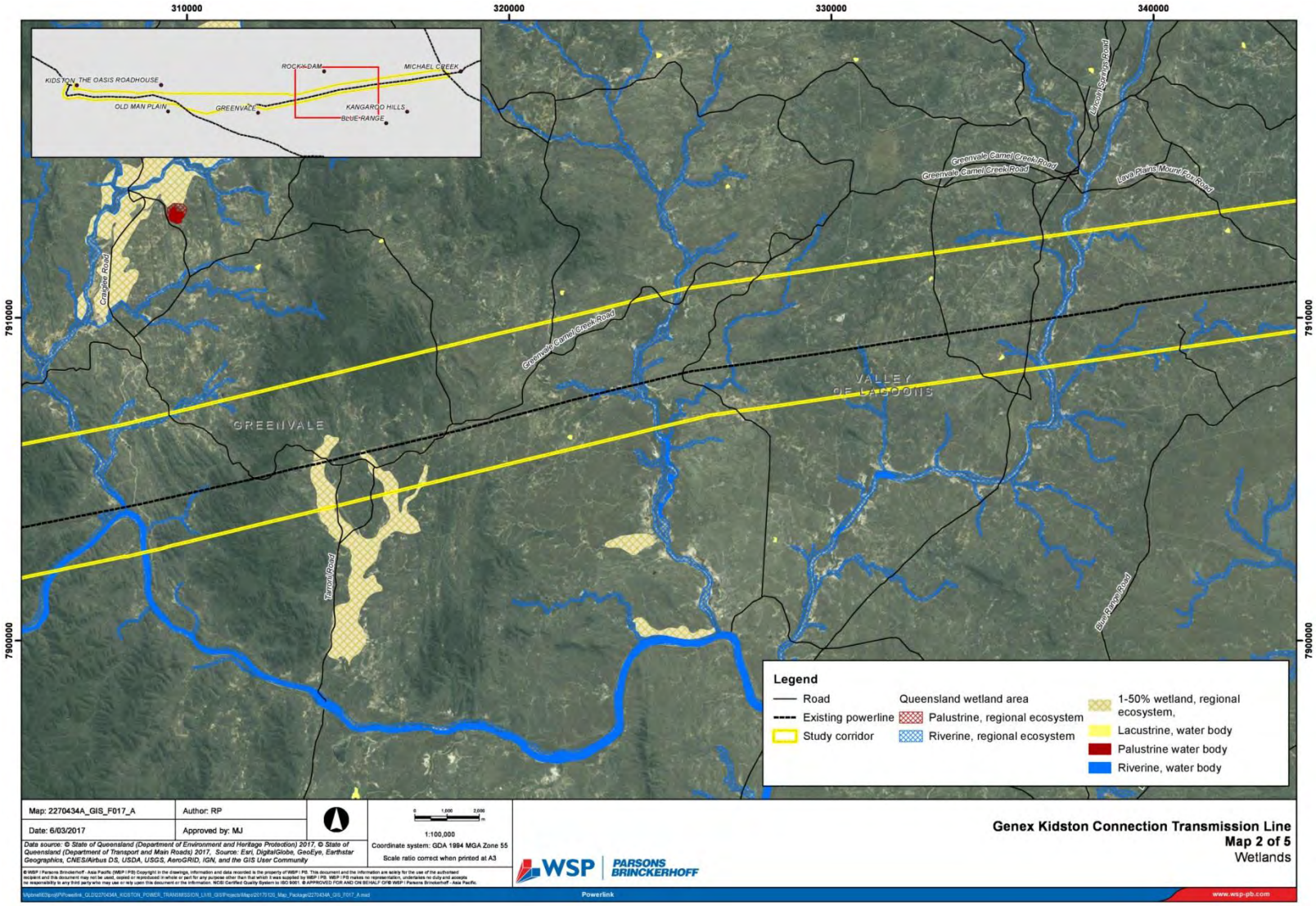
General ground disturbance associated with the construction of transmission structures and access tracks within the corridors has limited potential to result in sediment entering waterways. Where possible, existing access roads with established and maintained erosion and control measures (culverts and spoon drains) would be used, minimising vegetation clearing and disturbance to soil structures. Option C offers the greatest apparent advantage in this regard, reducing clearing requirement through co-location and allowing shared access via existing maintenance tracks.

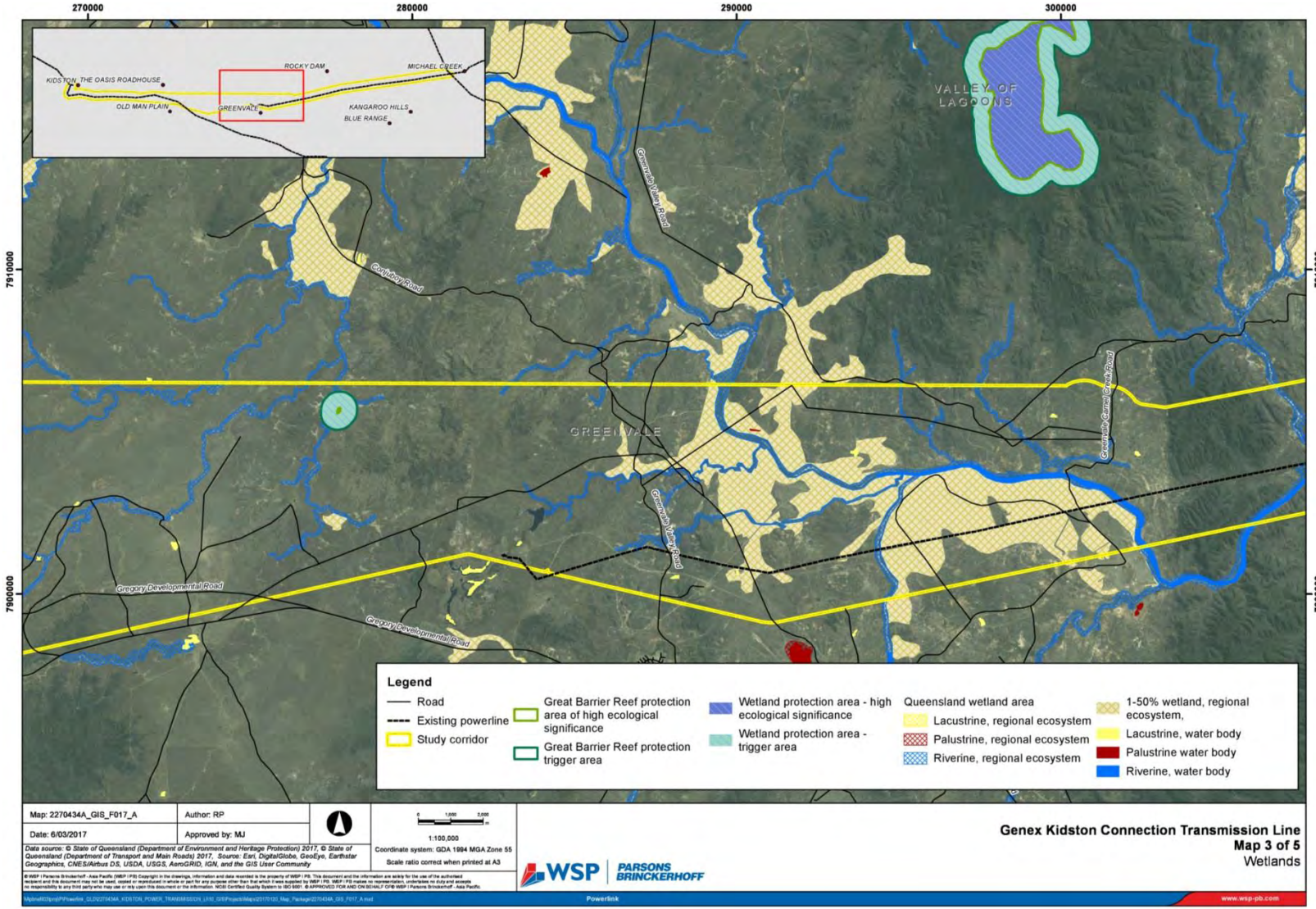
The suitability of the existing tracks to enable construction machinery to access sites will be assessed through future field reconnaissance and there may be repair and minor upgrades of tracks and crossings required.

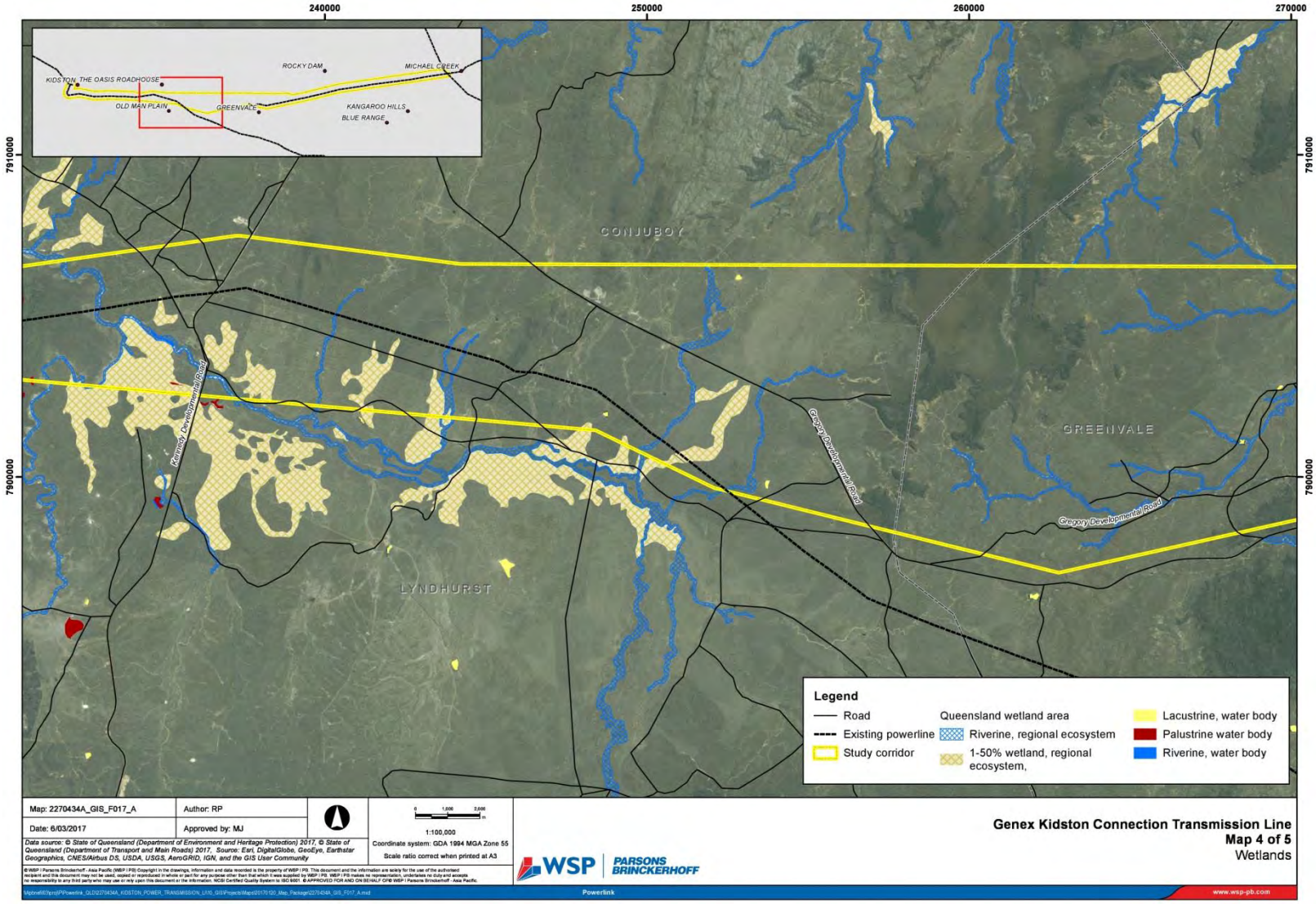
Further assessment of impacts and mitigation measures will be undertaken as part of future detailed impact assessments and would be subject to further engagement with the relevant landholders and stakeholders.

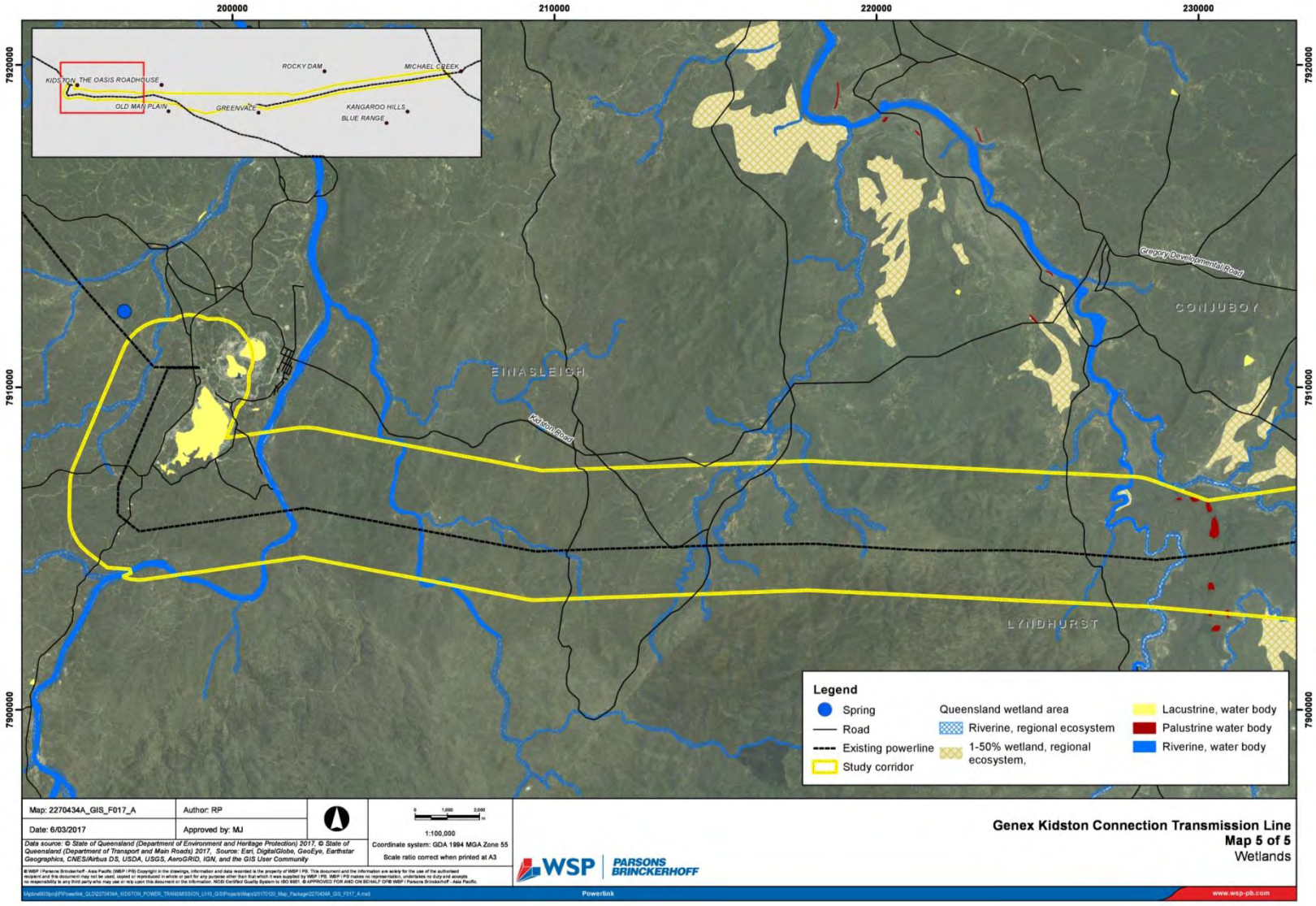
Figure 15 – Wetlands











PROPOSED GENEX KIDSTON CONNECTION PROJECT

Corridor Selection Report

PREPARED BY

QUEENSLAND ELECTRICITY TRANSMISSION CORPORATION LIMITED

(ACN 078 849 233) trading as “POWERLINK”

11 ECOLOGY AND VEGETATION

Powerlink commissioned third party ecological advice in late 2016. The purpose of the advice was to assess the likely presence of MNES, Matters of State Environmental Significance (MSES) and other ecological constraints, providing a better understanding of potential environmental impacts for each study corridor option. The full ecological assessment is provided at Attachment 1.

The ecological advice included the three study corridor options from the DCSR. It was prudent to add study corridor A from the DCSR to the ecological assessment to validate the conclusions of desktop assessment in the DCSR that study corridor A had the highest relative environmental impact. It was as a result of the DCSR that study corridor A was removed from assessment in this CSR and the ecological advice provided an opportunity to confirm that removal of study corridor A had been undertaken on sound logic. The ecological advice confirmed that study corridor A had the highest potential for environmental impact (Attachment 1).

Due to the expansive nature of the study area and the early nature of these investigations, it was not feasible or justified to undertake field studies (ecological or otherwise) for the purpose of the CSR. Field studies will be part of any future detailed impact assessment process

In an endeavour to improve the ecological assessment, recognising that field studies were not feasible, Powerlink commissioned a small scope of remote sensing work over the region. The methodology of the remote sensing work is described in Section 11.1. The purpose of remote sensing was to define the physical extents of woody vegetation in the project area, which are not readily understood from other publicly available data sources.

Defining the extent of woody vegetation allows for primary quantification of potential vegetation impacts associated with the study corridor options. Understanding the physical extent of vegetation impacted also allowed the ecological advice to make more informed inferences about the type of vegetation and habitat potentially impacted.

11.1 REMOTE SENSING

Remote sensing was undertaken over the same area as the ecological advice, being the general extent covered by all study corridor options from the DCSR. Satellite imagery was utilised due to the vast size of the project area and limited availability of aerial imagery.

The methodology captured the extent and spatial distribution of current woody vegetation using an object based image classification process. This methodology has been previously deployed at a wide range of scales and using different remotely sensed source datasets for organisations across Australia and internationally. Landsat satellite imagery was used to derive landcover classification for the project extent from which indicative regional ecosystem mapping was generated. This was then aggregated into the mapping of woody vegetation for the project.

The final report associated with the remote sensing scope is provided at Attachment 2 and contains extensive detail about the methodology adopted. The output of greatest importance was spatial data representing the woody vegetation in the project area, which formed the basis of the ecological assessment.

11.2 ECOLOCIAL ASSESSMENT METHODOLOGY

The general methodology adopted for the ecological assessment is described in Table 6.

Table 6 – Ecological Assessment Methodology

Process	Comments
Database searches	• EPBC Protected Matters Search Tool (by coordinates, buffer 5km) • Wildlife Online (Figure 16) • Atlas of Living Australia.
GIS analysis and mapping	All study corridor options buffered to 3km wide and intersection with the following features mapped and quantified: The number of Wildlife Online species records for threatened flora and fauna species listed under the NC Act and/or EPBC Act that have been previously recorded within each corridor investigation area. The number of Atlas of Living Australia's species records for threatened fauna listed under the NC Act and/or EPBC Act that have been previously recorded within each corridor investigation area. The presence or absence of 'high risk areas' for endangered, vulnerable and near threatened plants (EVNT plants) listed under NC Act on the 'protected plants flora survey trigger map' within each corridor investigation area. The extent (hectares) of MSES regulated vegetation in reference to: • Department of Natural Resources and Mine's (DNRM) regulated vegetation mapping (endangered and of concern regional ecosystems) • DNRM's regional ecosystem mapping (endangered, of concern and least concern regional ecosystems) • Virtual GIS's remote sensing analysis and mapping of woody vegetation – predicted and potential extent of remnant, regrowth and non-remnant vegetation • regulated remnant watercourse vegetation (endangered, of concern and least concern regional ecosystems). The extent (hectares) of other MSES listed under Schedule 2 of the Environmental Offsets Regulation 2014 within each corridor investigation area, including: • Protected areas (e.g. National parks and state reserves) • Wildlife habitats • Strategic environmental areas • High ecological significance wetlands • High ecological value waters (wetland) • High ecological value waters (watercourses) • Environmental offsets

	• Connectivity.
Regulated remnant watercourse vegetation	1:100,000 scale regulated vegetation mapping published by the State of Queensland covers approximately two thirds of the project area, while the remaining third (the western extent) is covered by the 1:250,000 scale mapping. The 1:250,000 scale mapping does not have stream order attributes. Therefore, the Strahler method was applied to the 1:250,000 watercourse layer using GIS to appropriately assign stream orders.
Threatened ecological communities	An assessment of the mapped regional ecosystems within each corridor was undertaken to identify the potential presence of regional ecosystems that may potentially constitute threatened ecological communities listed under the EPBC Act
Constraint Ranking	A ranking system was applied for each environmental matter and/or potential ecological constraint, to capture the degree of ecological constraints within each study corridor option. **RED** Greatest amount of potential impact and ecological constraint **ORANGE** Moderate amount of potential impact and ecological constraint **GREEN** Least amount of potential impact and ecological constraint The ranking system was not applied to database search results (i.e. Wildlife Online and PMST) because they have been used to inform species record searches and assessment. The ranking system was also not applied to matters that do not require significant impact assessments or trigger environmental offsets (i.e. least concern regional ecosystems and regrowth and areas of non-remnant). The 'high risk areas' for endangered, vulnerable and near threatened plants (EVNT plants) listed under NC Act on the 'protected plants flora survey trigger map', were not ranked because they were captured as flora species records.

11.3 POTENTIAL ENVIRONMENTAL IMPACT SUMMARY

Table 7 summarises the potential environmental impacts described in Sections 11.4 to 11.5.14. The summary is copied from the third party ecological assessment described in 11. The only variation is the removal of 3ha of impact to protected areas in study corridors A and C, resulting from the study area amendment described in Section 5.1.5.

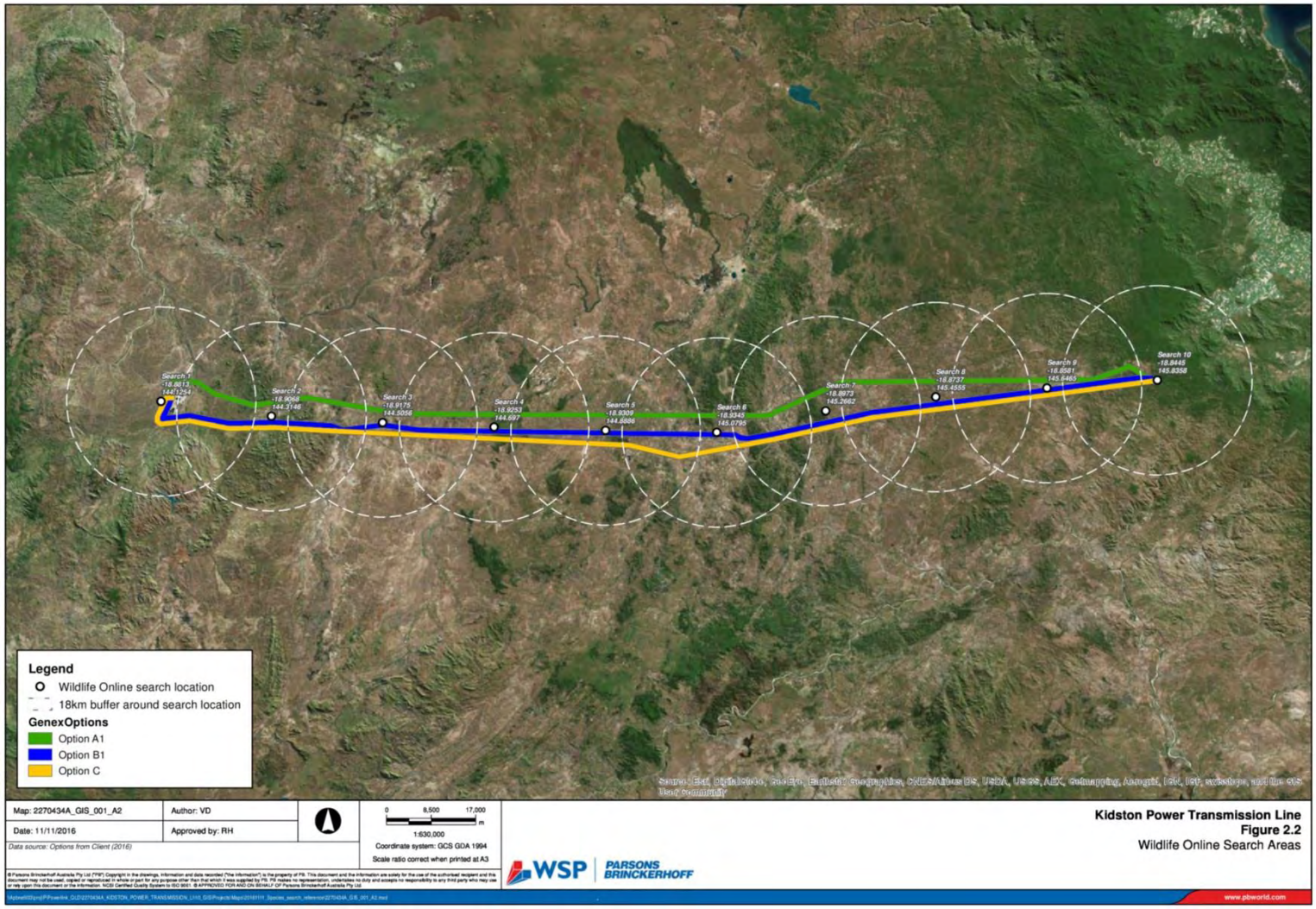
The summary is based on a traffic light system and demonstrates that study corridor option C is preferred from an environmental perspective. The difference in potential impact between study corridors B and C is small for many criteria but the cumulative benefit of study corridor C is likely to be significant. Co-location options and shared access opportunities around study corridor C offer potential to further lower overall impacts during impact assessment and design phases.

It is important to reiterate that study corridor A only appears in the ecological assessment to validate its removal from assessment at the DSCR stage. The traffic light system demonstrates that study corridor A had the potential for highest environmental impact by a reasonable margin.

Table 7 – Potential Environmental Impact Summary

Ecological constraint	CONSTRAINT RANKINGS		
	Option A	Option B	Option C
Matters of State Environmental Significance			
NC Act threatened species records (numbers)	2	4	5
Regulated of concern dominant vegetation (ha)	2,059	1,819	1,519
Regulated of concern sub-dominant vegetation (ha)	1,008	442	334
Regulated of high value regrowth vegetation (ha)	3.6	2.4	2.4
Regulated Category R regrowth vegetation (ha)	422	296	257
Mapped of concern dominant regional ecosystems (ha)	1,008	442	334
Mapped of concern dominant regional ecosystems (ha)	2,059	1,891	1,519
Predicted of concern dominant woody vegetation (ha)	1,535	1,460	1,223
Predicted of concern sub-dominant woody vegetation (ha)	549	295	618
Potential of concern dominant woody vegetation (ha)	240	344	431
Potential of concern sub-dominant woody vegetation (ha)	364	87	37
Regulated remnant watercourse Wet Tropics bioregion (ha)	118	50	45
Regulated remnant watercourse vegetation Einasleigh Uplands bioregion (ha)	5,585	5,547	5,493
Protected areas (ha)	655	214	142
Wildlife habitats (ha)	522	411	385
High ecological significance (HES) wetlands (ha)	0	1.1	0
Matters of National Environmental Significance			
Threatened and migratory species records (numbers)	3	6	5
Proximity to Wet Tropics of Queensland heritage properties (km)	4.8	5.2	5.6

Figure 16 – Wildlife Online Searches



11.4 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

11.4.1 EPBC ACT THREATENED AND MIGRATORY SPECIES

Database searches identified few records of threatened and migratory species. A low number of records was expected due to the remote and largely undeveloped and unsurveyed (ecological survey) nature of the project area. There is however the potential for additional species to be identified in subsequent impact assessment stages.

The records retrieved have been mapped for each study corridor option (Figure 3.1 – 3.3 in Attachment 1).

The potential to identify other species does not dictate that a referral under the *EPBC Act 1999* should, or should not, occur. It is rather a gap in existing database information. In an effort to address the shortfall in existing information, Powerlink commissioned a likelihood of occurrence assessment.

11.4.1.1 LIKELIHOOD OF OCCURRENCE ASSESSMENT

The likelihood of occurrence assessment (Attachment 3) built on the third party ecological advice described in Section 11.2. It related mapped vegetation types to fauna and flora species known to be associated with those features in the broader region well beyond the CSR study area, targeting more developed areas where species records are more readily available.

The likelihood of occurrence assessment represents best endeavours to identify flora and fauna species potentially occurring in the study area and responds to feedback from the Department of Environment and Heritage Protection in January 2017 suggesting such an investigation.

This additional assessment confirmed the initial ecological advice procured for the CSR and identified only a relatively small number of additional EPBC species that may occur in the study area. Importantly, no new Threatened Ecological Communities or World Heritage Values were identified through this additional assessment.

It is important to note that the likelihood of occurrence assessment does not influence the preferred study corridor at the current level of assessment because vegetation communities and habitats occur in a broad and homogenous manner across the CSR study area.

Future ecological survey approaches will be designed to reflect the potential for additional species and provide for an adequate survey intensity to explore the ecological values of the project area. Appropriate management measures can then be designed on the basis of survey results. A range of management and mitigation measures are available in the development of transmission lines and terrestrial impacts can be minimised in most circumstances.

The likelihood of occurrence assessment does not dictate that a referral under the *EPBC Act 1999* should, or should not, occur. Detailed discussion of the referral process is provided in Section 9.1.1.1.

11.4.2 THREATENED ECOLOGICAL COMMUNITIES (TEC)

Broad Leaf Tea-tree (Melaleuca viridiflora) woodlands in high rainfall coastal north Queensland was the only TEC revealed by the PMST as potentially occurring within the project area. The Broad Leaf Tea-tree TEC in

the Wet Tropics and Central Mackay Coast Bioregions is associated with varieties of regional ecosystems described as 7.3.8/ 7.5.4 (floodplain), 8.3.2, 8.5.2 or 8.5.6 (*Melaleuca*).

The ecological assessment determined that the likelihood of The Broad Leaf Tea-tree TEC occurring in the project area is low as the associated regional ecosystems are not present. Based on the assessment undertaken to date the risk of impacting TECs is considered low for all study corridor options.

11.4.3 WET TROPICS OF QUEENSLAND – WORLD, NATIONAL AND INDIGENOUS HERITAGE PROPERTIES

The ecological assessment considered proximity of the proposed line to the World Heritage-listed Wet Tropics. None of the study corridors impact the World Heritage area. Option A is the closest, located 4.8km at its closest point. At that distance, a transmission line is highly unlikely to impact the Wet Tropics in any manner (see Figure 3.65 in Attachment 1).

11.5 MATTERS OF STATE ENVIRONMENTAL SIGNIFICANCE

11.5.1 NC ACT THREATENED SPECIES

Wildlife Online database search results revealed that 26 threatened species listed under the NC Act and/or EPBC Act have been previously recorded within the search area, including 11 birds, six mammals and nine plants. Threatened species listed as endangered, vulnerable and special least concern under the NC Act are recognised as MSES under the *Environmental Offset Act 2014*. Near threatened species do not need to be assessed in terms of significant residual impacts under the *Environmental Offset Act 2014*, but have been included, just in case of any future changes in legislation that may occur during the approval pathway of the project.

As noted for EPBC Act threatened and migratory species (Section 11.4.1), the largely undeveloped and unsurveyed (ecological survey) nature of the project area dictates that species records are likely to be partial. There is potential for additional species to be identified in subsequent impact assessment stages.

Future ecological survey approaches will be designed to reflect the potential for additional species and provide for an adequate survey intensity to explore the ecological values of the project area. Appropriate management measures can then be designed on the basis of survey results. A range of management and mitigation measures are available in the development of transmission lines and terrestrial impacts can be minimised in most circumstances.

Appropriate management measures can then be designed on the basis of survey results. A range of management and mitigation measures are available in the development of transmission lines and terrestrial impacts can be minimised in most circumstances.

The records retrieved have been mapped for each study corridor option (Figure 3.1 – 3.3 in Attachment 1).

11.5.2 PROTECTED PLANTS

High risk areas for endangered, vulnerable and near threatened plants (EVNT plants) listed under NC Act on the ‘protected plants flora survey trigger map’ are presented in Figure 3.4 in Attachment 1. The high risk

areas indicate confirmed records of *Acacia tingoorensis* and represent a potential constraint to all three study corridors.

Subsequent impact assessment processes will need to target these areas and flora surveys will need to be undertaken in accordance with the *Flora Survey Guidelines – Protected Plants Nature Conservation Act 1992*. Powerlink has extensive experience in designing and developing infrastructure to minimise impacts to EVNT plants.

11.5.3 REGULATED VEGETATION

Category R Vegetation

DNRM's *Category R regrowth vegetation: A self-assessable vegetation clearing code* states that Category R regrowth vegetation is native woody vegetation on freehold land, Indigenous land or leasehold land granted for agriculture or grazing purposes, located within 50 metres of a watercourse in the Burdekin, Mackay, Whitsunday and Wet Tropics Great Barrier Reef catchments.

It is prudent to consider potential impacts to Category R vegetation, irrespective of the legislative treatment of Category R under the latter approval process for the project which may exempt the project dependant on the pathway chosen. Study corridor option C impacts the least amount of Category R vegetation. The physical extents impacted are described in Section 11.3.

11.5.4 DNRM REGIONAL ECOSYSTEMS

No endangered regional ecosystems are mapped in the study area. Study corridor option C impacts the least of concern regional ecosystem based on DNRM mapping. The physical extents impacted are described in Section 11.3.

Regional ecosystem mapping is undertaken by broad scale processes, with most maps prepared at a scale of 1:100,000 and based on the best available information. There are established processes for broad scale regional ecosystem mapping to be refined. Survey information collected during project development by Government and the private sector is used to amend the high level mapping, providing a clearer picture of the actual ecological makeup of the region.

The Genex Kidston Connection Project study area is largely undeveloped and therefore does not benefit from the same refinement of regional ecosystem mapping as more intensely developed regions. It is for this reason that the remote sensing scope described in Section 11.1 was undertaken. Remote sensing provides limited insight into the actual regional ecosystem communities present, but it does serve to rationalise the physical extent of vegetation in an otherwise largely unexplored region.

Higher regard is given to an assessment of potential vegetation impacts based on the intersection of regional ecosystem mapping with the results of the remote sensing exercise.

11.5.5 WOODY VEGETATION ASSESSMENT (REMOTELY SENSED)

The woody vegetation assessment used GIS remote sensing to predict the extent of woody remnant vegetation, and the potential extent of woody remnant vegetation and regrowth vegetation in each study corridor.

The assessment broadly involved:

- Physical identification of woody vegetation by remote sensing
- Removal of areas mapped as regional ecosystem where no vegetation was present
- Addition of areas where vegetation was present but not mapped in regional ecosystem mapping
- Attribution of remotely sensed vegetation with DNRM mapped regional ecosystem descriptions where the two intersected.

This process provides the best possible understanding of vegetation cover and potential impacts without the intensive investment of time and resources associated with a full impact assessment process. The description above is a summary in simple language for the purpose of this report. The full methodology is available in Attachment 2.

Study corridor C is the least constrained in terms of potential impacts upon 'of concern' dominant regional ecosystems. Study corridor B is least constrained in terms of potential impacts upon 'of concern' sub-dominant regional ecosystems. The cumulative impact to 'of concern' regional ecosystems is similar for both options.

Greater emphasis should be applied to the predicted of concern dominant remnant vegetation, which therefore suggests that study corridor C is least constrained in terms of regional ecosystems. The physical extents impacted are described in Section 11.3.

In interpreting the table it is useful to understand that 'predicted' woody remnant vegetation is those areas where woody vegetation was verified within the regional ecosystem mapping. Potential woody remnant vegetation is those areas identified by remote sensing of similar composition to other remnant vegetation but not currently mapped as regional ecosystems. It is expected that these areas will be verified as regional ecosystems in subsequent field surveys.

All study corridor options involve clearing. Subsequent impact assessment processes will focus heavily on the extent of impacts to vegetation. Option C is considered favourable not just for lower potential physical impact to vegetation, but for the benefit of co-location and the potential to further reduce those potential impacts by refining design of a shared corridor.

Mapping of potential regional ecosystem impacts based on the woody vegetation assessment are provided in Attachment 1.

11.5.6 REGULATED REMNANT WATERCOURSE VEGETATION

Regulated remnant watercourse vegetation occurs throughout the study area. A distance from the defining bank of the mapped watercourse is specified in regulation that defines a distance from the defining bank of the watercourse within which remnant vegetation represents remnant watercourse vegetation. The distance varies by bioregion and stream order.

Study corridor C has the lowest potential impact to remnant watercourse vegetation. The physical extent of potential impact is described in Section 11.3.

11.5.7 PROTECTED AREAS

Several protected areas under the *Nature Conservation (Protected Areas) Regulation 1994* were identified in the study area. These areas are nature refuges (Newcastle Range – The Oaks and Liefway) and National Parks (Girringun). Study corridor C intersects the lowest total extent of protected area.

The extent of impact to protected areas associated with study corridor C was lowered by the amendment to the study area described in 5.1.5, which remove the Liefway Nature Refuge from the study area entirely, benefitting study corridors A (removed at DCSR stage) and C. The refuge fell outside of study corridor B.

Study corridor C intersects the lowest amount of the Girringun national park area based on existing published boundaries, with about 70ha less of the protected area intersected than study corridor B.

11.5.8 WILDLIFE HABITAT

Wildlife habitat is mapped by the State and broadly includes:

- Threatened wildlife that is classified as endangered or vulnerable
- Special least concern animals (iconic) under the NCA.

Species mapping adopts wildlife habitat using, in order of preference:

- Essential habitat mapped under the VMA
- Modelled habitat (peer reviewed and accepted) mapped using climate, elevation, bioregion, and regional ecosystems
- Point records (buffered to 1,000m) that intersect with native vegetation (remnant or regrowth regional ecosystems) where it overlays a species record location.

Study corridor C intersects the least mapped wildlife habitat. As noted in Section 11.5.1 there is potential for additional NC Act species to be present in the project area due to a lack of historic surveys. The mapped wildlife habitat is based partially on these records and there is also logically potential for additional wildlife habitat to be present.

Notwithstanding limitations in the data, study corridor C impacts the least vegetation and benefits from co-location with existing transmission lines. It is likely that these features will also minimise potential habitat impacts. Habitat values will be explored in detail in subsequent impact assessments.

11.5.9 STRATEGIC ENVIRONMENTAL AREAS

Strategic environmental areas do not exist in the study area.

11.5.10 HIGH ECOLOGICAL SIGNIFICANCE (HES) WETLANDS

Only study corridor B intersects an identified HES wetland area. The physical extent of the intersection is described in Section 11.3.

11.5.11 HIGH ECOLOGICAL VALUE WATERS (WETLAND)

High ecological value waters (wetland) areas do not exist in the study area.

11.5.12 HIGH ECOLOGICAL VALUE WATERS (WATERCOURSES)

High ecological value waters (watercourse) areas do not exist in the study area.

11.5.13 ENVIRONMENTAL OFFSET AREAS

Environmental offset areas do not exist in the study area.

11.5.14 CONNECTIVITY

Connectivity is assessed as significant residual impacts under the Queensland Government's Environmental Offsets Policy version 1.1 (2014), once a project footprint has been determined. The residual impact is assessed using GIS and the Queensland Government's Landscape Fragmentation and Connectivity tool for an individual impact area. Essentially, the assessment is based upon the level of fragmentation to remnant vegetation as a result of a project's impact area(s).

All study corridor options would result in impacts to connectivity. On this basis, once a preferred study corridor option is selected and a project impact area(s) is defined during subsequent impact assessment processes, the impact upon connectivity will need to be assessed using the Landscape Fragmentation and Connectivity tool.

As all options impact connectivity and detailed impacts are subject to significant change, connectivity does not differentiate study corridor options.

12 CONSTRUCTABILITY

Overall the study area is of rural character, dominated by timbered areas, with some areas cleared for cattle grazing. The topography of the study areas is varied, with a large portion of the area being level or gently undulating plains. There are steeper sections on both corridors, including escarpments. This may present a challenging environment for construction and associated vehicle/plant access and consideration has been given to avoid where possible. Concrete batch plants will be required for the construction of the transmission line foundations.

Construction of a substation site at Mt Fox may present challenges due to topography within the area. A flat site is required for substation, which would likely require some level of cut and fill earthworks to achieve. Further detail is provided in Section 12.3. Despite potentially challenging topography, Mt Fox remains the closest viable connection point to the existing electricity transmission network (Section 5.1.3).

Constructability considerations remain similar across all draft corridor options and do not serve to differentiate options at this level of investigation. Powerlink is the foremost authority in transmission line and substation development in Queensland and will support Genex in the development of best for project design solutions.

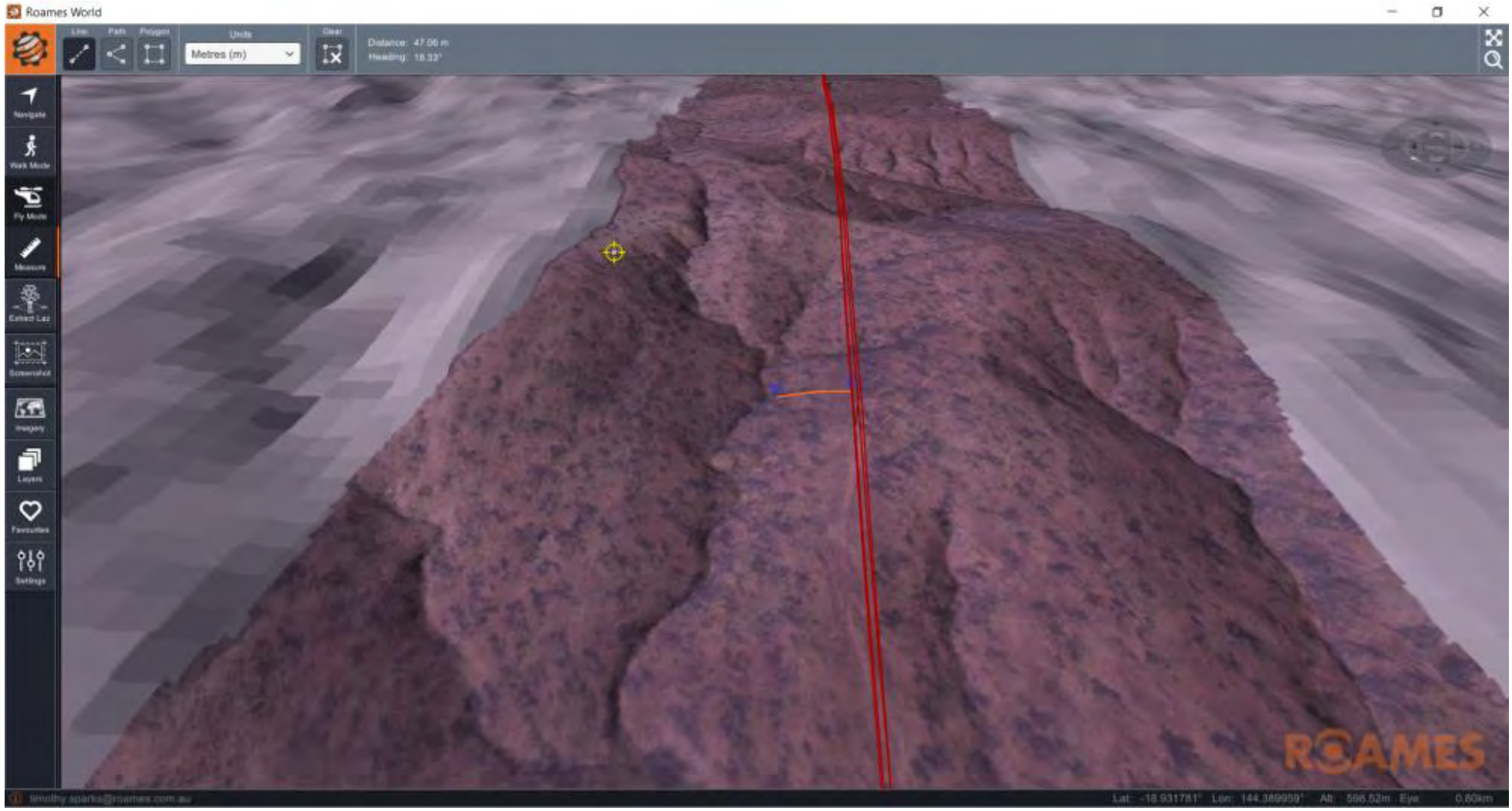
12.1 ROAMES DATA REVIEW

Ergon has compiled a comprehensive virtual model of their network using aerial survey techniques. Software called ROAMES, developed by spatial consultancy Fugro, is used to display and navigate this model.

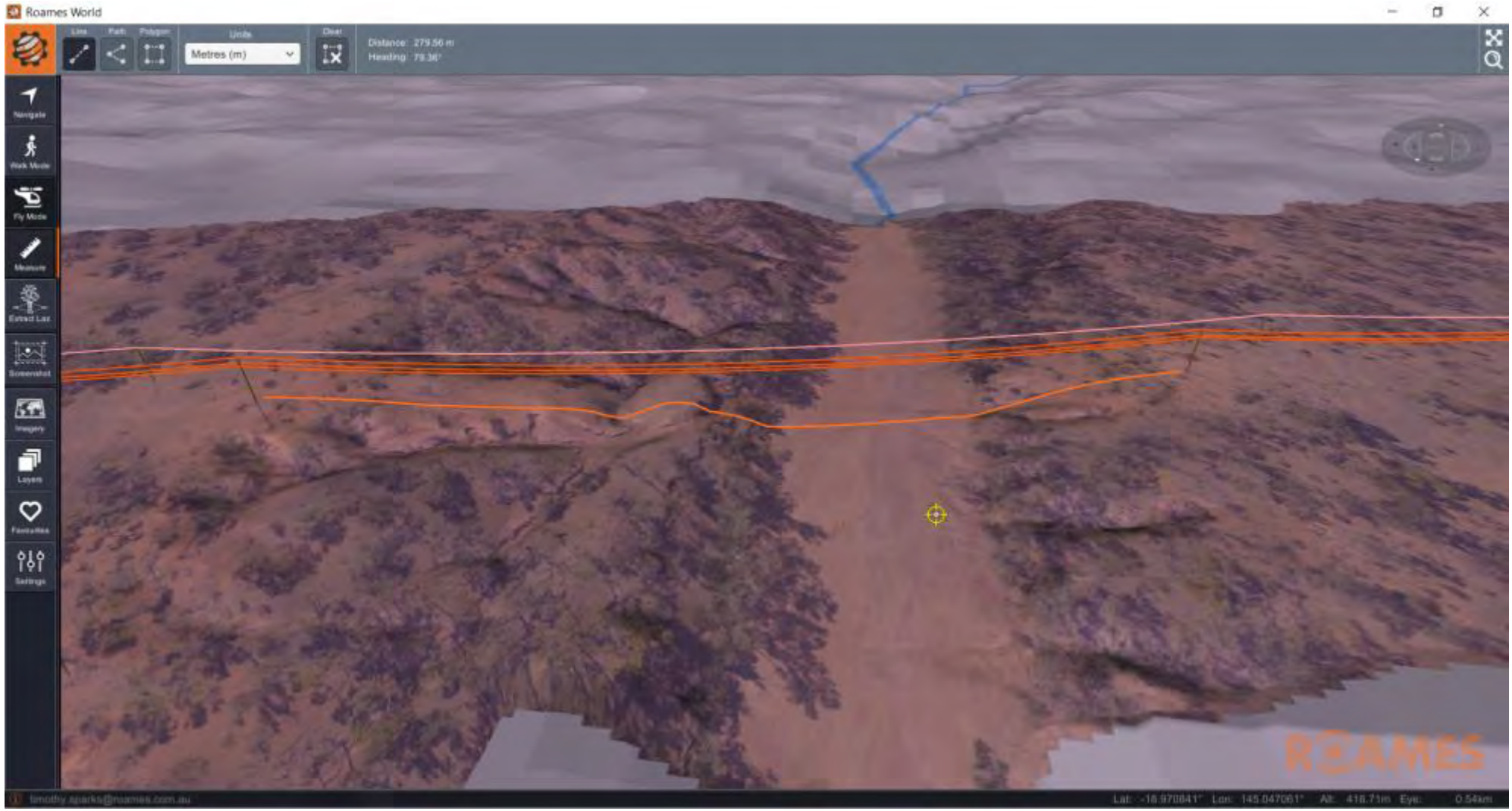
Powerlink contacted Fugro to enquire about data available in the Genex project area. The largely undeveloped nature of the study area means that spatial data available in the public realm is limited. Data was available for the existing Ergon 66kV and 132kV feeders in study corridor C and Powerlink was afforded the opportunity to view the ROAMES system on January 6, 2017 at the Fugro offices in Eight Mile Plains.

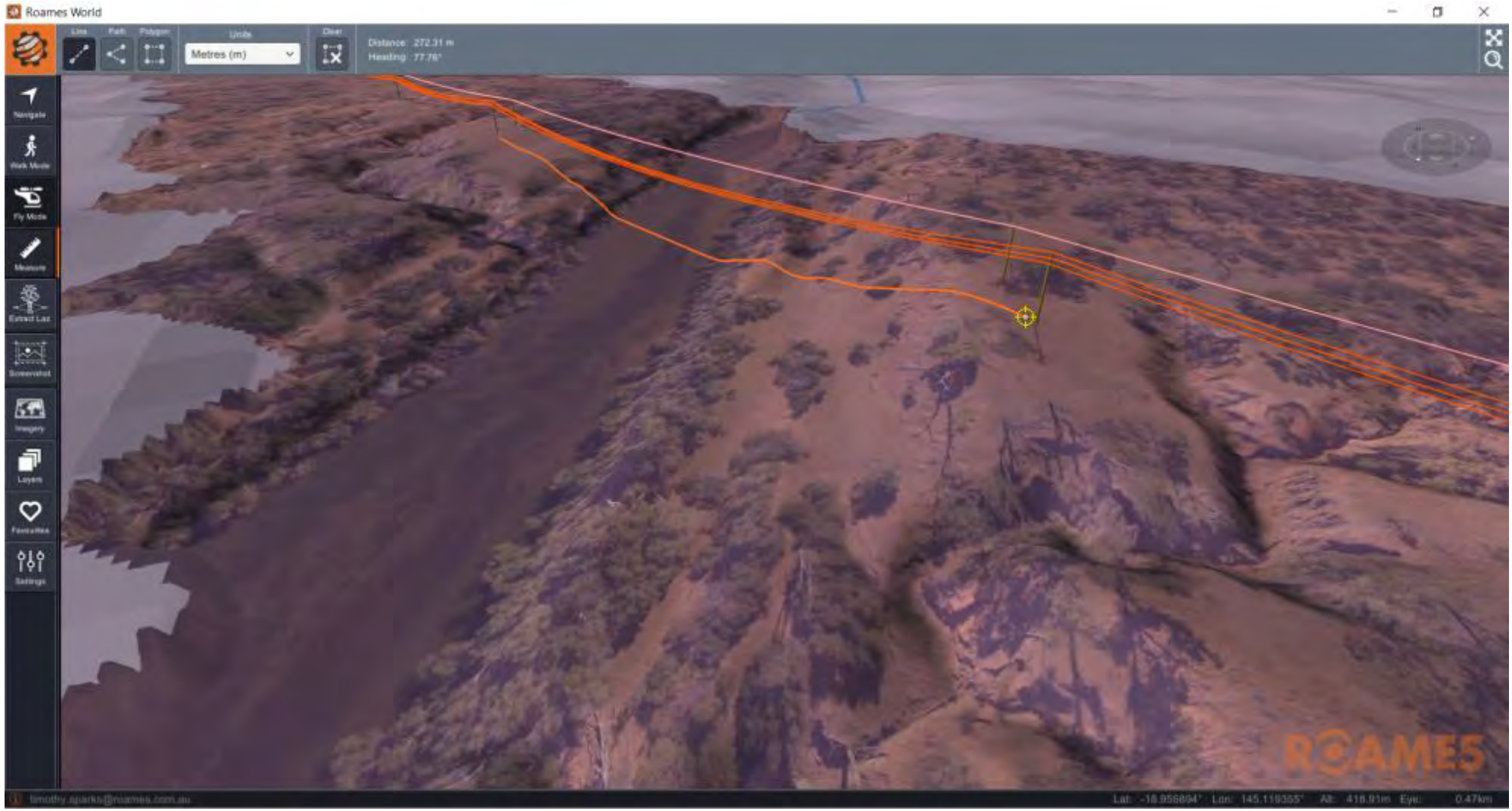
The principal benefit of viewing the ROAMES system was to gain greater insight into the variable terrain that might be encountered. Several areas of interest were identified and a screenshot for each was captured from the ROAMES system at those locations, including coordinates so the locations can be located and investigated in subsequent impact assessment phases (Figure 17).

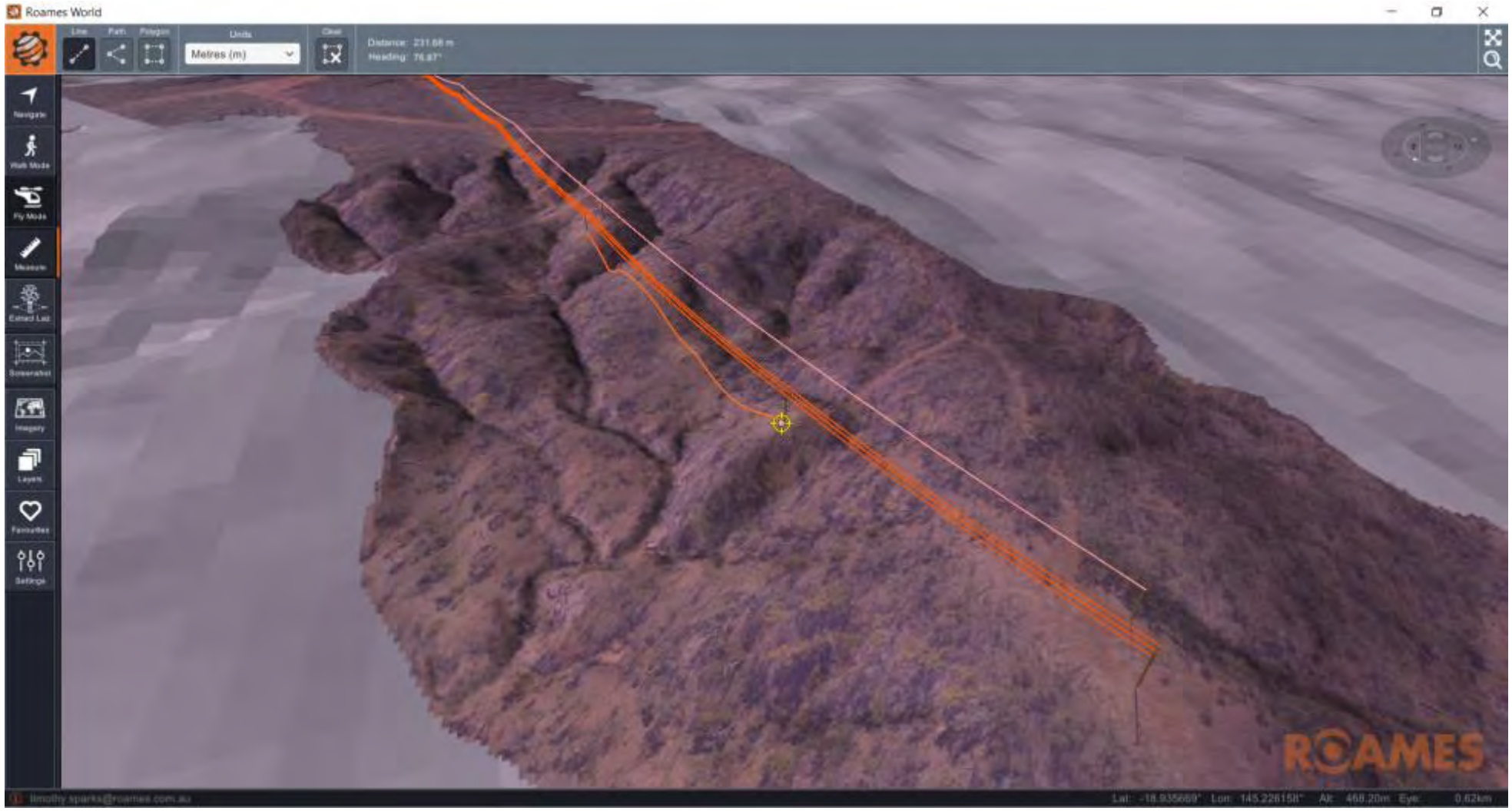
Figure 17 – ROAMES World Screenshots

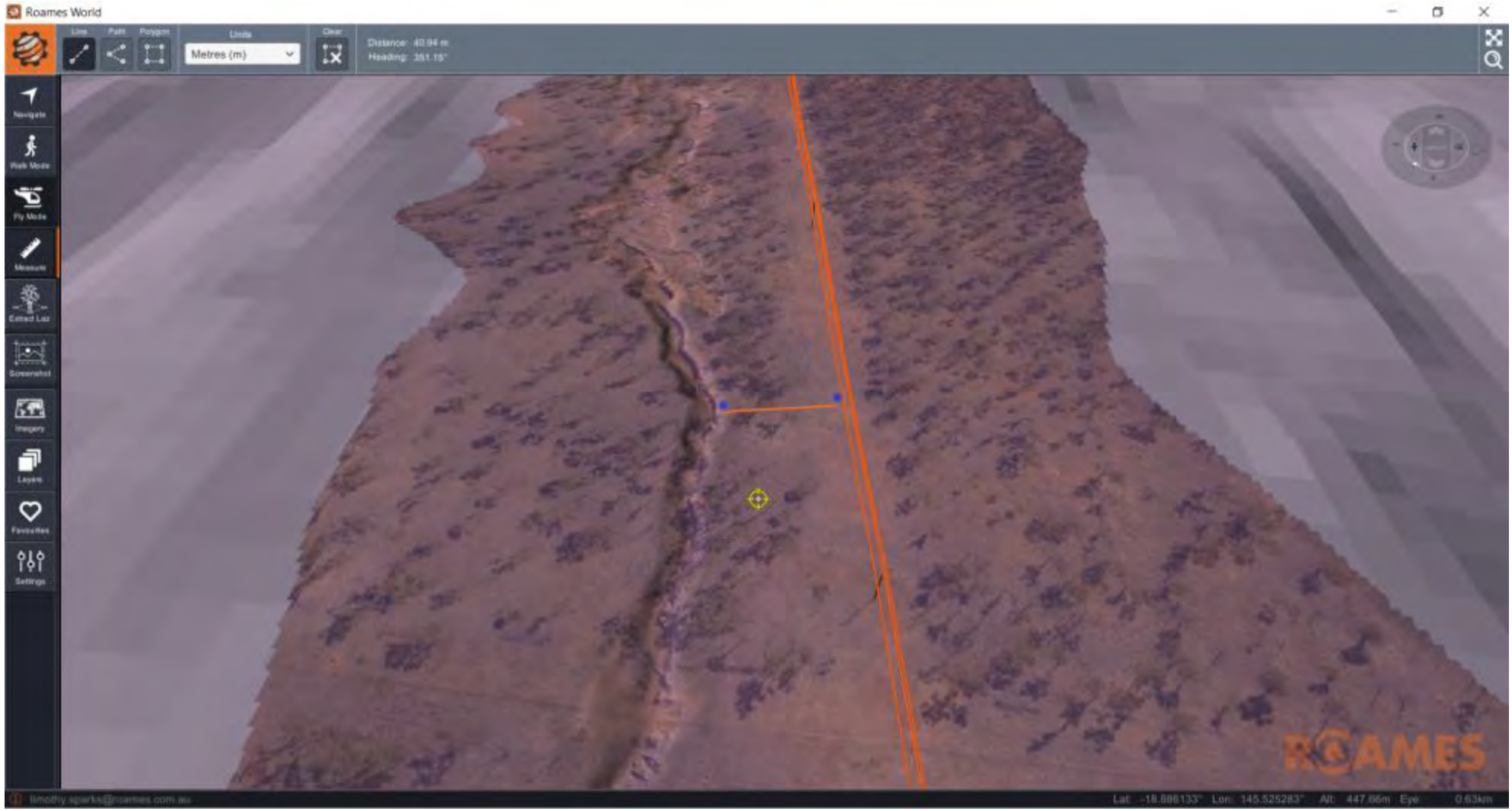



Roames World
ROAMES









12.2 HELICOPTER FLYOVER

Powerlink undertook an aerial inspection of the study area by helicopter in mid-January 2017. A helicopter was selected to minimise interference to landholders and their operations. All landholders were contacted in advance of the flight and any concerns raised were addressed by increased separation (altitude).

The fly over did not reveal any material constraints to delivery of the project. It was evident that the terrain is challenging in some locations, but through careful route selection and site specific design, terrain challenges can be overcome. Subsequent impact assessment and design phases will delve into greater detail around localised terrain and appropriate design responses. Challenging terrain is likely to occur along each study corridor and does not serve to differentiate options at the current level of assessment.

The flight supported that the study area amendment west of Greenvale discussed in Section 5.1.4 would facilitate constructability by avoiding escarpments. The preliminary alignment in this area will be outside of the initial extent of study corridor option C in response to the terrain that was not identifiable in the DCSR. No new properties were impacted as a result of the amendment and no material change to this assessment is realised by the deviation. See Section 5.1.4.

It was also evident from the fly over that recent rainfall had made much of the area difficult to traverse. Subsequent project planning will need to regard wet seasons and allow for restricted mobility through the area during those times. It was also evident that much of the soil was highly erodible, which will require further investigation during subsequent project phases. See Figure 18 and Figure 19.

Figure 18 – Swollen Creeks

Figure 19 – Erosion

12.3 MT FOX SITE OPPORTUNITIES

Constructability for the substation at Mt Fox was considered as part of this CSR. The assessment included identification of high level site opportunities and constraints based on landholder engagement, affording an understanding of the likely availability of a suitable substation site. It was not in the scope of this CSR to negotiate acquisition of a site or formal option over a site. No substation site has been selected.

Terrain in the Mt Fox area is undulating. There are likely to be sites that are suitable for a substation, but some care will be required in selecting one with suitable grades and access. Despite potentially challenging topography, Mt Fox remains the closest viable connection point to the existing electricity transmission network (Section 5.1.3).

Proximity to the existing 275kV Powerlink Ross to Chalumbin transmission line is also an important consideration. A site west of the existing line is preferable from a network configuration perspective, whether adjacent or nearby. It is partially for this reason that the study area amendment discussed in Section 5.1.5 was undertaken, with property east of the existing 275kV being less desirable for the substation.

Finally proximity to the existing Ergon 66kV line is desirable so that co-location of infrastructure begins at Mt Fox and the benefits of co-location apply to as much of the proposed Genex Kidston connection as possible. An area of interest for the substation has been identified, bounded generally by the refined study area and existing Powerlink and Ergon networks. The area is depicted in Figure 21.

Subsequent project phases would seek to identify a specific site in the area of interest through a targeted and detailed assessment process, involving higher resolution terrain data (and imagery if available) than what is currently available, and further engagement with landholders. The site selection process would consider matters including, but not limited to:

- Drainage

- Cut and fill volumes
- Environmental footprint
- Availability of clean fill
- Ability to import clean fill to site (access)
- Requirements for auxiliary works
- Operational parameters.

An option over a site may be considered during the site selection process, dependant on the outcomes of technical investigations and further landholder and stakeholder engagement. Powerlink is the foremost authority in substation development in Queensland and will support Genex in the selection of a site from the area of interest.

13 ENGAGEMENT FEEDBACK

Powerlink has undertaken early and targeted consultation with Federal, State and Local governments, peak bodies and landholders within the project area as part of preparing this CSR. The objective of stakeholder engagement at this point in the process is to raise awareness among relevant stakeholders and to gain meaningful input from those stakeholders to inform the CSR. In all cases, further and more extensive engagement and consultation will be undertaken in future stages of the project.

The following provides a summary of feedback received to date from stakeholders. Landholder engagement feedback is summarised in Section 13.7.

13.1 STAKEHOLDER WORKSHOP

Nine stakeholder organisations were invited to attend an CSR engagement workshop for the proposed Genex Kidston Connection transmission line project. The workshop on 21 November 2016 was attended by representatives of six stakeholder organisations.

The purpose of the workshop was to engage these stakeholders in identifying opportunities and constraints in the study area for the Genex Kidston Connection transmission line project Corridor Selection Report.

Representatives from the following organisations attended the workshop:

- North Queensland Conservation Council
- AgForce
- Department of Infrastructure, Local Government and Planning
- Department of Natural Resources and Mines
- Charters Towers Regional Council
- Etheridge Shire Council.

The following organisations declined the invitation to attend the workshop:

- Department of Environment and Heritage Protection
- Department of National Parks, Sport and Racing
- North Queensland Dry Tropics.

Drawing on their expert and local knowledge, workshop participants identified detailed opportunities and constraints applicable to the selection of a corridor for the Proposed Genex Power Kidston Connection transmission line. Key themes discussed are presented in Table 8. Detailed participants' input was comprehensively recorded at the workshop and informed the development of the CSR.

It is also noted that individual meetings were held with the Department of Environment and Heritage Protection and Department of National Parks, Sport and Racing (Section 13.2).

Table 8 – Summary of workshop participant input

Key theme	Workshop participants provided input and information about:
Environment	• Vegetation including remnant vegetation and high value areas • Biosecurity including weed management and cattle tick management • Water flow, erosion and sedimentation issues • Bush fire risk management • Conservation areas, wildlife refuges and National Parks • Fauna including pygmy glider, cassowary and redclaw yabbies (recreational in Kidston mine ponds) • Geology including dormant volcano and lava tubes • Climate including drought impacts.
Social	• Land use which is predominantly cattle grazing with some cropping on larger holdings; smaller land holdings include chicken farm and hobby farms; includes organic producers • Many properties are run by family owned businesses • Landholdings are predominantly leasehold • Fencing is limited on most properties • Road conditions and accessibility; • Air strips and wide use of aerial mustering • Visitors include fossickers at small active goldmines, 4WD enthusiasts and retirees • Access tracks are used by shooters and 4WD enthusiasts • Limited local education options for students, schools and School of the Air • Difficulties with connectivity due to limited mobile phone and Internet coverage, and poor radio reception • Accommodation exists at the former Kidston mine, Junction, Greenvale and camping at Mt Fox site • Native title and Indigenous Access Agreements (ILUA's) in place on some properties • Indigenous and European Cultural Heritage sites • Recent defence force plans and associated land acquisition.
Economic and technical issues	• Workforce access and retention • Access to raw materials and water • Opportunities for local industry and workers • Workforce accommodation • Cost of transport and alternative freight routes • Accessibility of stock routes • Reliability and accuracy of mapping • Construction traffic impacts to farmers and school bus • Weed wash down areas • Opportunities for other solar and renewable developments to connect • Opportunities downstream of the hydro dam • Viability of irrigation and agricultural projects that require power supply.
Key stakeholders and communication	• Stakeholders identified within the following groups: elected representatives, local government, interest groups, traditional owners, individuals • Options for communication with landholders include mail, email, newsletters and Council bulletins.
Potential local issues	• Native Title tenure • Acquisition of land process and recent experiences with defence force resumptions • Traffic management including vehicle movements and driver behaviour • Impacts on roads and road maintenance • Weed management and wash down facilities • Aerial mustering during project construction • Water supply and allocations

	• Management of stock during construction • Prospective exploration of rare earth metals.
Historical local issues	• Traffic issues related to mining activities • Shutdown of Mt Surprise mine
Opportunities	• To support local industry and workforce during construction and maintenance • Local sporting groups • Currently no community development projects in the area • Available industrial land for manufacturing and storage • Charters Towers airport • Vegetation management under transmission lines and on access tracks and related bushfire management • Local support for development including the Genex project • Communicating with landholders about the transmission line development.

13.2 DEPARTMENTAL STAKEHOLDERS

13.2.1 DEPARTMENT OF ENERGY AND WATER SUPPLY & TREASURY

Powerlink met with representatives of the Department of Energy and Water Supply (DEWS) and the Treasury Department on 15 April 2016 as part of the DCSR. Advice was also provided to both departments on 11 November 2016 about the CSR and Powerlink's engagement intentions. Neither department raised major issues or concerns at this early stage in the process.

13.2.2 DEPARTMENT OF ENVIRONMENT & HERITAGE PROTECTION

Powerlink met with representatives of the Department of Environment and Heritage Protection (DEHP) on 15 April 2016 to discuss the DCSR. A second meeting was held on 18 November 2016 to introduce the scope of this CSR.

Discussion was primarily held around DEHP's position on key areas of interest. These included protected flora and fauna, regional ecosystems and catchments/wetland/watercourses. Powerlink provided the third party ecological advice procured for this CSR to DEHP on 10 January 2017 and DEHP provided a response on 13 January 2017.

DEHP also noted that a likelihood of occurrence assessment would be a positive initiative to further identify species potentially occurring on the project area. Powerlink commissioned an assessment in response to DEHP feedback (Section 11.4.1.1). It is important to note that the likelihood of occurrence assessment will not influence the preferred study corridor at the current level of assessment because vegetation communities and habitats occur in a broad and homogenous manner across the CSR study area.

13.2.3 OFFICE OF THE COORDINATOR-GENERAL

Powerlink met with representatives of the Office of the Coordinator-General (OCOG) in late 2016. The OCOG is aware of the project through ongoing discussions with the proponent, Genex Power.

On 3 March 2016, the Minister for State Development declared the Genex Solar, Pumped Storage and Transmission Line project as a 'Prescribed Project' under the *State Development Public Works Organisation*

Act 1979. The Minister for State Development administers the SDPWO Act via the Office of the Coordinator General.

Discussion was primarily held around administrative functions of the department through the potential overarching approval process and appropriate approvals solutions. It was agreed that detailed discussion of approvals pathways was best postponed until this CSR was complete and a greater understanding of the study area was gained.

If the project was to proceed via the Coordinated Project process and Powerlink was also engaged to undertake subsequent work, we would continue to engage with the OCOG to achieve the respective project approvals and corridor acquisition. As the project progresses, a close working relationship with the OCOG will ensure delivery is done on a best-for-project basis.

13.2.4 BUILDING QUEENSLAND

Powerlink met with representatives of Building Queensland (BQ) on 15 April 2016 as part of the DCSR. Advice was provided to Building Queensland on 16 November 2016 about the CSR. Building Queensland was advised there would not be any trigger for investment decisions involving Building Queensland at this point in the process.

It is noted that the Building Queensland process is likely to affect only Powerlink and the Queensland Government as potential proponents of the transmission line development process. Building Queensland may require oversight of a future business case for development of the transmission line project.

13.2.5 DEPARTMENT OF TRANSPORT AND MAIN ROADS

No consultation has been undertaken to date with the Department of Transport and Main Roads given the early phase in the project development process. The proposed connection project traverses the Northern and Far North Transport and Main Roads districts.

No State roads are intersected in the Northern District. Two State roads are likely to be intersected in the Far North District, being the Kennedy and Gregory Development Roads. The roads will be spanned by conductors only where possible, with towers or other structures placed well clear of the road corridor. The potential for impact to State roads is therefore minimal. Where spanning is not possible due to significant width careful placement of structures will be required to minimise impact to the utility of the road corridor.

It is recommended that consultation with the Department of Transport and Main Roads occurs once subsequent impact assessment phases commence. Whilst State roads do not differentiate corridor options they do become influential as the project is refined and the location of access tracks, construction camps etc become clear.

13.2.6 DEPARTMENT OF NATIONAL PARKS, SPORT & RECREATION

Powerlink met with representatives of the Department of National Parks, Sports & Recreation (DNPSR) on 19 April 2016 as part of the DCSR. A second meeting was held for the CSR on 18 January 2017.

Girringun National Park (Mt Fox section) is an area of particular interest for DNPSR and amenity impacts on the park area will require assessment in latter project phases.

13.2.7 DEPARTMENT OF INFRASTRUCTURE, LOCAL GOVERNMENT & PLANNING

Powerlink met with representatives of the Department of Infrastructure, Local Government and Planning (DILGP) on 19 April 2016 as part of the DCSR. DILGP advised that they were not *aware of any* proposed developments or current development applications within the corridors at that time and raised only the non-statutory Gulf Regional Plan and future North Queensland Regional Plan for further consideration.

A DILGP representative attended the stakeholder workshop on 21 November 2016. No new development applications or issues around the Gulf and North Queensland Regional Plans were noted at the workshop. Other DILGP feedback is included in the summary notes from the workshop (Section 13.1).

Powerlink is aware that the North Queensland Regional Plan is currently under production and will monitor the status of the plan. Powerlink plays an active role in submitting to emerging regulatory frameworks and will monitor the North Queensland Regional Plan as part of this activity.

13.2.8 DEPARTMENT OF AGRICULTURE, ANDFISHERIES

Constraints mapping and project background information has been provided to DAF to undertake a desktop assessment and provide feedback on areas of interest to the department. It is recommended that a meeting be held early in future stages of the project to ensure any areas of interest to the department have can be addressed.

13.2.9 DEPARTMENT OF ENVIRONMENT & ENERGY(CWTH)

Powerlink met with a representative of the Commonwealth Department of Environment and Energy (DoEE) on 22 April 2016 as part of the preparation of DCSR to obtain initial and high-level advice regarding any Commonwealth environmental considerations. Contact was re-established with the same representative in November 2016 and again in January 2017 after the third party ecological advice was completed.

Powerlink proactively undertook a likelihood of occurrence assessment for EPBC Act threatened and migratory species and NC Act EVNT flora and fauna (Attachment 3). This additional scope of work is designed specifically to supplement the low number of records returned from the Protected Matters Search Tool.

It is important to note that the likelihood of occurrence assessment will not influence the preferred study corridor at the current level of assessment because vegetation communities and habitats occur in a broad and homogenous manner across the CSR study area.

13.2.10 DEPARTMENT OF NATURAL RESOURCES & MINES

Powerlink met with representatives of the Department of Natural Resources and Mines (DNRM) on 28 April 2016 as part of the preparation of the DCSR. Feedback in relation to dealing with resource interests indicated that consultation with interest holders would be the most beneficial way to address any potential issues or compatibility conflicts. Discussion focused on:

- Vegetation clearing governance relating to available project delivery frameworks
- Land tenure

- Resource interests.

A DNRM representative also attended the stakeholder workshop on 21 November 2016. Discussion was held around similar issues at the workshop. DNRM feedback is included in the summary notes from the workshop (Section 13.1).

Further consultation with DNRM will be an important part of subsequent impact assessment processes as further detail around tenure, resource interest and vegetation impacts emerges.

13.2.11 ERGON ENERGY

Powerlink made contact with regional representatives of Ergon Energy to gain further understanding of the study area. Feedback from Ergon has assisted in the development of this CSR and further engagement with a broader cross section of the organisation is recommended as early as possible in subsequent project phases.

13.3 ELECTED REPRESENTATIVES

Powerlink has provided initial advice about the CSR to all State and Federal Government elected representatives including Mr Shane Knuth, Mr Robbie Katter, Mr Andrew Cripps and Mr Bob Katter. Contact with these elected representatives occurred in November and December 2016. A project briefing was also provided to Mr Cripps on request, who made subsequent enquiries to Powerlink on behalf of a constituent.

13.4 STATE GOVERNMENT MINISTERS

Advice was provided to the following Ministerial offices about the project and Powerlink's engagement intentions:

- The Hon. Jackie Trad MP, Deputy Premier and Minister for Infrastructure, Local Government and Planning and Minister for Trade and Investment
- The Hon. Curtis Pitt MP, Treasurer, Minister for Aboriginal and Torres Strait Islander Partnerships and Minister for Sport
- The Hon. Mark Bailey MP, Minister for Main Roads, Road Safety and Ports and Minister for Energy, Biofuels and Water Supply
- The Hon. Coralee O'Rourke MP, Minister for Disability Services, Minister for Seniors and Minister Assisting the Premier on North Queensland.

13.5 LOCAL GOVERNMENT

13.5.1 ETHERIDGE SHIRE COUNCIL

Powerlink held a teleconference with representatives of Etheridge Shire Council on 14 April 2016 and a representative of Council attended the stakeholder workshop on 21 November 2016. Powerlink also provided initial advice to Etheridge Shire Council Mayor and CEO on 18 November 2016 about the CSR and engagement activities and offered a formal briefing.

This was followed up with a phone conversation with the Etheridge Shire CEO on 19 November 2016. A project presentation was provided via email to the Mayor and CEO on 22 December 2016, in lieu of a face-to-face briefing. Council is very familiar with the Genex project and have developed a working relationship with the proponent.

Council has approved the development application for the 50MW solar farm proposal on the Kidston tailings? Dam and continue to work with Genex on latter stages of the development.

Etheridge Shire has provided a range of feedback, much of which was included in the DCSR and has therefore contributed to this CSR. Council's feedback from late 2016 is included in the notes from the workshop (Section 13.1). No major issues or concern were raised at this early stage in the process.

13.5.2 CHARTERS TOWERS REGIONAL COUNCIL

Powerlink met with representatives of Charters Towers Regional Council on 28 April 2016 as part of the DCSR. Powerlink provided initial advice to Charters Towers Shire Council Mayor and CEO on 18 November 2016 about the CSR and engagement activities and offered a formal briefing for full Council, which occurred on 13 December 2016. A representative of Council also attended the workshop on 21 November.

Relevant feedback is included within this report and in the notes from the workshop (Section 13.1). No major issues or concern were raised at this early stage in the process.

13.5.3 HINCHINBROOK SHIRE COUNCIL

Powerlink met with representatives of Hinchinbrook Shire Council on 27 April 2016 as part of the DCSR. Powerlink also provided initial advice to Hinchinbrook Shire Council Mayor and CEO on 18 November 2016 about the CSR and engagement activities and offered a formal briefing for full Council, which occurred on 6 December 2016. No major issues or concern were raised at this early stage in the process.

13.6 PEAK BODIES

13.6.1 QUEENSLAND FARMERS FEDERATION

Powerlink met with a representative of the Queensland Farmers Federation (QFF) on 17 November 2016. Powerlink subsequently provided QFF a list of potentially impacted properties for validation against the databases of its constituents and was able to verify that QFF members were not impacted by the study area.

13.6.2 AGFORCE

A representative of AgForce attended the stakeholder workshop on 21 November, providing a host of valuable insights into the study area. AgForce feedback is included in the notes from the workshop (Section 13.1).

13.6.3 QUEENSLAND RESOURCE COUNCIL

Powerlink contacted the Queensland Resource Council (QRC) in late 2016 to introduce the project. QRC advised that they had no feedback at the time of contact.

13.6.4 NQ CONSERVATION COUNCIL

A representative from the NQ Conservation Council attended the stakeholder workshop on 21 November, providing a host of valuable insights into the study area. NQ Conservation Council feedback is included in the notes from the workshop (Section 13.1).

13.6.5 NORTHERN GULF RESOURCE MANAGEMENT GROUP

Powerlink contacted the Northern Gulf Resource Management Group (NGRMG) in late 2016 to introduce the project. NGRMG subsequently advised that they had no feedback.

13.6.6 TOWNSVILLE ENTERPRISE

Powerlink provided project details to Townsville Enterprise on 13 January 2017 and sought further information in relation to the location of Hell's Gate Dam.

13.7 ABORIGINAL PARTIES

Input into this CSR has been sought from each of the relevant Aboriginal Parties (as defined under the *Aboriginal Cultural Heritage Act 2003*) as well as the Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP) Cultural Heritage Unit.

Powerlink met with Townsville based representatives of DATSIP on 15th December 2016 to gain an understanding of any local Aboriginal cultural heritage issues and known constraints. Whilst no specific cultural heritage issues were raised, the importance of meaningful and early engagement with the relevant Aboriginal Parties was stressed along with the importance of operating under an agreement or CHMP with the Aboriginal Parties. No comments were provided to differentiate between study corridor options.

Telephone contact was made with representatives of the Gugu Badhun Aboriginal Corporation, representing the Gugu Badhun native title holders and with Tatampi Puranga Aboriginal Corporation, representing the Ewamian People#2 and Ewamian People#3 native title holders on 15 and 16 December 2016, respectively. Further details of the project were provided by email on 22 December. A subsequent teleconference was held with various members of the Gugu Badhun native title holders on 31 January 2017.

Gugu Badham representatives noted the presence of known Aboriginal cultural heritage sites in the area north of Greenvale and the 'Old Beef Road' but felt these would be unlikely to be an influencing factor the differentiation between corridor options at the current level of assessment. They also noted a general preference for co-location with the existing Ergon Energy easement.

Both Aboriginal Parties, however, stressed the need for detailed cultural heritage assessments once a corridor is determined. This will require early engagement with the parties in order to reach agreement (i.e. a signed CHMP or formal agreement) on assessment methodology and heritage protective measures. Negotiation for such agreement would commence prior to a final alignment decision.

13.8 LANDHOLDER ENGAGEMENT FEEDBACK

Landholders provided input to the CSR through interactions with Powerlink representatives during the period from November 2016 to mid-January 2017. Landholders were provided with a map of their property that

showed the extent of the study area for the CSR, constructed broadly from study corridor options B and C plus the amendments discussed in Sections 5.1.4 and 5.1.5.

Table 9 presents a summary of the input from landholders to the CSR. The input has been sorted into topic groups. Confidential, personal or private information provided by landholders is not presented in this report.

The matters most frequently raised by landholders were:

- Potential impacts on property operations including mustering activities, access and security
- Identification of constraints to the alignment including existing and proposed infrastructure and topography on their properties and in the adjoining area
- Most landholders considered co-locating with the existing ergon transmission lines as causing the least impact to their properties
- Biosecurity and weed management during construction and maintenance, and the movement of weeds throughout the life cycle of the proposed transmission line
- Line design, including conductor to ground clearance.

Figure 20 – Graph of Major Topics Raised by Landholders

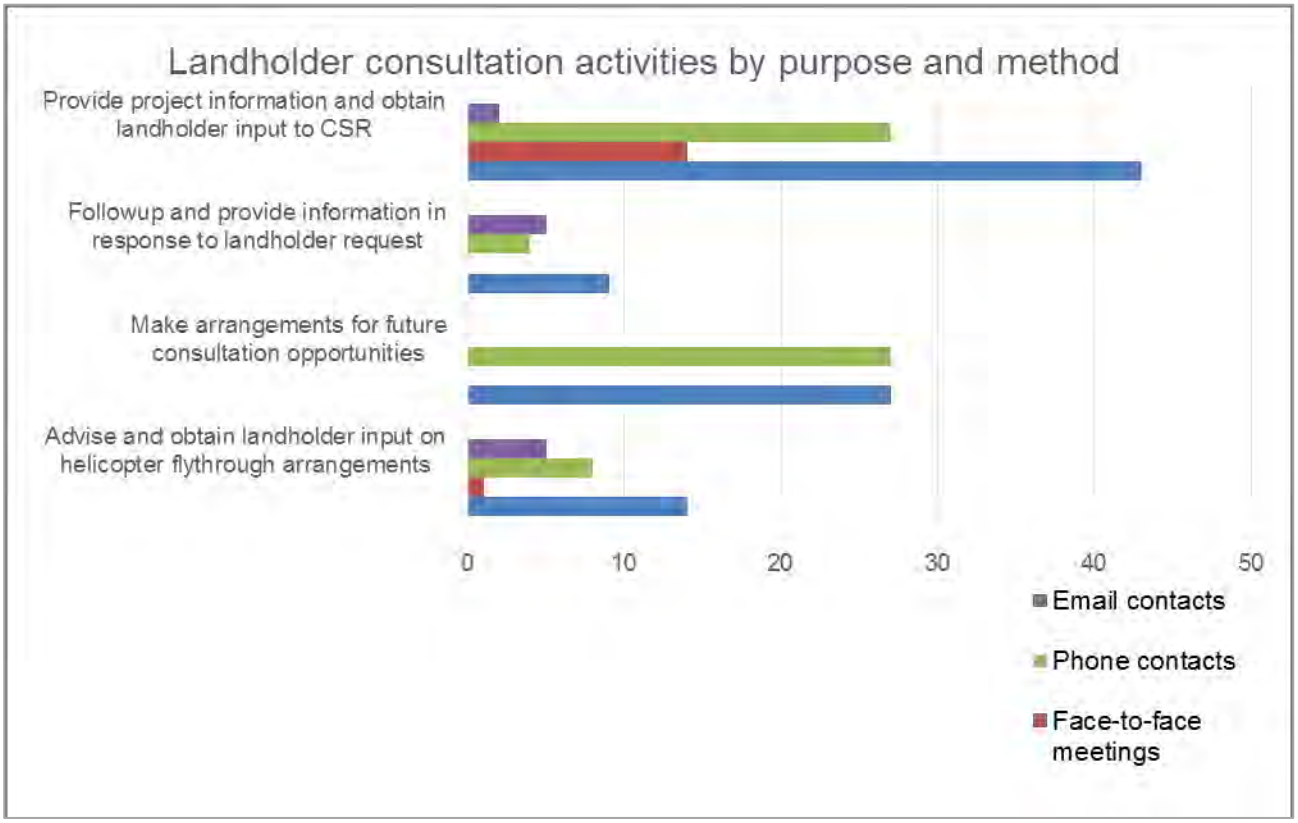


Table 9 – Summary of landholder input to CSR

Topic raised by landholders	Detailed content of topic raised by landholders
Potential impacts on property operations	Landholders identified the potential for impacts on their property operations including: • Helicopter work and mustering • Helicopter maintenance of transmission lines • Loss of pasture/grass • Traffic impacts • Gate protocols • Access track maintenance/erosion • Disruption to telephone service • Requirements for working on and traversing registered organic status properties • Potential for landholder owned generation projects • Property value • Biosecurity • Proximity to residences • Electromagnetic fields (EMF) • Ongoing access to maintain the transmission line.
Constraints to the alignment location including existing and planned infrastructure and topography	Landholders identified the locations of existing infrastructure which may be impacted by the transmission line alignment including: dams, buildings, air strips, fences, gates, cattle yards, cattle watering points and associated infrastructure, pipelines, low voltage powerlines, houses, roads, rivers and community areas. Landholders identified the potential impacts on proposed infrastructure including Hell's Gate Dam, and suggested that there could be resumption of properties in the greater Greenvale area by Defence. Landholders identified natural features and topography which may impact the alignment of the proposed structure. Landholders offered up solutions to many of the issues they identified.
Co-location with Ergon transmission lines	Where relevant, most landholders considered co-locating with the existing Ergon transmission lines to have least impact to their operations, by paralleling the Ergon 132kV line all the way until it intersects the 275kV transmission line.
Biosecurity and weed	Landholders stated their concern for the potential transmission of Parthenium weed,

management matters	Grader Grass and other weed seeds during construction and maintenance of the transmission line, and identified the need for wash-down stations. The need for biosecurity procedures and standards during construction and maintenance was identified.
Line design and clearance preferences	Landholders requested that during the design of the transmission line consideration be given to: • Line clearance over roads for cattle trucks • Line clearance from air strips • Potential to place the line underground • Heights, spans and tower design.
Importance of communication with landholders	Landholders stated the value of good communication with landholders during planning, construction and maintenance including access to the project decision makers.
Potential impacts on property values	Landholders stated their concern that the proposed transmission line would impact their property value.
Desire for local benefits from the project	Landholders questioned whether the proposed transmission line would provide local benefits including: • Improved reliability of their power supply • Access into the electricity grid for their own solar projects • Impacts to their power bills • Opportunities for the location of construction base/camp • Use of local contractors.
Compensation	Landholders raised fair compensation as a concern.
Potential environmental impacts	Extent of vegetation clearing that would be required for the project and erosion control measures.
Potential impacts on visual amenity	The need for screening the substation at Mt Fox.

The vast majority of the topics raised during landholder engagement were issues to be managed in latter impact assessment phases. The top five topics included potential impacts to property operations, existing infrastructure/ topography, biosecurity, co-location and design/ clearance preferences.

The only one of these top five topics that influences the selection of a preferred study corridor from the study area discussed with landholders at the current, broad level of investigation is the desire from landholders that linear impacts are co-located. In this regard, study corridor C is preferred. All study corridor options are likely to have some level of interaction with, and potential impact on the other topics raised.

Powerlink provided a detailed record of discussion to landholders, with a duplicate copy retained by Powerlink for its records. The records of discussion are not included in this CSR because they represent confidential discussions between Powerlink and the landholder.

Powerlink's commitment to landholders was that feedback would be included in the CSR. The CSR also serves as a record of the issues raised, which informs latter impact assessment processes. A copy of the finalised CSR will be made available to all landholders consulted on the project.

14 STUDY FINDINGS

14.1 PREFERRED STUDY CORRIDOR

Study Corridor option C is the preferred study corridor based on the assessment in this CSR. Study Corridor option C is broadly preferred because it:

- Offers the lowest potential for environmental impact based on systematic and independent ecological assessment
- Offers the highest potential to further reduce overall impacts through refinement of design and route selection, maximising the benefits of co-location.

This CSR and the recommended corridor were developed based on a range of intensive desktop investigations, stakeholder and landholder engagement, along with virtual and aerial reconnaissance. No material constraint or opportunity was revealed during any of these investigations that would alter the preference for study corridor option C.

It is noted that a deviation from the original extent of study corridor option C is required between approximately Greenvale and Conjuboy to manage large escarpments identified during the development of this CSR. No new additional properties are impacted by the amendment (Section 5.1.4) and the preliminary alignment will reflect this deviation (Section 14.2).

14.2 PRELIMINARY ALIGNMENT

This CSR seeks to select both a preferred study corridor from the broader study area and a preliminary alignment to serve as the basis of further investigation during subsequent assessment processes. The preliminary alignment is an area of nominal width that can contain the final 60m easement required for the proposed 275kV transmission line.

The preliminary alignment is depicted in Figure 21 and is mapped at a nominal 120m wide around the centreline of the existing Ergon lines. The width of 120m represents sufficient area to place the proposed 275kV line either north or south of the existing Ergon lines depending on terrain and other local constraints. This width facilitates a notional clearance of 30m between both the centreline of the two transmission lines and the edge of a new easement for the 275kV line and is retained across the entire preliminary alignment for consistency.

The nominal 120m may require variation in specific areas where more than one Ergon line exists (local distribution lines were noted in parts of the Ergon transmission corridors). It may also require local variation where Ergon distribution transformers are present, where existing Ergon lines are heavily stayed or where topography dictates amendment. These areas cannot be defined with any certainty at the current level of investigation but are noted for completeness.

The preliminary alignment within study corridor option C is generally anchored by the existing Ergon transmission lines, which offer opportunity to reduce overall impacts through co-location. There are two areas where alternative alignments are required.

14.2.1 MT FOX

The final substation location at Mt Fox will be identified during latter stages of project development. For the purposes of the preliminary alignment in the CSR, a general area of interest is identified for the substation.

As noted in Section 12.3 it is likely that a substation with suitable grade and proximity to the existing Powerlink and Ergon network can be procured within the area of interest. The area of interest is depicted in Figure 21.

14.2.2 GREENVALE TO CONJUBOY

There is an area of approximately 62 km between Greenvale and Conjuboy where the landholder engagement and aerial survey process provided an enhanced understanding of the local environment. In this region an alternative alignment is required to avoid terrain not identified in the DCSR, to minimise potential conflicts with the SCONI Phase 1 Project (Section 10.1.2.1) and to maximise colocation with the existing Ergon network. This area is depicted in Figure 4

14.2.2.1 SCONI PHASE 1 PROJECT

Figure 9 shows graphically the minor deviation to avoid conflict with the SCONI Phase 1 Project. The preliminary alignment is currently located between the existing Stenhouse Dam in and the identified resource areas.

As noted in Section 10.1.2.1 direct contact with the tenement holder could not be established during the production of this CSR. There appears from desktop and aerial investigations however to be ample room for the mining use and transmission line to co-exist.

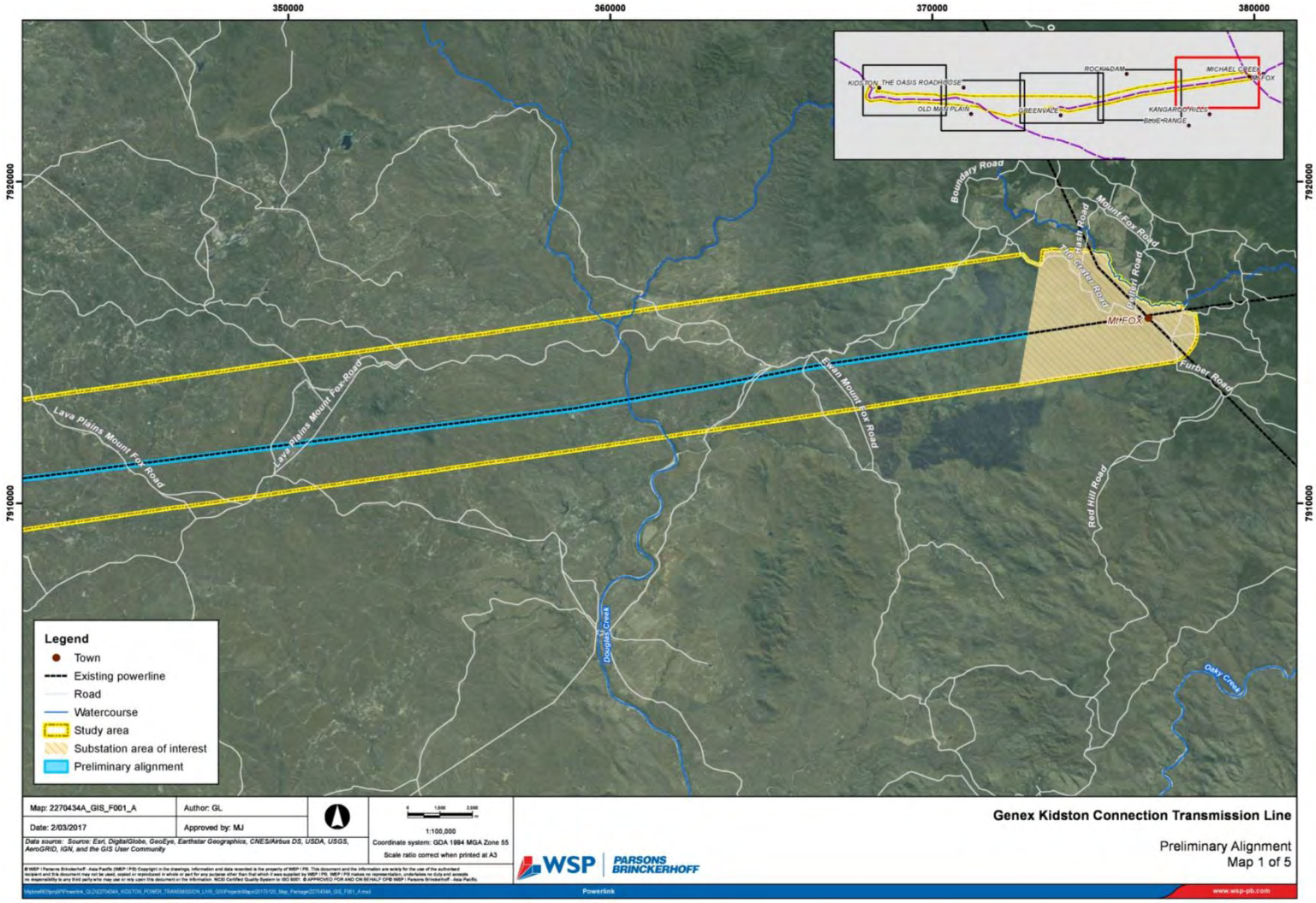
14.2.2.2 WEST OF GREENVALE

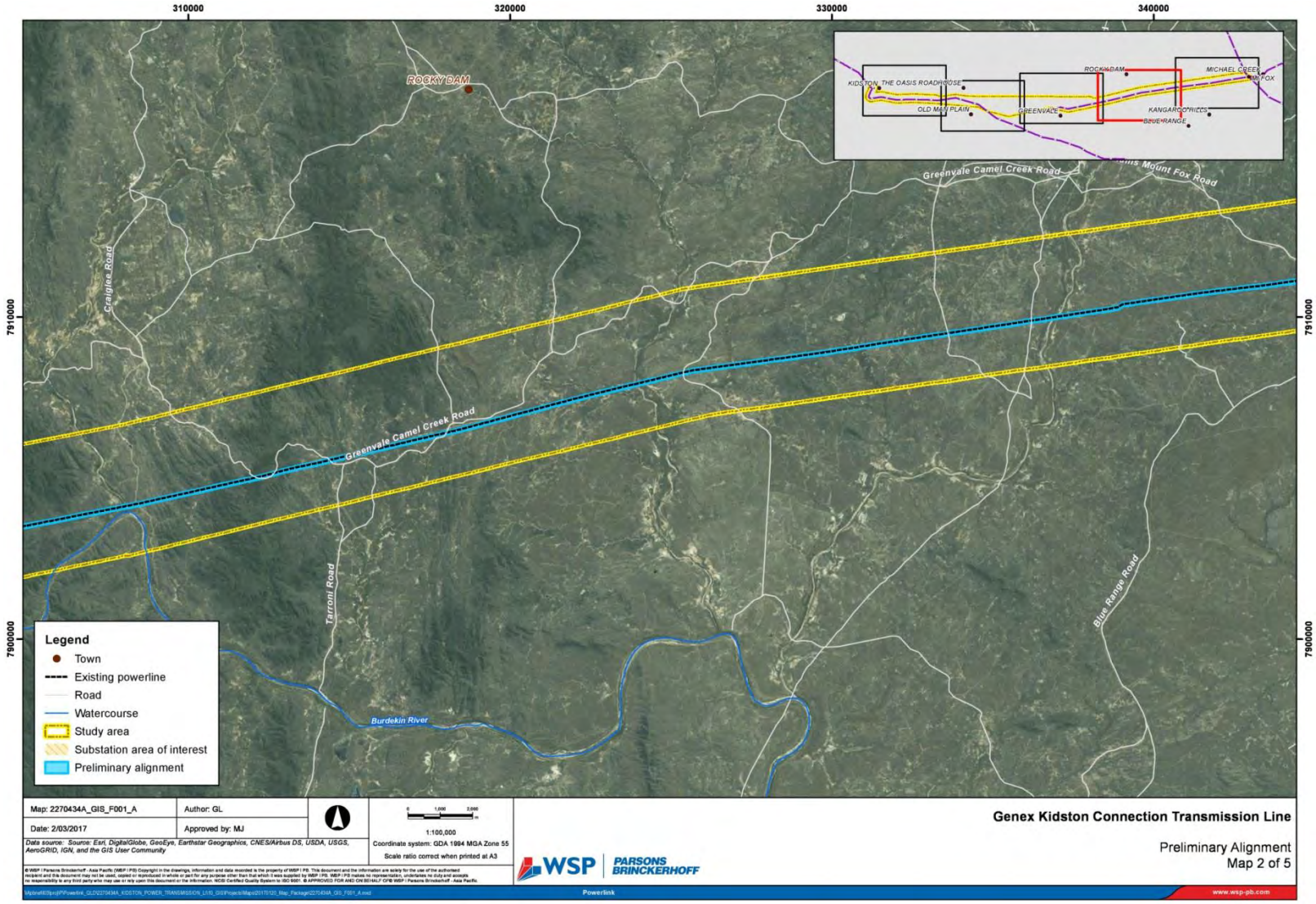
As noted in Section 5.1.4 a study area amendment was adopted west of Greenvale to avoid escarpments not identified in the DCSR phase. The preliminary alignment in this area necessarily deviates from study corridor C as identified in the DCSR.

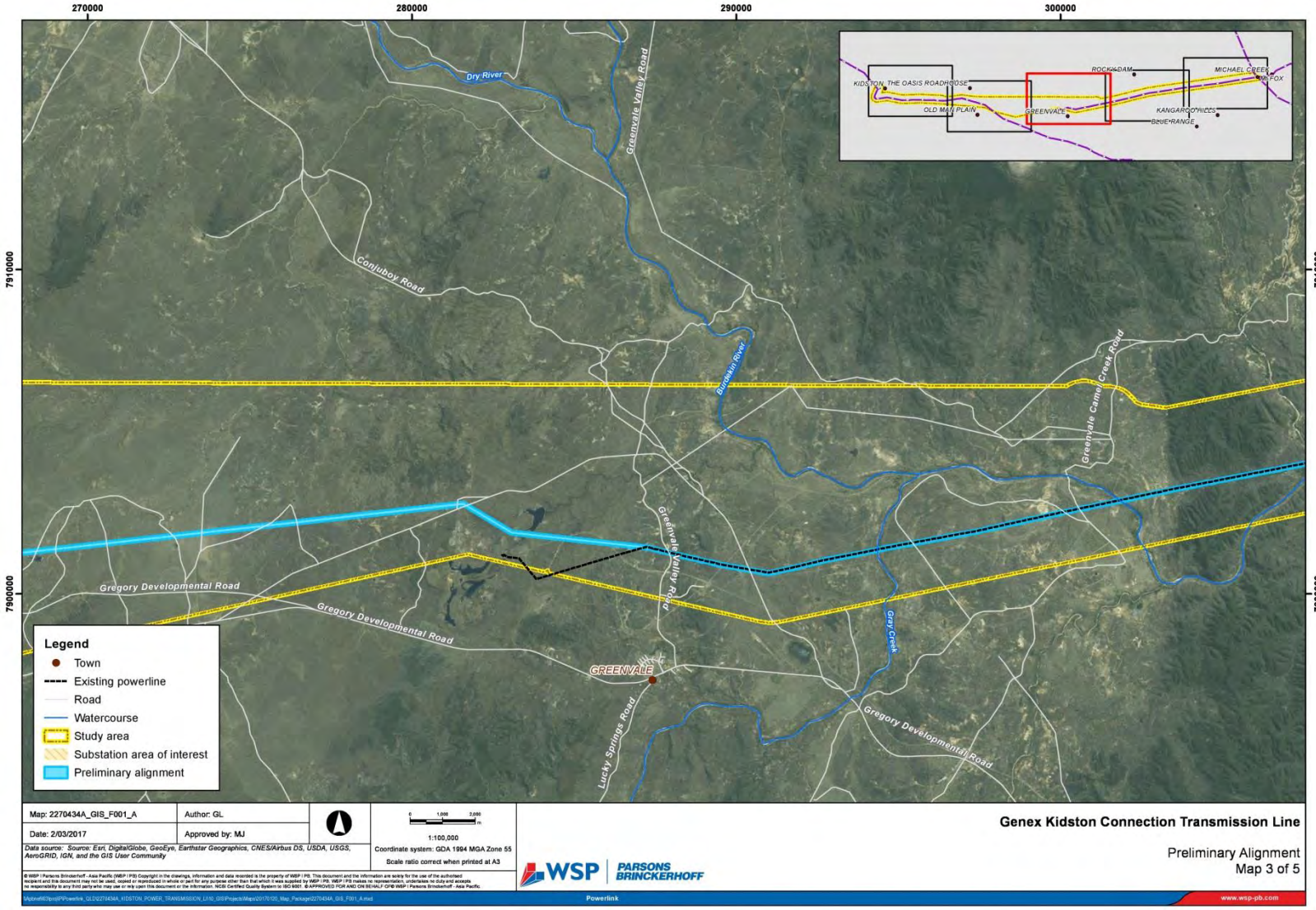
Figure 4 shows the preliminary alignment in this area. It is noted that no new properties were affected by the amendment. It is also noted that this area was not reflected in the third party ecological advice due to late identification of the need for alteration to the study area. Advice from the third party undertaking the ecological assessment is that the amendment would not materially affect the results of the investigation, with MNES and MSES occurring across the study area in a largely homogenous manner. The third party ecological advice reflects this in its Section 1.

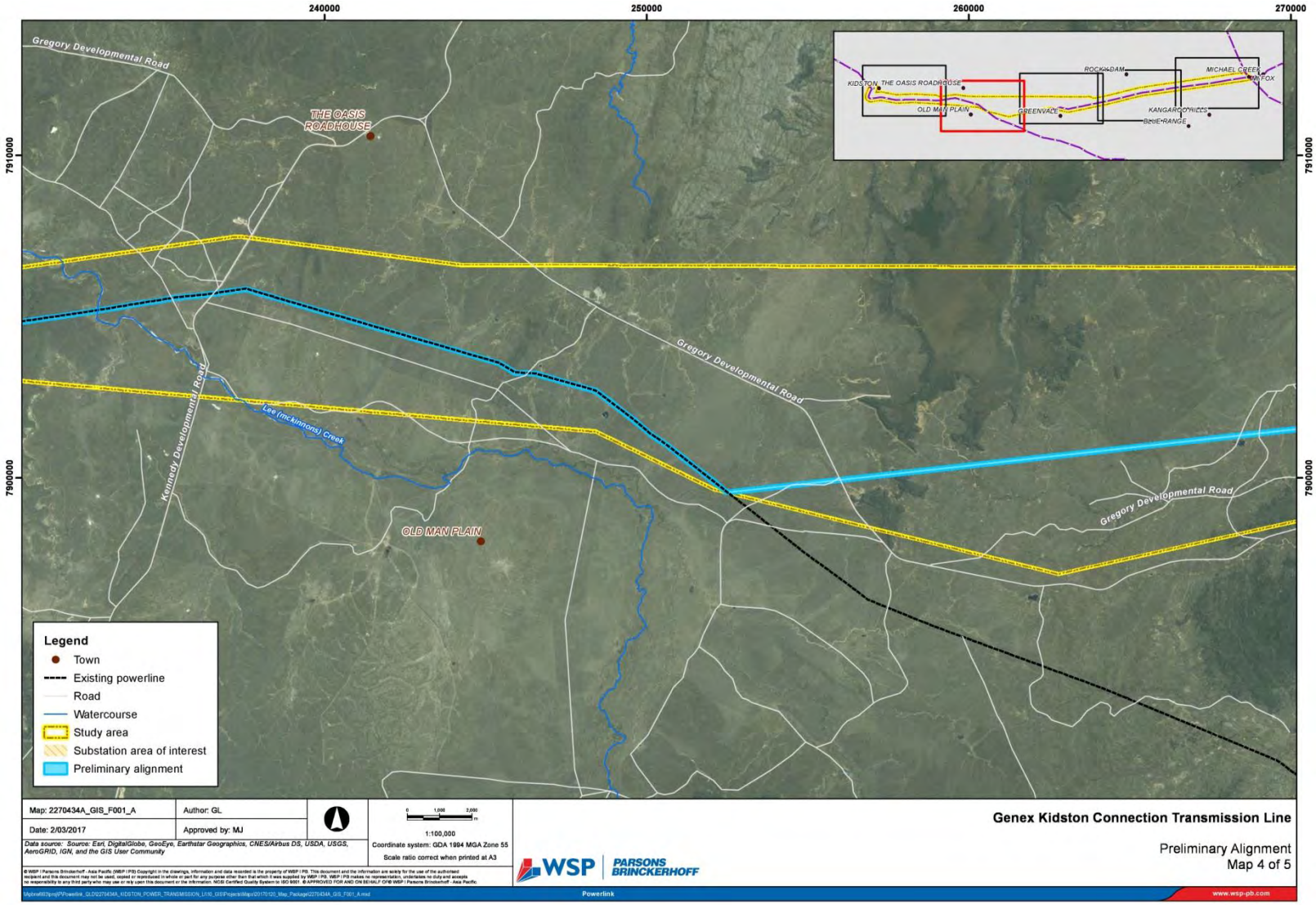
The preliminary alignment also departs from study corridor C immediately west of the amended study area discussed above. The departure of approximately 8 km is designed to maximise co-location with the existing network, which was contained in study corridor B from the DCSR for this localise region. The deviation from study corridor C, like the larger deviation west of Greenvale has no effect on the results of this CSR. It is likely instead to reduce overall impacts by maximising co-location opportunities.

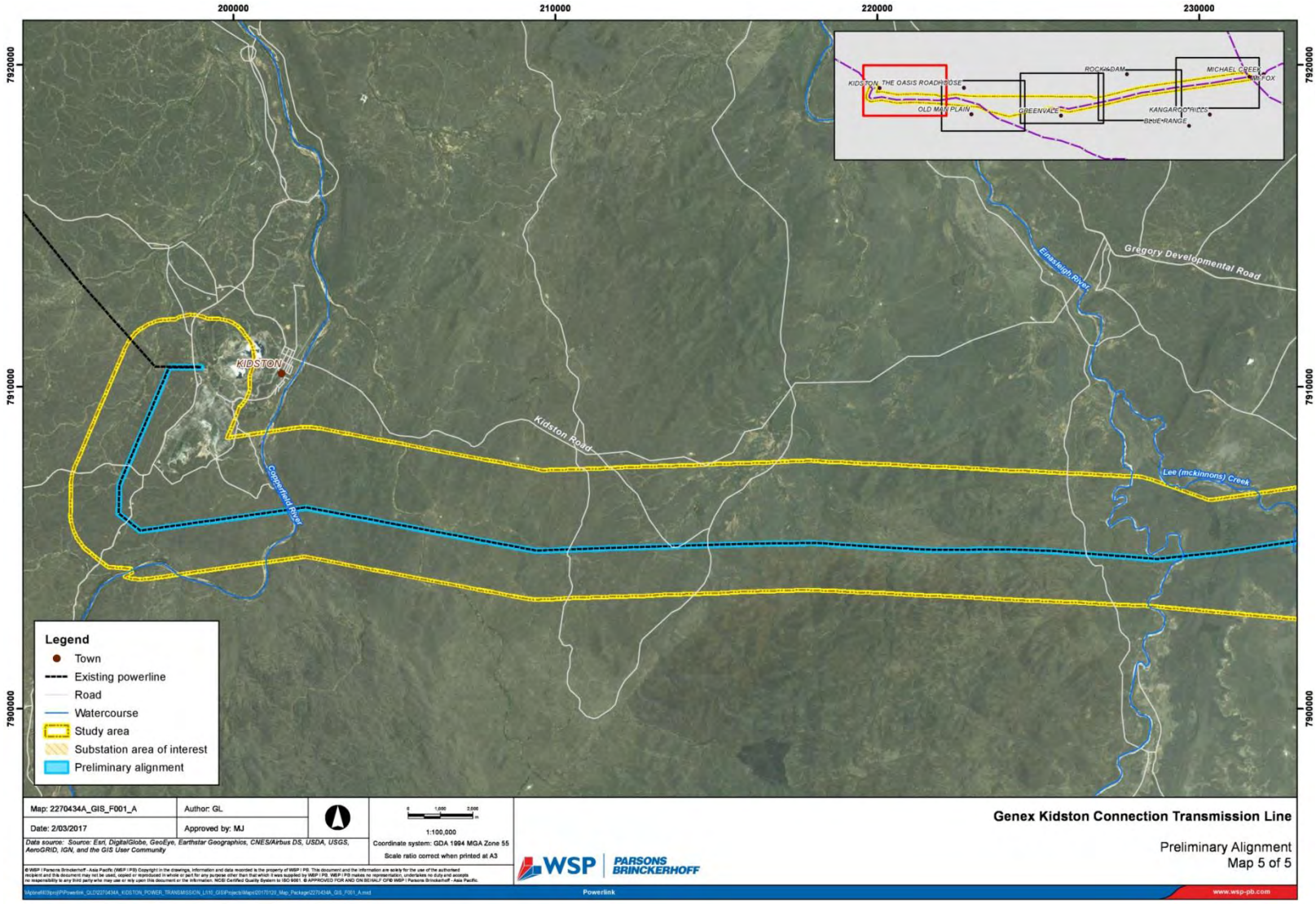
Figure 21 – Preliminary Alignment











PROPOSED GENEX KIDSTON CONNECTION PROJECT

Corridor Selection Report

PREPARED BY

QUEENSLAND ELECTRICITY TRANSMISSION CORPORATION LIMITED

(ACN 078 849 233) trading as “POWERLINK”

15 FURTHER ASSESSMENTS

15.1 APPROVALS PROCESS

A range of approval mechanisms are available to the project. Irrespective of the major approvals process, a rigorous environmental impact assessment would be required for a project of this scale. This assessment will be targeted toward the specific natural and social values of the project area that may be impacted by an electrical transmission line, many of which were identified during development of this CSR.

It is important to record key commitments from this CSR that require specific treatment in subsequent assessment processes. Key commitments are described in Section 15.4.

Powerlink has a wealth of experience in transmission line development, impact assessment, land acquisition, stakeholder and landholder engagement to support Genex in subsequent phases, whichever process is deemed preferable.

15.2 STAKEHOLDER AND LANDHOLDER ENGAGEMENT

Ongoing engagement in subsequent project phases is recommended to refine the preliminary alignment and continue to develop the relationships established during development of this CSR. Ongoing engagement will ensure that potential impacts are thoroughly understood and can be effectively managed. Powerlink notes and values the contributions of stakeholders and landholders and their time and information in helping develop this CSR.

15.3 EPBC ACT REFERRAL

The third party ecological advice demonstrated negligible risk to Threatened Ecological Communities and the World Heritage Wet Tropics Area, which provides significant comfort around some MNES. Unfortunately database searches returned few results for MNES flora and fauna and follow-up work is required to address the gaps in available information.

Powerlink proactively undertook a likelihood of occurrence assessment for EPBC Act threatened and migratory species and NC Act EVNT flora and fauna. See Section 11.4.1.1. The likelihood of occurrence assessment related mapped vegetation types to fauna and flora species known to be associated with those features in the broader region well beyond the CSR study area, targeting more developed areas where species records are more readily available.

This additional assessment confirmed the initial ecological advice procured for the CSR and identified only a relatively small number of additional EPBC species that may occur in the study area. Importantly, no new Threatened Ecological Communities or World Heritage Values were identified through this additional assessment.

Powerlink has significant experience and relationships in managing the EPBC referral process and designing solutions to minimise potential impacts to MNES. Powerlink projects have generally not been declared controlled actions due to our ability to optimise infrastructure siting to minimise terrestrial impacts.

Based on Powerlink's experience, it is recommended that referral of the project to the DoEE for further approvals in relation to the EPBC Act should occur early in subsequent stages of the project (e.g. Draft EIS phase).

This approach is recommended as field surveys will be necessary to provide adequate detail for DoEE assessment managers to develop sufficient understanding of any potential issues and, if necessary, develop and apply risk-appropriate controls.

Whilst every reasonable effort has been undertaken to assess potential impacts to MNES flora and fauna at the desktop level for this CSR, the broad scale nature of mapping over the largely undeveloped project area means field surveys will be important in future stages of the project to confirm any potential impacts and allow appropriate mitigation methods to be developed.

Preliminary scheduling by Powerlink indicates that sufficient time is available in Genex's schedule to refer the project and receive a decision under the EPBC Act, even if the project is declared a Controlled Action.

Importantly, field surveys and a better understanding of the presence of threatened habitats and species, may also support an application for a lower level of assessment, such as a declaration of Not a Controlled Action - Particular Manner.

The optimal approach for the project is therefore to undertake field surveys prior to referring the project to DoEE, ensuring that potential impacts to MNES flora and fauna are understood and a proposal for an appropriate level of assessment under the EPBC Act can be formulated. Powerlink will work with closely Genex to manage the assessment of MNES flora and fauna, advising on an appropriate course of action once the likelihood of occurrence assessment is available.

15.4 KEY COMMITMENTS & ACTIONS

A number of key commitments and matters of importance to the project have arisen from the development of this CSR. These matters are summarised in Table 10 and serve as a useful reference for subsequent impact assessment and engagement phases of the project. The matters summarised in Table 10 are project specific and are not intended to be exhaustive.

Table 10 – Key Commitments and Actions

Topic/ Issue	Comments
Hells Gate Dam	The location of the proposed Hells Gate and Mt Fullstop Dams is an important input to latter assessment phases and further investigation should be undertaken
Planning Act 2016	The emerging Planning Act 2016 should be actively monitored for potential changes to major approvals frameworks
Seek Detailed Landholder Input	Work closely with landholders to fully understand their properties and refine an alignment for the proposed transmission line for further more detailed investigation as part of the EIS process should the project proceed
Resource Tenements	Consultation with mining tenement holders should occur as early as possible in subsequent assessment phases
Mt Fox Site Selection	Undertake a targeted site selection process at Mt Fox based on higher resolution terrain information (and imagery if possible) than that currently available
Biosecurity	Ensure a rigorous biosecurity management plan is prepared before field surveys or field activities commence

Terrain Information	Procure higher resolution terrain information and imagery to inform project development. The ROAMES information held by Ergon may represent an opportunity to procure recent, off the shelf information for a lower capital cost for much of the preferred study corridor
Local Providers	Commence discussions around use of local providers early in the project development process to ensure amendments to existing procurement processes can occur if required
Defence Acquisition	Continue enquiries into the potential Defence Force acquisition of land in the Hinchinbrook/ Charters Towers Council areas (Section 13.7)
Additional engagement	Expand engagement to include broader community groups and associations identified by stakeholders during the CSR phase (e.g. local rural fire brigade, schools etc.). These stakeholders are listed in Section 13.1.

16 REFERENCES & INFORMATION SOURCES

Bureau of Meteorology (BOM)

http://www.bom.gov.au

Charters Towers Regional Council

http://www.charterstowers.qld.gov.au/

Commonwealth of Australia, Australian Bureau of Statistics

http://www.abs.gov.au

Department of Environment and Energy

http://www.environment.gov.au

Heritage Protection

https://www.ehp.qld.gov.au

Department of Natural Resources and Mines (DNRM)

http://www.nrm.qld.gov.au

Etheridge Regional Council

http://www.etheridge.qld.gov.au/

Hinchinbrook Shire Council

http://www.hinchinbrook.qld.gov.au/

Genex Power – The Kidston Solar Project

http://www.genexpower.com.au/projects/The_Kidston_Project

Queensland Government, Office of Economic and Statistical Research

http://statistics.oesr.qld.gov.au/qld-regional-profiles

Queensland Spatial Catalogue - QSpatial

qldspatial.information.qld.gov.au

Attachment 1 – Third Party Ecological Advice

POWERLINK

Initial Desktop Assessment and Preliminary Ecological Constraints Advice

PROPOSED GENEX KIDSTON CONNECTION PROJECT

CONFIDENTIAL

DECEMBER 2016

WSP | PARSONS BRINCKERHOFF

Initial Desktop Assessment and Preliminary Ecological Constraints Advice

PROPOSED GENEX KIDSTON CONNECTION PROJECT

Powerlink

Confidential

REV	DATE	DETAILS
A	29/11/2016	Draft report
B	16/12/2016	Final report

AUTHOR, REVIEWER AND APPROVER DETAILS

Prepared by:	Rob Harrison	Date: 16/12/2016	Signature:
Reviewed by:	Steve Lyngcoln	Date: 16/12/2016	Signature:
Approved by:	Rob Harrison	Date: 16/12/2016	Signature:

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Filename: 2270434A-ENV-REP-001 RevB

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1 INTRODUCTION

Powerlink is investigating three potential corridor options for powerline to connect a renewable energy generator (Genex) at Kidston in Far North Queensland, to the electricity transmission grid. The site at Kidston will contain a mix of solar and pumped storage (hydro) technology with a total generation capacity of approximately 400 MW. The pumped storage component of the facility can be rapidly ramped up and down to produce energy at times of peak demand.

The closest connection point to Kidston is at Mount Fox, approximately 200 km east of Kidston. It is most likely that a 275 kV transmission line will be required to provide adequate capacity for the connection over that distance. On this basis, Powerlink has been commissioned by Genex to produce a Corridor Selection Report, to identify a preferred corridor and a preliminary alignment for the connection from a broad study area.

The assessment for the Corridor Selection Report will include engagement with Government agencies, peak bodies and landowners in the study area, as well as high level environmental, land use planning and technical investigations. It builds on a Draft Corridor Selection Report compiled for Genex in mid-2016, which identified three high level corridor options for further assessment.

The Corridor Selection Report will assess a study area based on the two southern most options from the Draft Corridor Selection Report (Options B and C), the northern most option (Option A) having been removed from assessment based on feedback during the development of the report. Part of the rationale for removal of Option A was its potential for greater environmental impacts, which was evident at the Draft Corridor Selection stage.

To validate the higher potential for environmental impact this Initial Desktop Assessment and Preliminary Ecological Constraints Advice considers all options from the Draft Corridor Selection Report. The intention is to validate the removal of the Option A, providing surety that the Corridor Selection Report is focused on the right study area and double checking the corridor refinement process undertaken to date.

This Initial Desktop Assessment and Preliminary Ecological Constraints Advice identifies the Matters of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES) that are of relevance to each corridor option. The findings herein will inform the preferred option selection process of Powerlink's Corridor Selection Report.

Since completion of this assessment, an additional area outside of Options A, B and C, is being considered. The additional area was identified during desktop investigations and allows the opportunity to avoid difficult topography and potentially seek to co-locate with the Gregory Development Road.

This additional area was identified after this report was substantially complete and has therefore not been assessed as part of this assessment. However, based upon the similarities of the MNES and MSES assessed for each alignment, it is unlikely the additional area would include anything that has not already been assessed, nor is it likely to influence the calculations for the MNES and MSES that have been assessed as occurring broadly across all three corridor options. Furthermore, the extent of ecological constraints for each Corridor option would be unlikely to increase or decrease substantially by including the additional area, and the corridor option identified as the option of least ecological constraint would be unlikely to change.

1.1 Purpose

This initial desktop assessment and preliminary ecological advice identifies the matters of national and state environmental significance (MNES and MSES) that may be of potential relevance to each corridor option (A, B and C. It presents the potential ecological constraints and risks associated with each option and provides advice on a preferred option from an environmental perspective, which contains the least amount of MNES and MSES ecological constraints.

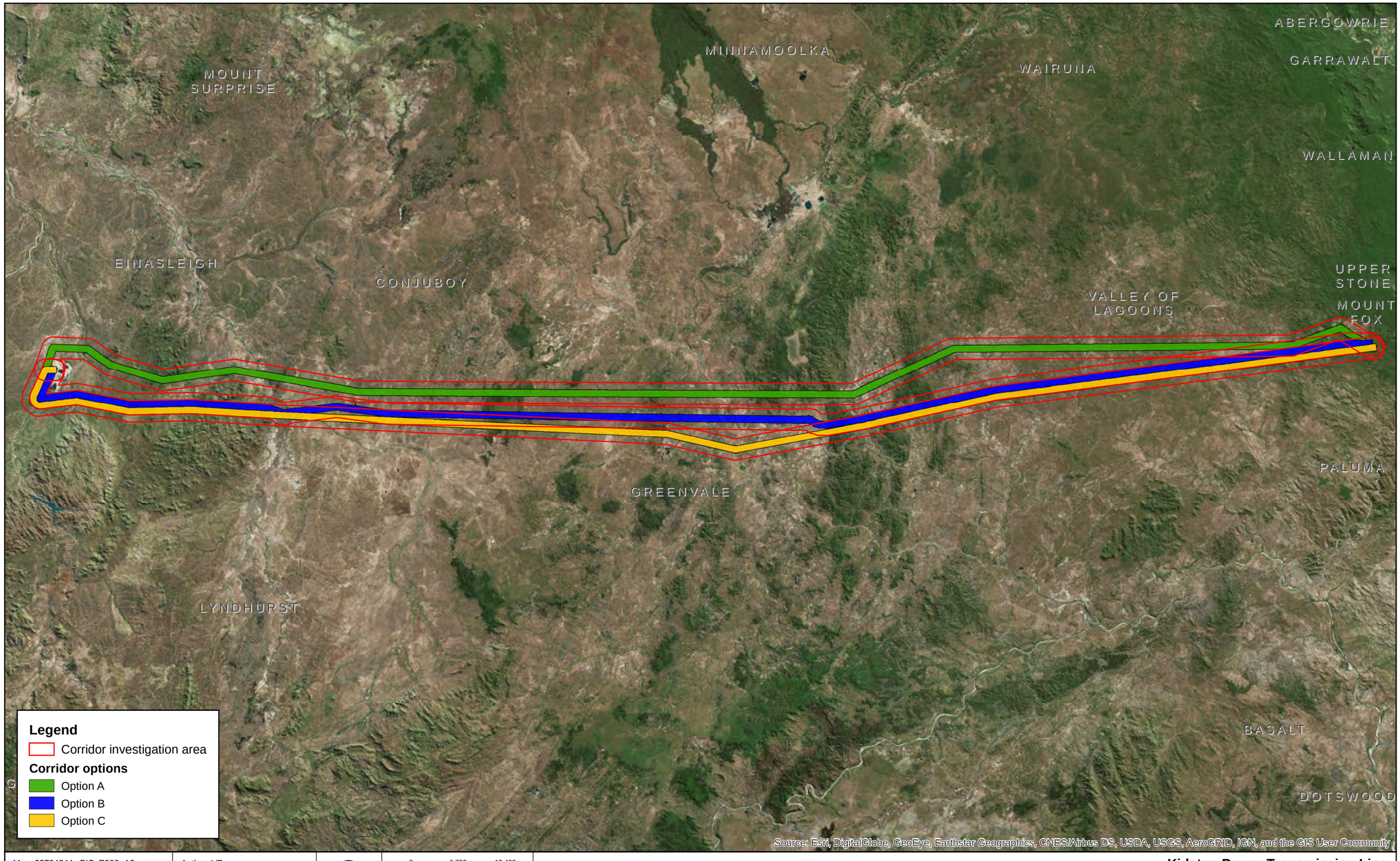
It also provides preliminary advice on the possible requirement of significant impact assessments for potential impacts to relevant MNES and MSES within each corridor, and whether the Project should be referred to the Department of the Environment and Energy (DoEE).

A brief discussion on potential Commonwealth and State environmental offset requirements has also been provided.

1.1.1 Terminology

The desktop assessment discusses the corridor options and corridor investigation areas, which are defined as:

- *Corridor options* – three 1 km wide corridor options as defined in the Draft Corridor Selection Report, and shown on Figure 1.1.
- *Corridor investigation areas* – a 3 km wide corridor investigation area has been applied to the centreline of each 1 km wide corridor option, to inform the Corridor Selection Report of the potential ecological constraints of relevance to each option, as shown on Figure 1.1.



Map: 2270434A_GIS_E008_A2	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Options from Client (2016), locality from Department of Environment and Resource Management (2015)

0 6,700 13,400 m

1:499,564

Coordinate system: GCS GDA 1994

Scale ratio correct when printed at A3

Kidston Power Transmission Line
Figure 1.1
Corridor options and corridor investigation areas

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2 DESKTOP ASSESSMENT METHODS

The initial desktop assessment has been designed to inform Powerlink of the MNES and MSES ecological constraints that are of relevance to each of the three corridor options. Powerlink has provided the three corridor options (A, B and C). Each option is 1 km wide. This initial desktop assessment applies database searches and GIS analysis to 3 km wide corridor investigation areas for each corridor option. The main purpose of the assessment is to determine the option of least ecological constraint for the Project. The methods used for the initial desktop assessment have been discussed in more detail in the following Sections 2.1–2.5.

2.1 Database searches

The initial desktop assessment included searches of the following databases:

- Commonwealth Department of the Environment and Energy's (DoEE) *Protected Matters Search Tool* (PMST), with a 5 km buffer applied to each 1 km wide corridor option, as indicated on Figure 2.1.
- State Department of Science, Information Technology and Innovation's (DSITI) – *Wildlife Online*, by applying 10 point searches (18 km radius) along a shared centreline of the three options, as indicated in Figure 2.2.

2.2 Data collation and record searches

The data collation process and threatened species records searches for determining the threatened species and/or ecological communities, listed under the EPBC Act and/or NC Act, that are of relevance to each corridor option are discussed in Sections 2.2.1–2.2.2.

2.2.1 Data collation

The data collation process identifies the threatened and migratory species listed under the EPBC Act and/or NC Act for which species record searches are undertaken.

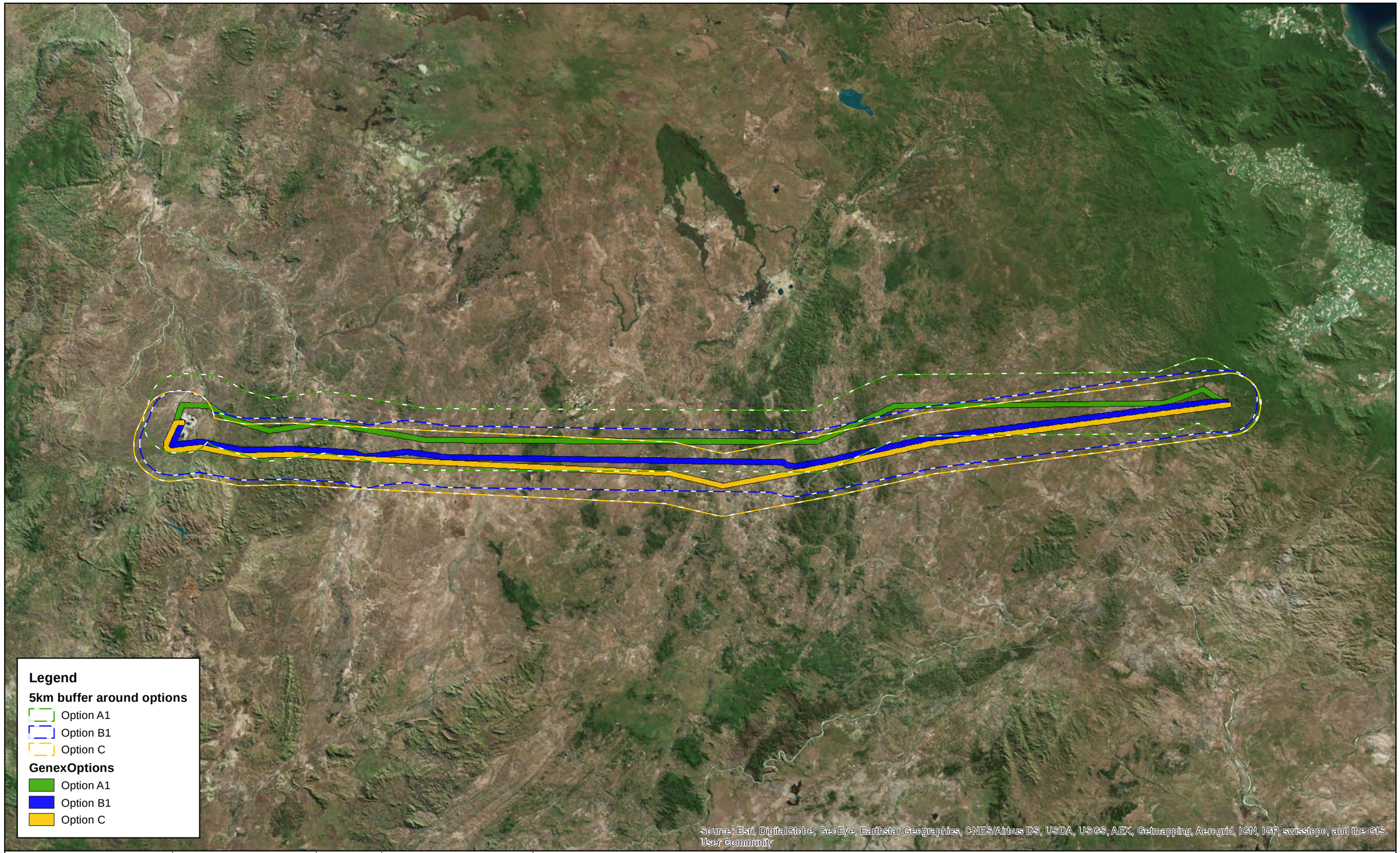
2.2.1.1 PMST

The PMST database results reveals the MNES of potential relevance to each corridor option. The PMST searches are presented in Appendix A. The PMST search results for each corridor option have been collated into a spreadsheet to present the results of relevance to each corridor option. This spreadsheet is available in Appendix B.

2.2.1.2 Wildlife Online

The 10 Wildlife Online database search results were obtained as Excel files so they could be amended to draw attention to the threatened, special least concern and migratory species listed under the NC Act and/or EPBC Act. These amended spreadsheets are presented in Appendix C.

The Wildlife Online database results were taken from 10 centre point searches with an 18 km radius along a shared centreline of the three options, as shown on Figure 2.2. Wildlife Online database is based upon species records. The results of the 10 point searches (18 km radius) were collated into a spreadsheet to identify the endangered, vulnerable, near threatened and special least concern species that have records within the search area. This spreadsheet is available in Appendix D.



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Data source: Options from Client (2016)

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Coordinate system: GCS GDA 1994

Scale ratio correct when printed at A3

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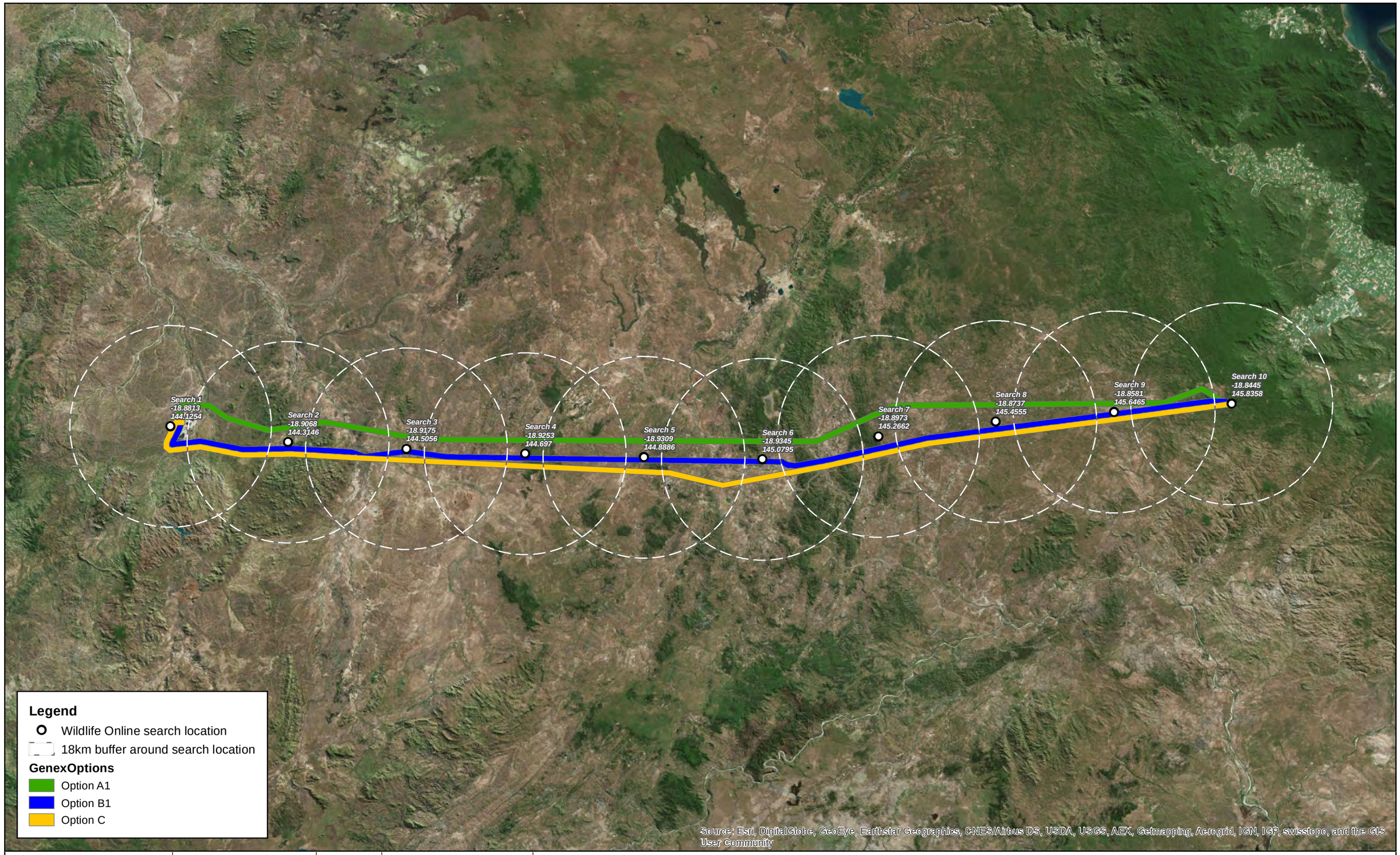
Kidston Power Transmission Line
Figure 2.1

PMST Search Areas



Map: 2270434A_GIS_001_A2	Author: VD
Date: 11/11/2016	Approved by: RH

Data source: Options from Client (2016)

0 8,500 17,000 m

1:630,000

Coordinate system: GCS GDA 1994

Scale ratio correct when printed at A3

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Kidston Power Transmission Line
Figure 2.2
Wildlife Online Search Areas

2.2.2 Threatened species records searches

The next step of the process involved undertaking species records searches for each threatened species returned from the combined PMST and Wildlife Online search results. The collated PMST and Wildlife Online search results spreadsheet that was developed to inform species records searches, as presented in Appendix E. The following two databases have been searched for species records:

1. State DSITI – Species profile search to obtain state wide records for the threatened flora and fauna species listed under the NC Act and/or EPBC Act.
2. Commonwealth Government administered Atlas of Living Australia to obtain national records for the threatened fauna species listed under the NC Act and/or EPBC Act.

It is important to note that for some NC Act listed threatened flora and fauna species (e.g. orchids and frogs) are not made available by DSITI, due to the risk of them being illegally captured or removed from the environment.

Once all of the available records were obtained, they were put through the GIS analysis and mapping process.

2.3 GIS analysis and mapping

Using ESRI ArcGIS, a 1 km buffer was applied to the centreline of each 1 km wide corridor option (A, B and C) to create a 3 km wide investigation area. Each 3 km wide investigation area (corridor investigation area) is the basis for quantifying and mapping the MNES and MSES ecological constraints therein. This was done to draw comparisons between each corridor option to inform the option selection process.

2.3.1 Quantification of ecological constraints

The number and/ or extent (hectares) of ecological constraints, within each 3 km wide corridor investigation area (Options A, B and C), has been quantified and mapped using the GIS intersect tool for the following mapping layers:

- The **number** of DSITI's species records for threatened flora and fauna species listed under the NC Act and/or EPBC Act that have been previously recorded within each corridor investigation area.
- The **number** of Atlas of Living Australia's species records for threatened fauna listed under the NC Act and/or EPBC Act that have been previously recorded within each corridor investigation area.
- The **presence or absence** of 'high risk areas' for endangered, vulnerable and near threatened plants (EVNT plants) listed under NC Act on the 'protected plants flora survey trigger map' within each corridor investigation area.
- The **extent (hectares)** of MSES regulated vegetation in reference to:
  - Department of Natural Resources and Mine's (DNRM) regulated vegetation mapping (endangered and of concern regional ecosystems)
  - DNRM's regional ecosystem mapping (endangered, of concern and least concern regional ecosystems)
  - Virtual GIS's remote sensing analysis (refer Section 3.1.4) and mapping of woody vegetation – predicted and potential extent of remnant, regrowth and non-remnant vegetation
  - regulated remnant watercourse vegetation (endangered, of concern and least concern regional ecosystems), methodology provided below in Section 2.3.1.1
  - regulated remnant wetland vegetation (endangered, of concern and least concern regional ecosystems), methodology provided below in Section 2.3.1.2.
- The **extent (hectares)** of other MSES listed under *Schedule 2* of the *Environmental Offsets Regulation 2014* within each corridor investigation area, including:
  - protected areas (e.g. National Parks and State reserves)
  - wildlife habitats
  - strategic environmental areas

- high ecological significance wetlands
- high ecological value waters (wetland)
- high ecological value waters (watercourses)
- environmental offsets
- connectivity.

2.3.1.1 Regulated remnant watercourse vegetation

The 1:100,000 scale regulated vegetation mapping covers approximately two thirds of each corridor investigation area, while the remaining thirds, toward the western extent of each corridor investigation area, are covered by the 1:250,000 scale mapping.

The 1:250,000 scale mapping does not have stream order attributes. Therefore, the Strahler method has been applied to the 1:250,000 watercourse layer using GIS to appropriately assign the stream orders.

The defined distance for a remnant regional ecosystem along a watercourse has been determined on whether the area of investigation is located in a coastal bioregion and sub-regions or non-coastal bioregion and sub-regions, which are prescribed under Schedule 2 clause 2, subsections (4) and (6) of the Environmental Offsets Regulation 2014, including:

→ Coastal bioregions and sub-regions:

- Townsville Plains (11.1), Bogie River Hills (11.2) and Marlborough Plains (11.14) Subregions, Brigalow Belt (SBRB) Bioregion
- Central Queensland Coast (CQC) Bioregion
- Starke Coastal Lowlands (3.2) Subregion, Cape York Peninsula (CYP) Bioregion
- Hodgkinson Basin (9.3) Subregion, Einasleigh Uplands (EIU) Bioregion
- Wet Tropics (WET) Bioregion
- South East Queensland (SEQ) Bioregion.

→ Non-coastal bioregions and sub-regions:

- Brigalow Belt (SBRB) Bioregion (excluding Subregions 11.1, 11.2 and 11.14)
- New England Tableland (NET) Bioregion
- Northwest Highlands (NWH) Bioregion
- Gulf Plains (GUP) Bioregion
- Cape York Peninsula (CYP) Bioregion (excluding Subregion 3.2)
- Mitchell Grass Downs (MGD) Bioregion
- Channel Country (CHC) Bioregion
- Mulga Lands (MUL) Bioregion
- Einasleigh Uplands (EIU) Bioregion (excluding Subregion 9.3)
- Desert Uplands (DEU) Bioregion.

The distances for regulated remnant watercourse vegetation from the defining bank of watercourse stream orders in coastal bioregions and sub-regions, is presented in Table 2.1.

Table 2.1 Distances for regulated remnant watercourse vegetation from the defining bank of watercourse stream orders in coastal bioregions

WATERCOURSE STREAM ORDER	DISTANCE FROM THE DEFINING BANK (metres)
1 or 2	10
3 or 4	25
5 or greater	50

The distances for regulated remnant watercourse vegetation from the defining bank of watercourse stream orders in non-coastal bioregions and sub-regions, is presented in Table 2.2.

Table 2.2 Distances for regulated remnant watercourse vegetation from the defining bank of watercourse stream orders in non-coastal bioregions

WATERCOURSE STREAM ORDER	DISTANCE FROM THE DEFINING BANK (metres)
1 or 2	25
3 or 4	50
5 or greater	100

2.3.1.2 Regulated remnant wetland vegetation

The extent (ha) of remnant vegetation (endangered, of concern and least concern regional ecosystems) of relevance to areas of mapped regulated wetland vegetation, is determined by applying a 50 m buffer to the mapped regulated vegetation wetlands.

2.4 Threatened ecological communities assessment

An assessment of the mapped regional ecosystems within each corridor was undertaken to identify the potential presence of regional ecosystems that may potentially constitute threatened ecological communities listed under the EPBC Act.

2.5 Constraint ranking

A ranking system has been applied to each corridor investigation area, for each environmental matter and/or potential ecological constraint, to capture the degree of ecological constraints within each corridor option and to assist with determining the least constrained or preferred corridor.

RED	Greatest amount of potential impact and ecological constraint
ORANGE	Moderate amount of potential impact and ecological constraint
GREEN	Least amount of potential impact and ecological constraint

The ranking system has not been applied to database search results (i.e. Wildlife Online and PMST) because they have been used to inform species record searches and assessment. The ranking system has also not been applied to matters that do not require significant impact assessments or trigger environmental offsets (i.e. least concern regional ecosystems and regrowth and areas of non-remnant).

The ‘high risk areas’ for endangered, vulnerable and near threatened plants (EVNT plants) listed under NC Act on the ‘protected plants flora survey trigger map’, have also not been ranked as they are captured as flora species records.

PROPOSED GENEX KIDSTON CONNECTION PROJECT

Corridor Selection Report

PREPARED BY

QUEENSLAND ELECTRICITY TRANSMISSION CORPORATION LIMITED

(ACN 078 849 233) trading as “POWERLINK”

3 ECOLOGICAL CONSTRAINTS

3.1 Matters of State Environmental Significance

The following MSES have been assessed in the following sections:

- NC Act threatened flora and fauna species
- regulated vegetation, including:
  - DNRM's regulated vegetation mapping
  - DNRM's regional ecosystem mapping
  - Virtual GIS's remote sensing analysis and mapping of woody vegetation
  - regulated remnant watercourse vegetation
  - regulated remnant wetland vegetation
- protected areas (e.g. National Parks and State reserves)
- wildlife habitats
- strategic environmental areas
- high ecological significance (HES) wetlands
- high ecological value (HEV) waters (wetland)
- high ecological value (HEV) waters (watercourses)
- environmental offsets
- connectivity.

3.1.1 NC Act threatened species

3.1.1.1 Wildlife Online results

The Wildlife Online database search results revealed that 26 threatened species listed under the NC Act and/or EPBC Act have been previously recorded within the search area that was applied to all three corridor options, including 11 birds, six mammals and nine plants.

The results of the Wildlife Online database search is presented in Table 3.1. The complete Wildlife Online database searches are presented in Appendix C.

Threatened species listed as endangered, vulnerable and special least concern under the NC Act are recognised as MSES under the *Environmental Offset Act 2014*. Near threatened species do not need to be assessed in terms of significant residual impacts under the *Environmental Offset Act 2014*, but have been included, just in case of any future changes in legislation that may occur during the approval pathway of the Project.

Table 3.1 Wildlife Online database search results for threatened flora and fauna species previously recorded within the search area

SCIENTIFIC NAME	COMMON NAME	NC ACT	EPBC ACT
Birds			
Calidris ruficollis	Red-necked Stint	SL	M
Calyptorhynchus lathami erebus	Glossy Black-cockatoo (northern)	V	–
Casuarius casuarius johnsonii (southern population)	Southern Cassowary (southern population)	E	E
Cuculus optatus	Oriental Cuckoo	SL	M
Erythrura gouldiae	Gouldian Finch	E	E
Hirundapus caudacutus	White-throated Needletail	SL	M

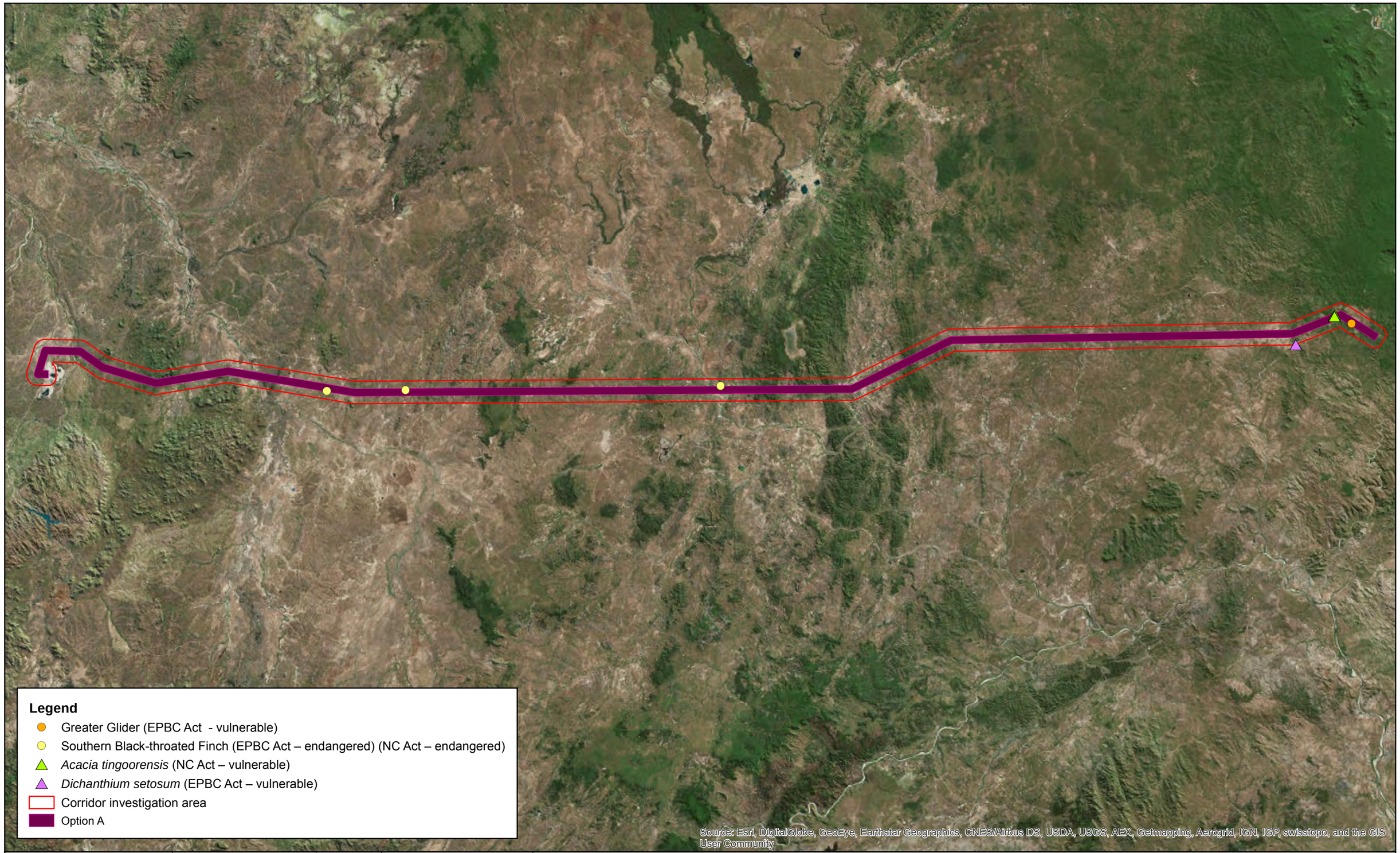
SCIENTIFIC NAME	COMMON NAME	NC ACT	EPBC ACT
Hydroprogne caspia	Caspian Tern	SL	M
Monarcha melanopsis	Black-faced Monarch	SL	M
Poephila cincta cincta	Black-throated Finch (white-rumped subspecies)	E	E
Rhipidura rufifrons	Rufous Fantail	SL	M
Symposiachrus trivirgatus	Spectacled Monarch	SL	M
Mammals			
Mesembriomys gouldii	Black-footed Tree-rat	–	V
Petauroides volans minor	Northern Greater Glider	–	V
Petaurus gracilis	Mahogany Glider	E	E
Petrogale sharmani	Sharman's Rock-wallaby	V	V
Phascolarctos cinereus	Koala	V	V
Tachyglossus aculeatus	Short-beaked Echidna	SL	–
Plants			
Acacia tingoorensis	–	V	–
Arytera dictyoneura	–	NT	–
Cycas cairnsiana	–	V	V
Corybas cerasinus	–	NT	–
Corymbia leptoloma	–	V	V
Glossocardia orthochaeta	Yellow jacket	E	–
Leptospermum pallidum	–	NT	–
Lepturus minutus	–	V	–
Oenanthe javanica	–	NT	–

Key: E = endangered, V = vulnerable, NT = near threatened, SL = special least concern, M = migratory

3.1.1.2 Threatened species records

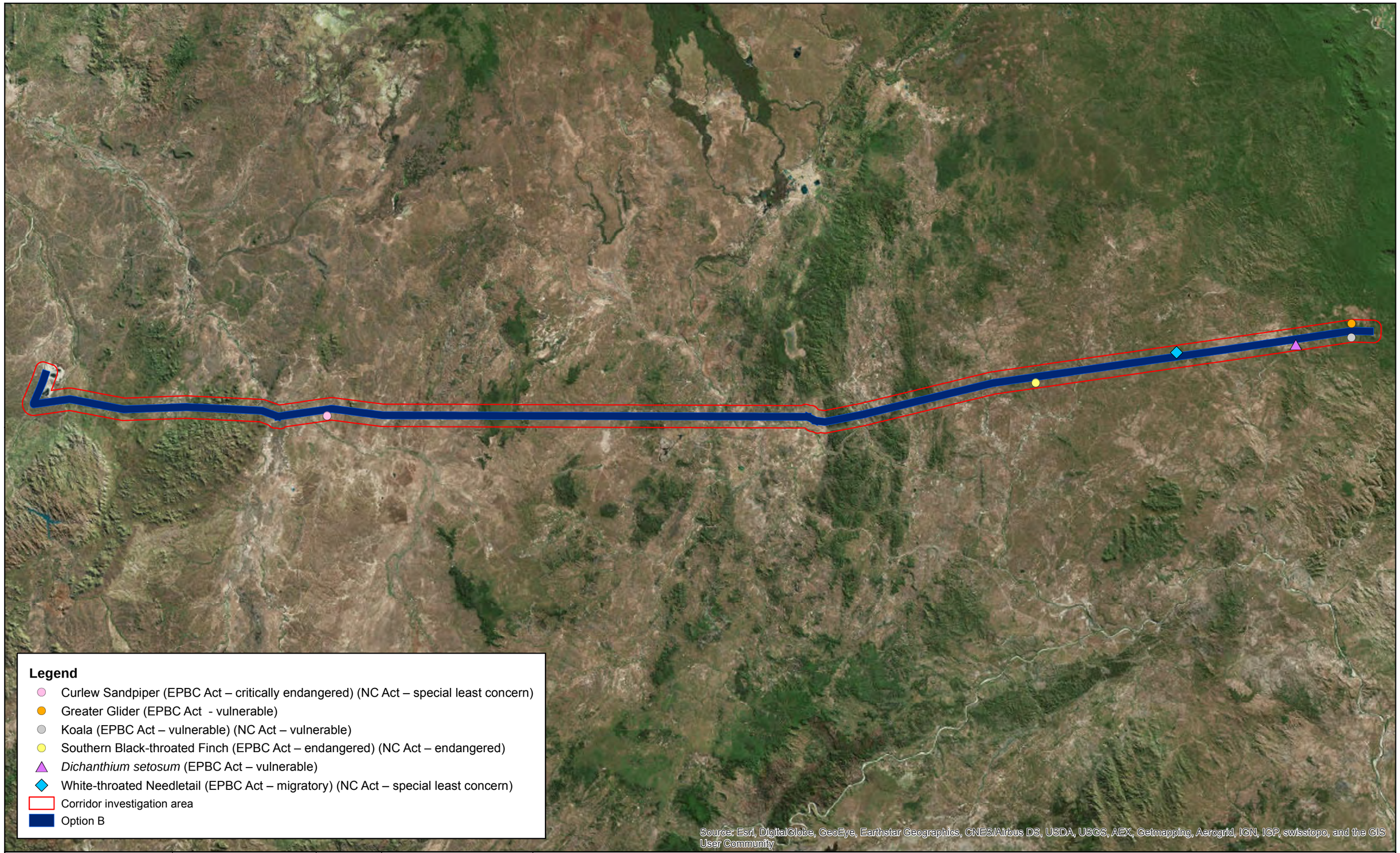
The NC Act threatened species records, obtained from DSITI's species profile search and Atlas of Living Australia that are of relevance to each corridor option have been quantified and mapped using GIS. The number of threatened species listed under the NC Act that have been previously recorded within each corridor investigation area is presented in Table 3.2 and mapped on Figure 3.1–Figure 3.3.

The spreadsheet that contains the analysis of threatened species records is presented in Appendix F.



Map: 2270434A_GIS_E003_A3a	Author: VD		0 6,300 12,600 m 1:470,000
Date: 12/12/2016	Approved by: RH		Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Data source: Species records from DSITI © The State of Queensland (2016) and Atlas of Living Australia (2016)			

Kidston Power Transmission Line
Figure 3.1
Threatened species records
Option A



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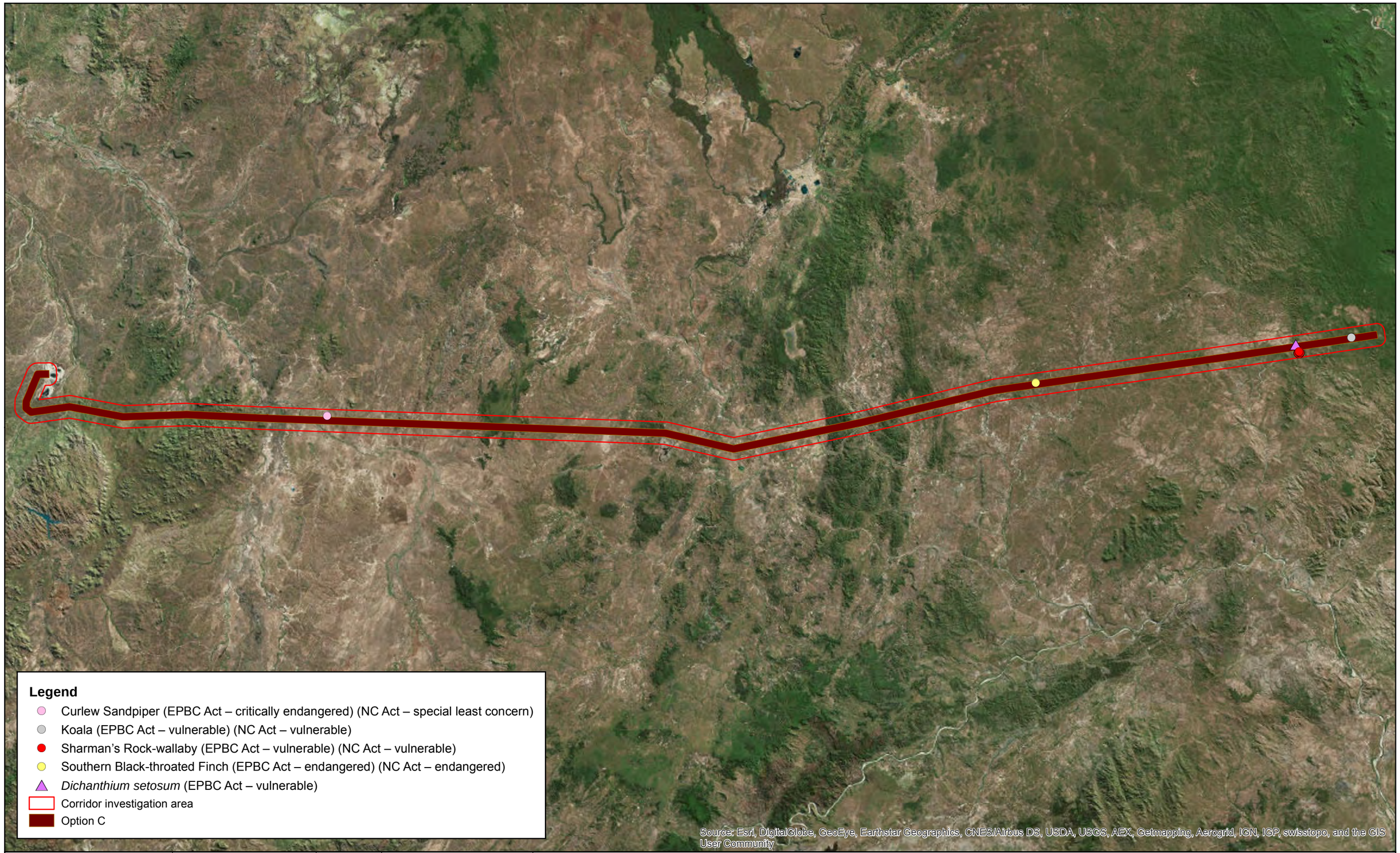
Date: 12/12/2016	Approved by: RH		
Data source: Species records from DSITI © The State of Queensland (2016) and Atlas of Living Australia (2016)			

Kidston Power Transmission Line
Figure 3.2
Threatened species records
Option B



Map: 2270434A_GIS_E003_A3c	Author: VD		0 6,300 12,600 m 1:470,000
Date: 12/12/2016	Approved by: RH		Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Data source: Species records from DSITI © The State of Queensland (2016) and Atlas of Living Australia (2016)			

Kidston Power Transmission Line
Figure 3.3
Threatened species records
Option C

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Table 3.2 The number of NC Act listed species that have been previously recorded within each corridor investigation area

NC ACT STATUS	OPTION A	OPTION B	OPTION C
Threatened flora species			
Endangered	-	-	-
Vulnerable	1	-	-
Near threatened	-	-	-
Threatened fauna species			
Endangered	1	1	1
Vulnerable	-	1	3
Near threatened	-	-	-
Special least concern	-	2	1
Total records	**2**	**4**	**5**

In reference to Table 3.2, Option A has the least number of NC Act threatened species records and is therefore the least constrained.

It is important to note that the number of threatened species records are representative of the number of flora and fauna surveys that are undertaken in specific areas for developments or in association with protected areas. In respect to the remoteness of the corridor investigation areas, it is possible that flora and fauna surveys for the Project may identify threatened species that may have not yet been recorded within the corridor investigation areas, and as such formerly captured on the DSITI and ALA species records databases.

3.1.1.3 Protected plants flora survey trigger map high risk areas

The 'high risk areas' for endangered, vulnerable and near threatened plants (EVNT plants) listed under NC Act on the 'protected plants flora survey trigger map' within each corridor investigation area is presented on Figure 3.4. This indicates the presence of threatened flora species within the high risk areas and indicates a potential ecological constraint to all three corridor options. The high risk areas have been mapped for confirmed records of *Acacia tingoorensis*.

Once a final project footprint is obtained a protected plants flora survey in accordance with the *Flora Survey Guidelines – Protected Plants Nature Conservation Act 1992* (DEHP, 2014), would need to be conducted within the high risk areas that intersect the project footprint. This survey would need to be conducted within 12 months of construction within the high risk areas.

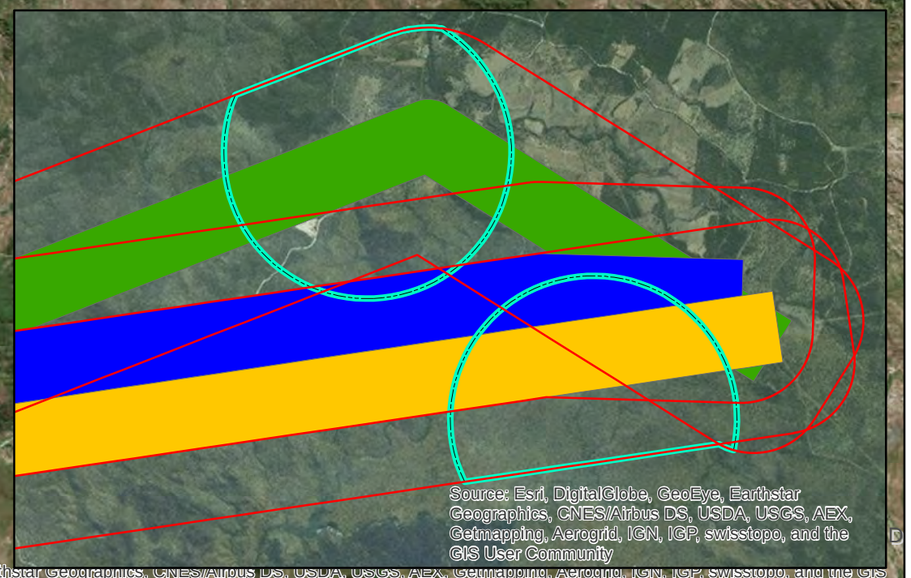
ABERGOWRIE
MINNAMOOLKA
WAIRUNA
GARRAWALT
MOUNT SURPRISE
EINASLEIGH
CONJUBOY
WALLAMAN
UPPER STONE
MOUNT FOX
VALLEY OF LAGOONS
PALUMA
GREENVALE
LYNDHURST

Legend

- Corridor investigation area
- High risk flora trigger areas

Corridor options

- Option A
- Option B
- Option C



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Map: 2270434A_GIS_E001_A3	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Department of Environment and Heritage Protection (2016)

0 6,300 12,600 m

1:470,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

Kidston Power Transmission Line
Figure 3.4
High risk flora trigger areas

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3.1.2 Mapped regulated vegetation

The extent of DNRM's mapped regulated vegetation that is of potential of relevance to each corridor investigation area, is presented on Figure 3.5–Figure 3.19.

The area of mapped regulated vegetation that is of potential relevance to each corridor option has been further calculated using GIS, and is listed in Table 3.3.

The area (ha) of mapped regulated vegetation associated with dominant and sub-dominant of concern regional ecosystems that is of potential relevance to each corridor investigation area is presented in Table 3.3. The analysis of regulated vegetation for each corridor option is presented in Appendix G.

Based on the results of this assessment, Option C is the least constrained in terms of potential impacts upon mapped regulated vegetation, as presented in Table 3.3.

Table 3.3 Extent of regulated vegetation of relevance to each corridor option

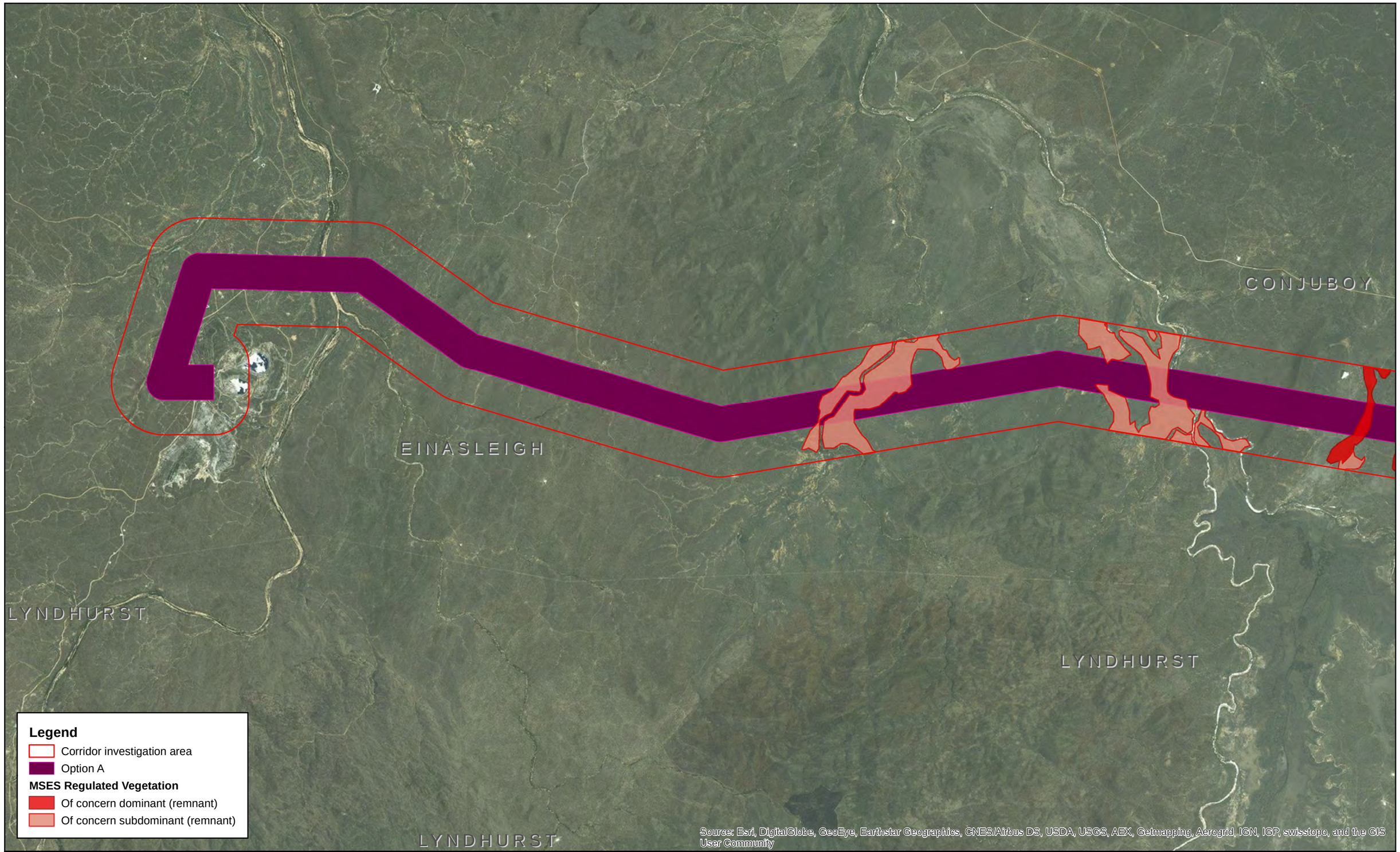
CORRIDOR	MAPPED REGULATED VEGETATION (HA)			
	OF CONCERN DOMINANT	OF CONCERN SUB-DOMINANT	OF CONCERN HVR	CATEGORY R REGROWTH
Option A	2,059	1,008	3.6	422
Option B	1,819	442	2.4	296
Option C	1,519	334	2.4	257

3.1.2.1 Category R vegetation

The DNRM's mapped *Category R regrowth vegetation: A self-assessable vegetation clearing code* (DNRM, 2013), specifies that Category R regrowth vegetation is native woody vegetation on freehold land, Indigenous land or leasehold land granted for agriculture or grazing purposes, located within 50 metres of a watercourse in the Burdekin, Mackay, Whitsunday and Wet Tropics Great Barrier Reef catchments (DNRM, 2013).

The need to consider Category R regrowth vegetation will be dependent upon the approval pathway for the Project. Assessment of the approvals pathway for the Project is excluded from the scope of this report, however a review of Community Infrastructure Designations (CIDs) database (Department of Infrastructure, Local Government and Planning, 2015) indicates that most Powerlink transmission lines are assessed and approved by the State under a CID under Chapter 5 of the *Sustainable Planning Act 2009*. Schedule 24 of the Sustainable Planning Regulation 2009 (SP Regulation) enables clearing of vegetation for community infrastructure mentioned in schedule 2 (of the SP Regulation), if the clearing is carried out on designated land.

Given the likelihood that approval for the transmission line is required by the State under the CID process, it is relevant to consider the potential ecological constraints associated with Category R regrowth vegetation until the approval pathway has been determined. In reference to Table 3.3, Option C is of least constraint in terms of potential impacts upon Category R regrowth vegetation.



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Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

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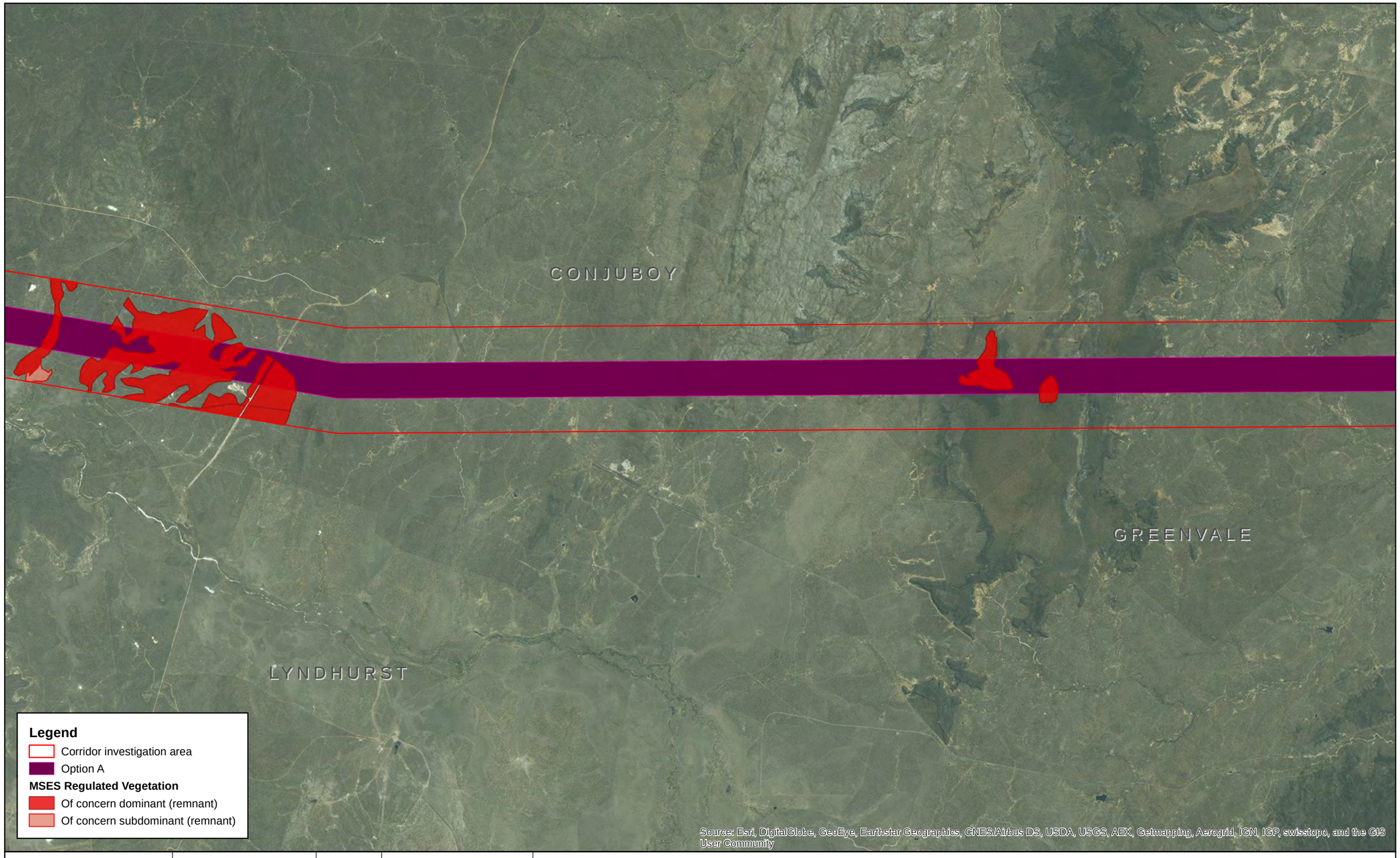
Kidston Power Transmission Line
Figure 3.5
MSES Regulated Vegetation
Option A



Map: 2270434A_GIS_E005_A3a	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

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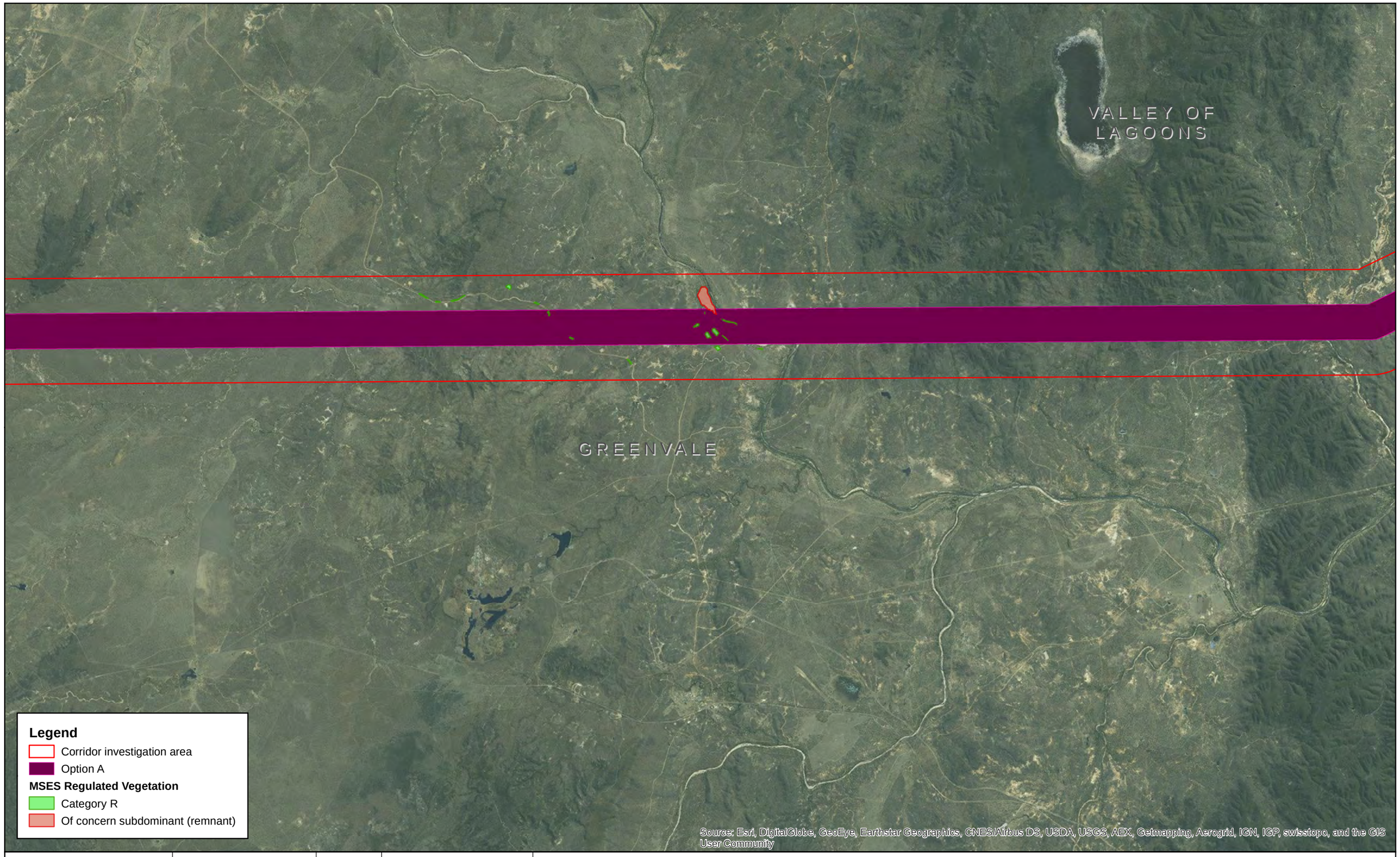
Kidston Power Transmission Line
Figure 3.6
MSES Regulated Vegetation
Option A



Map: 2270434A_GIS_E005_A3a	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Department of Environment and Heritage Protection (2016)

0 1,300 2,600 m

1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

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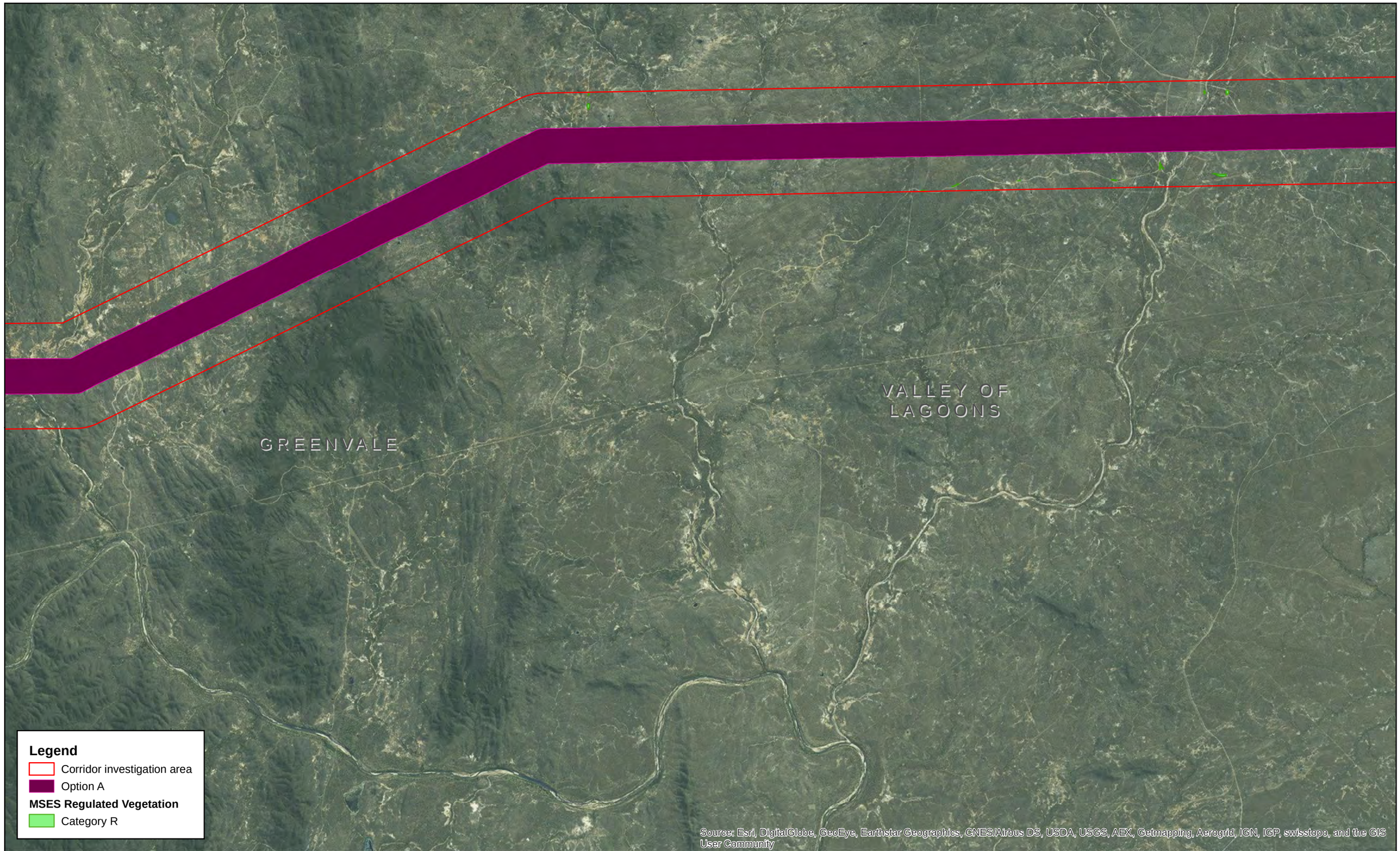
Kidston Power Transmission Line
Figure 3.7
MSES Regulated Vegetation
Option A



Map: 2270434A_GIS_E005_A3a	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Department of Environment and Heritage Protection (2016)

0 1,300 2,600 m

1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

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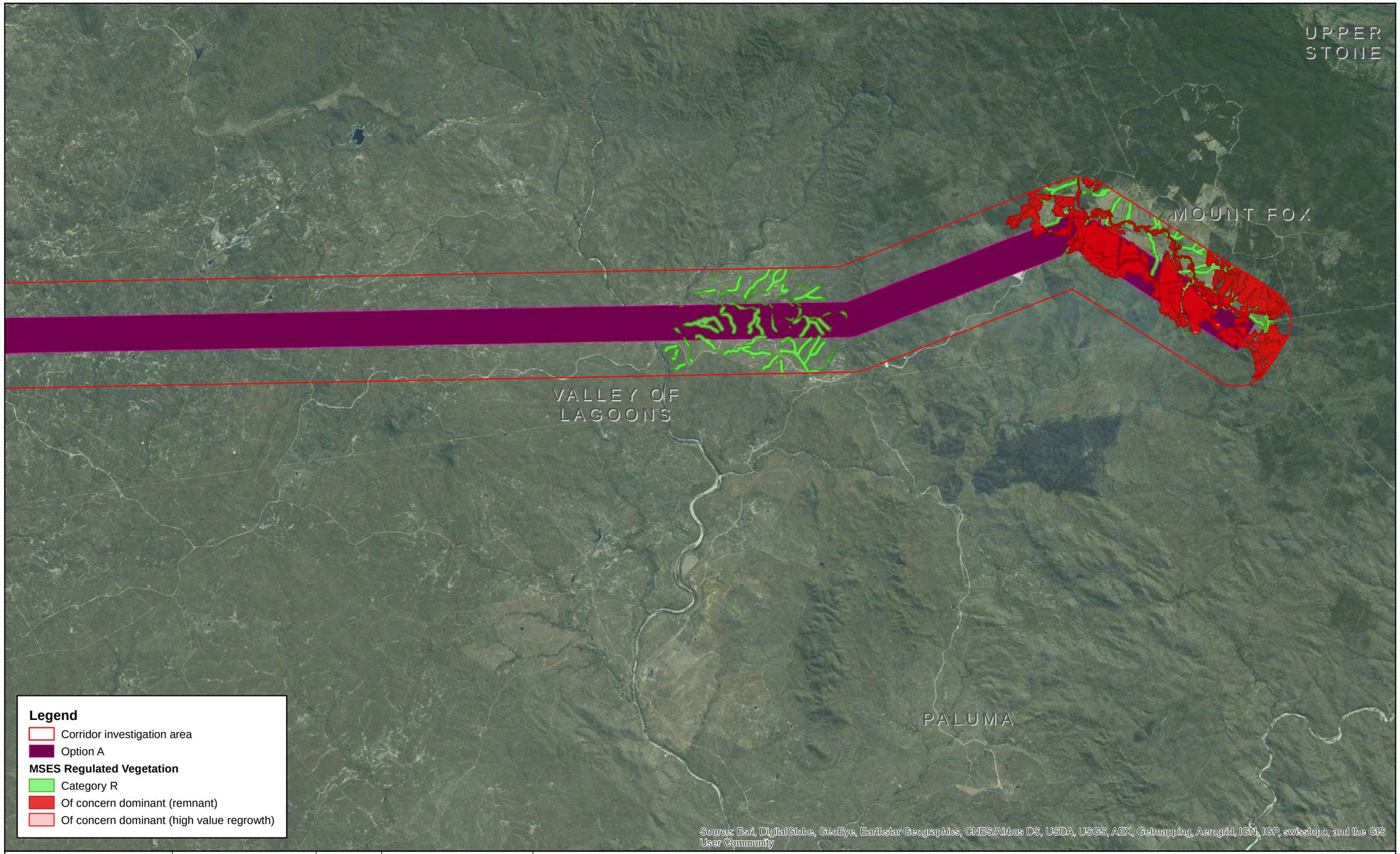
Kidston Power Transmission Line
Figure 3.8
MSES Regulated Vegetation
Option A



Map: 2270434A_GIS_E005_A3a	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Department of Environment and Heritage Protection (2016)

0 1,300 2,600 m

1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

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Kidston Power Transmission Line
Figure 3.9
MSES Regulated Vegetation
Option A

Map: 2270434A_GIS_E005_A3b	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

Kidston Power Transmission Line
Figure 3.10
MSES Regulated Vegetation
Option B

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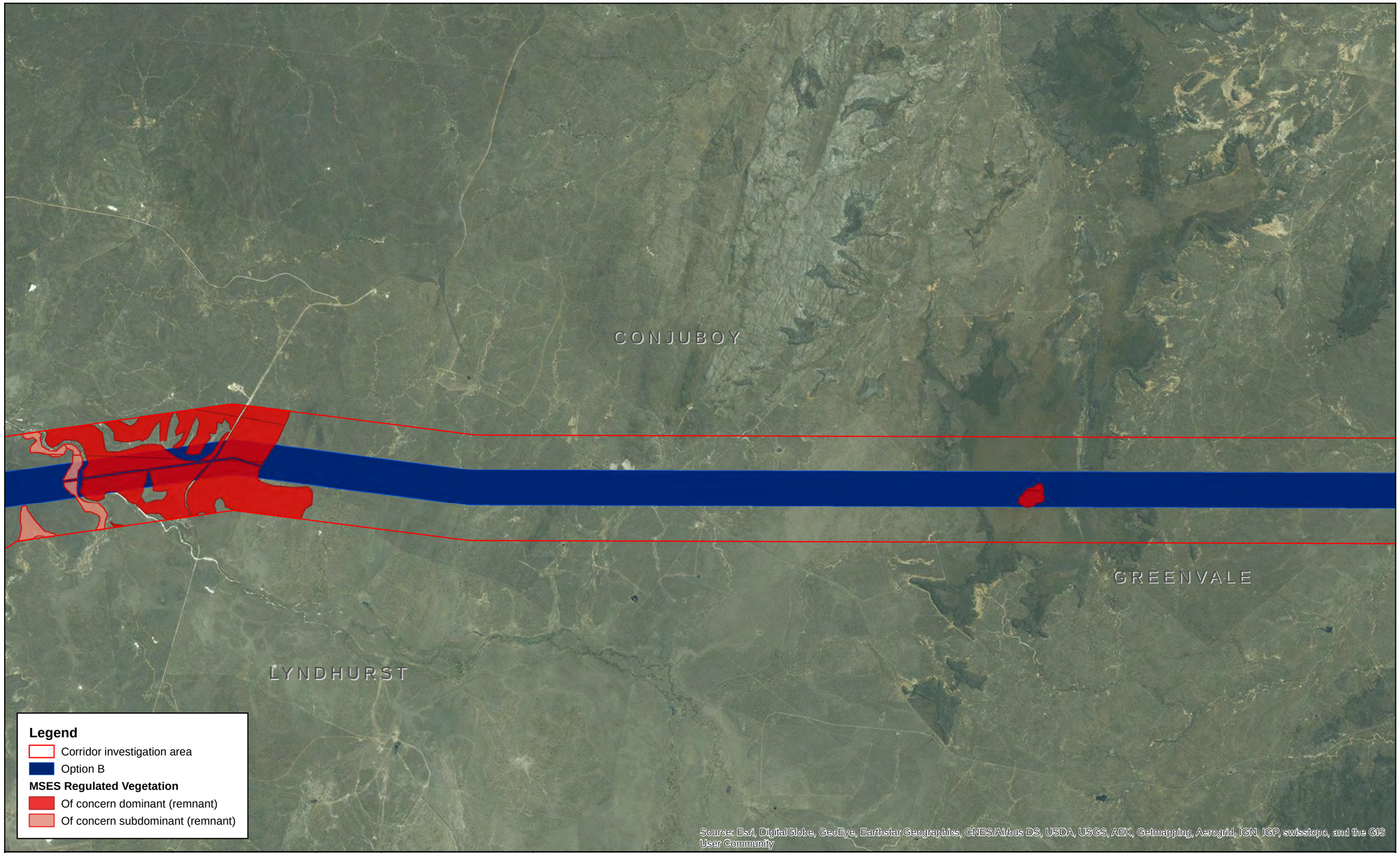


Map: 2270434A_GIS_E005_A3b	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Department of Environment and Heritage Protection (2016)

0 1,300 2,600 m

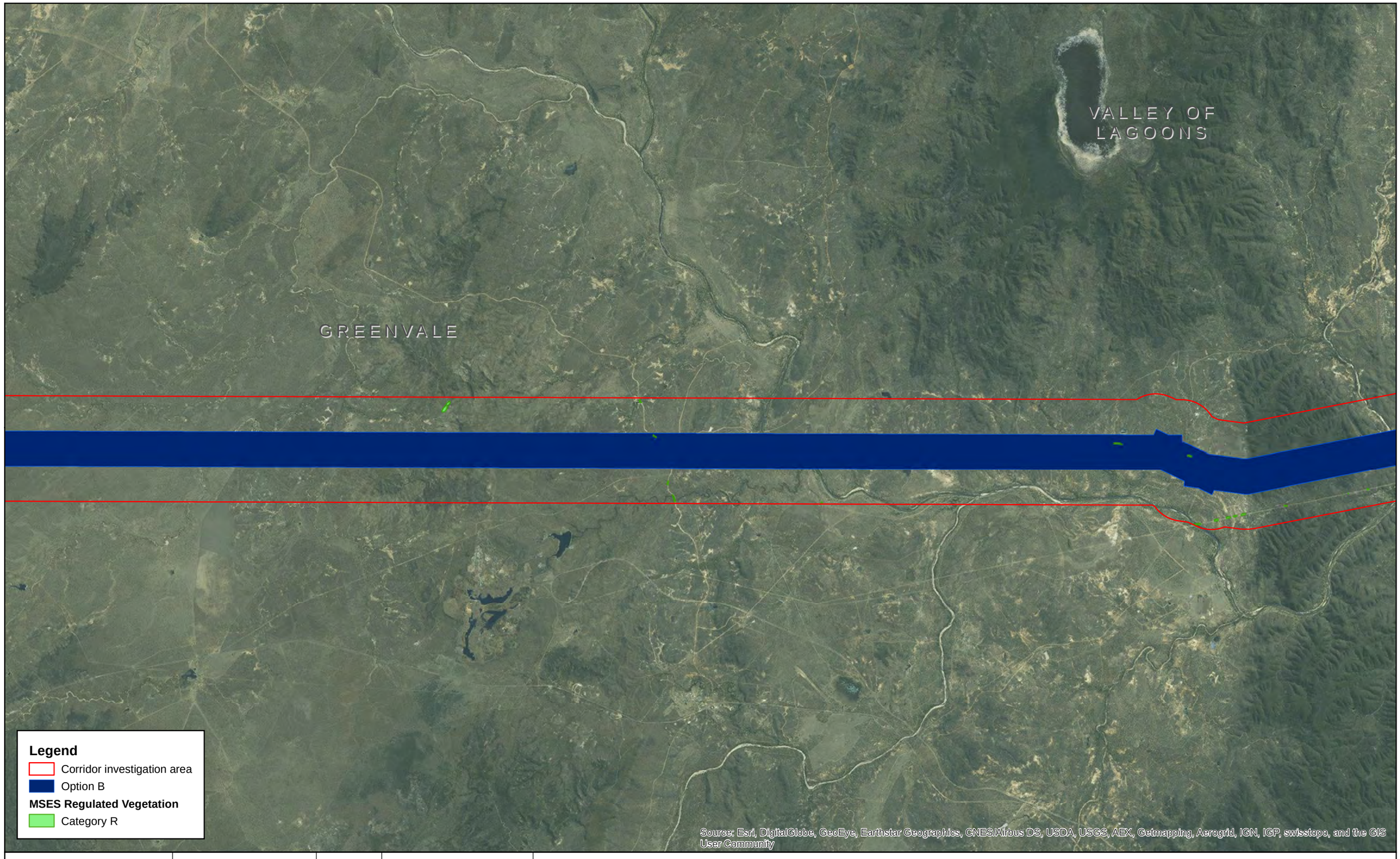
1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

WSP | PARSONS BRINCKERHOFF

Kidston Power Transmission Line
Figure 3.11
MSES Regulated Vegetation
Option B



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Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

Kidston Power Transmission Line
Figure 3.12
MSES Regulated Vegetation
Option B

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Map: 2270434A_GIS_E005_A3b	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

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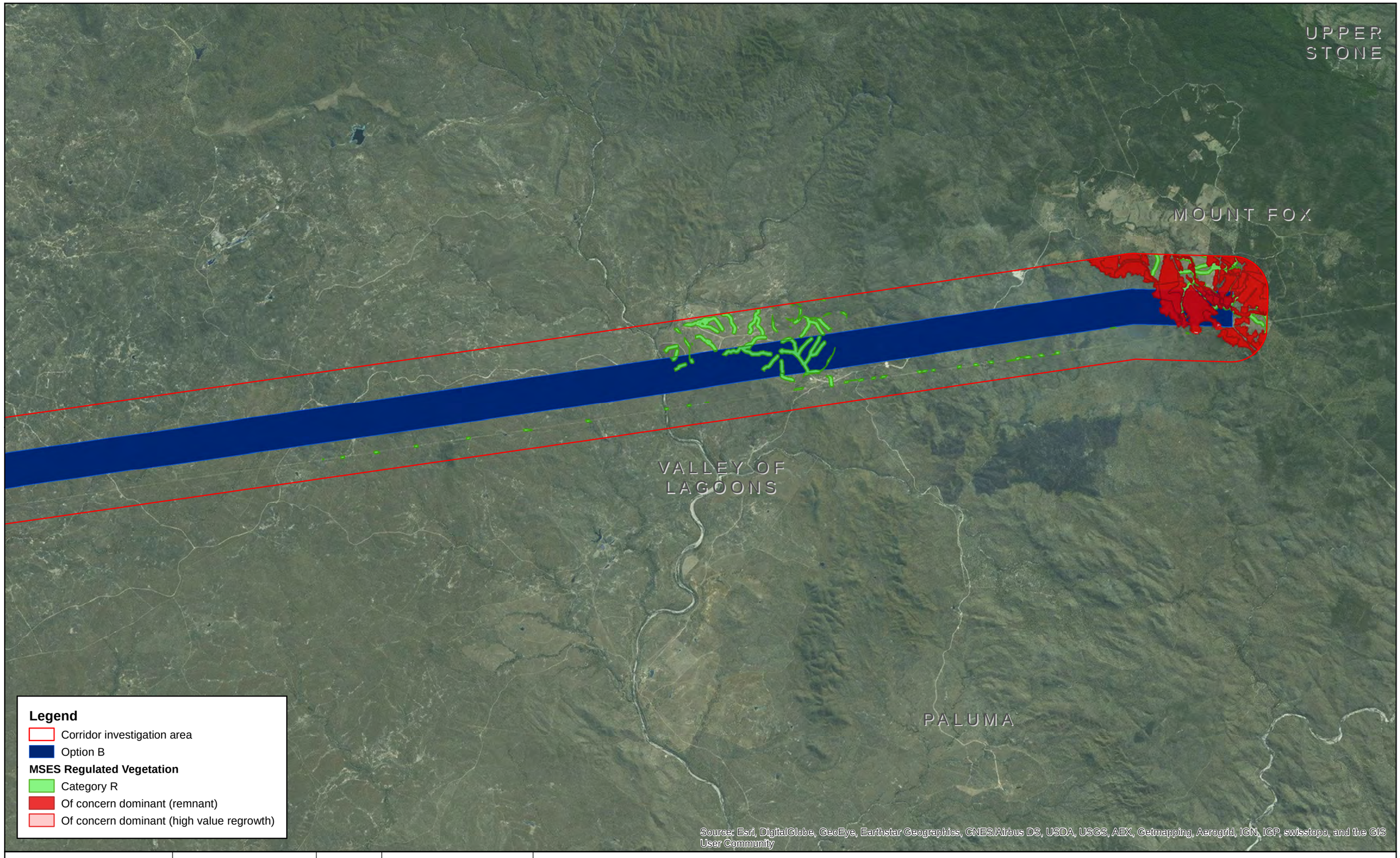
Kidston Power Transmission Line
Figure 3.13
MSES Regulated Vegetation
Option B



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Date: 12/12/2016	Approved by: RH

Data source: Department of Environment and Heritage Protection (2016)

0 1,300 2,600 m

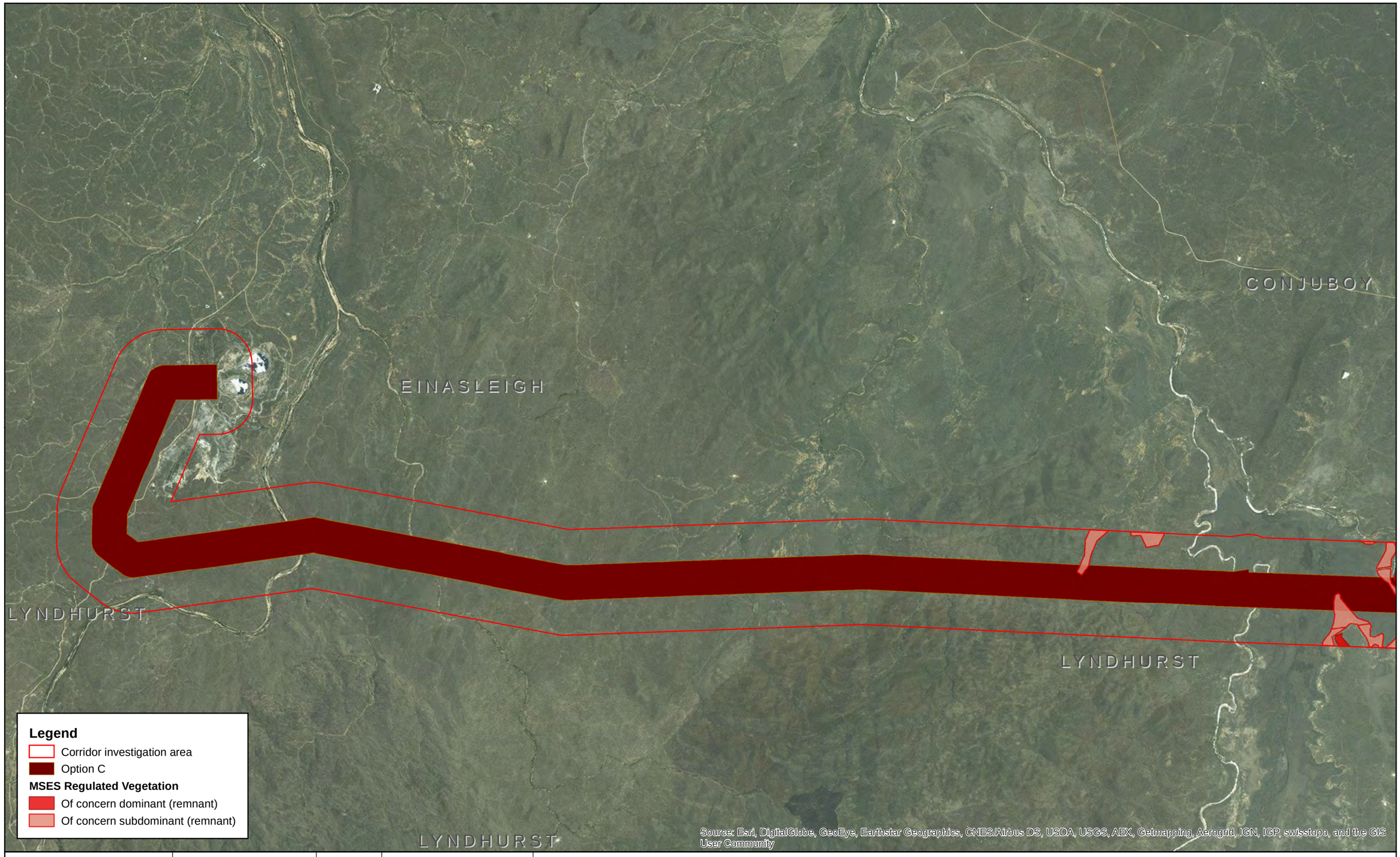
1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

WSP | PARSONS BRINCKERHOFF

Kidston Power Transmission Line
Figure 3.14
MSES Regulated Vegetation
Option B



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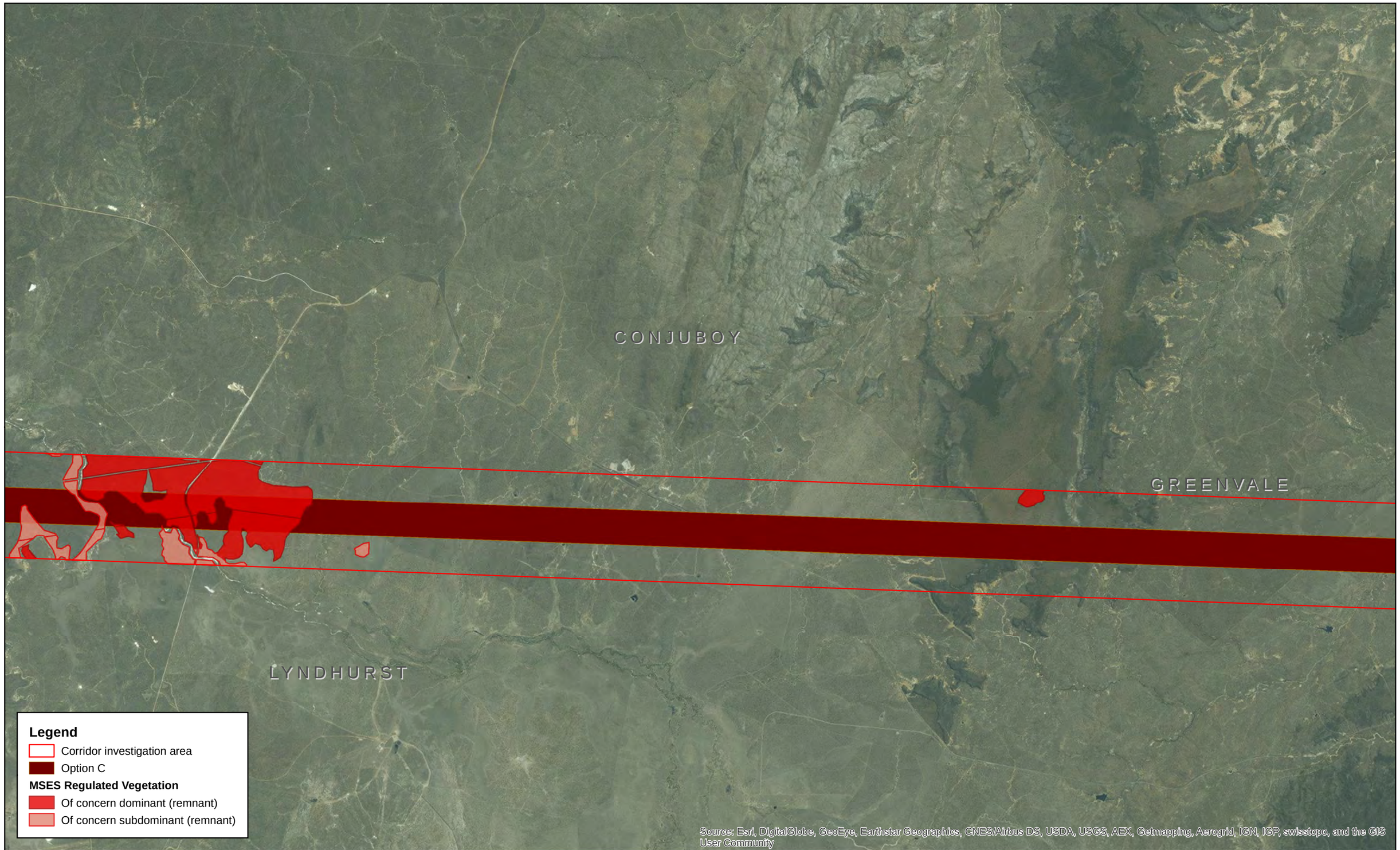
Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

Kidston Power Transmission Line
Figure 3.15
MSES Regulated Vegetation
Option C



Map: 2270434A_GIS_E005_A3c	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Department of Environment and Heritage Protection (2016)

0 1,300 2,600 m

1:100,000

Coordinate system: GDA 1994 MGA Zone 55

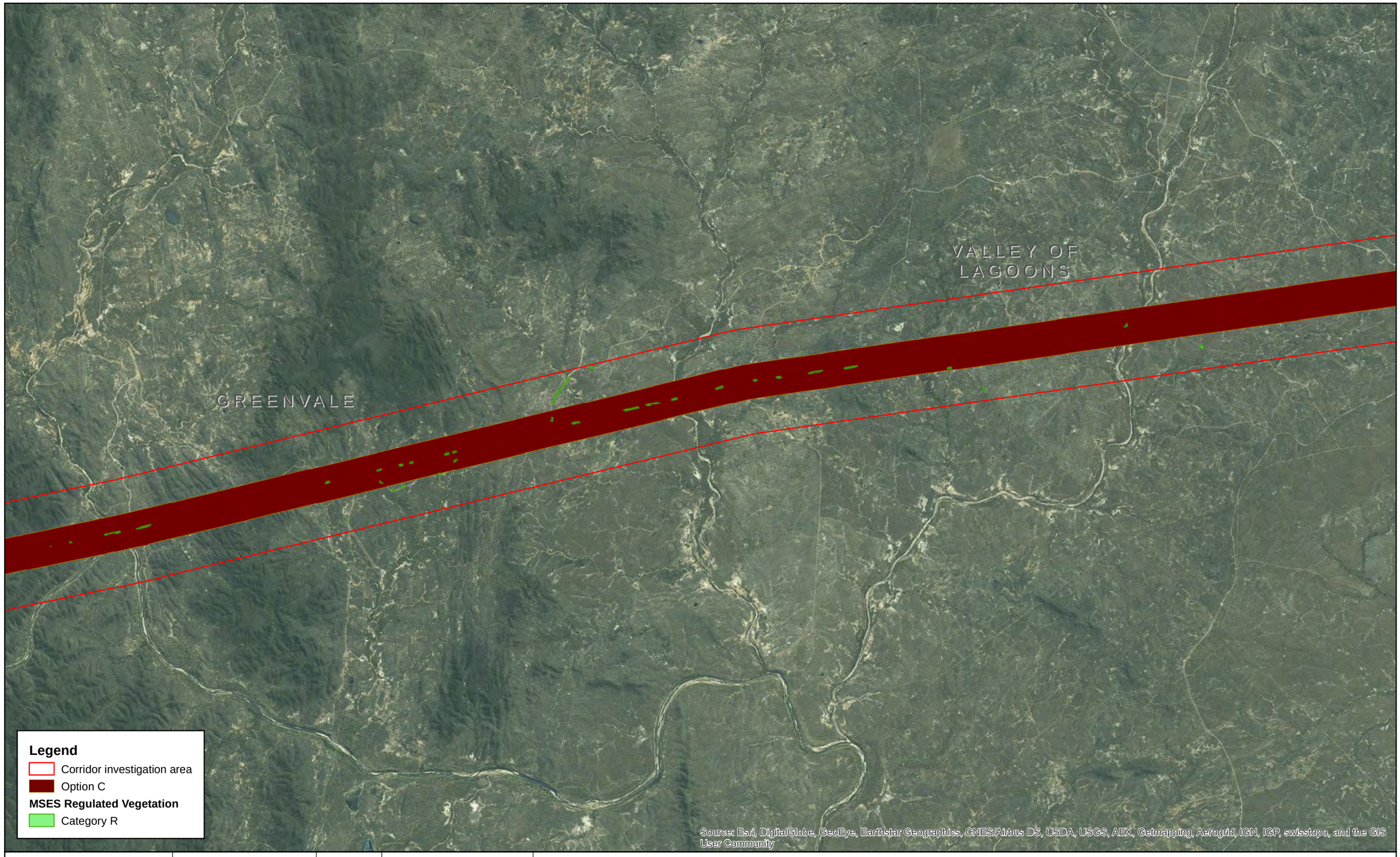
Scale ratio correct when printed at A3

Kidston Power Transmission Line
Figure 3.16
MSES Regulated Vegetation
Option C

Map: 2270434A_GIS_E005_A3c	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

WSP | PARSONS BRINCKERHOFF

Kidston Power Transmission Line
Figure 3.17
MSES Regulated Vegetation
Option C



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Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

Kidston Power Transmission Line
Figure 3.18
MSES Regulated Vegetation
Option C

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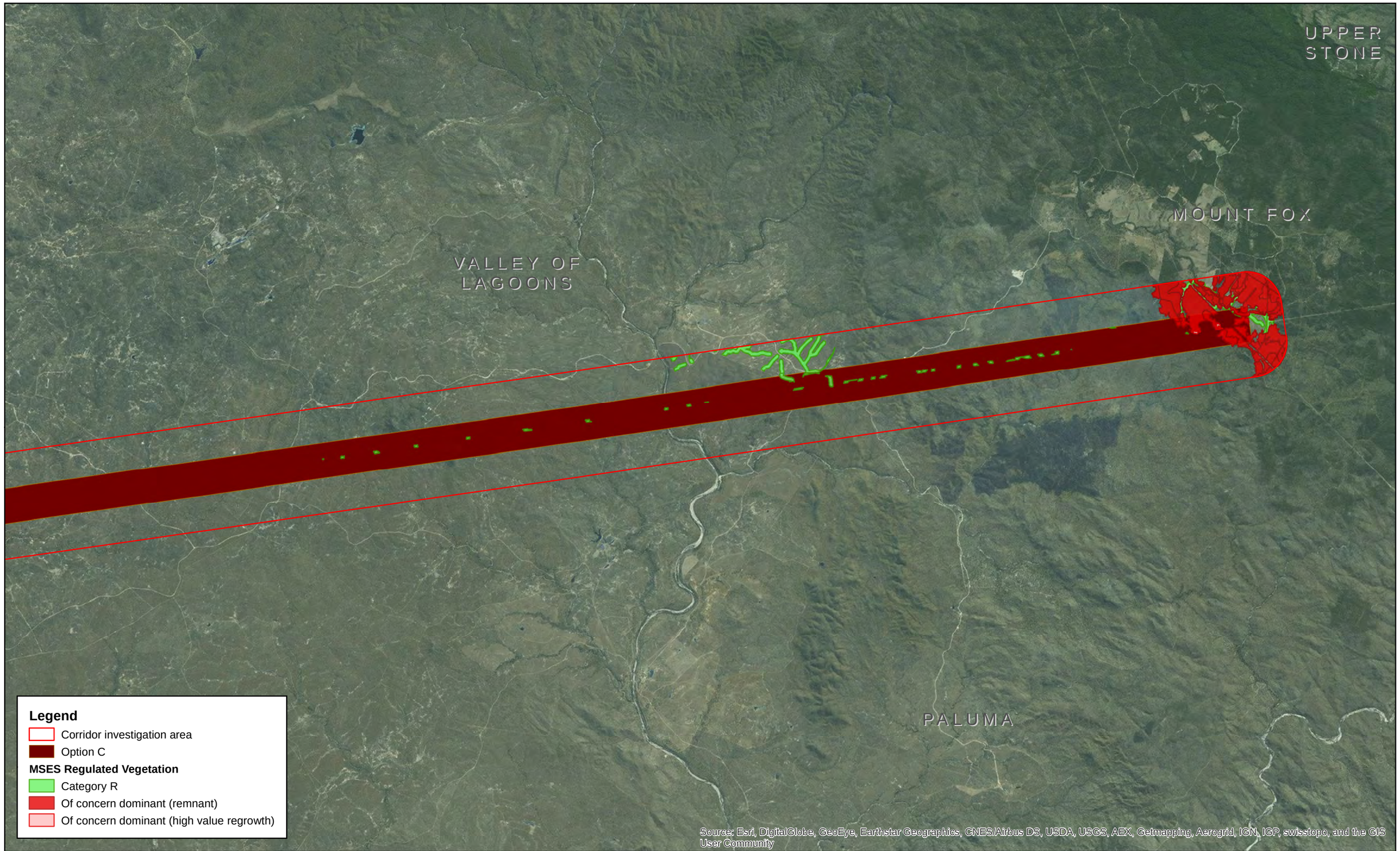


Map: 2270434A_GIS_E005_A3c	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

Kidston Power Transmission Line
Figure 3.19
MSES Regulated Vegetation
Option C

3.1.3 DNRM regional ecosystem mapping

The results of the GIS analysis of DNRM's regional ecosystems mapping determined the extent of mapped of concern dominant and sub-dominant, and least concern regional ecosystems that is of potential relevance to each corridor option.

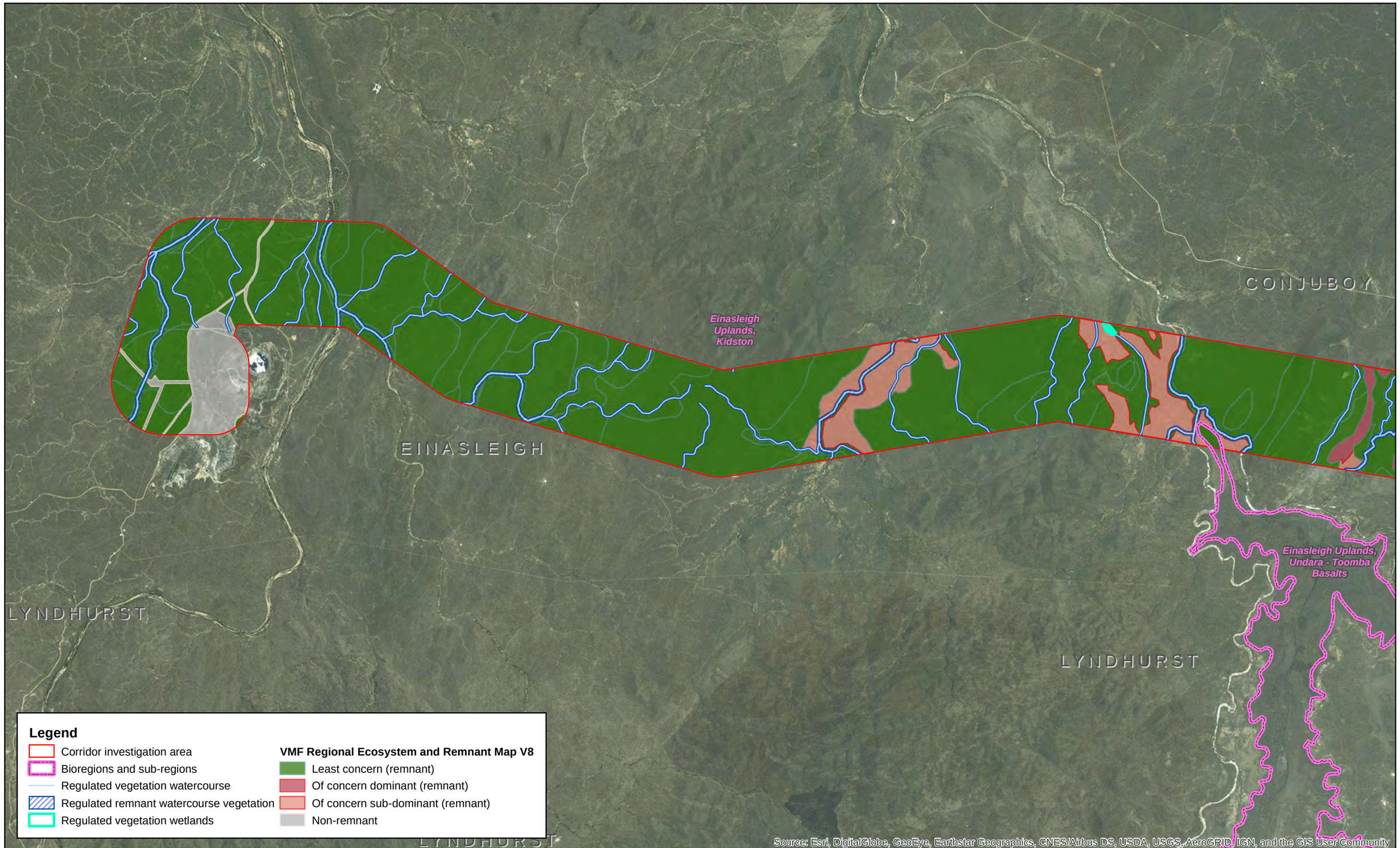
The extent of DNRM's mapped regional ecosystems that is of potential of relevance to each corridor investigation area, is presented on Figure 3.20–Figure 3.34.

The area (ha) of dominant and sub-dominant of concern, and least concern regional ecosystems that is of potential relevance to each corridor investigation area is presented in Table 3.4. The analysis of regional ecosystems for each corridor option is presented in Appendix G.

Option C is of least constraint in terms of potential impacts upon of concern dominant and sub-dominant regional ecosystems (refer Table 3.4).

Table 3.4 Extent of mapped regional ecosystems of relevance to each corridor option

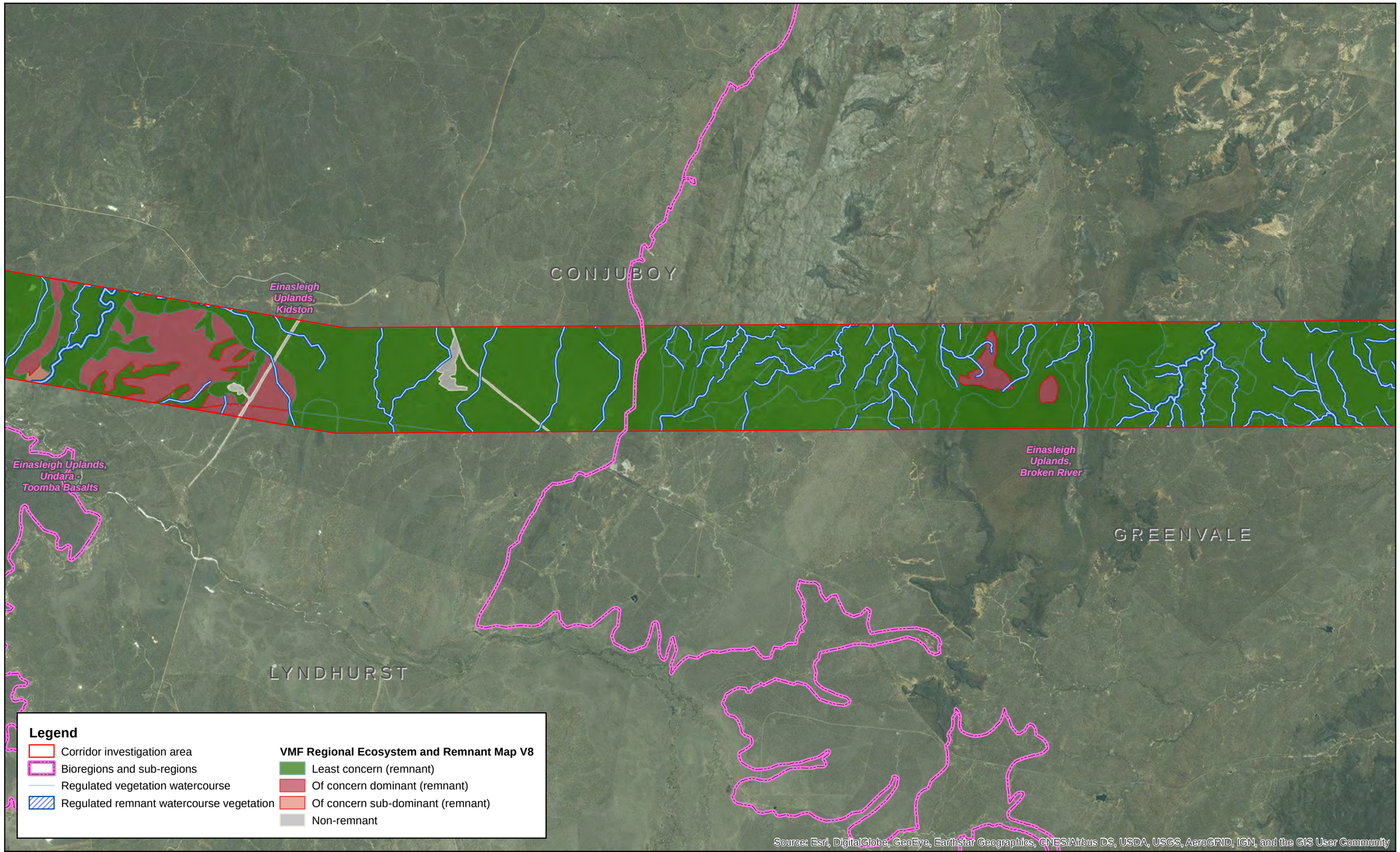
CORRIDOR	REMNANT VEGETATION (HA)			REGROWTH VEGETATION (HVR) (HA)		NON-REMNANT (HA)	
	OF CONCERN DOMINANT	OF CONCERN SUB-DOMINANT	LEAST CONCERN	OF CONCERN DOMINANT	LEAST CONCERN	VEGETATION	WATER
Option A	**2,059**	**1,008**	50,675	3.6	62	2,675	20
Option B	**1,891**	**442**	51,121	2.4	202	2,379	117
Option C	**1,519**	**334**	52,609	2.4	266	2,458	29



Map: 2270434A_GIS_E009_A2a	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

WSP | PARSONS BRINCKERHOFF

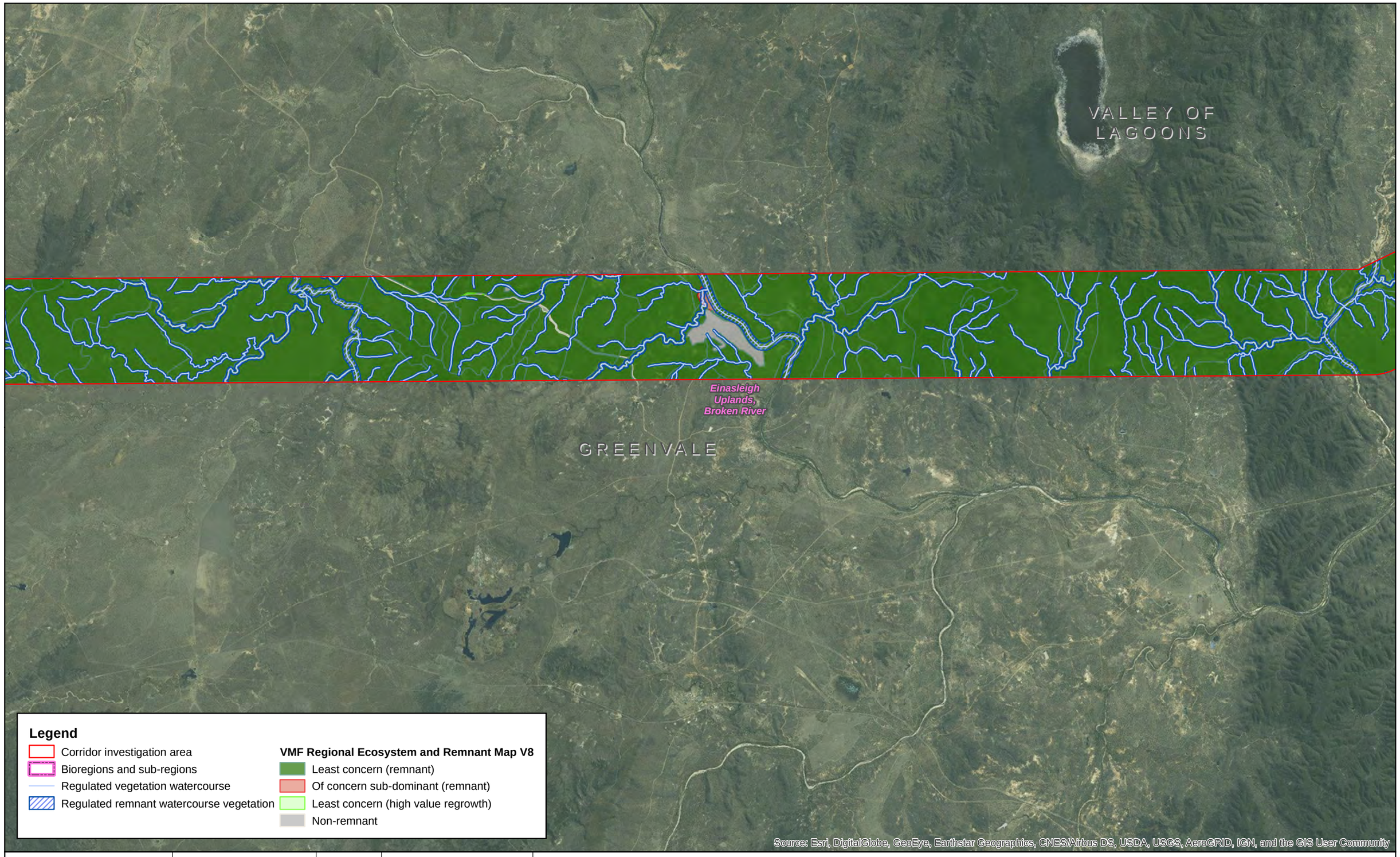
Kidston Power Transmission Line
Figure 3.20
Regional ecosystems and regulated remnant water course vegetation
Option A



Map: 2270434A_GIS_E009_A2a	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

Kidston Power Transmission Line
Figure 3.21
Regional ecosystems and regulated remnant water course vegetation
Option A

WSP | PARSONS BRINCKERHOFF



Map: 2270434A_GIS_E009_A2a	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Department of Environment and Heritage Protection (2016)

0 1,300 2,600 m

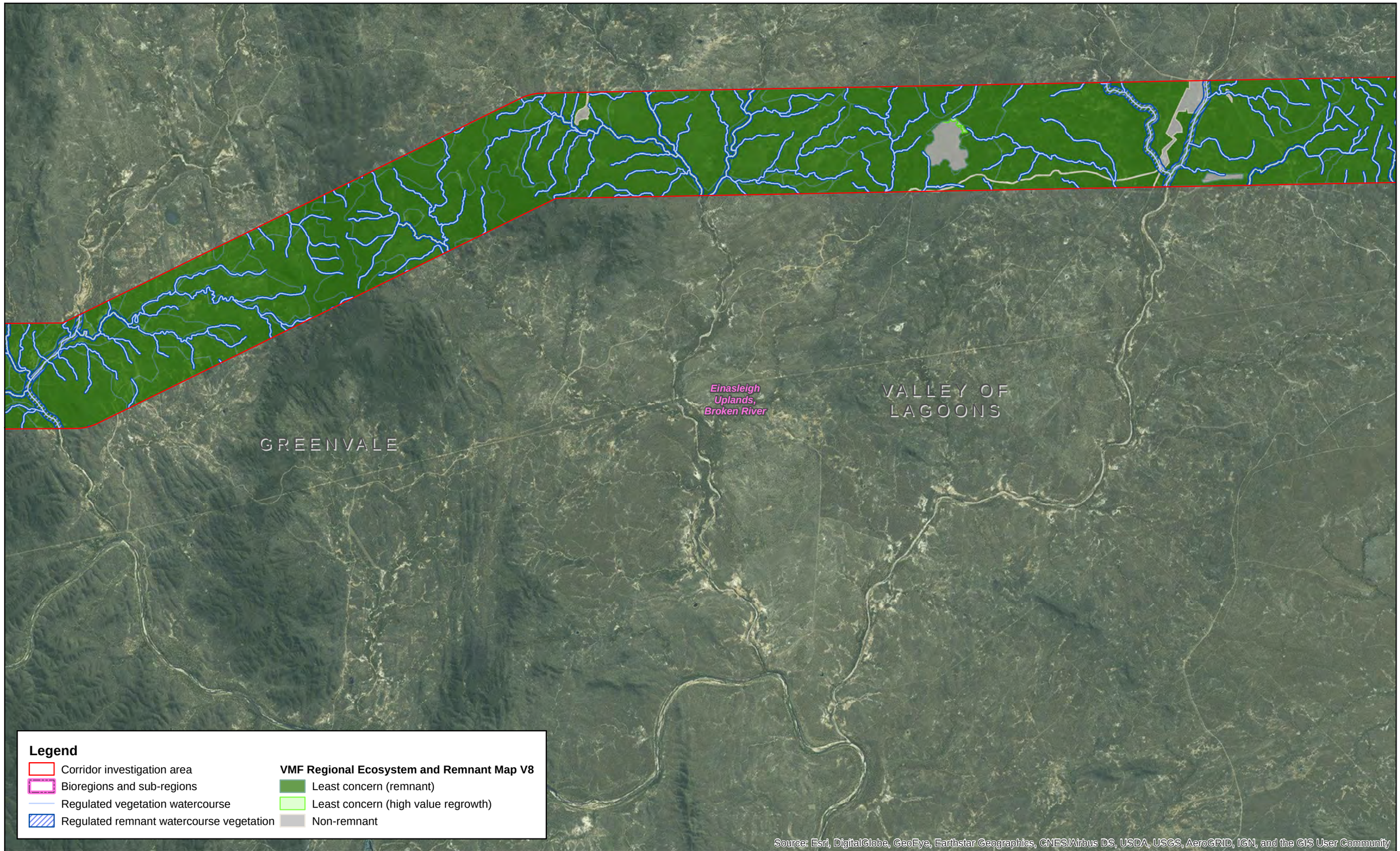
1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

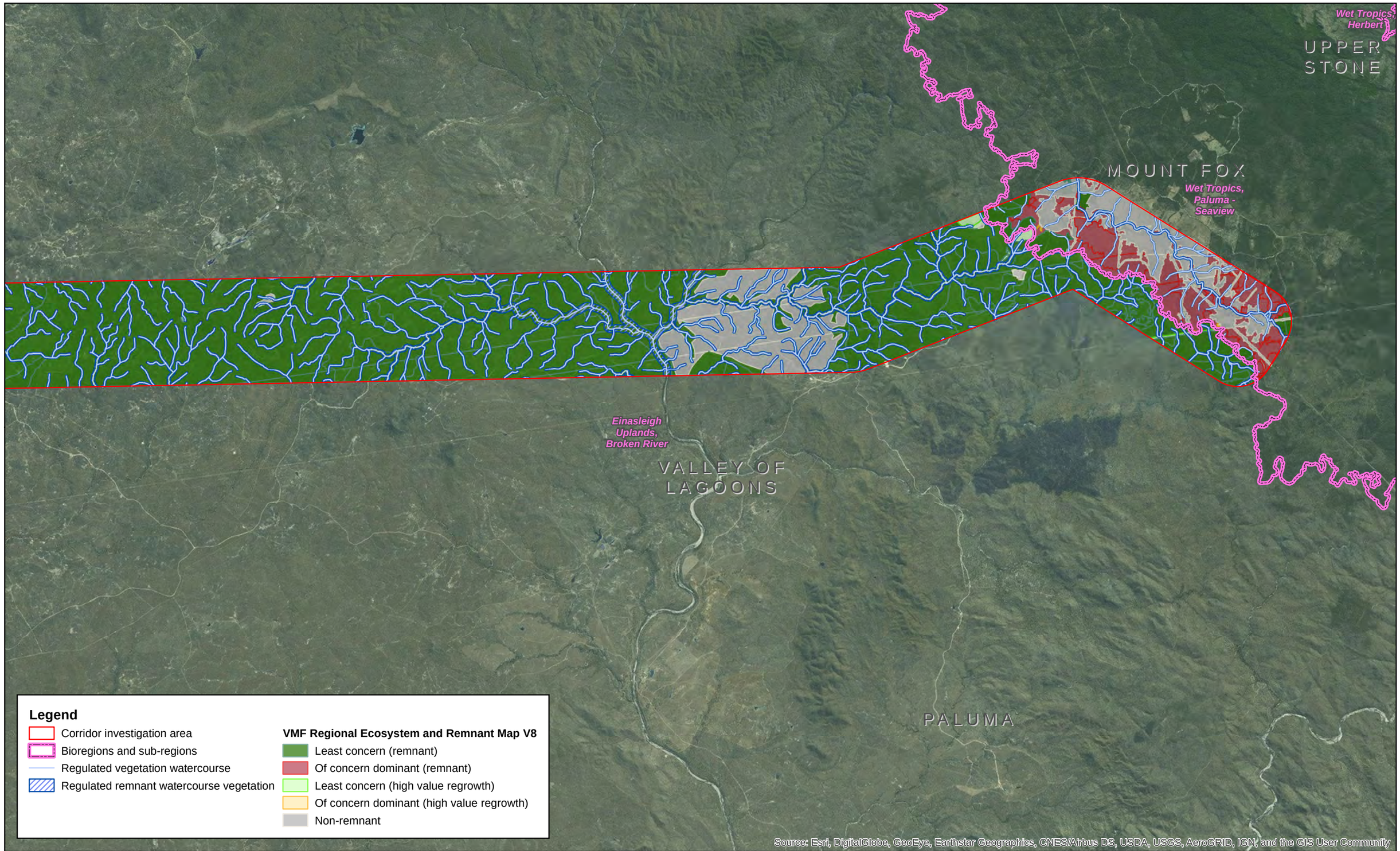
WSP | PARSONS BRINCKERHOFF

Kidston Power Transmission Line
Figure 3.22
Regional ecosystems and regulated remnant water course vegetation
Option A



Map: 2270434A_GIS_E009_A2a	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

Kidston Power Transmission Line
Figure 3.23
Regional ecosystems and regulated remnant water course vegetation
Option A



Map: 2270434A_GIS_E009_A2a	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Department of Environment and Heritage Protection (2016)

0 1,300 2,600 m

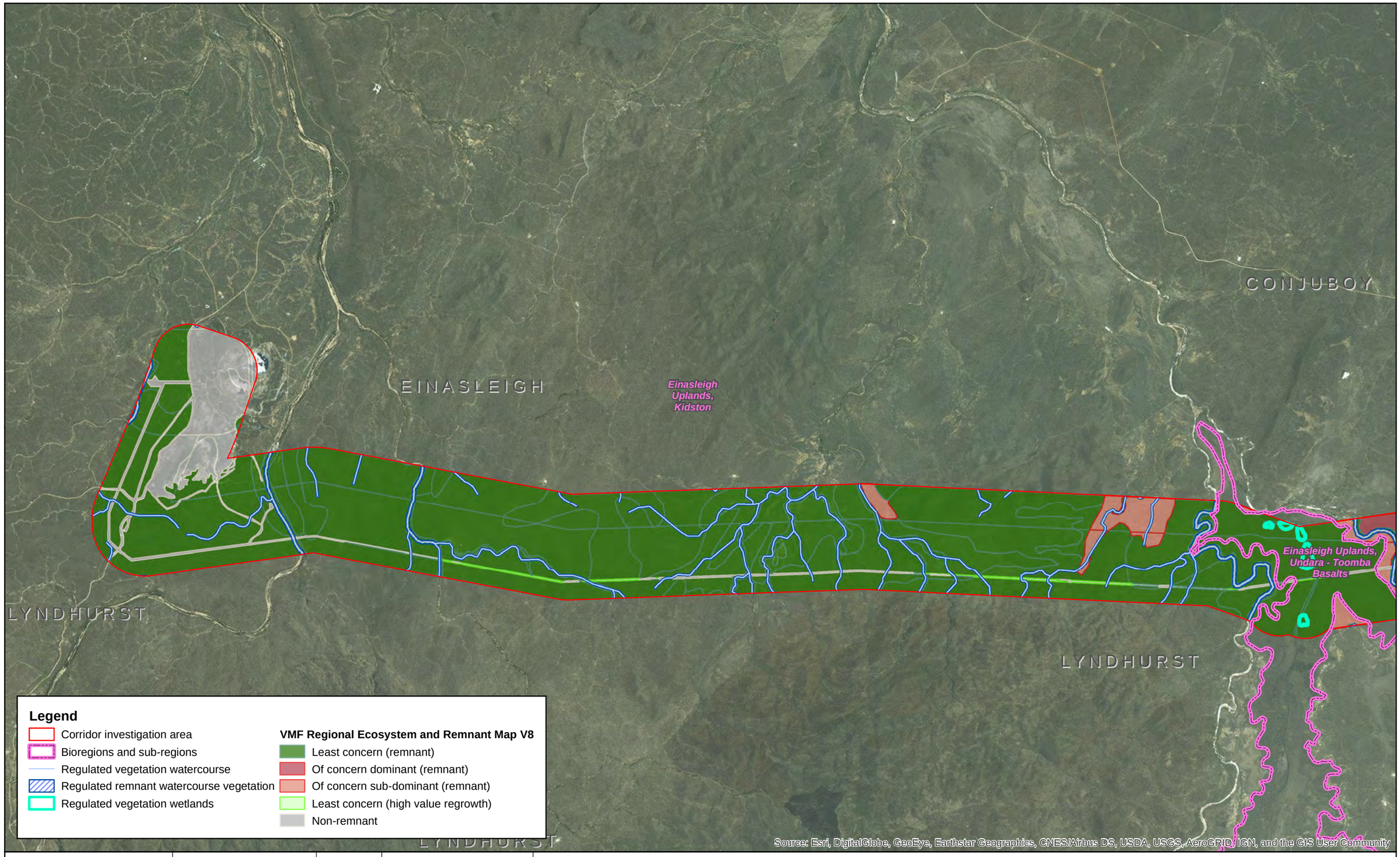
1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

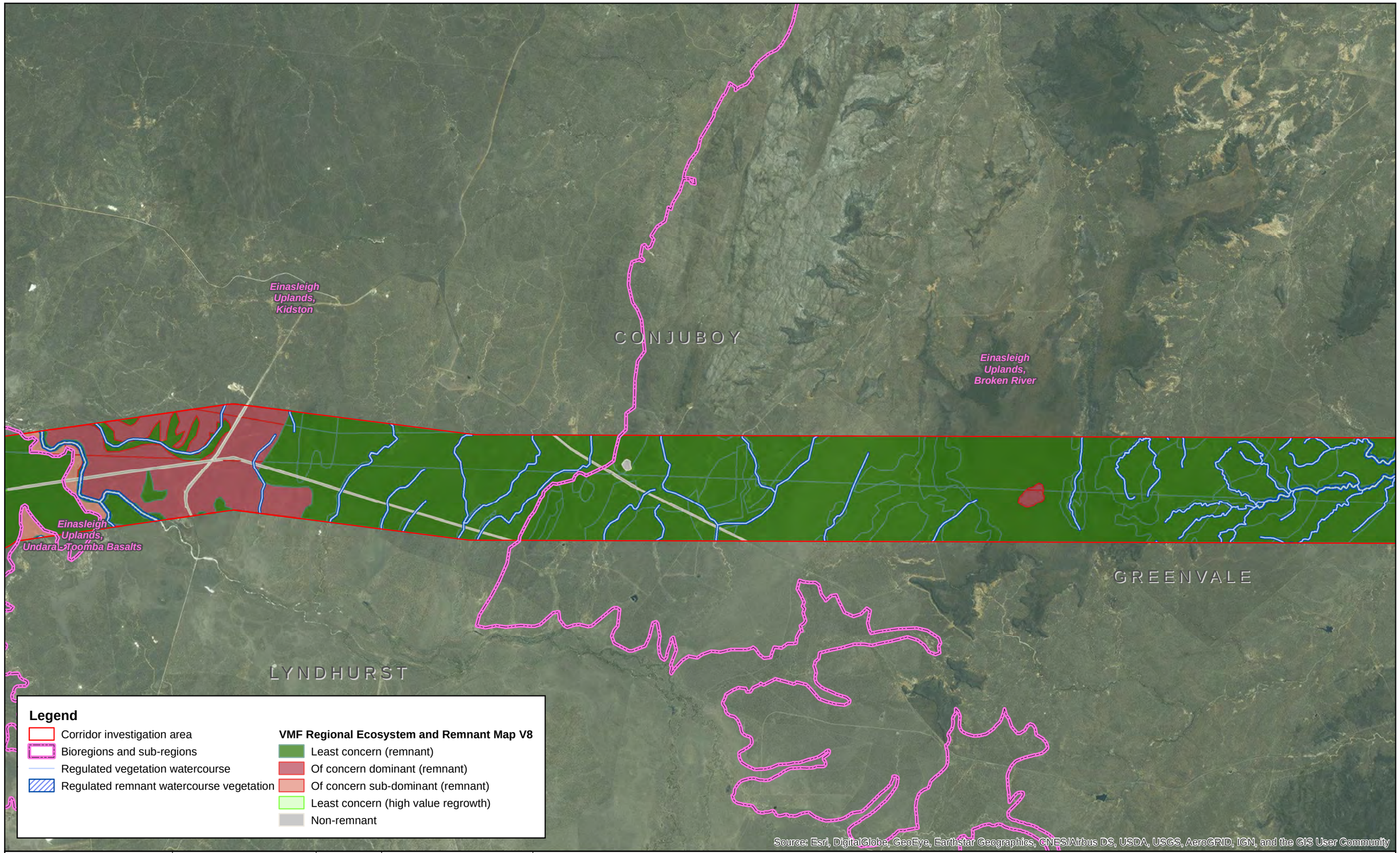
WSP | PARSONS BRINCKERHOFF

Kidston Power Transmission Line
Figure 3.24
Regional ecosystems and regulated remnant water course vegetation
Option A



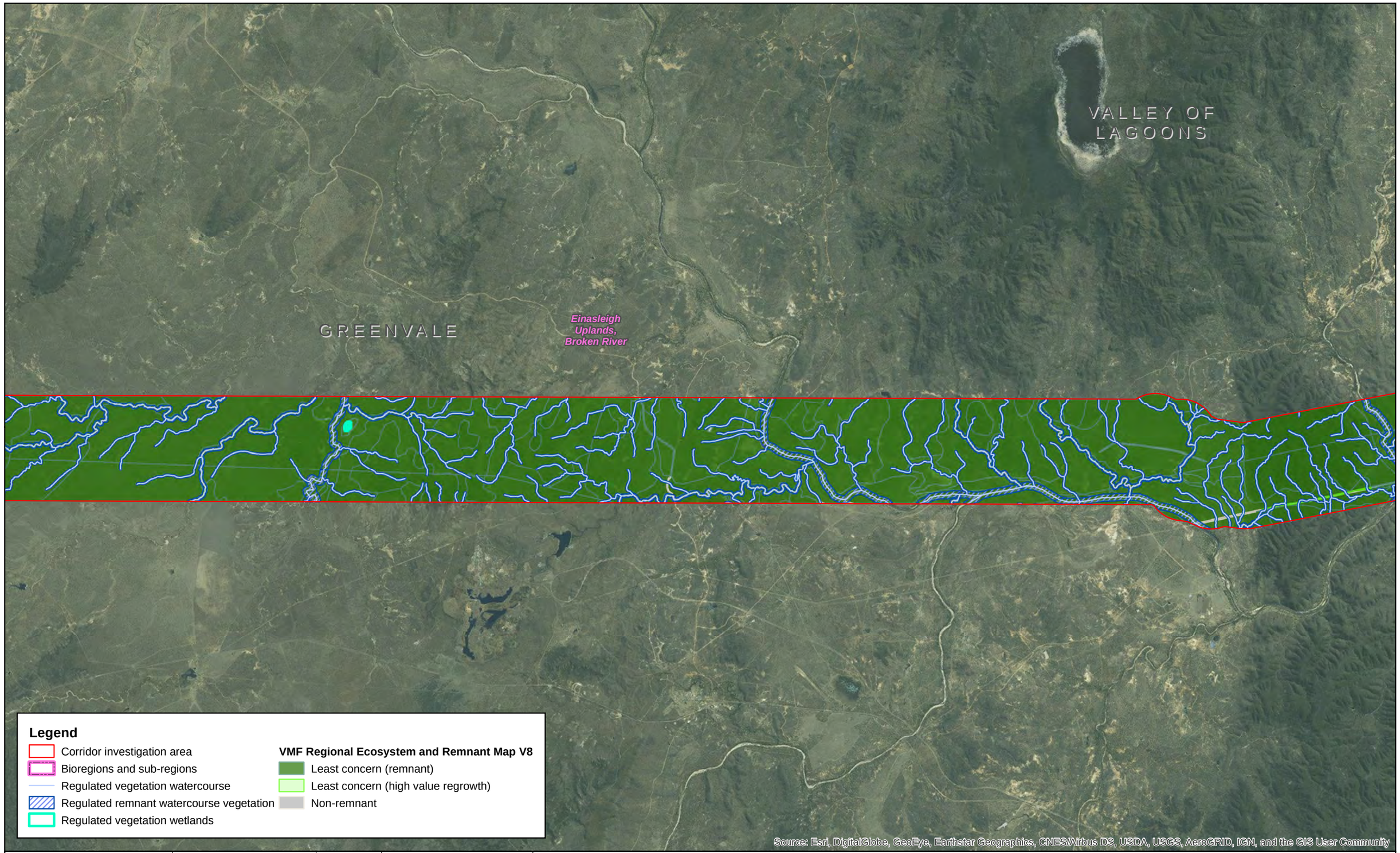
Map: 2270434A_GIS_E009_A2b	Author: VD		0 1,300 2,600 m
Date: 12/12/2016	Approved by: RH		1:100,000
Data source: Department of Environment and Heritage Protection (2016)			Coordinate system: GDA 1994 MGA Zone 55
			Scale ratio correct when printed at A3

Kidston Power Transmission Line
Figure 3.25
Regional ecosystems and regulated remnant water course vegetation
Option B



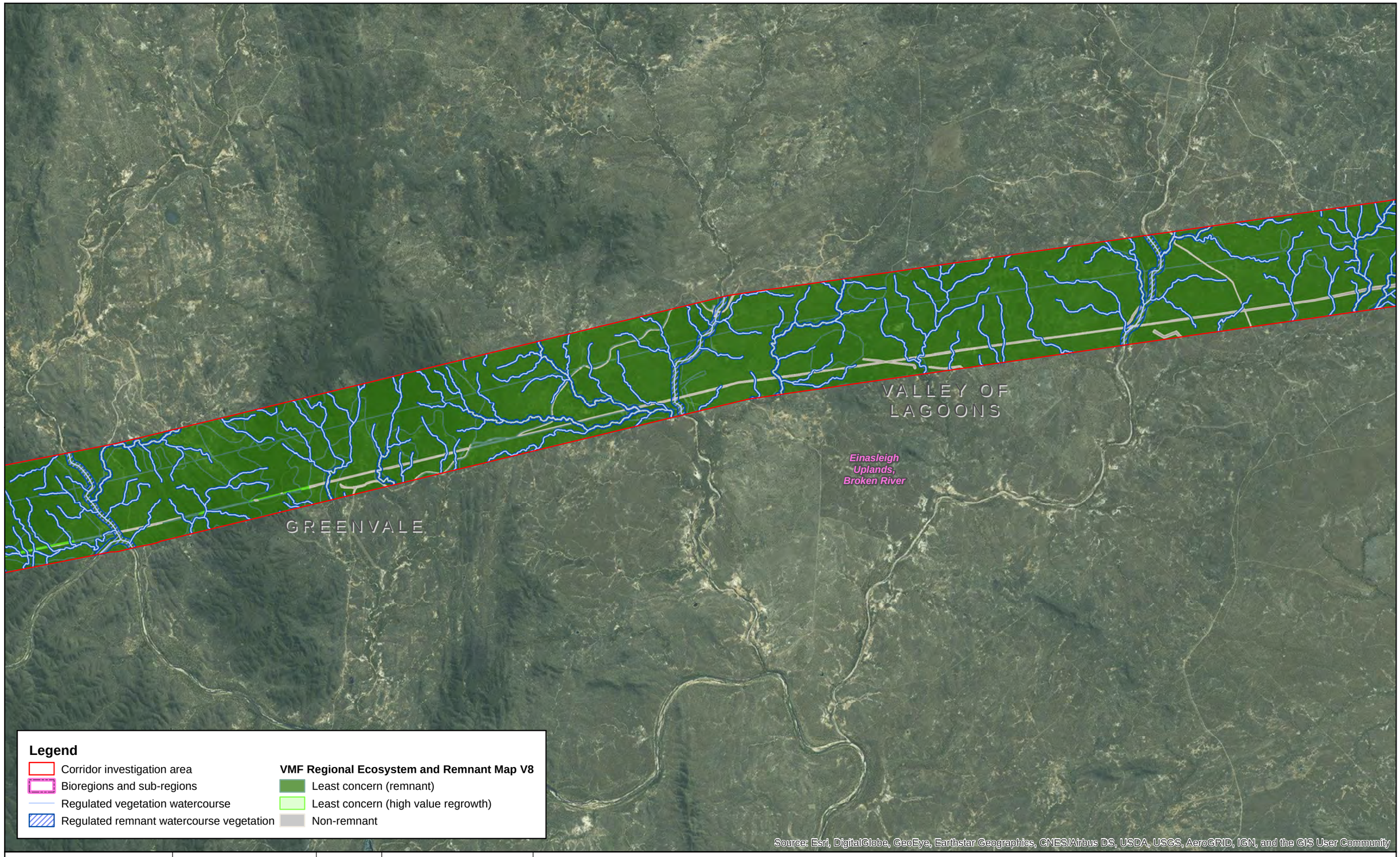
Map: 2270434A_GIS_E009_A2b	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

Kidston Power Transmission Line
Figure 3.26
Regional ecosystems and regulated remnant water course vegetation
Option B



Map: 2270434A_GIS_E009_A2b	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

Kidston Power Transmission Line
Figure 3.27
Regional ecosystems and regulated remnant water course vegetation
Option B



Map: 2270434A_GIS_E009_A2b	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

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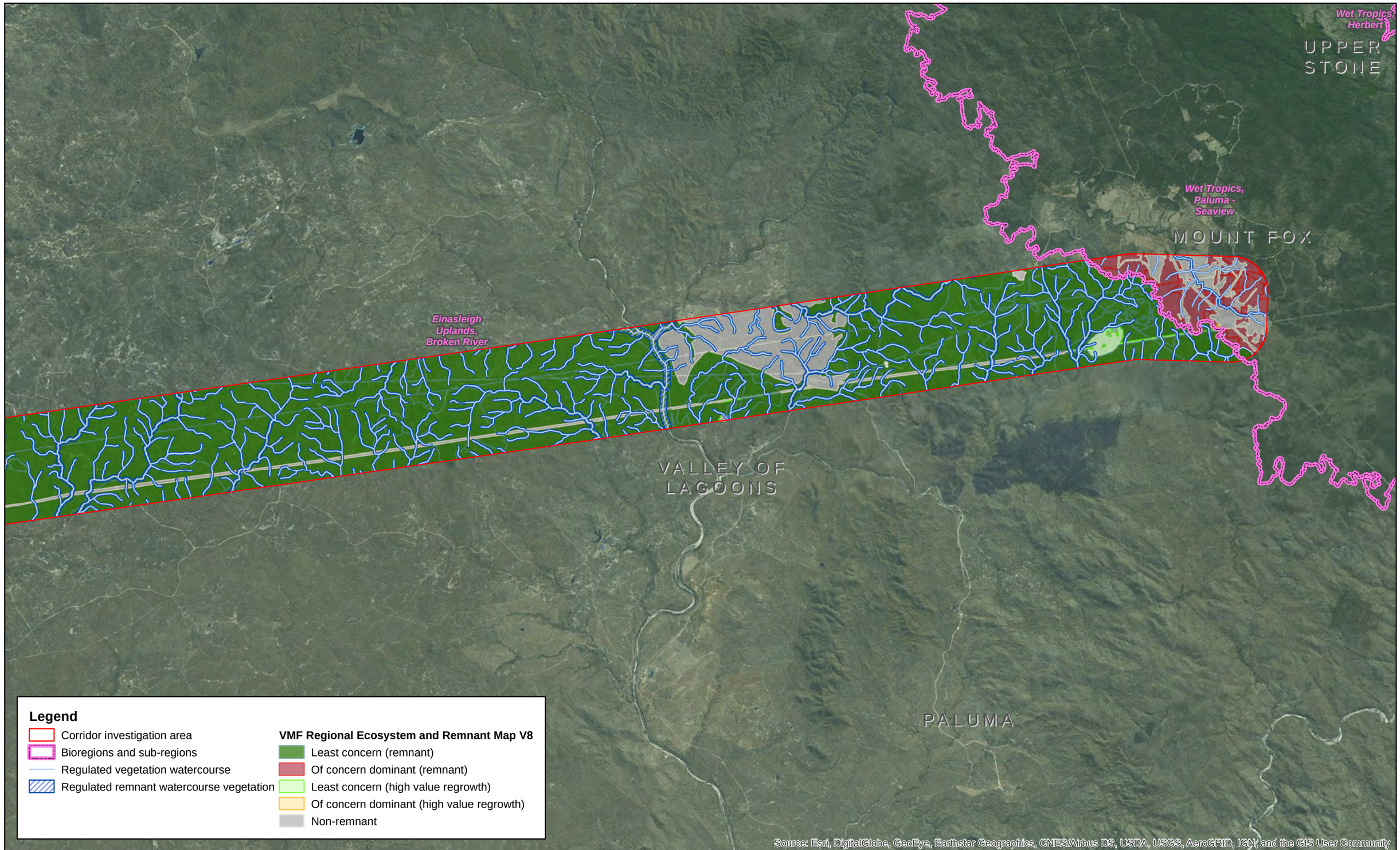
Kidston Power Transmission Line
Figure 3.28
Regional ecosystems and regulated remnant water course vegetation
Option B



Map: 2270434A_GIS_E009_A2b	Author: VD		0 1,300 2,600 m
Date: 12/12/2016	Approved by: RH		1:100,000
Data source: Department of Environment and Heritage Protection (2016)			Coordinate system: GDA 1994 MGA Zone 55
			Scale ratio correct when printed at A3

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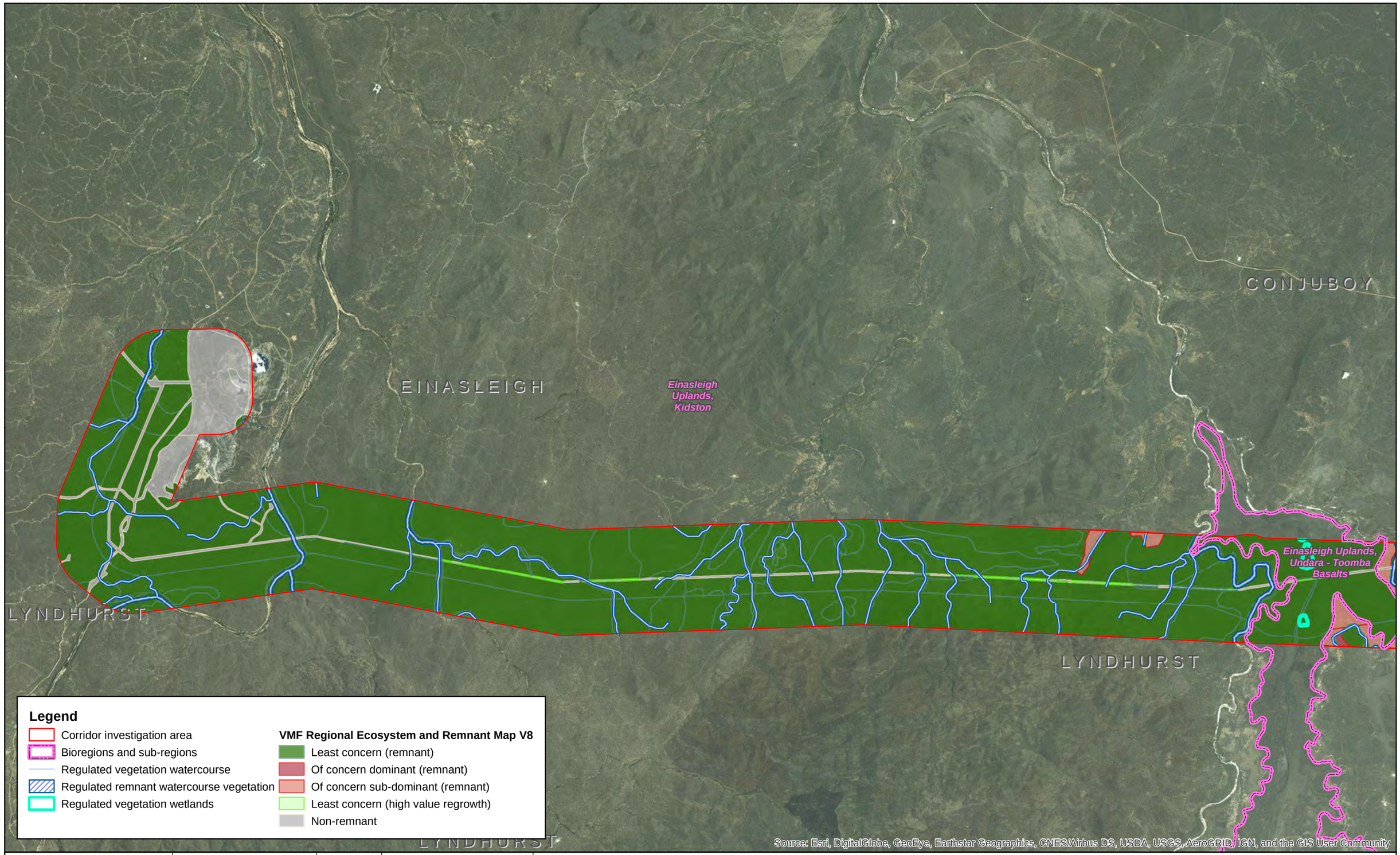
Kidston Power Transmission Line
Figure 3.29
Regional ecosystems and regulated remnant water course vegetation
Option B



Map: 2270434A_GIS_E009_A2c	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

Kidston Power Transmission Line
Figure 3.30
Regional ecosystems and regulated remnant water course vegetation
Option C

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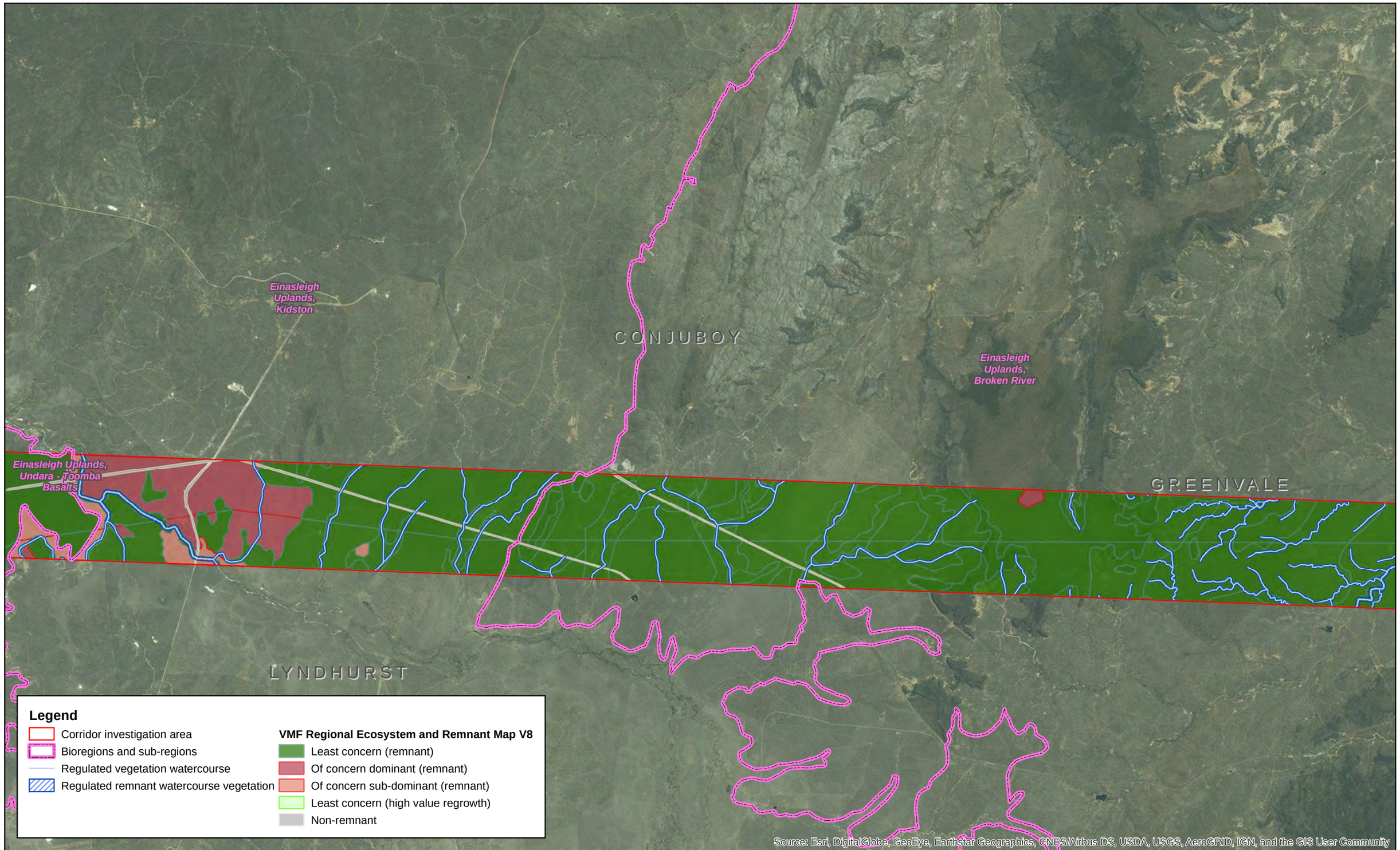
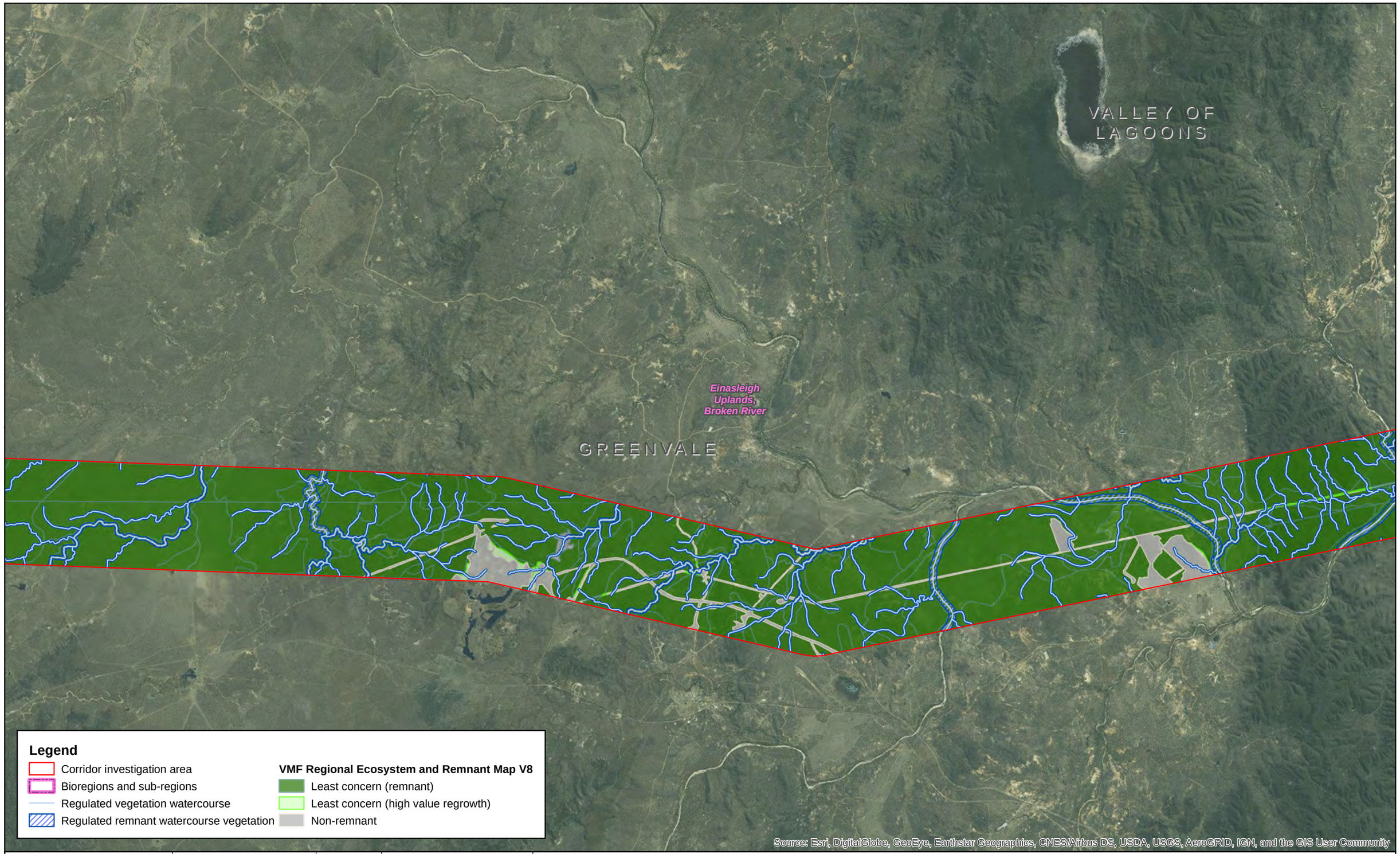


Map: 2270434A_GIS_E009_A2c	Author: VD		0 1,300 2,600 m
Date: 12/12/2016	Approved by: RH		1:100,000
Data source: Department of Environment and Heritage Protection (2016)			Coordinate system: GDA 1994 MGA Zone 55
			Scale ratio correct when printed at A3

WSP | PARSONS BRINCKERHOFF

Kidston Power Transmission Line
Figure 3.31
Regional ecosystems and regulated remnant water course vegetation
Option C



Map: 2270434A_GIS_E009_A2c	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

Kidston Power Transmission Line
Figure 3.32
Regional ecosystems and regulated remnant water course vegetation
Option C

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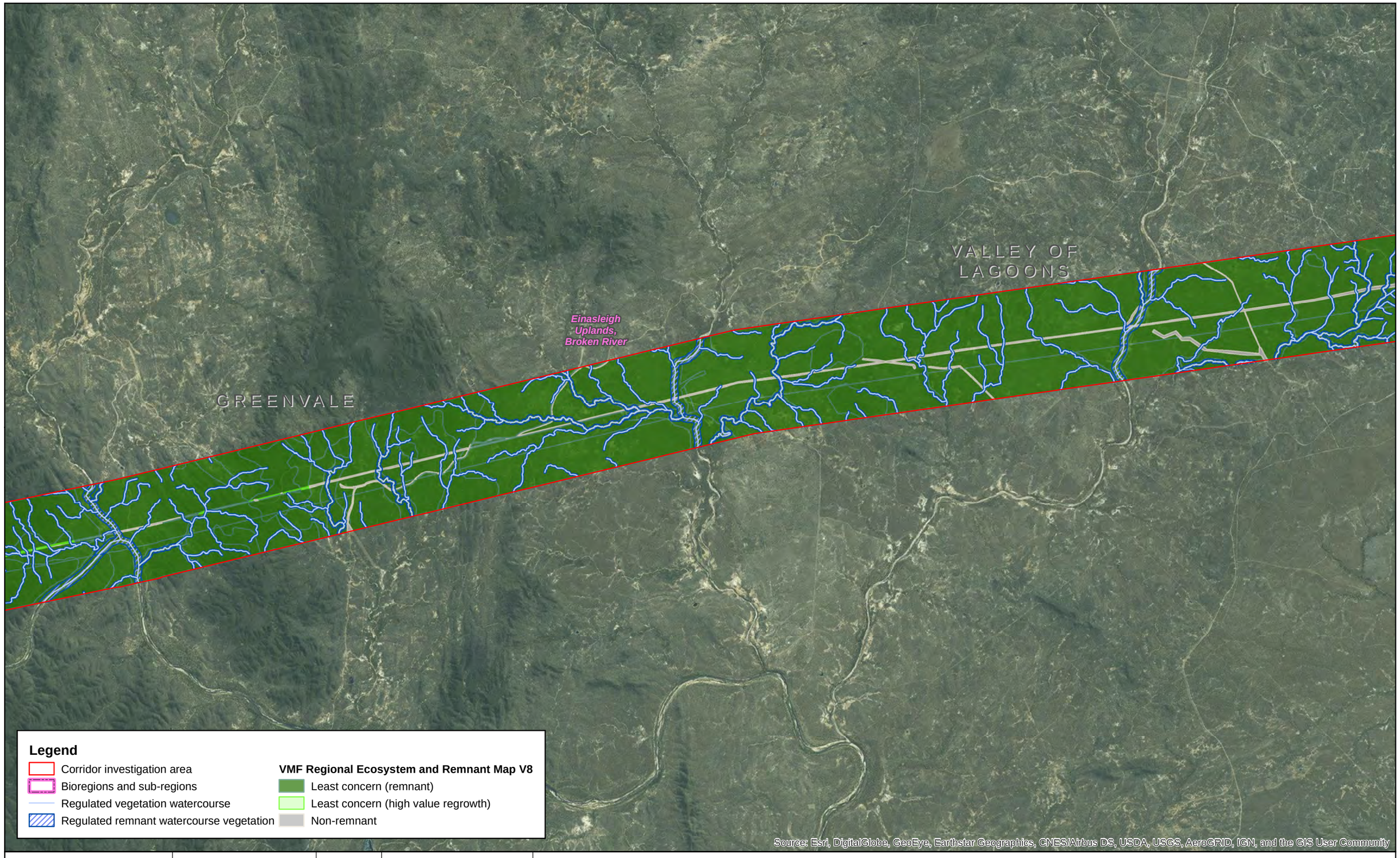

Map: 2270434A_GIS_E009_A2c	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Department of Environment and Heritage Protection (2016)

0 1,300 2,600 m

1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

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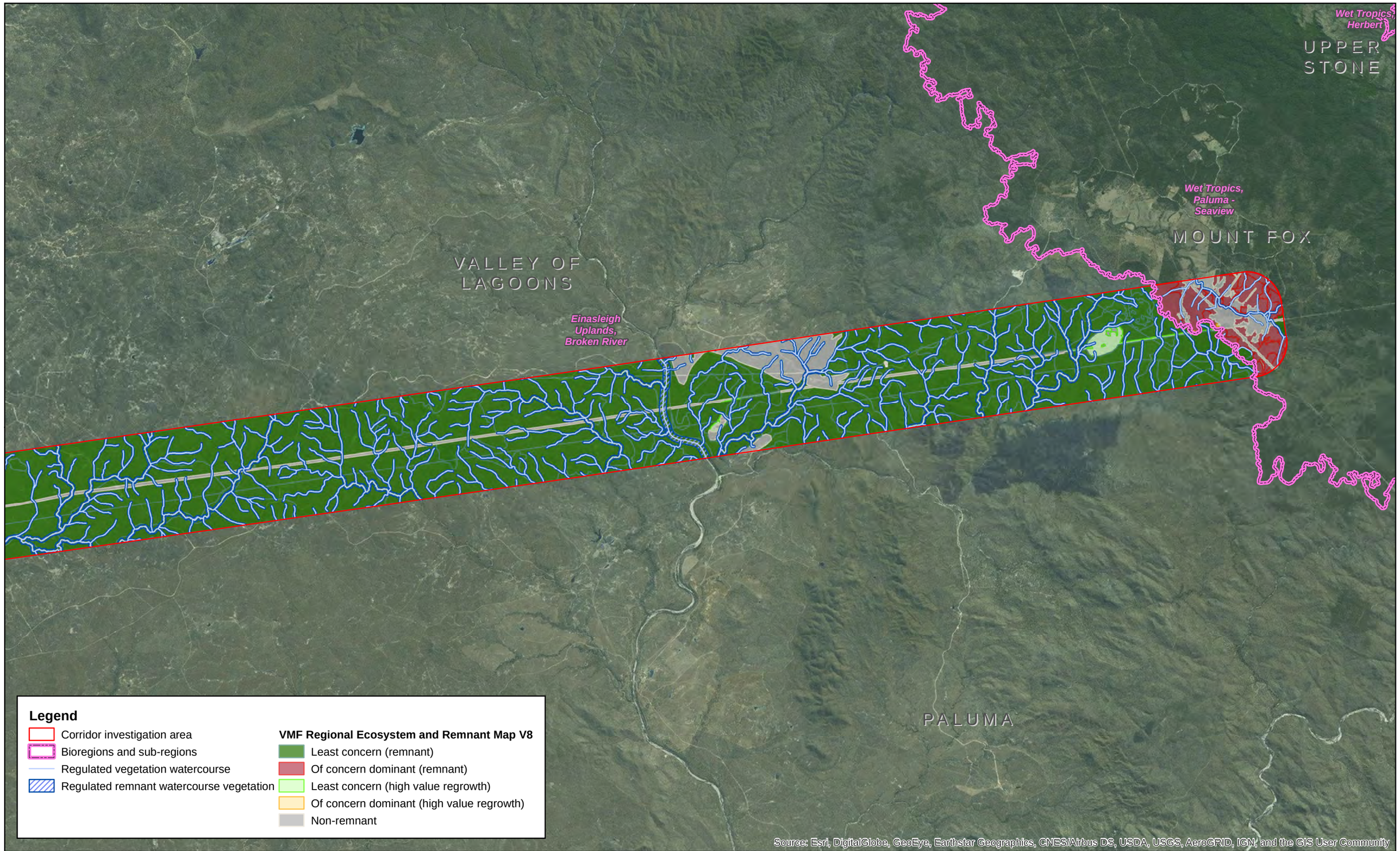
Kidston Power Transmission Line
Figure 3.33
Regional ecosystems and regulated remnant water course vegetation
Option C



Map: 2270434A_GIS_E009_A2c	Author: VD		0 1,300 2,600 m
Date: 12/12/2016	Approved by: RH		1:100,000
Data source: Department of Environment and Heritage Protection (2016)			Coordinate system: GDA 1994 MGA Zone 55
			Scale ratio correct when printed at A3

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Kidston Power Transmission Line
Figure 3.34
Regional ecosystems and regulated remnant water course vegetation
Option C

PROPOSED GENEX KIDSTON CONNECTION PROJECT

Corridor Selection Report

PREPARED BY

QUEENSLAND ELECTRICITY TRANSMISSION CORPORATION LIMITED

(ACN 078 849 233) trading as “POWERLINK”

3.1.4 Woody vegetation assessment

The woody vegetation assessment performed by Virtual GIS, used GIS remote sensing to predict the extent of woody remnant vegetation, and the potential extent of woody remnant vegetation and regrowth vegetation in each corridor investigation area. The results of the woody vegetation mapping is useful for identifying potential areas of inconsistency between the woody vegetation assessment and the DNRM mapping, for which such areas would be targeted as part of the ground-truthing surveys during the next phase of the Project.

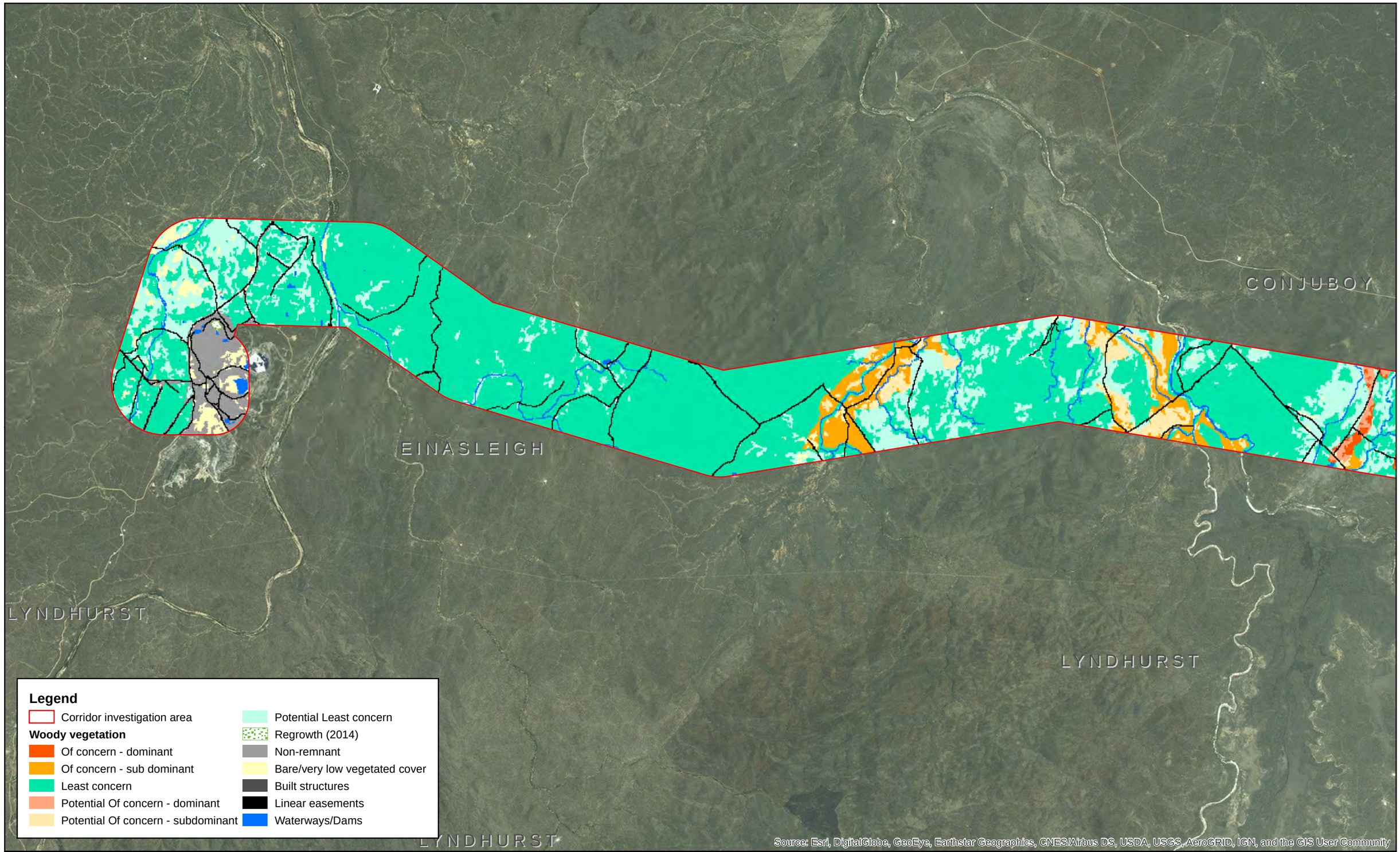
The woody vegetation that is of potential relevance to each corridor option, as an output of remote sensing of woody vegetation, is presented on Figure 3.35–Figure 3.49.

The area (ha) of dominant and sub-dominant of concern regional ecosystems that is of potential relevance to each corridor investigation area is presented in Table 3.5. The results of the analysis of woody vegetation for each corridor option is presented in Appendix G.

In reference to the predicted and potential woody remnant vegetation in Table 3.5, Option C is of least constraint in terms of potential impacts upon potential and predicted of concern dominant. On the other hand, Option B is of least constraint in terms of potential impacts upon potential and predicted of concern sub-dominant regional ecosystems. However, a greater emphasis should be applied to the predicted of concern dominant remnant vegetation being of greater significance, which therefore suggests that Option C is of least ecological constraint.

Table 3.5 Remotely sensed predicted and potential extent of woody remnant and regrowth vegetation of relevance to each corridor option

CORRIDOR	PREDICTED WOODY REMNANT VEGETATION (HA)			POTENTIAL WOODY REMNANT VEGETATION (HA)			POTENTIAL REGROWTH			NON-REMNANT	
	OF CONCERN DOMINANT	OF CONCERN SUB-DOMINANT	LEAST CONCERN	OF CONCERN DOMINANT	OF CONCERN SUB-DOMINANT	LEAST CONCERN	OF CONCERN DOMINANT	LEAST CONCERN	UNCLASSIFIED REGROWTH	VEGETATION	BARE EARTH, WATER AND EASEMENT
Option A	**1,535**	**549**	37,602	**240**	**364**	9,002	6.9	48	235	2,174	4,670
Option B	**1,460**	**295**	37,969	**344**	**87**	8,439	6.6	214	219	1,812	5,428
Option C	**1,223**	**618**	38,808	**431**	**37**	8,494	28.8	172	291	1,718	5,771



Map: 2270434A_GIS_E010_A2a	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Virtual GIS (2016)			

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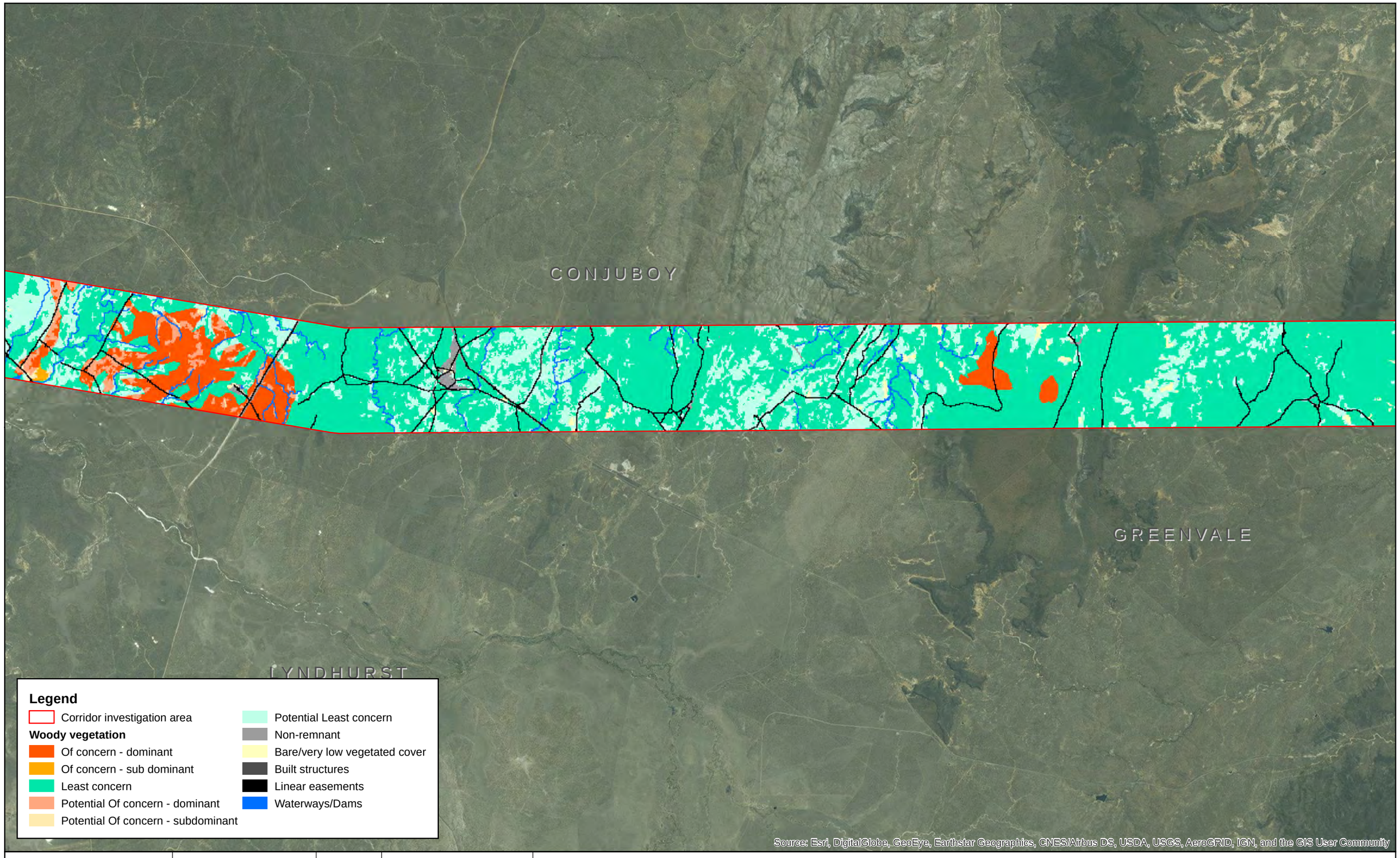
Kidston Power Transmission Line
Figure 3.35
Woody Vegetation
Option A



Map: 2270434A_GIS_E010_A2a	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Virtual GIS (2016)			

Kidston Power Transmission Line
Figure 3.36
Woody Vegetation
Option A

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VALLEY OF LAGOONS

GREENVALE

Legend

- Corridor investigation area
- **Woody vegetation**
  - Of concern - sub dominant
  - Least concern
  - Potential Of concern - subdominant
  - Potential Least concern
- Regrowth (2014)
- Non-remnant
- Bare/very low vegetated cover
- Linear easements
- Waterways/Dams

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Map: 2270434A_GIS_E010_A2a	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Virtual GIS (2016)

0 1,300 2,600 m

1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

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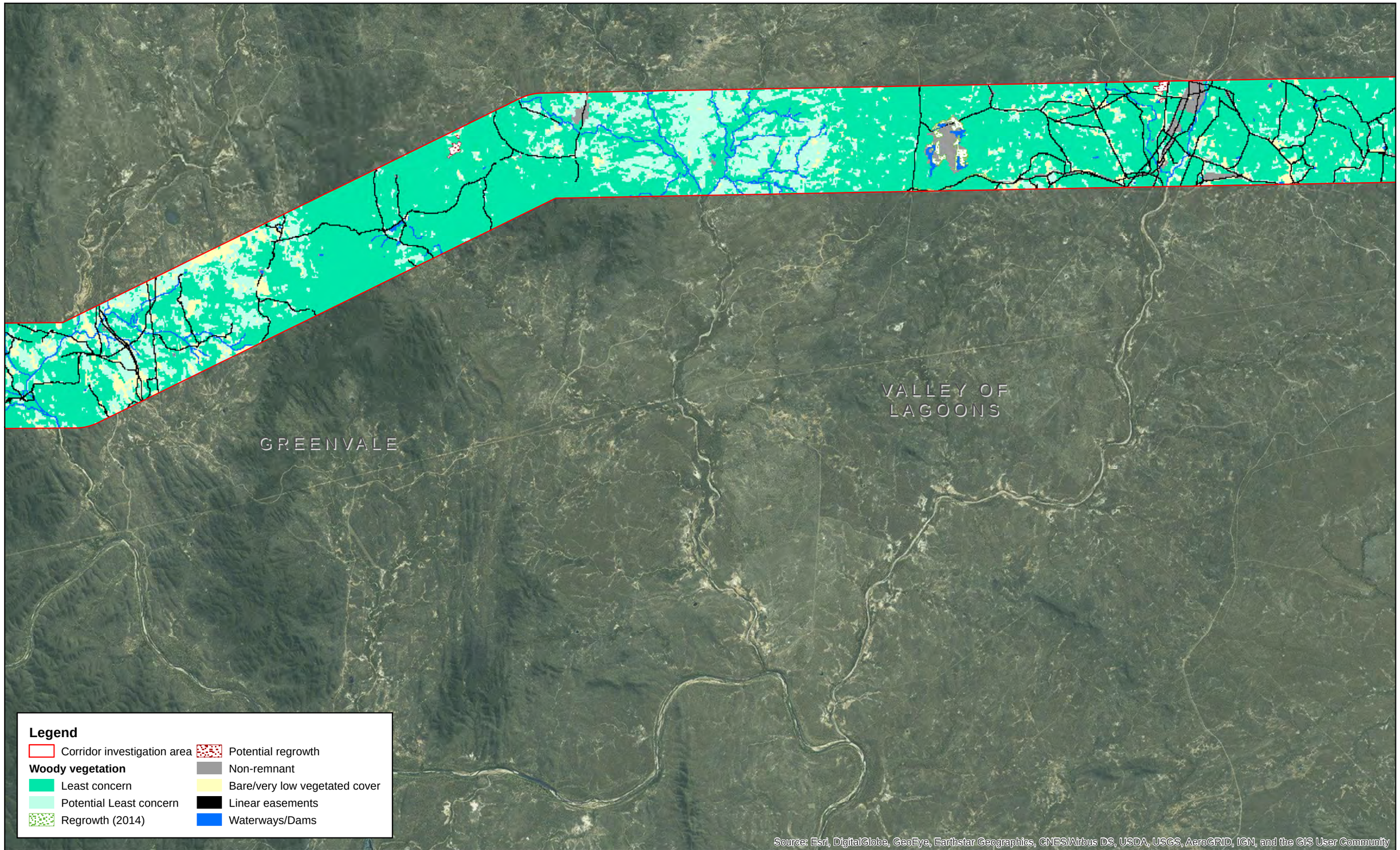
Kidston Power Transmission Line
Figure 3.37
Woody Vegetation
Option A



Map: 2270434A_GIS_E010_A2a	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Virtual GIS (2016)

0 1,300 2,600 m

1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

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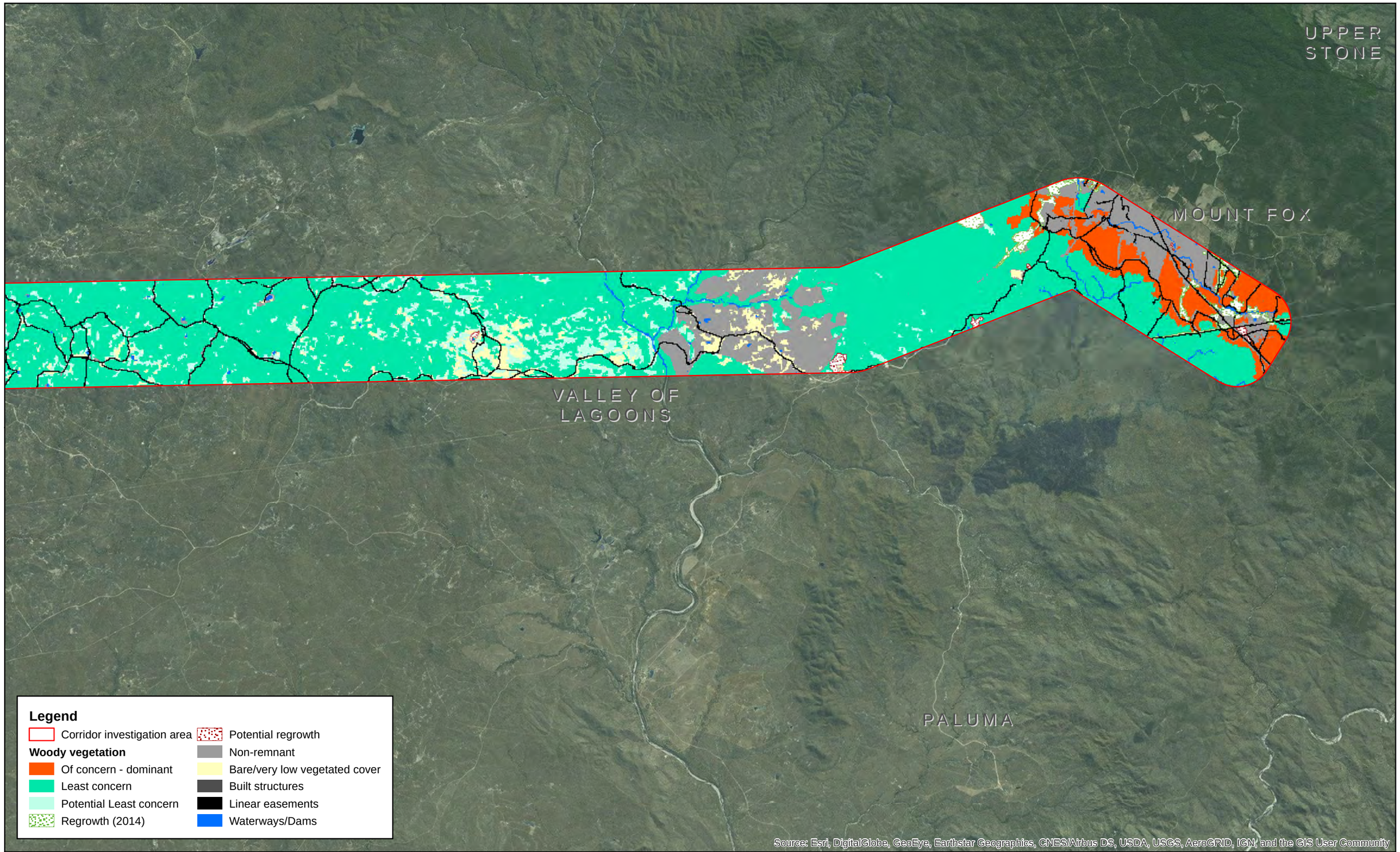
Kidston Power Transmission Line
Figure 3.38
Woody Vegetation
Option A



Map: 2270434A_GIS_E010_A2a	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Virtual GIS (2016)			

Kidston Power Transmission Line
Figure 3.39
Woody Vegetation
Option A

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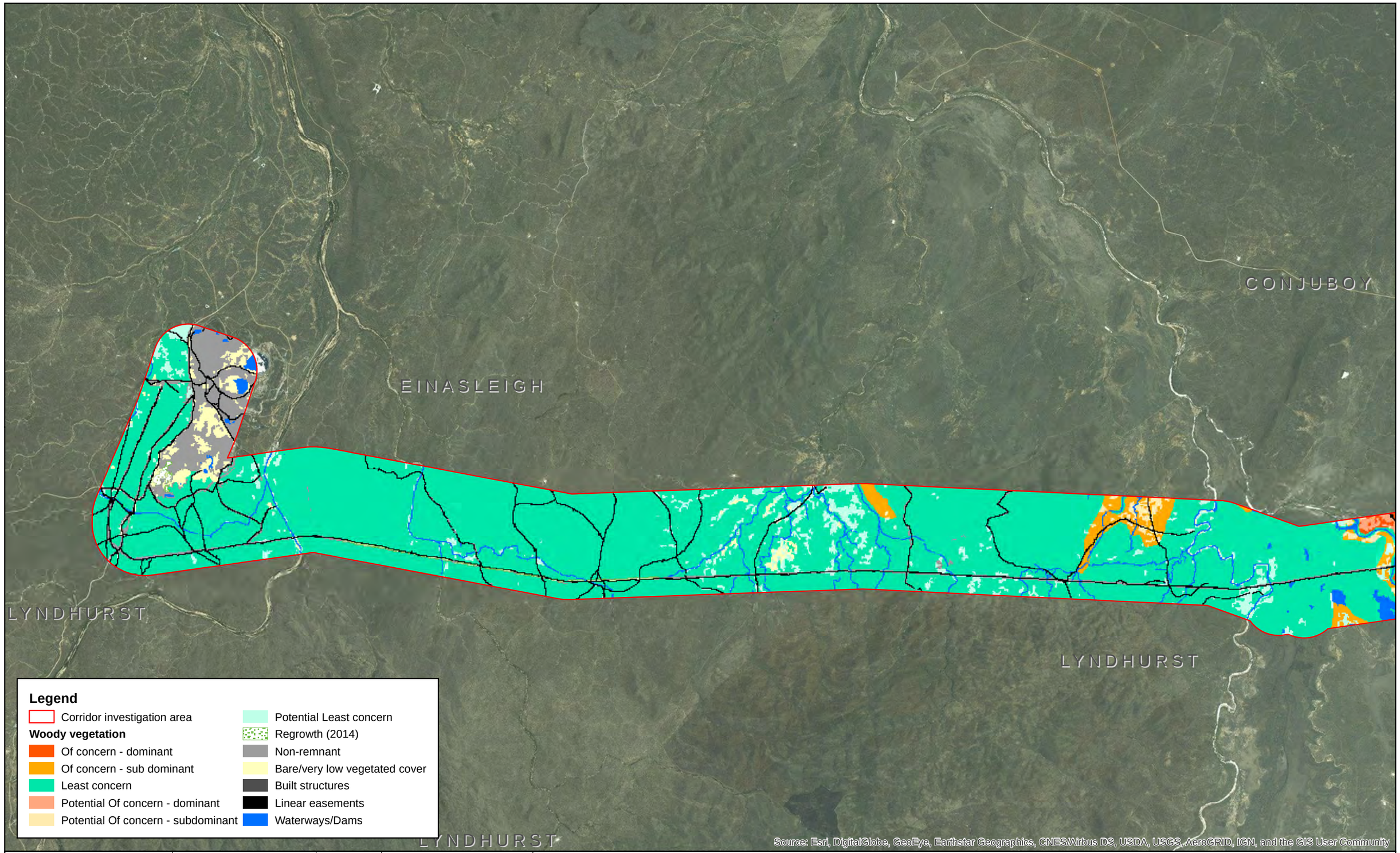
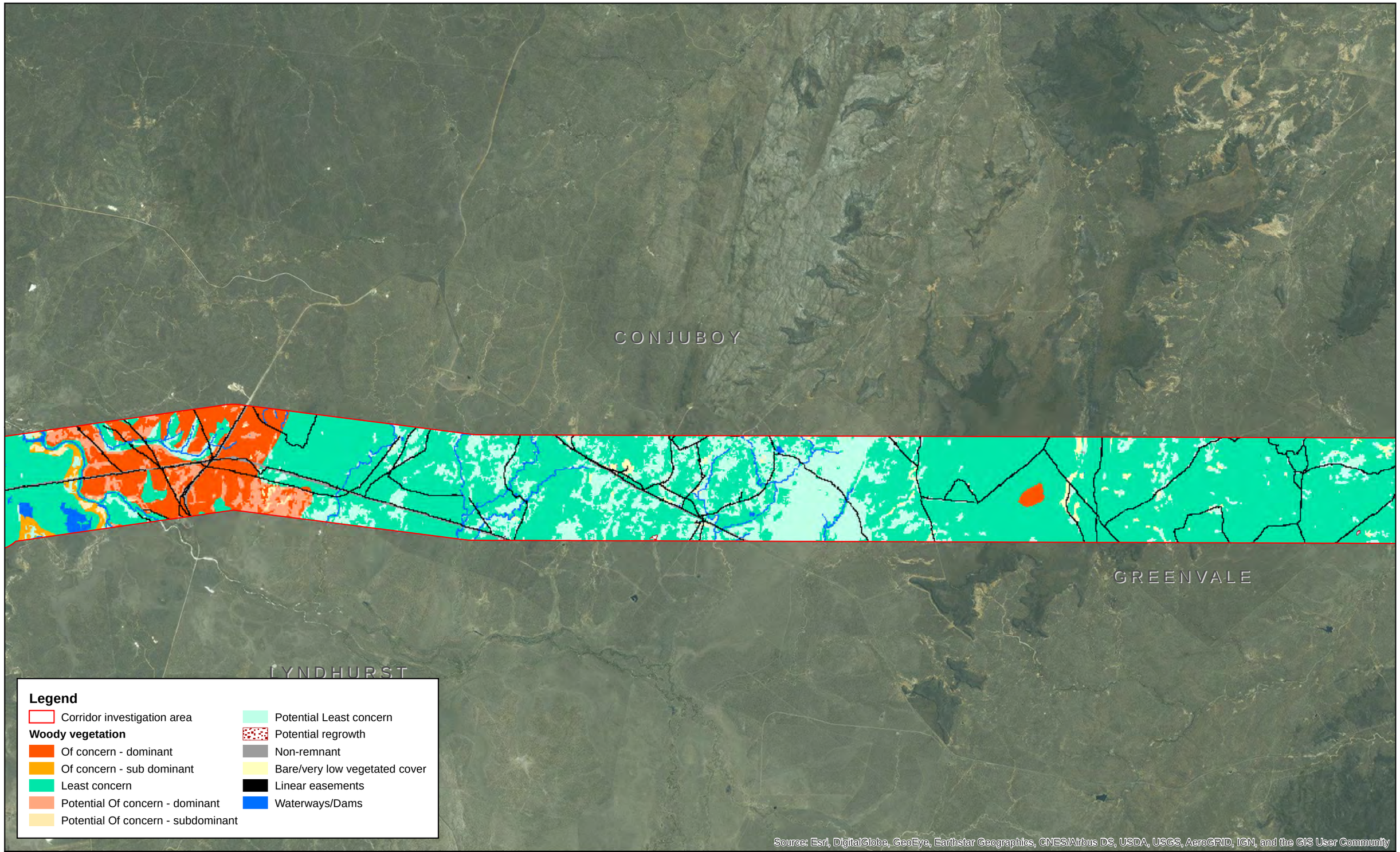


Map: 2270434A_GIS_E010_A2b	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Virtual GIS (2016)			

Kidston Power Transmission Line
Figure 3.40
Woody Vegetation
Option B



Map: 2270434A_GIS_E010_A2b	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Virtual GIS (2016)

0 1,300 2,600 m

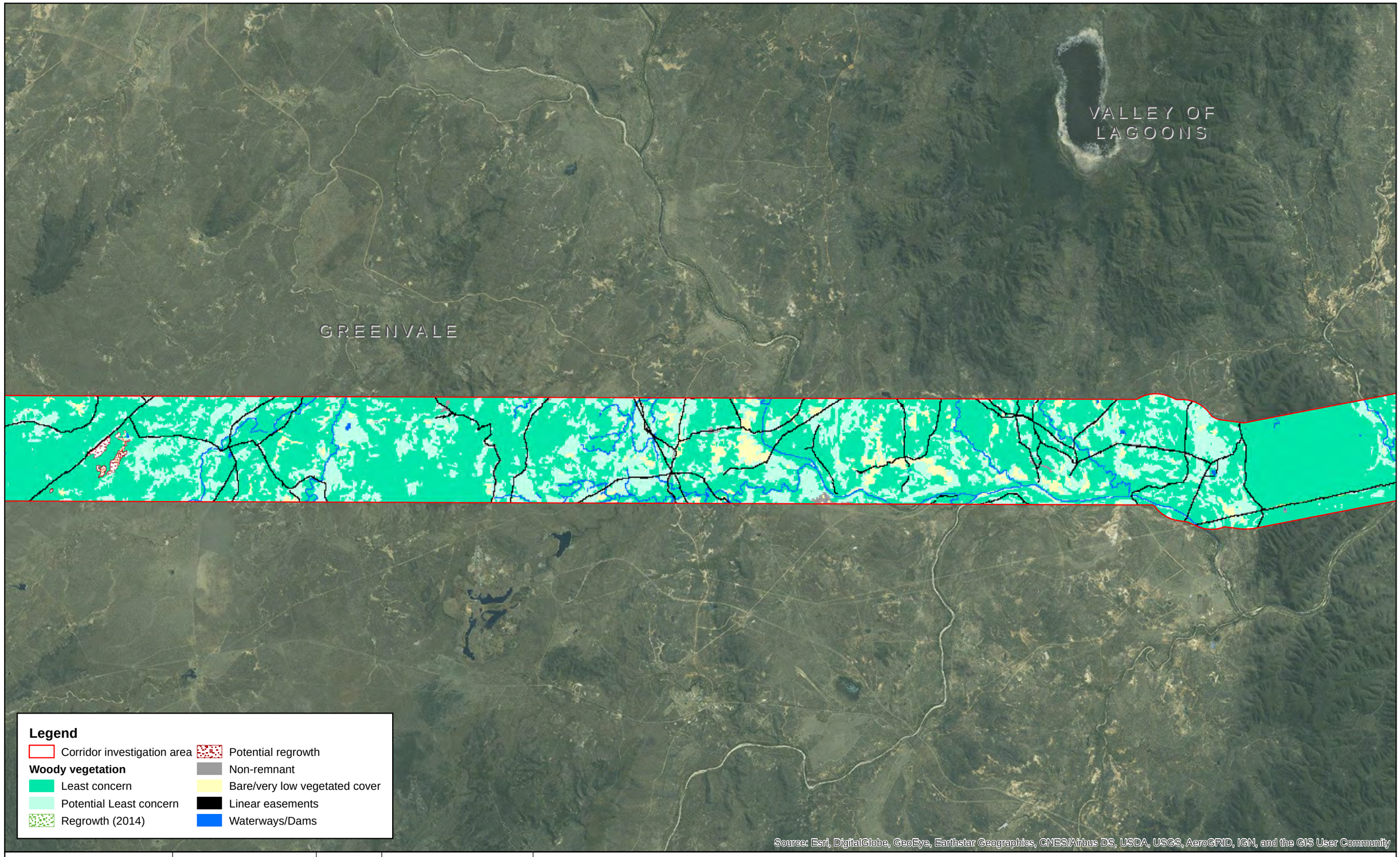
1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

WSP | PARSONS BRINCKERHOFF

Kidston Power Transmission Line
Figure 3.41
Woody Vegetation
Option B



Map: 2270434A_GIS_E010_A2b	Author: VD		0 1,300 2,600 m
Date: 12/12/2016	Approved by: RH		1:100,000
Data source: Virtual GIS (2016)			Coordinate system: GDA 1994 MGA Zone 55
			Scale ratio correct when printed at A3

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Kidston Power Transmission Line
Figure 3.42
Woody Vegetation
Option B

Map: 2270434A_GIS_E010_A2b	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Virtual GIS (2016)

0 1,300 2,600 m

1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

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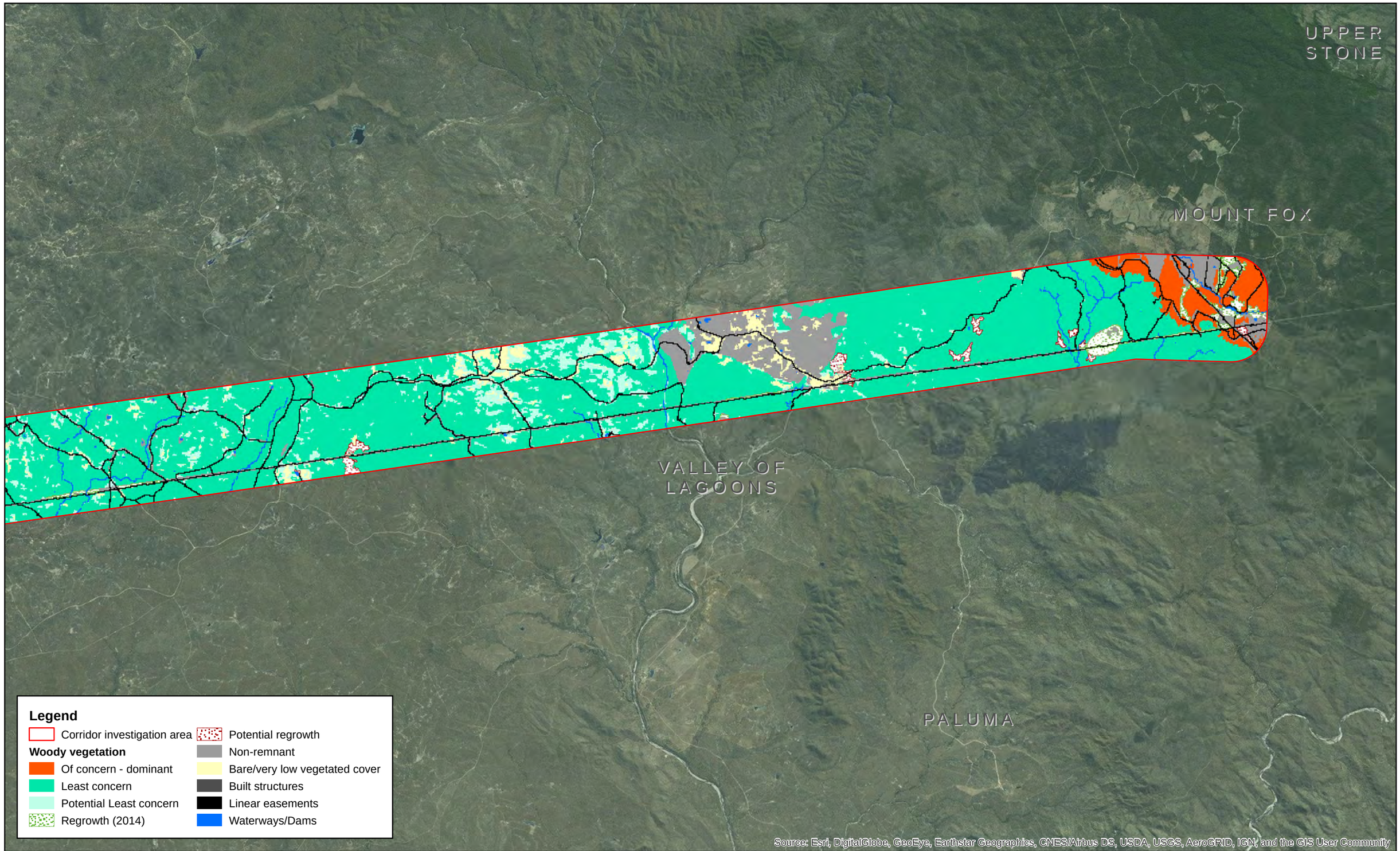
Kidston Power Transmission Line
Figure 3.43
Woody Vegetation
Option B



Map: 2270434A_GIS_E010_A2b	Author: VD		0 1,300 2,600 m
Date: 12/12/2016	Approved by: RH		1:100,000
Data source: Virtual GIS (2016)			Coordinate system: GDA 1994 MGA Zone 55
			Scale ratio correct when printed at A3

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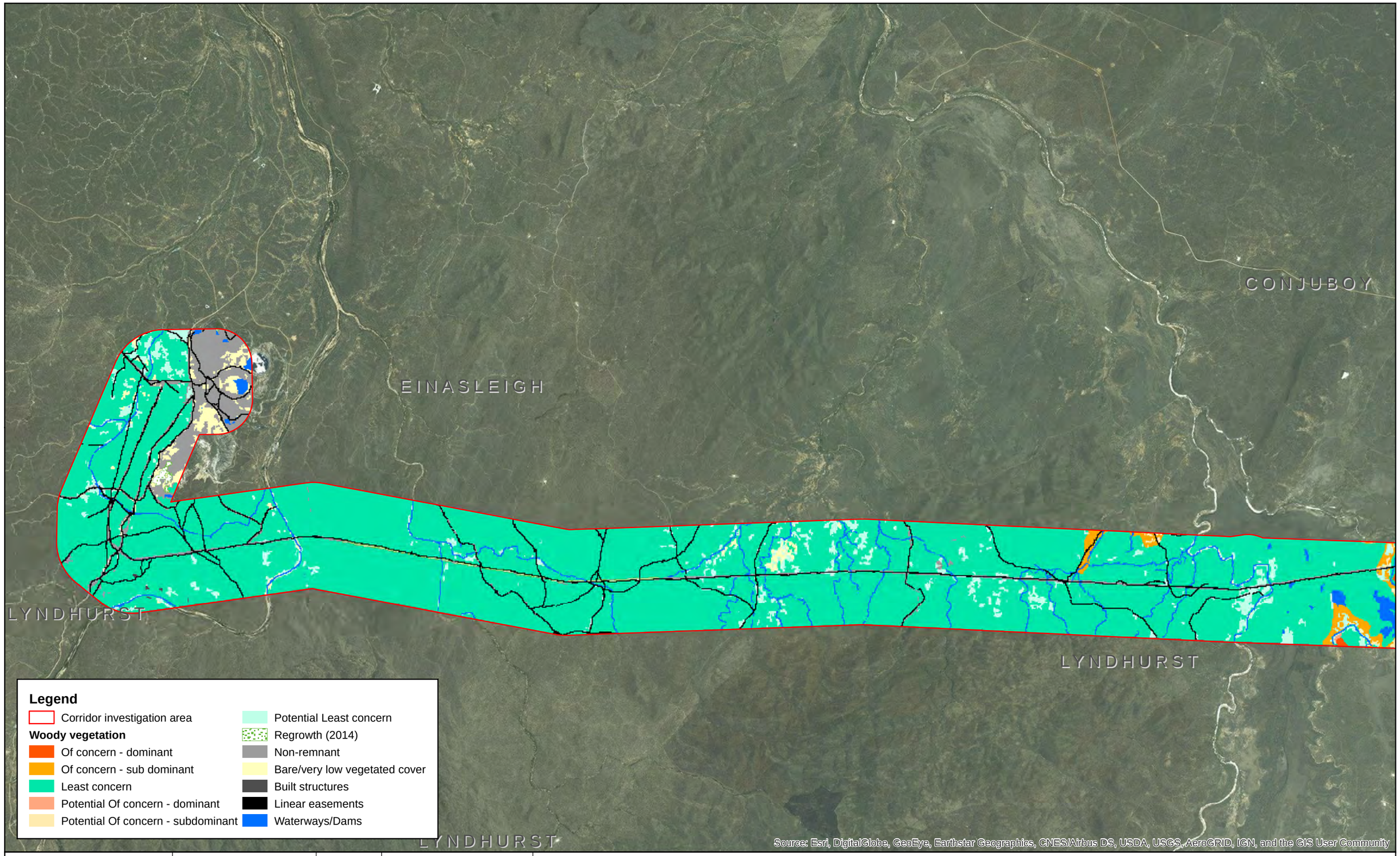
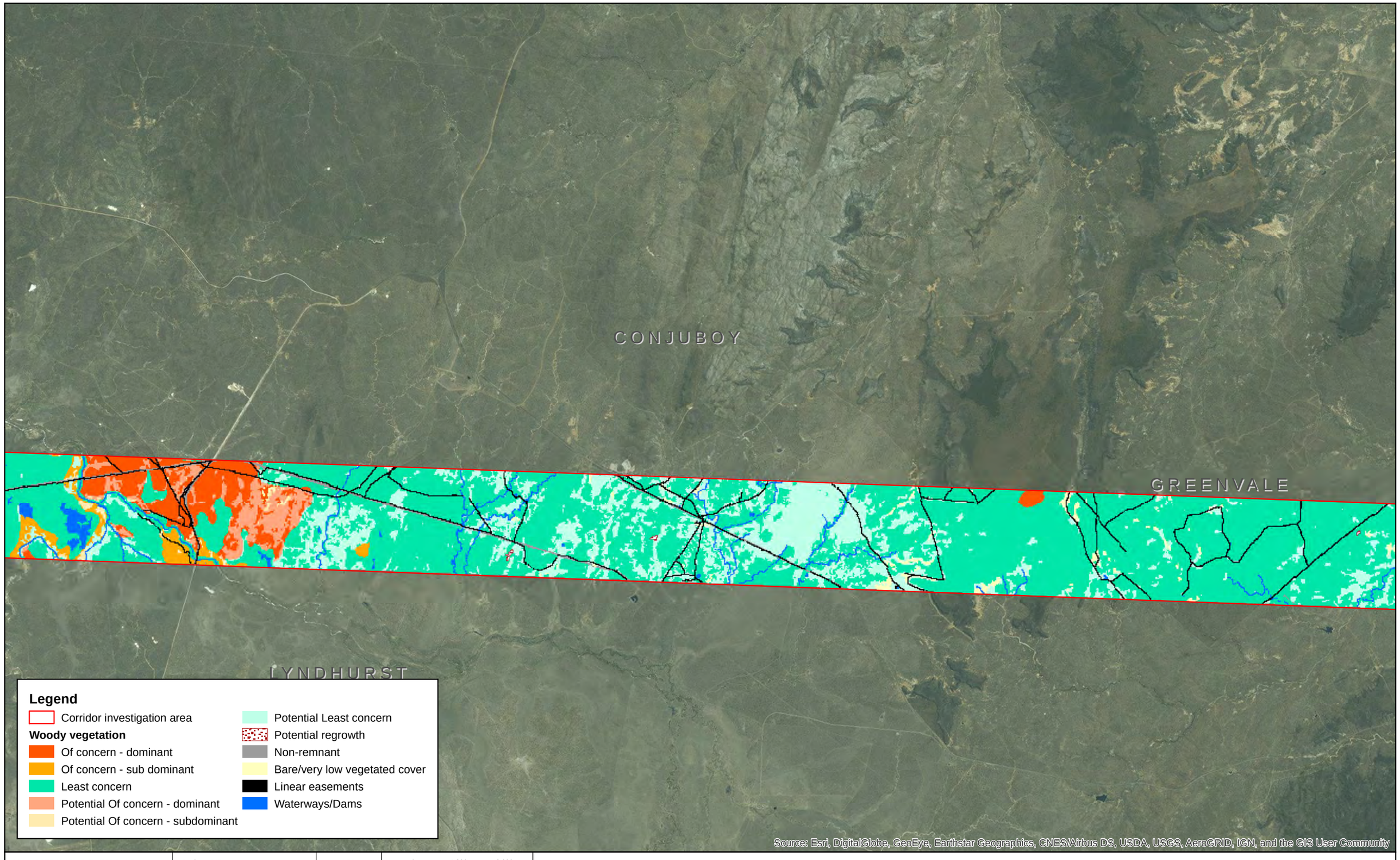
Kidston Power Transmission Line
Figure 3.44
Woody Vegetation
Option B



Map: 2270434A_GIS_E010_A2c	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Virtual GIS (2016)			

Kidston Power Transmission Line
Figure 3.45
Woody Vegetation
Option C



Map: 2270434A_GIS_E010_A2c	Author: VD		0 1,300 2,600 m 1:100,000
Date: 12/12/2016	Approved by: RH		Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3

Data source: Virtual GIS (2016)

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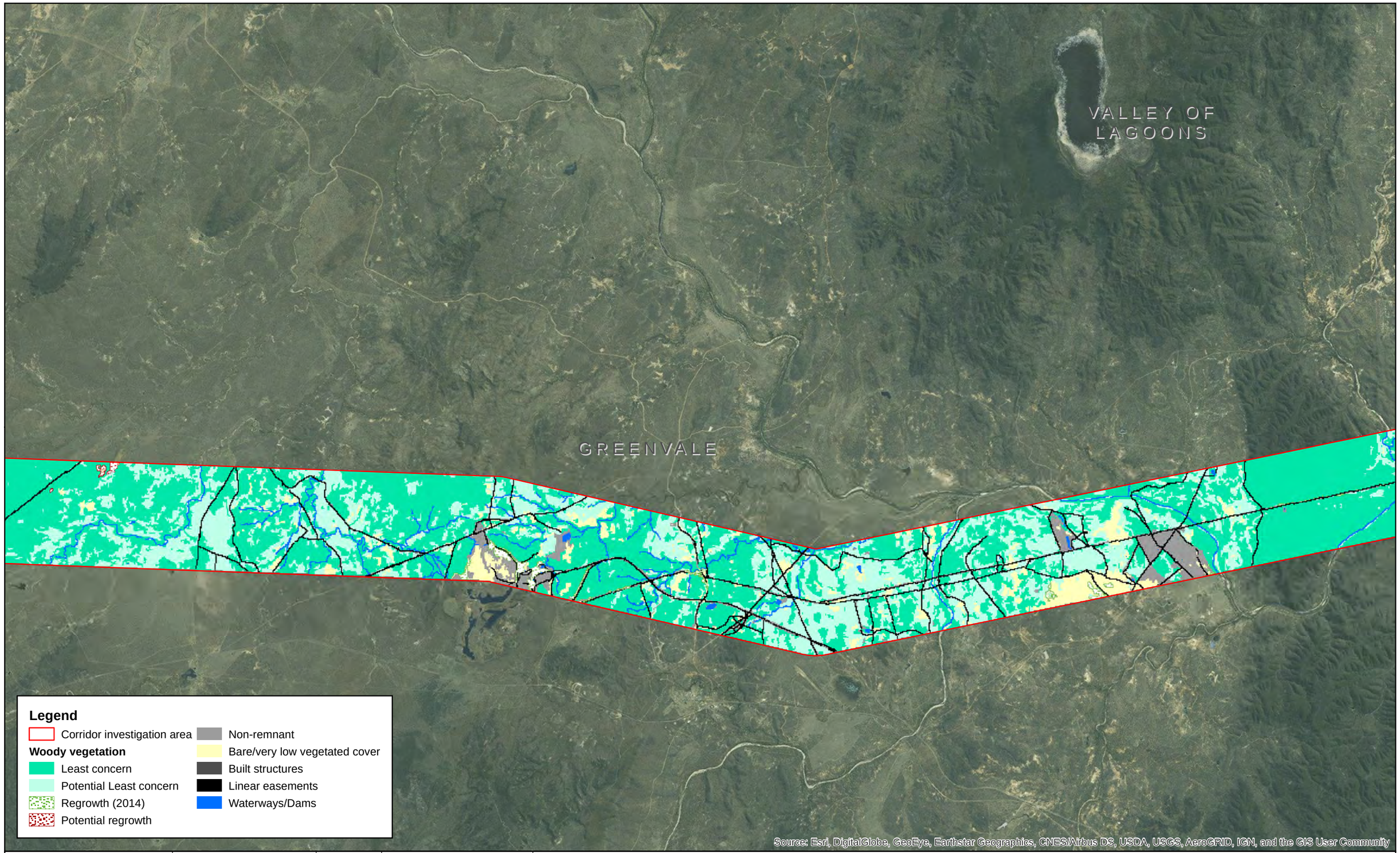
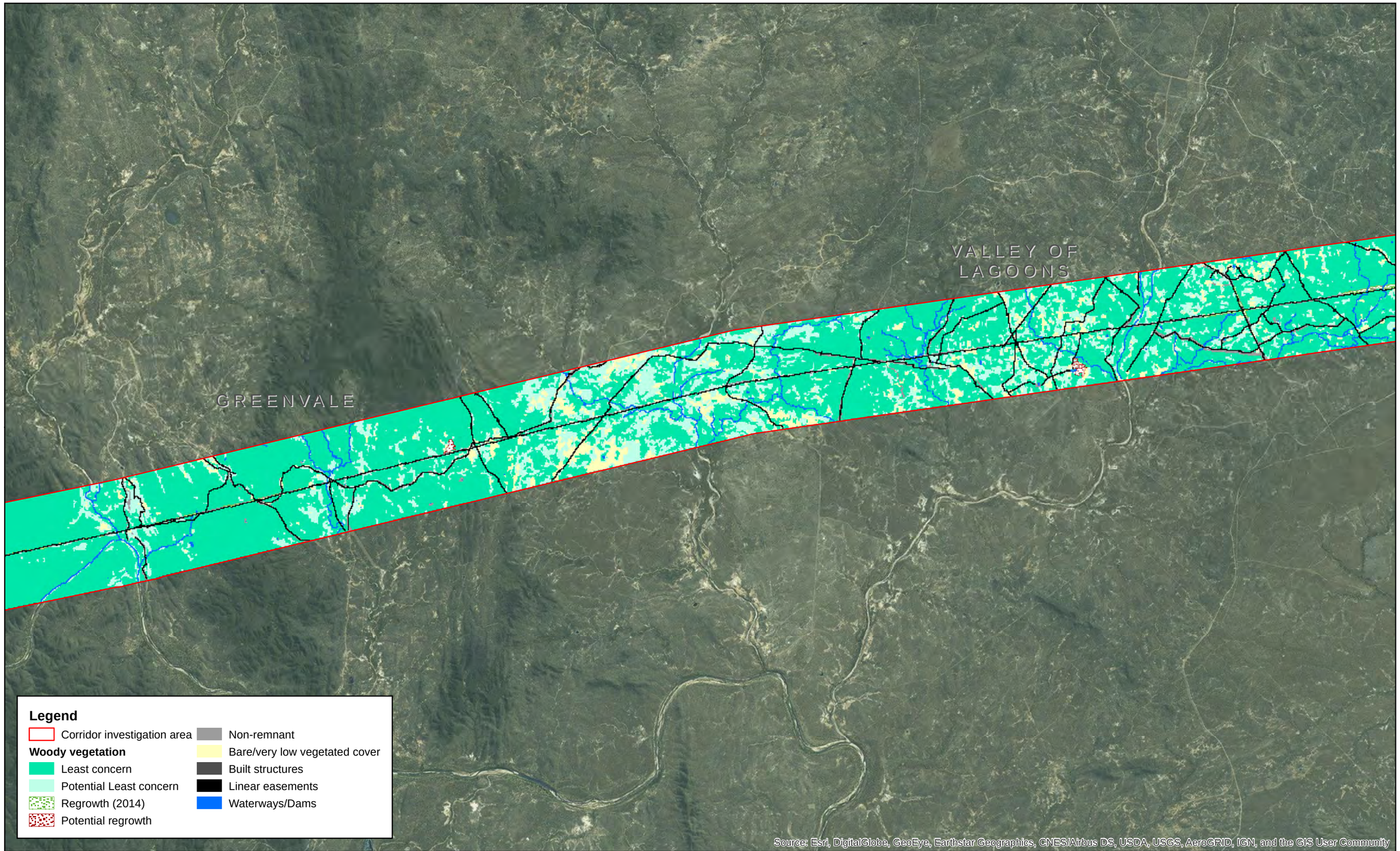
Kidston Power Transmission Line
Figure 3.46
Woody Vegetation
Option C



Map: 2270434A_GIS_E010_A2c	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Virtual GIS (2016)			

Kidston Power Transmission Line
Figure 3.47
Woody Vegetation
Option C

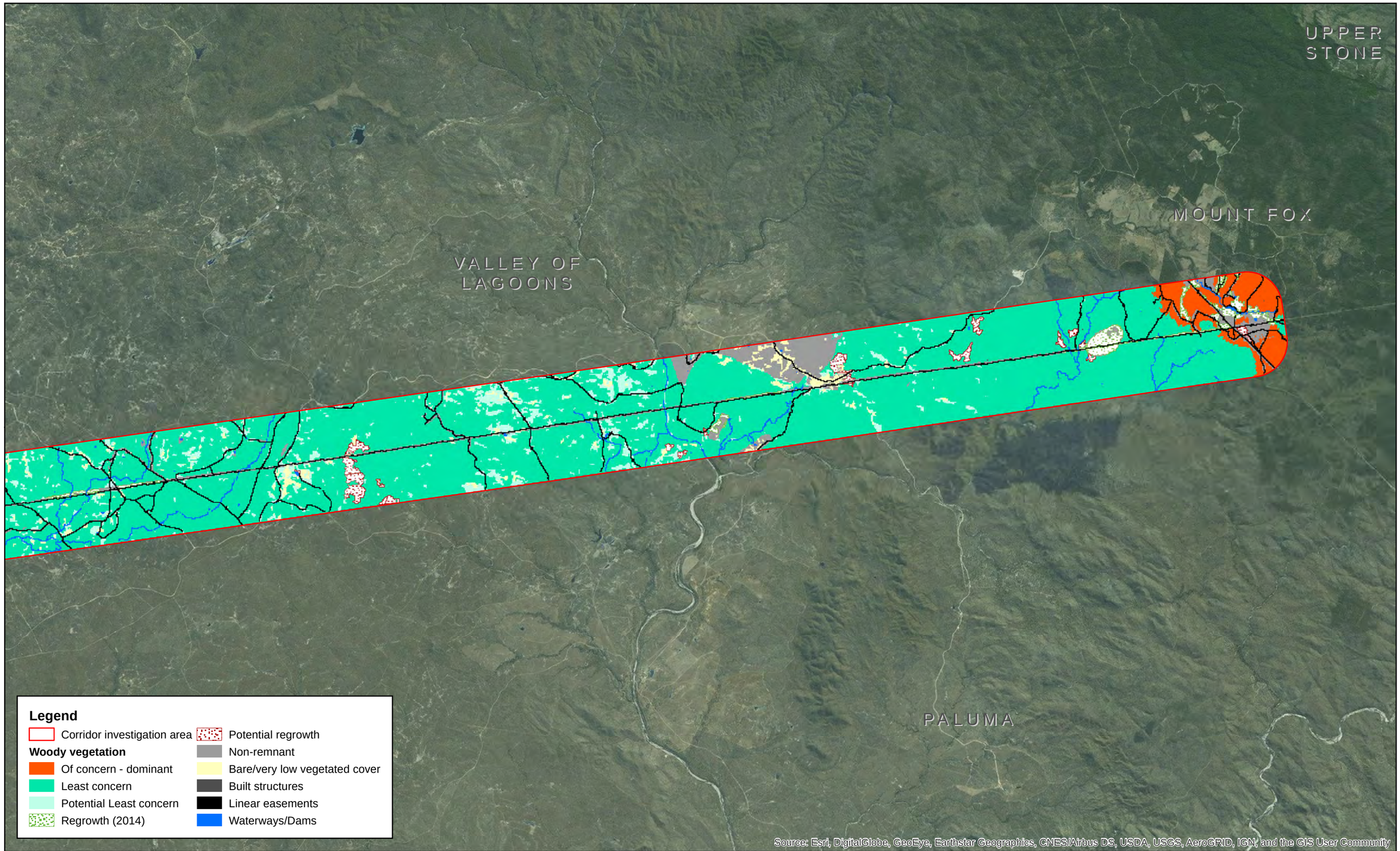
WSP | PARSONS BRINCKERHOFF



Map: 2270434A_GIS_E010_A2c	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Virtual GIS (2016)			

WSP | PARSONS BRINCKERHOFF

Kidston Power Transmission Line
Figure 3.48
Woody Vegetation
Option C



Map: 2270434A_GIS_E010_A2c	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Virtual GIS (2016)

0 1,300 2,600 m

1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

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Kidston Power Transmission Line
Figure 3.49
Woody Vegetation
Option C

3.1.5 Regulated remnant watercourse vegetation

All three corridor investigation areas intersect remnant watercourse vegetation on the 1:100,000 and 1:250,000 scale vegetation management watercourse maps, as indicated above on Figure 3.20–Figure 3.34.

The eastern third of Options A, B and C are located in the coastal Wet Tropics bioregion and for those part of each option, the defined distances for a remnant regional ecosystem in a coastal bioregion applies (refer Table 2.1). The remaining two-thirds of Options A, B and C are located in the non-coastal Einasleigh Uplands bioregion and therefore are aligned to the defined distances for a remnant regional ecosystem in a non-coastal bioregion (refer Table 2.2).

The area (ha) of potential impact of each corridor option upon regulated remnant watercourse vegetation in the coastal Wet Tropics bioregion is presented in Table 3.6.

The results of the analysis of regulated remnant watercourse vegetation for each corridor option is presented in Appendix G.

Table 3.6 The extent (ha) of potential impact of each corridor option upon regulated remnant watercourse vegetation in the coastal Wet Tropics bioregion

WATERCOURSE STREAM ORDER	DISTANCE FROM THE DEFINING BANK (M)	OPTION A (HA)	OPTION B (HA)	OPTION C (HA)
1 or 2	10	65	30	23
3 or 4	25	53	20	22
5 or greater	50	0	0	0
Totals		**118**	**50**	**45**

In reference to Table 3.6, Option C is of least constraint in terms of potential impacts upon regulated remnant watercourse vegetation within the defined distances of watercourses in the coastal Wet Tropics bioregion.

The extent (ha) of potential impact of each corridor option upon regulated remnant watercourse vegetation in the non-coastal Einasleigh Uplands bioregion, is presented in Table 3.7.

Table 3.7 The extent (ha) of potential impact of each corridor option upon regulated remnant watercourse vegetation in the non-coastal Einasleigh Uplands bioregion

WATERCOURSE STREAM ORDER	DISTANCE FROM THE DEFINING BANK (M)	OPTION A (HA)	OPTION B (HA)	OPTION C (HA)
1 or 2	25	3,619	3,518	3,511
3 or 4	50	1,301	1,325	1,379
5 or greater	100	665	704	603
Totals		**5,585**	**5,547**	**5,493**

In reference to Table 3.7, Option C is of least constraint in terms of potential impacts upon regulated remnant watercourse vegetation within the defined distances of watercourses in the non-coastal Einasleigh Uplands bioregion.

3.1.6 Regulated remnant wetland vegetation

All three corridor investigation areas intersect remnant wetland vegetation, as indicated above on Figure 3.20–Figure 3.34.

The area (ha) of potential impact of each corridor option upon regulated remnant wetland vegetation is presented in Table 3.8.

The results of the analysis of regulated remnant watercourse vegetation for each corridor option is presented in Appendix G.

In reference to Table 3.8, Option A is of least constraint in terms of potential impacts upon regulated remnant wetland vegetation that is within a 50 m of the defined bank of mapped regulated vegetation wetlands.

Table 3.8 The extent (ha) of potential impact of each corridor option upon regulated remnant wetland vegetation

CORRIDOR	REGULATED REMNANT WETLAND VEGETATION (HA)
Option A	**4.7**
Option B	**42.3**
Option C	**27.7**

3.1.7 Protected areas

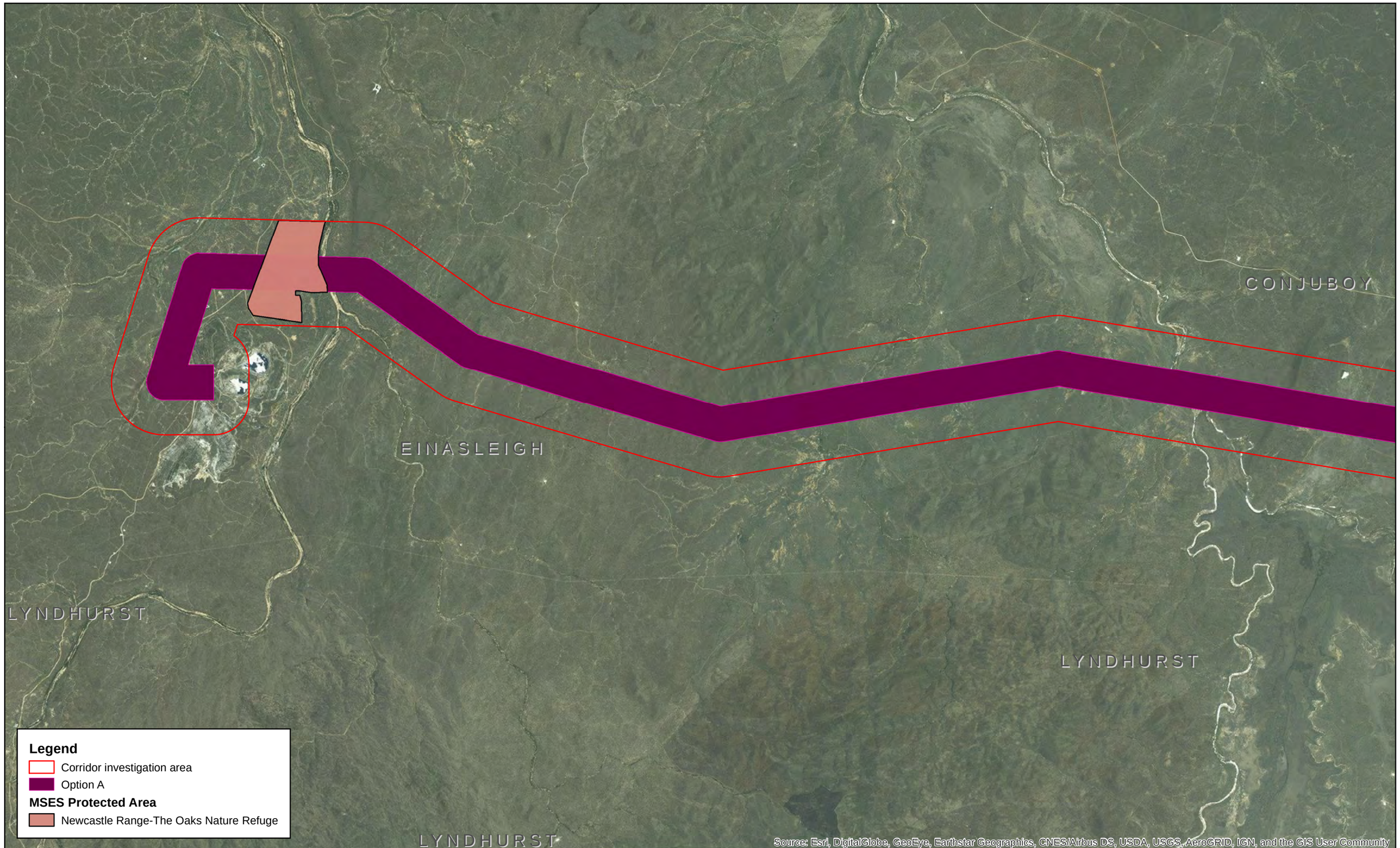
All three corridor investigation areas intersect with sections of protected areas, as indicated on Figure 3.50–Figure 3.64. The area (ha) of protected areas associated with each corridor investigation area is presented in Table 3.9.

The spreadsheet that contains the analysis of protected areas is presented in Appendix G.

In reference to Table 3.9, Option C is of least constraint in terms of potential impacts upon MSES Protected Areas.

Table 3.9 Amount (ha) of protected areas associated with each corridor investigation area

PROTECTED AREA	OPTION A (HA)	OPTION B (HA)	OPTION C (HA)
Newcastle Range – The Oaks Nature Refuge	439.8	0	0
Liefway Nature Refuge	4.7	0	3.0
Sub-totals – Nature Refuges	**444.5**	**0**	**3.0**
Girringun National Park	213.7	214.4	142.3
Sub-total – National Parks	**213.7**	**214.4**	**142.3**
Total – Protected Areas	**658**	**214**	**145**



Map: 2270434A_GIS_E007_A2a	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Department of Environment and Heritage Protection (2016)

0 1,300 2,600 m

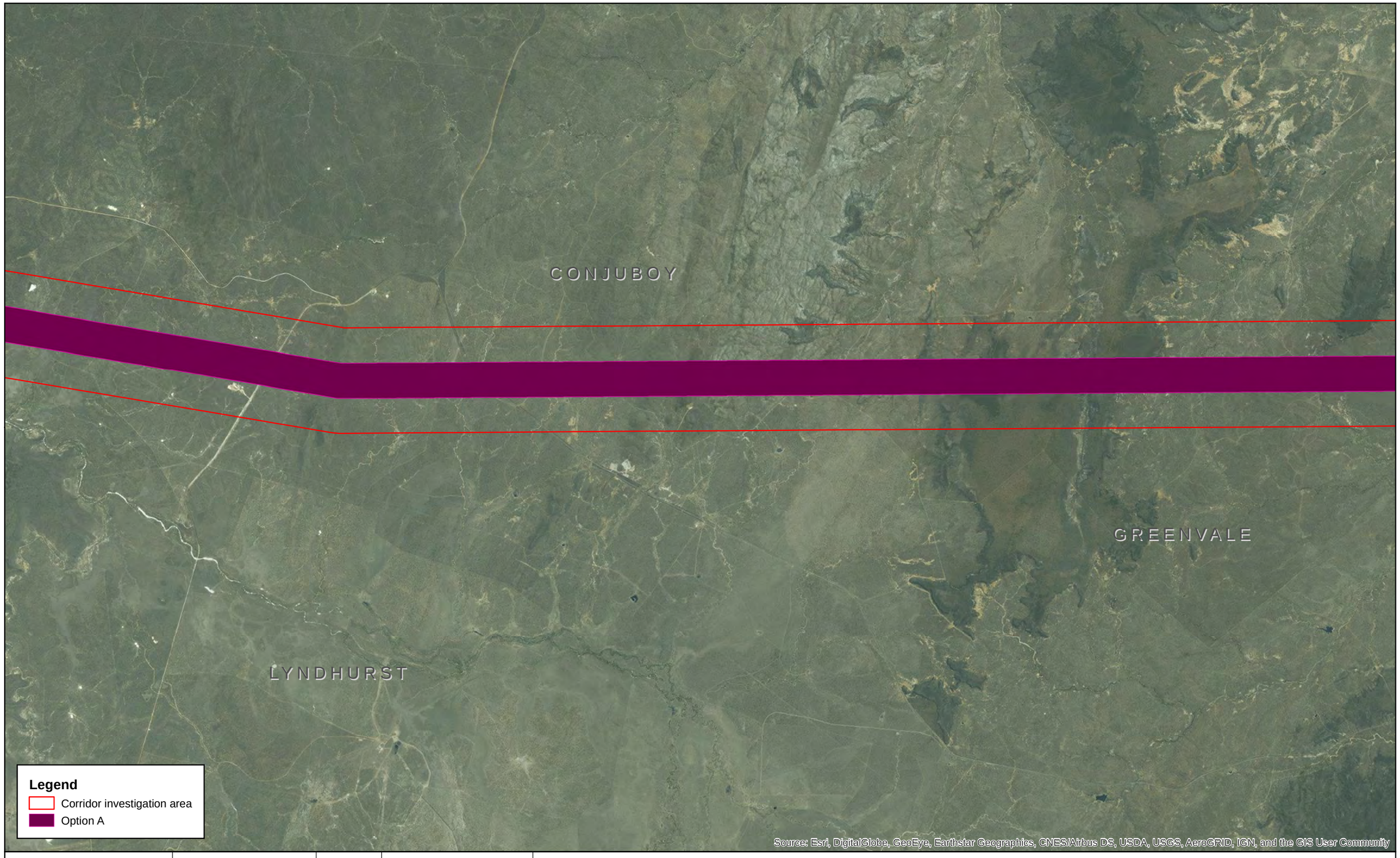
1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

WSP | PARSONS BRINCKERHOFF

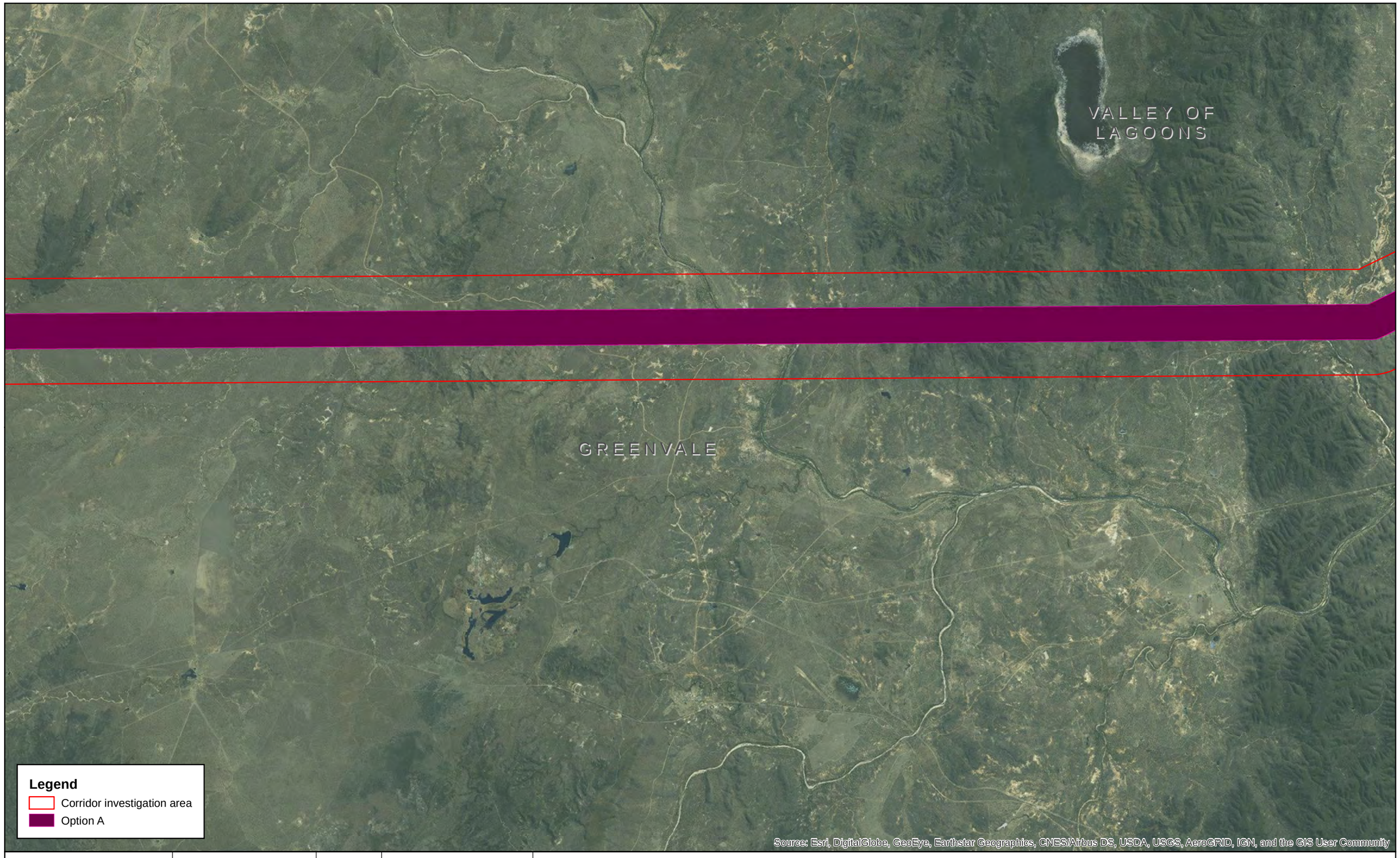
Kidston Power Transmission Line
Figure 3.50
Protected areas, wildlife habitats and high ecological significance (HES) wetlands
Option A



Map: 2270434A_GIS_E007_A2a	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

WSP | PARSONS BRINCKERHOFF

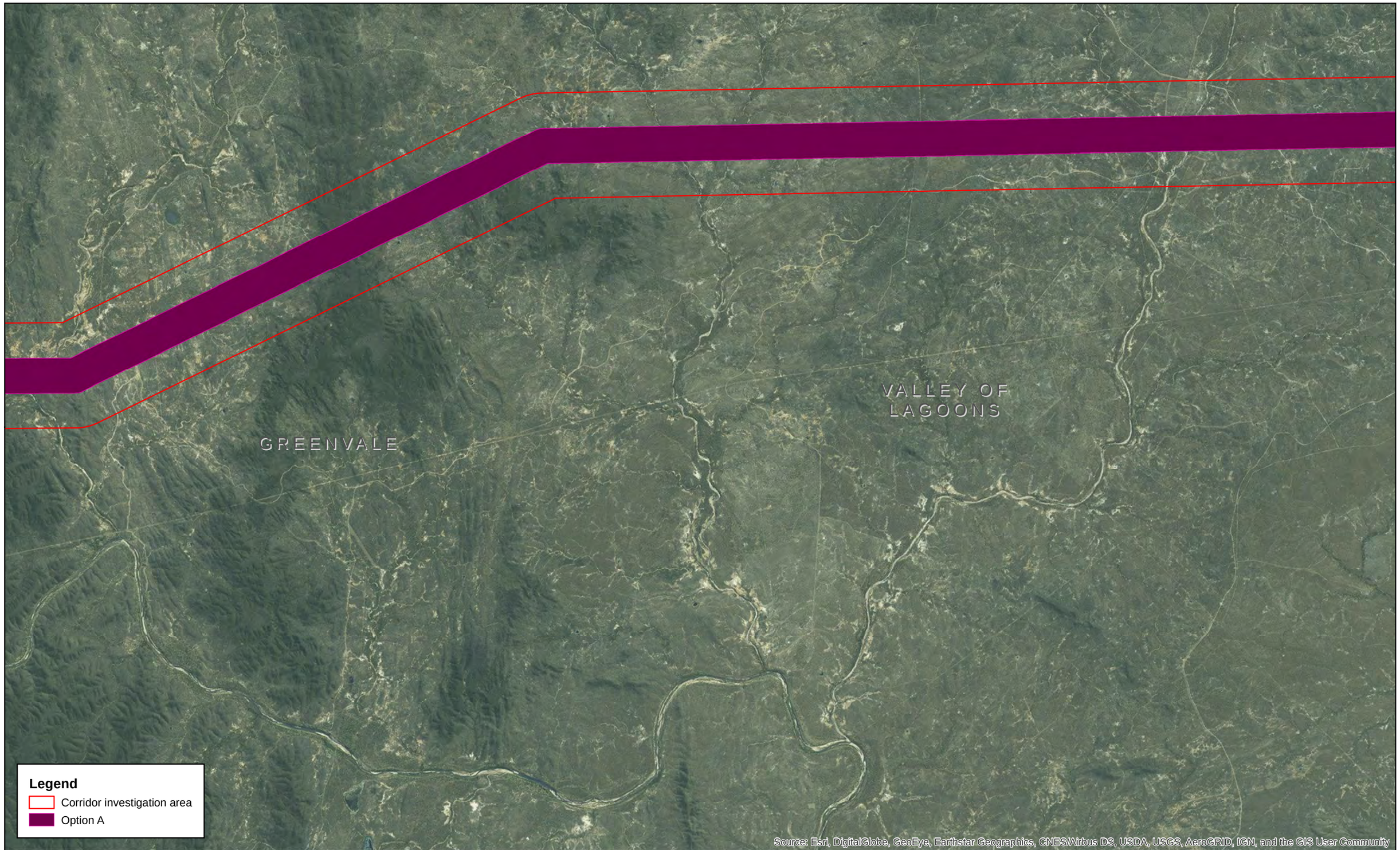
Kidston Power Transmission Line
Figure 3.51
Protected areas, wildlife habitats and high ecological significance (HES) wetlands
Option A



Map: 2270434A_GIS_E007_A2a	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

Kidston Power Transmission Line
Figure 3.52
Protected areas, wildlife habitats and high ecological significance (HES) wetlands
Option A

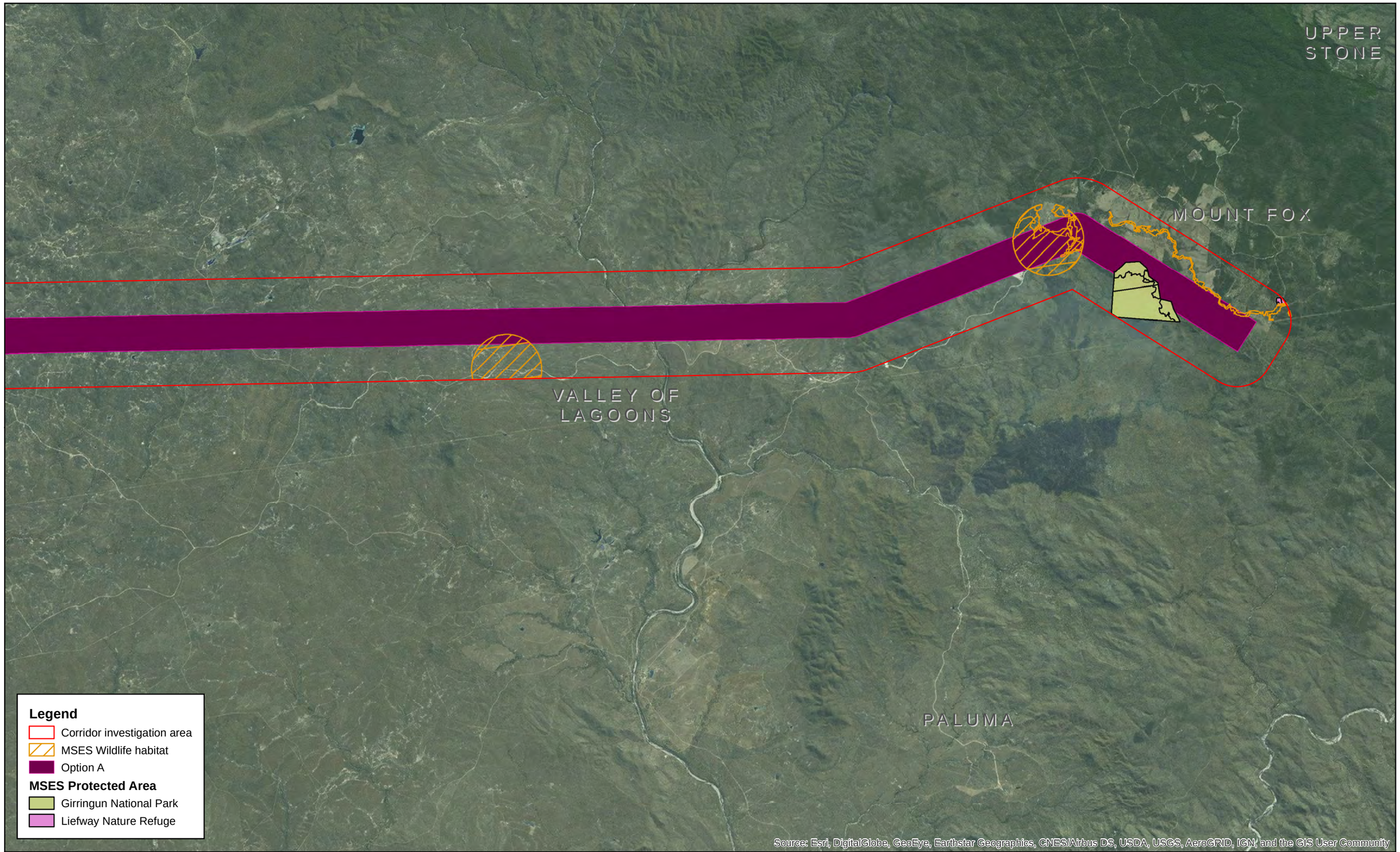
WSP | PARSONS BRINCKERHOFF



Map: 2270434A_GIS_E007_A2a	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

WSP | PARSONS BRINCKERHOFF

Kidston Power Transmission Line
Figure 3.53
Protected areas, wildlife habitats and high ecological significance (HES) wetlands
Option A



Map: 2270434A_GIS_E007_A2a	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Department of Environment and Heritage Protection (2016)

0 1,300 2,600 m

1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

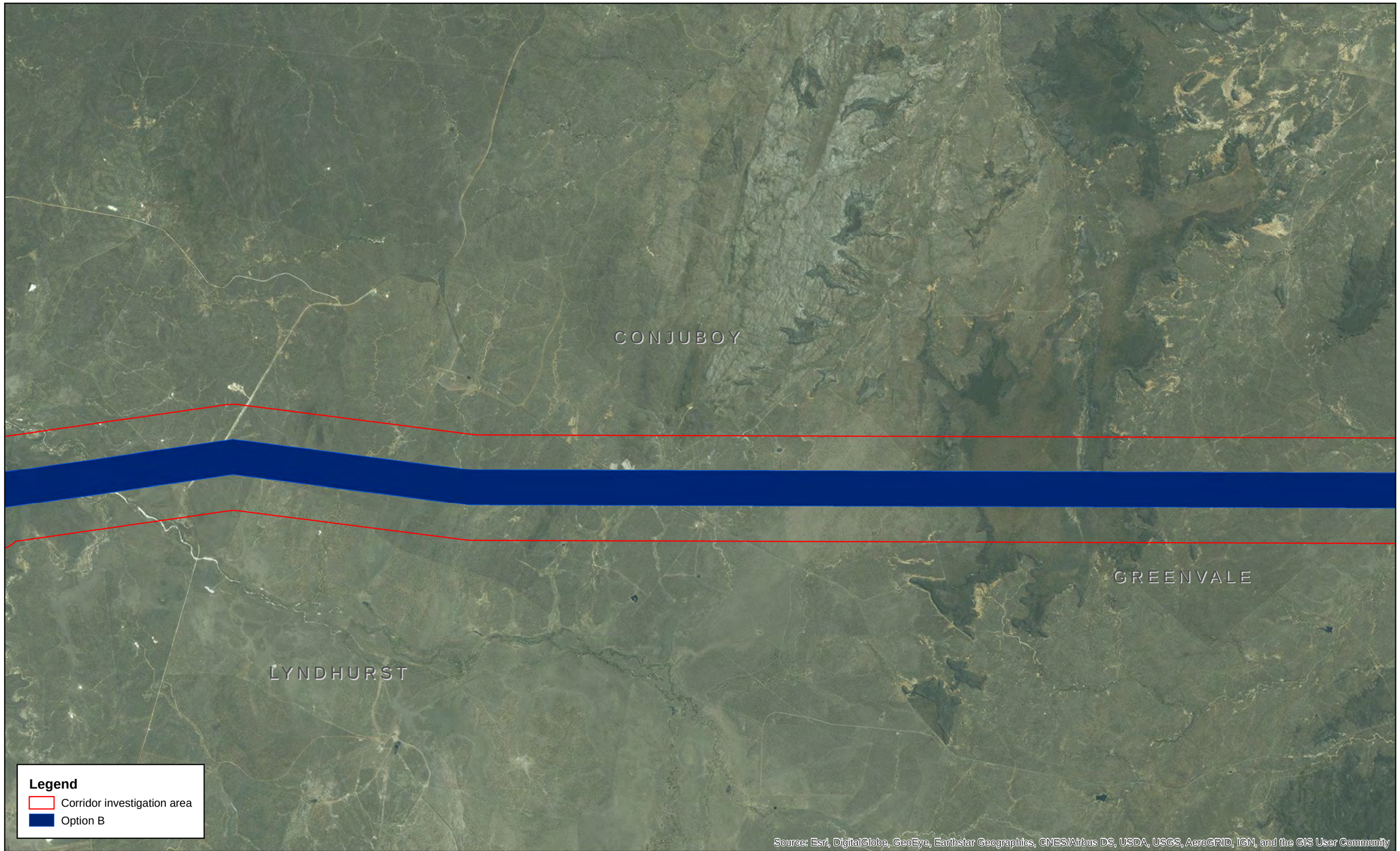
Kidston Power Transmission Line
Figure 3.54
Protected areas, wildlife habitats and high ecological significance (HES) wetlands
Option A

WSP | PARSONS BRINCKERHOFF

Map: 2270434A_GIS_E007_A2b	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

WSP | PARSONS BRINCKERHOFF

Kidston Power Transmission Line
Figure 3.55
Protected areas, wildlife habitats and high ecological significance (HES) wetlands
Option B



Map: 2270434A_GIS_E007_A2b	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Department of Environment and Heritage Protection (2016)

0 1,300 2,600 m

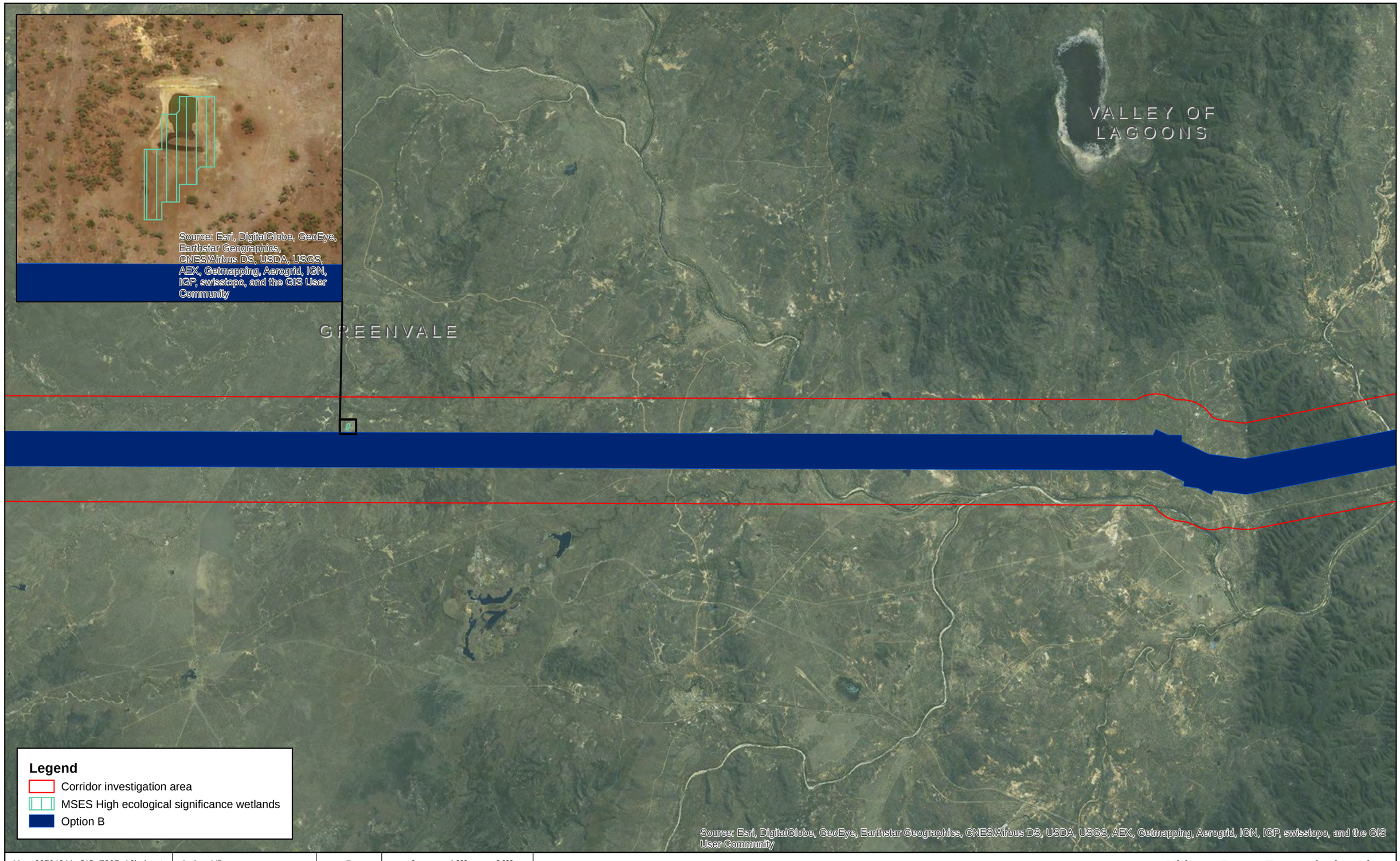
1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

Kidston Power Transmission Line
Figure 3.56
Protected areas, wildlife habitats and high ecological significance (HES) wetlands
Option B

WSP | PARSONS BRINCKERHOFF



Map: 2270434A_GIS_E007_A2b_inset	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Department of Environment and Heritage Protection (2016)

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1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

WSP | PARSONS BRINCKERHOFF

Kidston Power Transmission Line
Figure 3.57
Matters of State Environmental Significance Wildlife Habitat and HES Wetlands
Option B

Map: 2270434A_GIS_E007_A2b	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Department of Environment and Heritage Protection (2016)

0 1,300 2,600 m

1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

WSP | PARSONS BRINCKERHOFF

Kidston Power Transmission Line
Figure 3.58
Protected areas, wildlife habitats and high ecological significance (HES) wetlands
Option B

UPPER STONE

MOUNT FOX

VALLEY OF LAGOONS

PALUMA

Legend

- Corridor investigation area
- MSES Wildlife habitat
- Option B

MSES Protected Area

- Girringun National Park

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Map: 2270434A_GIS_E007_A2b	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Department of Environment and Heritage Protection (2016)

0 1,300 2,600 m

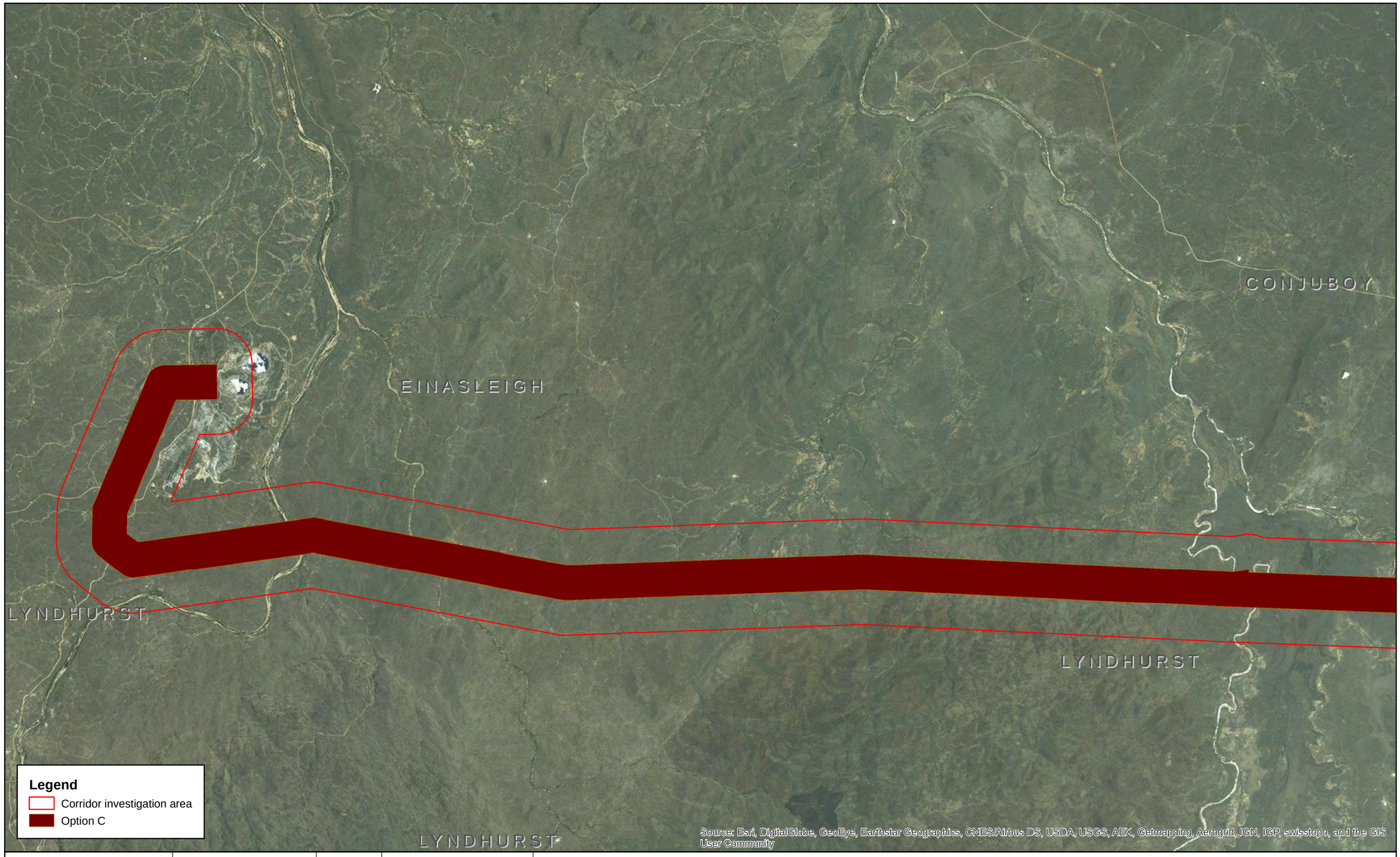
1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

WSP | PARSONS BRINCKERHOFF

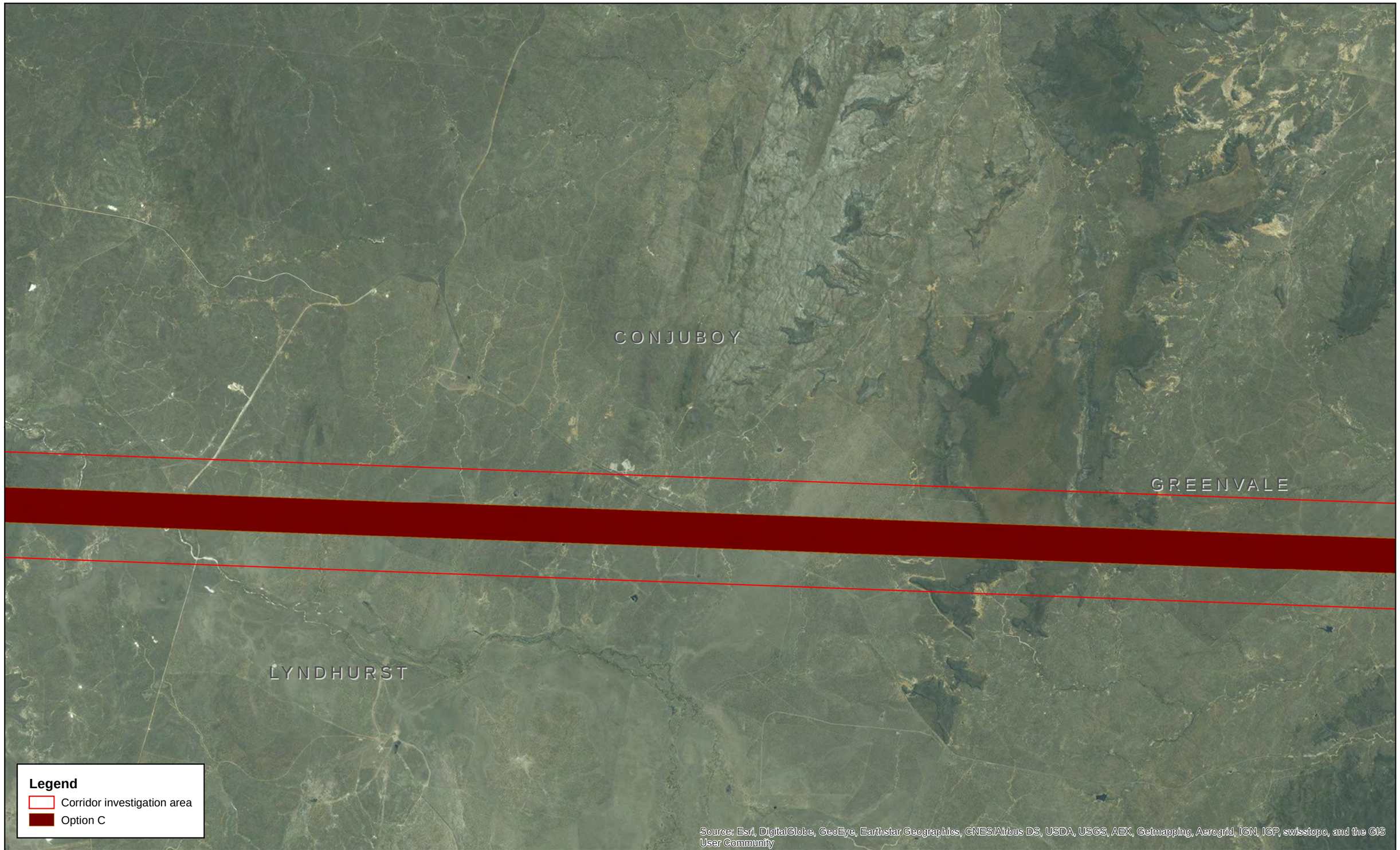
Kidston Power Transmission Line
Figure 3.59
Protected areas, wildlife habitats and high ecological significance (HES) wetlands
Option B



Map: 2270434A_GIS_E007_A2c	Author: VD		0 1,300 2,600 m
Date: 12/12/2016	Approved by: RH		1:100,000
Data source: Department of Environment and Heritage Protection (2016)			Coordinate system: GDA 1994 MGA Zone 55
			Scale ratio correct when printed at A3

WSP | PARSONS BRINCKERHOFF

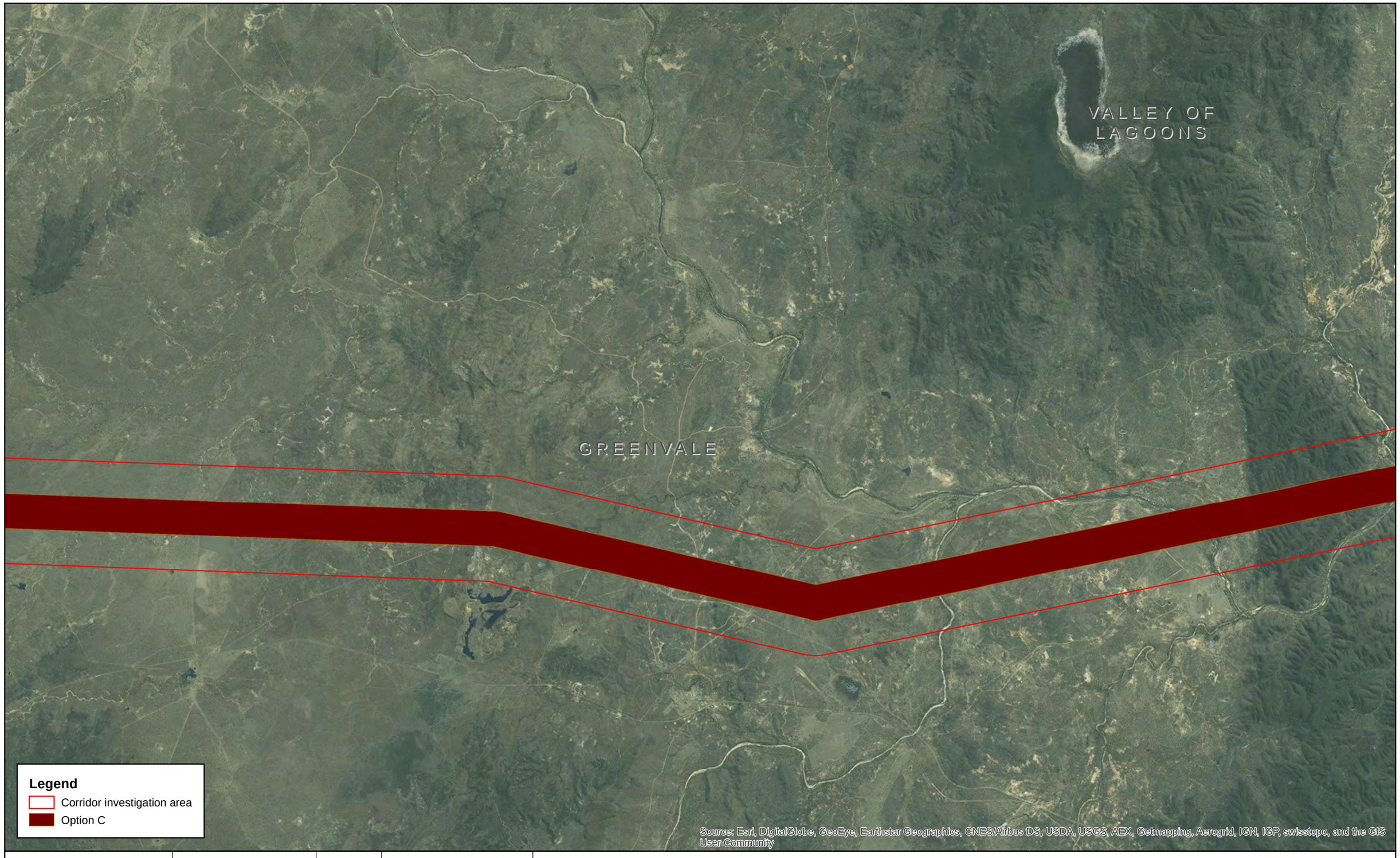
Kidston Power Transmission Line
Figure 3.60
Protected areas, wildlife habitats and high ecological significance (HES) wetlands
Option C



Map: 2270434A_GIS_E007_A2c	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

WSP | PARSONS BRINCKERHOFF

Kidston Power Transmission Line
Figure 3.61
Protected areas, wildlife habitats and high ecological significance (HES) wetlands
Option C



Map: 2270434A_GIS_E007_A2c	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Department of Environment and Heritage Protection (2016)

0 1,300 2,600 m

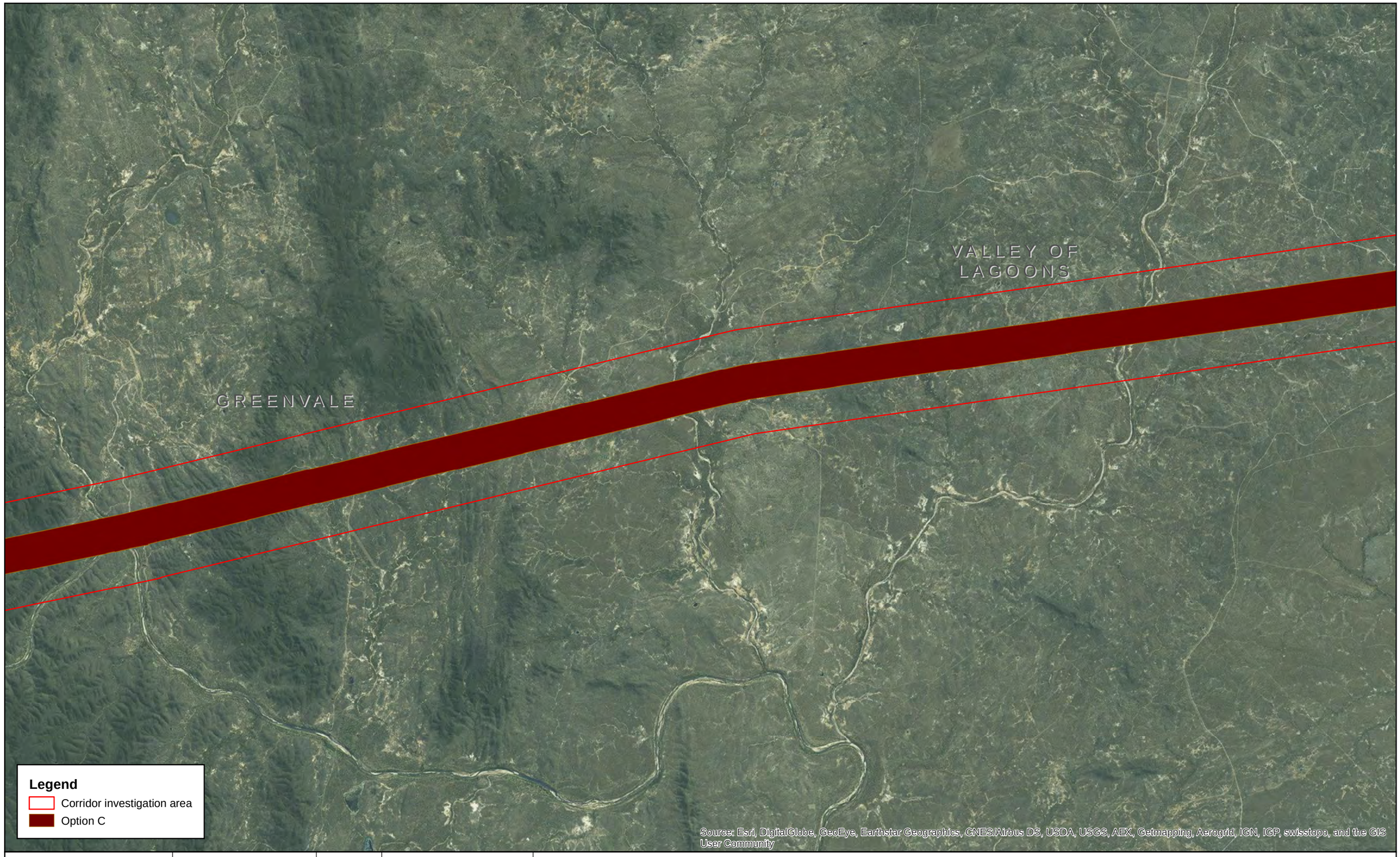
1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

WSP | PARSONS BRINCKERHOFF

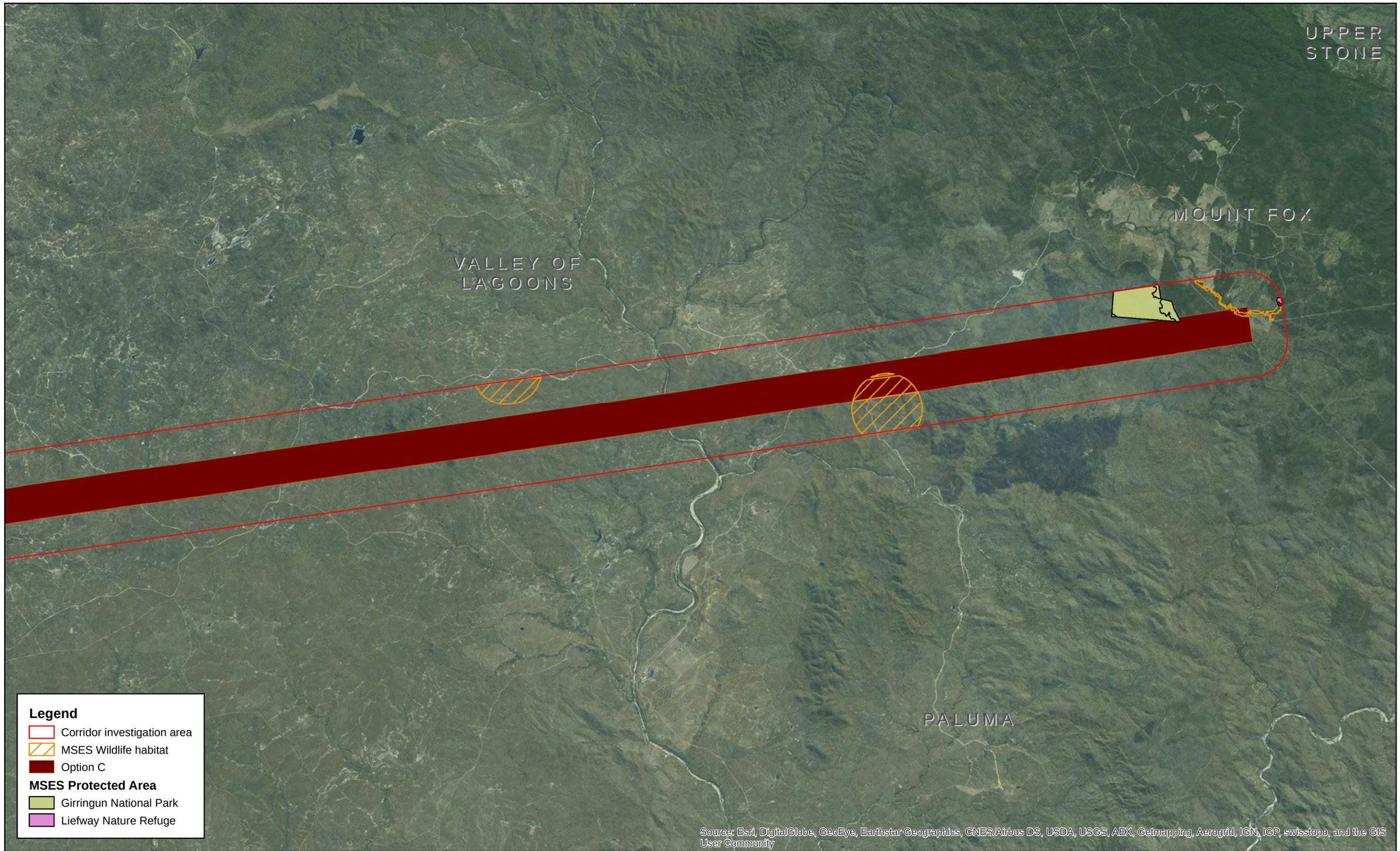
Kidston Power Transmission Line
Figure 3.62
Protected areas, wildlife habitats and high ecological significance (HES) wetlands
Option C



Map: 2270434A_GIS_E007_A2c	Author: VD		0 1,300 2,600 m 1:100,000 Coordinate system: GDA 1994 MGA Zone 55 Scale ratio correct when printed at A3
Date: 12/12/2016	Approved by: RH		
Data source: Department of Environment and Heritage Protection (2016)			

WSP | PARSONS BRINCKERHOFF

Kidston Power Transmission Line
Figure 3.63
Protected areas, wildlife habitats and high ecological significance (HES) wetlands
Option C



Map: 2270434A_GIS_E007_A2c	Author: VD
Date: 12/12/2016	Approved by: RH

Data source: Department of Environment and Heritage Protection (2016)

0 1,300 2,600 m

1:100,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

Kidston Power Transmission Line
Figure 3.64
Protected areas, wildlife habitats and high ecological significance (HES) wetlands
Option C

3.1.8 Wildlife habitats

All three corridor investigation areas intersect mapped wildlife habitats, as indicated on Figure 3.50–Figure 3.64. The amount (ha) protected areas associated with each corridor investigation area is presented in Table 3.10. The spreadsheet that contains the analysis of wildlife habitat is presented in Appendix G.

In reference to Table 3.10, Option C is of least constraint in terms of potential impacts upon MSES Wildlife Habitat.

Table 3.10 Amount (ha) of wildlife habitats associated with each corridor investigation area

CORRIDOR	WILDLIFE HABITATS (HA)
Option A	**522**
Option B	**411**
Option C	**385**

3.1.9 Strategic environmental areas

Strategic environmental areas are not relevant to any of the three corridor options.

3.1.10 High ecological significance (HES) wetlands

Of the three corridor investigation areas, only Option B intersects high ecological significance wetlands, as indicated on Figure 3.50–Figure 3.64. The area (ha) of high ecological significance wetlands associated with each corridor investigation area is presented in Table 3.11. The results of the analysis of HES wetlands is presented in Appendix G.

Table 3.11 Amount (ha) of HES wetlands associated with each corridor investigation area

CORRIDOR	HIGH ECOLOGICAL SIGNIFICANCE WETLANDS (HA)
Option A	**0**
Option B	**1.1**
Option C	**0**

3.1.11 High ecological value waters (wetland)

High ecological value waters (wetland) are not relevant to any of the three corridor options.

3.1.12 High ecological value waters (watercourses)

High ecological value waters (watercourses) are not relevant to any of the three corridor options.

3.1.13 Environmental offset areas

Environmental offset areas are not relevant to any of the three corridor options.

3.1.14 Connectivity

Connectivity is assessed significant residual impacts under the Queensland Government's *Environmental Offsets Policy version 1.1* (2014), once a project footprint has been determined. This impact is assed using GIS and the Queensland Government's *Landscape Fragmentation and Connectivity tool* for an individual impact area. Essentially, the assessment is based upon the level of fragmentation to remnant vegetation as a result of a project's impact area(s).

In reference to the amount of remnant vegetation that occurs within each corridor investigation area, all three corridor options would result in impacts to connectivity. On this basis once a preferred corridor option is selected and project impact area(s) are defined, the potential impact upon connectivity would need to be assessed using the Landscape Fragmentation and Connectivity tool.

3.2 Matters of National Environmental Significance

The following MNES have been assessed in the following sections:

- threatened species and migratory species
- threatened ecological communities
- heritage properties of international and national significance.

3.2.1 EPBC Act Protected Matters Search Tool results

The PMST database search results revealed the MNES of potential relevance to the corridor options, including one TEC, 33 threatened species and 15 migratory species. The search also identified world, national and indigenous heritage properties.

The results of the PMST database search for each corridor investigation area is presented in Table 3.12. The complete PMST reports for each corridor option are presented in Appendix A.

Table 3.12 PMST database search results for each corridor investigation area

MNES	SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS	NC ACT STATUS	OPTION A	OPTION B	OPTION C
TECs	Broad leaf tea-tree (*Melaleuca viridiflora*) woodlands in high rainfall coastal north Queensland		E	–	x	x	x
Total					**1**	**1**	**1**
Threatened species							
Birds	*Calidris ferruginea*	Curlew Sandpiper	CE (M)	SL	x	x	x
	Casuarius casuarius johnsonii	Southern Cassowary	E	E	x	x	x
	Erythrotriorchis radiatus	Red Goshawk	V	E	x	x	x
	Erythrura gouldiae	Gouldian Finch	E	E	x	x	x
	Numenius madagascariensis	Eastern Curlew	CE	V	x	x	x
	Poephila cincta cincta	Southern Black-throated Finch	E	E	x	x	x
	Rostratula australis	Australian Painted Snipe	E	V	x	x	x
	Tyto novaehollandiae kimberli	Masked Owl (northern)	V	V	x	x	x
Frogs	*Litoria dayi*	Australian Lace-lid	E	E	x	x	x
	Litoria nannotis	Waterfall Frog	E	E	x	x	x
	Litoria rheocola	Common Mistfrog	E	E	x	x	x

MNES	SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS	NC ACT STATUS	OPTION A	OPTION B	OPTION C
Mammals	*Dasyurus hallucatus*	Northern Quoll	E	–	x	x	x
	Dasyurus maculatus gracilis	Spotted-tailed Quoll (north Queensland)	E	E	x	x	x
	Hipposideros semoni	Semon's Leaf-nosed Bat	E	E	x	x	x
	Macroderma gigas	Ghost Bat	V	V	x	x	x
	Mesembriomys gouldii rattoides	Black-footed Tree-rat (north Queensland)	V	-	x	x	x
	Petauroides volans	Greater Glider	V	-	x	x	x
	Petrogale sharmani	Sharman's Rock-wallaby	V	V	x	x	x
	Phascolarctos cinereus	Koala	V	V	x	x	x
	Pteropus conspicillatus	Spectacled Flying-fox	V	V	x	x	x
	Pteropus poliocephalus	Grey-headed Flying-fox	V	-	x	x	x
	Rhinolophus robertsi	Large-eared Horseshoe Bat	E	E	x	x	x
	Saccolaimus saccolaimus nudicluniatus	Bare-rumped Sheath-tailed Bat	CE	E	x	x	x
Plants	*Acacia crombiei*	Pink Gidgee	V	V	x	x	x
	Bulbophyllum globuliforme	Miniature Moss-orchid	V	NT	x	x	x
	Cajanus mareebensis	–	E	E	x	x	x
	Dichanthium setosum	Bluegrass	V	-	x	x	x
	Lindsaea pulchella var. blanda	–	V	EX	x	x	x
	Marsdenia brevifolia	–	V	V	x	x	x
	Phaius australis	Lesser Swamp-orchid	E	E	x	x	x
	Tephrosia leveillei	–	V	V	x	x	x
Reptiles	*Egernia rugosa*	Yakka Skink	V	V	x	x	x
	Lerista vittata	Mount Cooper Striped Lerista	V	V	x	x	x
Migratory (marine)	*Apus pacificus*	Fork-tailed Swift	M	SL	x	x	x
Migratory (terrestrial)	*Cuculus optatus*	Oriental Cuckoo	M	SL	x	x	x
	Hirundapus caudacutus	White-throated Needletail	M	SL	x	x	x

MNES	SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS	NC ACT STATUS	OPTION A	OPTION B	OPTION C
	Hirundo rustica	Barn Swallow	M	SL	x	x	x
	Monarcha melanopsis	Black-faced Monarch	M	SL	x	x	x
	Monarcha trivirgatus	Spectacled Monarch	M	SL	x	x	x
	Motacilla cinerea	Grey Wagtail	M	SL	x	x	x
	Motacilla flava	Yellow Wagtail	M	SL	x	x	x
	Myiagra cyanoleuca	Satin Flycatcher	M	SL	x	x	x
	Rhipidura rufifrons	Rufous Fantail	M	SL	x	x	x
Migratory (wetland)	*Calidris ferruginea*	Curlew Sandpiper	M (CE)	SL	x	x	x
	Gallinago hardwickii	Latham's Snipe	M	SL	x	x	x
	Numenius madagascariensis	Eastern Curlew	M (CE)	SL	x	x	x
	Pandion haliaetus	Osprey	M	SL	x	x	x
	Tringa nebularia	Common Greenshank	M	SL	-	x	x
Totals					**47**	**48**	**48**
Other MNES							
World Heritage properties - Wet Tropics of Queensland					x	–	–
National Heritage properties (natural) - Wet Tropics of Queensland					x	–	–
National Heritage properties (indigenous) - Wet Tropics World Heritage Area (Indigenous Values)					x	–	–

Key: EX = extinct in the wild, CE = critically endangered, E = endangered, V = vulnerable, NT = near threatened, M = migratory, SL = special least concern

3.2.2 EPBC Act threatened and migratory species records

The EPBC Act threatened and migratory species records obtained from DSITI's species profile search and Atlas of Living Australia that are of relevance to each corridor option have been quantified and mapped using GIS. The number of threatened and/or migratory species listed under the EPBC Act that have been previously recorded within each corridor investigation area is presented in Table 3.13 and mapped on Figure 3.1–Figure 3.3.

The results of the analysis of threatened species records is presented in Appendix F.

In reference to Table 3.13, Option A has the least number of EPBC Act threatened species records. However, as mentioned above, threatened species records are representative of the flora and fauna surveys that are undertaken in specific areas for developments or in association with protected areas. In respect to the remoteness of the corridor investigation areas, targeted surveys for the Project are likely to identify several threatened species that have not yet been recorded and formerly on the DSITI and ALA records databases.

Table 3.13 The number of EPBC Act listed species that have been previously recorded within each corridor investigation area

EPBC ACT STATUS	OPTION A	OPTION B	OPTION C
Threatened flora species			
Critically endangered	–	–	–
Endangered	–	–	–
Vulnerable	1	1	1
Threatened fauna species			
Critically endangered	–	1	1
Endangered	1	1	1
Vulnerable	1	2	2
Migratory fauna species			
Migratory (marine)	–	1	–
Migratory (terrestrial)	–	–	–
Migratory (wetland)	–	–	–
Total records	**3**	**6**	**5**

3.2.3 Threatened ecological communities

Broad Leaf Tea-tree (Melaleuca viridiflora) woodlands in high rainfall coastal north Queensland is the only TEC that was revealed by the PMST as potentially occurring within corridor option investigation areas. A map of the predicted distribution of the Broad Leaf Tea-tree TEC is presented in Appendix H. The 'likely' and 'may' occur categories of the TEC's distribution is based upon Queensland Government regional ecosystem mapping. No other TECs were revealed by the PMST.

The likely to occur category has been assigned to the following regional ecosystems of the Wet Tropics and Central Mackay Coast Bioregions, including:

- 7.3.8a – Floodplain (other than floodplain wetlands). *Melaleuca viridiflora* open forest to open woodland. Includes areas of natural invasion onto former grasslands. Alluvial plains.
- 7.3.8b – Floodplain (other than floodplain wetlands). *Melaleuca viridiflora* open forest to open woodland with eucalypt emergents (or sparse eucalypt overstorey) of species such as *Corymbia clarksoniana*, *Eucalyptus platyphylla*, *Lophostemon suaveolens* and *E. drepanophylla*. Poorly drained alluvium, mostly on the coastal plains.
- 7.3.8c – Floodplain (other than floodplain wetlands). *Melaleuca viridiflora* and *Lophostemon suaveolens* open forest to woodland. Poorly drained soils of coastal lowlands.
- 7.3.8d – Floodplain (other than floodplain wetlands). Melaleuca viridiflora, *Lophostemon suaveolens* and *Allocasuarina littoralis* open shrubland. Poorly drained soils of coastal lowlands.
- 7.5.4g – Floodplain (other than floodplain wetlands). *Melaleuca viridiflora* woodland. Laterite.
- 8.3.2 – *Melaleuca viridiflora* woodland on seasonally inundated alluvial plains with impeded drainage
- 8.5.2a – *Melaleuca viridiflora* var. *viridiflora* open woodland to open forest (5–20 m tall). Poorly drained, duplex soils with a sandy surface.
- 8.5.2c – *Melaleuca viridiflora* var. *viridiflora* and *M. nervosa* open woodland to open forest. Occurs on Tertiary sand plains on gently undulating plains of lowlands, dissected by many incised streams.
- 8.5.6 – *Melaleuca viridiflora* +/- *Allocasuarina littoralis* woodland on Tertiary sand plains.

None of the above listed regional ecosystems occur in the three corridor investigation areas.

The Broad Leaf Tea-tree TEC may also occur category within regional ecosystems on Land Zones 3 and 5 of the Wet Tropics and Central Mackay Coast Bioregions. However, based upon the regional ecosystem mapping, it has been determined there is a low possibility of the Broad Leaf Tea-tree TEC occurring in the corridor investigation areas.

3.3 Wet Tropics of Queensland – World, National and Indigenous Heritage properties

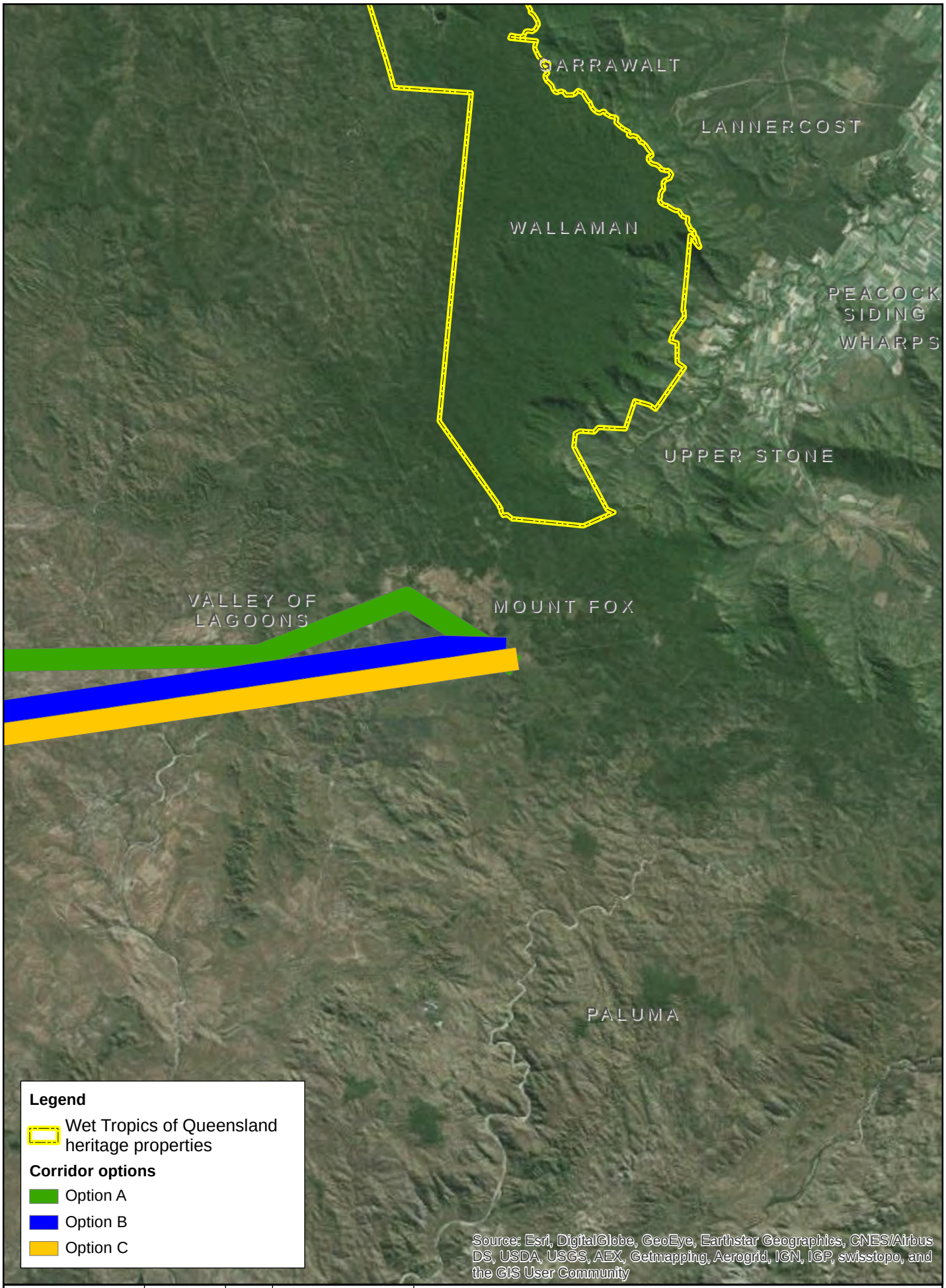
The Wet Tropics of Queensland World Heritage properties were inscribed on the World Heritage List in 1988. It was then included in the National Heritage List on 21 May 2007, as one of the one of 15 World Heritage places of Australia. On 9 November 2012 the Australian Government announced the inclusion of the national Indigenous heritage values, as part of the existing National Heritage Listing for the Wet Tropics of Queensland. A distribution map for the Wet Tropics of Queensland heritage properties, is presented in Appendix I.

None of corridor investigation areas intersect the Wet Tropics of Queensland heritage properties, as shown on Figure 3.65.

The distance of the Wet Tropics of Queensland heritage properties from each corridor investigation area is presented in Table 3.14. Based upon the distances from each corridor investigation area, the Project would be unlikely to indirectly impact the Wet Tropics of Queensland heritage properties. However this would need to be assessed in greater detail during the next phase of the Project.

Table 3.14 Distance of each corridor option from the Wet Tropics of Queensland heritage properties

OPTION	DISTANCE FROM WET TROPICS OF QUEENSLAND HERITAGE PROPERTIES (KM)
Option A	**4.8**
Option B	**5.2**
Option C	**5.6**



Map: 2270434A_GIS_E004_A3	Author: VD		
Date: 12/12/2016	Approved by: RH		

Data source: World heritage areas from Department of Environment and Heritage Protection (2016)

0 1,500 3,000 m

1:220,000

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A4

\\APBNEFIL03\proj\P\Powerlink_QLD\2270434A_KIDSTON_POWER_TRANSMISSION_LI\10_GIS\Projects\Maps\2270434A_GIS_E004_A3.mxd

Power Kidston Transmission Line
Figure 3.65
Wet Tropics of Queensland heritage properties

WSP | PARSONS BRINCKERHOFF

4 PRELIMINARY ADVICE

4.1 Ecological constraints

The least amount of ecological constraints (MNES and MSES) are primarily associated with Option C, with Option B being the next preferred option with a moderate amount of ecological constraints, and Option A with the greatest amount of ecological constraints, as listed in Table 4.1.

Table 4.1 Summary of ecological constraint rankings for each corridor option

ECOLOGICAL CONSTRAINT	CONSTRAINT RANKINGS		
	Option A	Option B	Option C
Matters of State Environmental Significance			
NC Act threatened species records (numbers)	2	4	5
Regulated of concern dominant vegetation (ha)	2,059	1,819	1,519
Regulated of concern sub-dominant vegetation (ha)	1,008	442	334
Regulated of high value regrowth vegetation (ha)	3.6	2.4	2.4
Regulated Category R regrowth vegetation (ha)	422	296	257
Mapped of concern dominant regional ecosystems (ha)	1,008	442	334
Mapped of concern dominant regional ecosystems (ha)	2,059	1,891	1,519
Predicted of concern dominant woody vegetation (ha)	1,535	1,460	1,223
Predicted of concern sub-dominant woody vegetation (ha)	549	295	618
Potential of concern dominant woody vegetation (ha)	240	344	431
Potential of concern sub-dominant woody vegetation (ha)	364	87	37
Regulated remnant watercourse Wet Tropics bioregion (ha)	118	50	45
Regulated remnant watercourse vegetation Einasleigh Uplands bioregion (ha)	5,585	5,547	5,493
Regulated remnant wetland vegetation (ha)	4.7	42.3	27.7
Protected areas (ha)	658	214	145
Wildlife habitats (ha)	522	411	385
High ecological significance (HES) wetlands (ha)	0	1.1	0
Matters of National Environmental Significance			
Threatened and migratory species records (numbers)	3	6	5
Proximity to Wet Tropics of Queensland heritage properties (km)	4.8	5.2	5.6

Table 4.1 clearly indicates that Option C would result in the least amount of impact upon MNES and MSES and would be the corridor of least ecological constraint for the Project. It also clearly indicates that Option A has the greatest amount of ecological constraint, while Option B has a moderate amount of ecological constraint, which overall is not much greater than Option C.

4.2 Flora and fauna surveys

As part of the next phase of the Project, it would be necessary to undertake field surveys to verify the presence and extent of the ecological constraints outlined in Table 4.1.

Targeted flora and fauna surveys may identify ecological constraints that have not been identified by this desktop assessment. For example, the threatened species records are representative of the limited amount of ecological investigations that have been conducted across the relevant bioregions, in particular the Einasleigh Uplands bioregion. This reflects the remoteness of the corridor investigation areas where there is a low amount of large developments that require ecological investigations and environmental approvals. It is possible that targeted surveys for the Project may identify threatened species and supporting habitats that have not yet been recorded and formerly placed on the DSITI and ALA records databases.

4.3 Regional ecosystem verification

Vegetation surveys would be required for the Project to verify DNRM mapped regional ecosystems. It is often the case that DNRM regional ecosystem mapping can be inaccurate at a project scale. This is a function of both scale and availability of field verified vegetation survey data.

The remote sensing analysis of woody vegetation, completed by Virtual GIS, has used a similar methodology as that used by the Queensland Herbarium. It is useful in terms of identifying areas potentially containing of concern dominant and sub-dominant regional ecosystems. However, it too can be expected to have a certain amount of inaccuracy compared to what may be revealed by field verification surveys.

4.4 Significant impact assessments for MNES

Of the MNES assessed, threatened and/or migratory species are the only MNES of relevance to the three corridor options. On the other hand, MNES such as threatened ecological communities, world and national heritage properties, nationally important wetlands and the Great Barrier Reef, have been assessed as not being relevant to the three corridor options.

Under the requirements of the EPBC Act, significant impact assessments in accordance with the *Matters of National Environmental Significance: Significant impact guidelines 1.1* (2013), would need to be applied to MNES that are recorded or considered likely occurrences in areas that may be subject to project related impacts. These significant impact assessments may be required for the threatened species listed under the EPBC Act, for which records have been revealed by this assessment, including:

- Curlew Sandpiper (*Calidris ferruginea*) – Critically endangered
- White-throated Needletail (*Hirundapus caudacutus*) – Migratory (terrestrial)
- Greater Glider (*Petauroides volans*) – Vulnerable
- Sharman's Rock-wallaby (*Petrogale sharmani*) – Vulnerable
- Koala (*Phascolarctos cinereus*) – Vulnerable
- Southern Black-throated Finch (*Poephila cincta cincta*) – Endangered
- Bluegrass (*Dichanthium setosum*) – Vulnerable.

It is possible that field surveys may identify other MNES that may also require significant impacts assessments. It is recommended that significant impacts assessments be prepared in respect to predicted project impacts for the yet to be selected corridor option. The design process for the preferred option transmission line will consider opportunities to avoid or minimise impacts upon MNES. This would also be coupled with mitigation strategies to mitigate any potential impacts upon MNES, thus reducing the overall risk and extent (ha) of residual impacts upon the relevant MNES.

The outcomes of the significant impact assessments should identify whether the Project should referral is required for or not. The significant impact assessments would also identify any potential environmental offsets for the Project under the Department of the Environment and Energy's *EPBC Act Environmental Offsets Policy* (2012).

4.5 Queensland – Significant residual impact assessments for MSES

In accordance with Queensland Government's *Environmental Offsets Policy version 1.1* (2014), potential impacts upon MSES need to be applied in accordance with either the Department of Environment and Heritage Protection's *Significant Residual Impact Guideline* (2014), or the Department of Development, Infrastructure and Planning's *Significant Residual Impact Guideline* (2014), which would be dependent on the approval pathway for the Project. It is important to note that significant impact assessments for an MNES that is also an MSES are not required under the Queensland Government framework.

In reference to this assessment the MSES that are likely to require significant residual impact assessments, include:

- threatened species, including:
  - *Acacia tingoorensis* – Vulnerable
- regulated vegetation, including:
  - of concern regional ecosystems
  - of concern high value regrowth (to be confirmed as to why it is in the regulated vegetation layer)
  - category R regrowth vegetation (approval pathway dependant)
  - remnant watercourse vegetation
- protected areas
- wildlife habitats
- high ecological significance
- connectivity.

Depending on the outcomes of the significant residual impact assessments, some if not all of the above MSES, may require environmental offsets to compensate for project related residual impacts.

Once a preferred corridor option is selected and project impact area(s) are defined, the significant residual impact upon connectivity may also need to be assessed using the Landscape Fragmentation and Connectivity tool.

4.6 Summary

This initial desktop assessment and preliminary ecological constraints advice has identified Corridor Option C as containing the least amount of ecological constraints for the proposed power transmission line project.

This initial desktop assessment has identified the MNES and MSES that are of potential relevance to the Project and has provided an indication of the next steps that may be required for the Project if it is to proceed to the EIS or other approval pathway stage. Potential environmental offset commitments under Commonwealth and State environmental offset policies have also been identified.

Once a preferred corridor option is selected by the Corridor Options Report and predicted project related impacts are understood and tangible, it is recommended that Powerlink and/or Genex consider preparing significant impact assessments for MNES to determine whether an EPBC Act referral is required.

In addition, significant impact assessments (MNES) and significant residual impact assessments (MSES) should be instrumental in identifying the potential Commonwealth and State environmental offset requirements, and an approach to Commonwealth and State environmental offsets delivery.

Appendix A

PROTECTED MATTERS SEARCH TOOL

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

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

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

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

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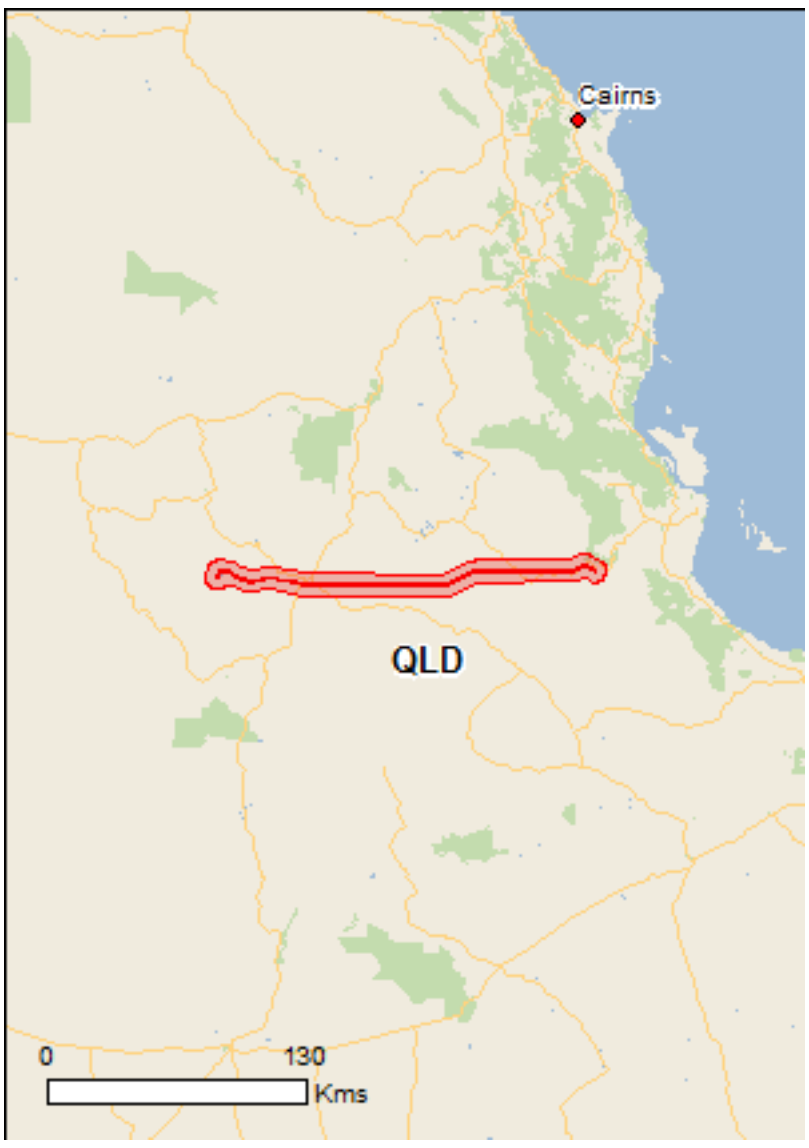
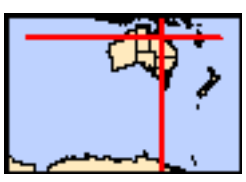


This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates
Buffer: 5.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	1
National Heritage Places:	2
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	33
Listed Migratory Species:	15

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	22
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

State and Territory Reserves:	4
Regional Forest Agreements:	None
Invasive Species:	22
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

World Heritage Properties		[Resource Information]
Name	State	Status
Wet Tropics of Queensland	QLD	Declared property

National Heritage Properties		[Resource Information]
Name	State	Status
Natural		
Wet Tropics of Queensland	QLD	Listed place
Indigenous		
Wet Tropics World Heritage Area (Indigenous Values)	QLD	Within listed place

Listed Threatened Ecological Communities		[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Broad leaf tea-tree (Melaleuca viridiflora) woodlands in high rainfall coastal north Queensland	Endangered	Community may occur within area

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Casuarius casuarius johnsonii		
Southern Cassowary, Australian Cassowary, Double-wattled Cassowary [25986]	Endangered	Species or species habitat known to occur within area
Erythrotriorchis radiatus		
Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Erythrura gouldiae		
Gouldian Finch [413]	Endangered	Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Poephila cincta cincta		
Southern Black-throated Finch [64447]	Endangered	Species or species habitat known to occur within area
Rostratula australis		
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Tyto novaehollandiae kimberli		
Masked Owl (northern) [26048]	Vulnerable	Species or species habitat likely to occur within area
Frogs		

Name	Status	Type of Presence
Litoria dayi Australian Lace-lid, Lace-eyed Tree Frog [86707]	Endangered	Species or species habitat likely to occur within area
Litoria nannotis Waterfall Frog, Torrent Tree Frog [1817]	Endangered	Species or species habitat may occur within area
Litoria rheocola Common Mistfrog [1802]	Endangered	Species or species habitat likely to occur within area
Mammals		
Dasyurus hallucatus Northern Quoll, Digul [331]	Endangered	Species or species habitat likely to occur within area
Dasyurus maculatus gracilis Spotted-tailed Quoll (North Queensland), Yarri [64475]	Endangered	Species or species habitat likely to occur within area
Hipposideros semoni Semon's Leaf-nosed Bat, Greater Wart-nosed Horseshoe-bat [180]	Endangered	Species or species habitat may occur within area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area
Mesembriomys gouldii rattoides Black-footed Tree-rat (north Queensland), Shaggy Rabbit-rat [87620]	Vulnerable	Species or species habitat likely to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Petrogale sharmani Mount Claro Rock Wallaby, Sharman's Rock Wallaby [59281]	Vulnerable	Species or species habitat known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pteropus conspicillatus Spectacled Flying-fox [185]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Rhinolophus robertsi Large-eared Horseshoe Bat, Greater Large-eared Horseshoe Bat [87639]	Endangered	Species or species habitat likely to occur within area
Saccolaimus saccolaimus nudicluniatus Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889]	Critically Endangered	Species or species habitat likely to occur within area
Plants		
Acacia crombiei Pink Gidgee [10927]	Vulnerable	Species or species habitat may occur within area
Bulbophyllum globuliforme Miniature Moss-orchid, Hoop Pine Orchid [6649]	Vulnerable	Species or species habitat likely to occur within area
Cajanus mareebensis [8635]	Endangered	Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Lindsaea pulchella var. blanda [20842]	Vulnerable	Extinct within area
Marsdenia brevifolia [64585]	Vulnerable	Species or species habitat likely to occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat likely to occur within area
Tephrosia leveillei [16946]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area
Lerista vittata Mount Cooper Striped Lerista [1308]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Marine Species		
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat likely to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Anseranas semipalmata		
Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Cuculus saturatus		
Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat known to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Reptiles		
Crocodylus johnstoni Freshwater Crocodile, Johnston's Crocodile, Johnston's River Crocodile [1773]		Species or species habitat may occur within area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Girringun	QLD
Girringun	QLD
Liefway	QLD
Newcastle Range-The Oaks	QLD

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Plants		
Acacia nilotica subsp. indica Prickly Acacia [6196]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Poison Lake	QLD

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-18.87024 144.1472,-18.87927 144.1471,-18.87901 144.1329,-18.87735 144.13,-18.87434 144.129,-18.8443 144.1393,-18.84225 144.1411,-18.84156 144.1438,-18.84368 144.1898,-18.8636 144.2184,-18.88303 144.2839,-18.87004 144.3748,-18.8979 144.5356,-18.90103 145.1652,-18.84323 145.2928,-18.83884 145.7251,-18.81633 145.7881,-18.84454 145.8358,-18.85216 145.8307,-18.82587 145.7873,-18.84778 145.7269,-18.85223 145.2943,-18.90995 145.1673,-18.90686 144.5343,-18.87912 144.375,-18.89211 144.2828,-18.87187 144.2145,-18.85232 144.1863,-18.85101 144.1469,-18.87014 144.1403,-18.87024 144.1472

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Parks and Wildlife Commission NT, Northern Territory Government
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

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

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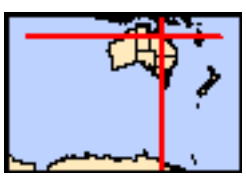
Coordinates
Buffer: 5.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	33
Listed Migratory Species:	16

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	23
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

State and Territory Reserves:	4
Regional Forest Agreements:	None
Invasive Species:	22
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Broad leaf tea-tree (Melaleuca viridiflora) woodlands in high rainfall coastal north Queensland	Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Casuarius casuarius johnsonii Southern Cassowary, Australian Cassowary, Double-wattled Cassowary [25986]	Endangered	Species or species habitat known to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
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Petrogale sharmani Mount Claro Rock Wallaby, Sharman's Rock Wallaby [59281]	Vulnerable	Species or species habitat known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pteropus conspicillatus Spectacled Flying-fox [185]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Rhinolophus robertsi Large-eared Horseshoe Bat, Greater Large-eared Horseshoe Bat [87639]	Endangered	Species or species habitat known to occur within area
Saccolaimus saccolaimus nudicluniatus Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889]	Critically Endangered	Species or species habitat likely to occur within area
Plants		
Acacia crombiei Pink Gidgee [10927]	Vulnerable	Species or species habitat may occur within area
Bulbophyllum globuliforme Miniature Moss-orchid, Hoop Pine Orchid [6649]	Vulnerable	Species or species habitat may occur within area
Cajanus mareebensis [8635]	Endangered	Species or species habitat likely to occur within area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Lindsaea pulchella var. blanda [20842]	Vulnerable	Extinct within area

Name	Status	Type of Presence
Marsdenia brevifolia [64585]	Vulnerable	Species or species habitat likely to occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat likely to occur within area
Tephrosia leveillei [16946]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area
Lerista vittata Mount Cooper Striped Lerista [1308]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Marine Species		
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Migratory Wetlands Species		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
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Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area
Reptiles		
Crocodylus johnstoni Freshwater Crocodile, Johnston's Crocodile, Johnston's River Crocodile [1773]		Species or species habitat may occur within area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Girringun	QLD
Girringun	QLD
Liefway	QLD
Newcastle Range-The Oaks	QLD

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Plants		
Acacia nilotica subsp. indica Prickly Acacia [6196]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

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Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Parks and Wildlife Commission NT, Northern Territory Government
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

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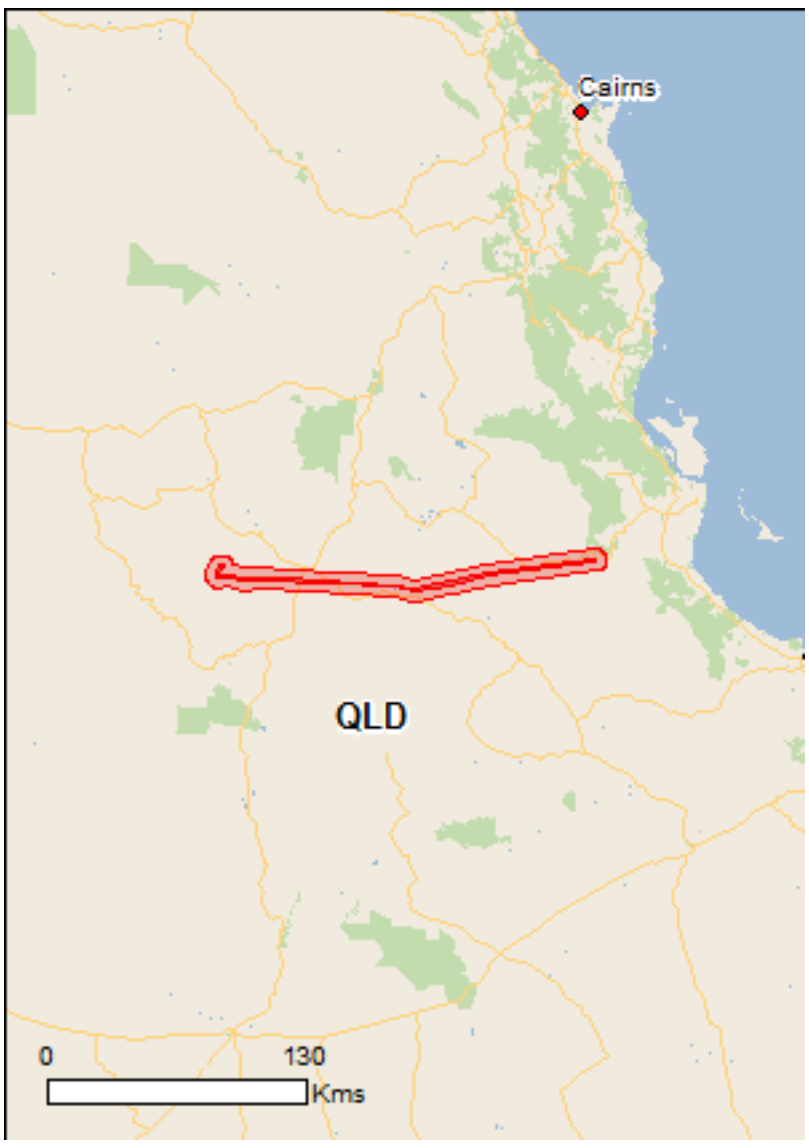

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Coordinates
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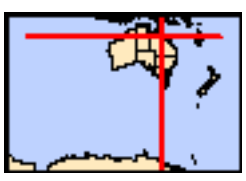

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Acacia crombiei Pink Gidgee [10927]	Vulnerable	Species or species habitat may occur within area
Bulbophyllum globuliforme Miniature Moss-orchid, Hoop Pine Orchid [6649]	Vulnerable	Species or species habitat may occur within area
Cajanus mareebensis [8635]	Endangered	Species or species habitat likely to occur within area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Lindsaea pulchella var. blanda [20842]	Vulnerable	Extinct within area

Name	Status	Type of Presence
Marsdenia brevifolia [64585]	Vulnerable	Species or species habitat likely to occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat likely to occur within area
Tephrosia leveillei [16946]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat may occur within area
Lerista vittata Mount Cooper Striped Lerista [1308]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Marine Species		
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Migratory Wetlands Species		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area
Reptiles		
Crocodylus johnstoni Freshwater Crocodile, Johnston's Crocodile, Johnston's River Crocodile [1773]		Species or species habitat may occur within area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Girringun	QLD
Girringun	QLD
Liefway	QLD
Newcastle Range-The Oaks	QLD

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Acacia nilotica subsp. indica Prickly Acacia [6196]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-18.87006 144.148,-18.8791 144.148,-18.87909 144.1369,-18.90823 144.1233,-18.91321 144.1231,-18.91545 144.1259,-18.90989 144.1736,-18.92307 144.2417,-18.92151 144.3212,-18.92745 144.4211,-18.92693 144.4254,-18.92767 144.4255,-18.95179 144.9292,-18.97166 145.0154,-18.90435 145.3466,-18.84082 145.8332,-18.84976 145.8346,-18.91328 145.348,-18.95105 145.1765,-18.98079 145.0149,-18.96079 144.9283,-18.93055 144.3214,-18.93213 144.2409,-18.91898 144.1732,-18.9246 144.1236,-18.91696 144.1138,-18.90601 144.114,-18.87068 144.1314,-18.87006 144.148

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Parks and Wildlife Commission NT, Northern Territory Government
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Appendix B

PROTECTED MATTERS SEARCH TOOL – OPTIONS COLLATED

PMST results for each Corridor Option

MNES Category	Scientific name	Common name	Status	Option A	Option B	Option C
TECs	Broad leaf tea-tree (*Melaleuca viridiflora*) woodlands in high rainfall coastal north Queensland		E	x	x	x
Threatened species						
Birds	*Calidris ferruginea*	Curlew Sandpiper	CE (M)	x	x	x
	Casuarius casuarius johnsonii	Southern Cassowary	E	x	x	x
	Erythrotriorchis radiatus	Red Goshawk	V	x	x	x
	Erythrura gouldiae	Gouldian Finch	E	x	x	x
	Numenius madagascariensis	Eastern Curlew	CE	x	x	x
	Poephila cincta cincta	Southern Black-throated Finch	E	x	x	x
	Rostratula australis	Australian Painted Snipe	E	x	x	x
	Tyto novaehollandiae kimberli	Masked Owl (northern)	V	x	x	x
Frogs	*Litoria dayi*	Australian Lace-lid	E	x	x	x
	Litoria nannotis	Waterfall Frog	E	x	x	x
	Litoria rheocola	Common Mistfrog	E	x	x	x
Mammals	*Dasyurus hallucatus*	Northern Quoll	E	x	x	x
	Dasyurus maculatus gracilis	Spotted-tailed Quoll (North Queensland)	E	x	x	x
	Hipposideros semoni	Semon's Leaf-nosed Bat	E	x	x	x
	Macroderma gigas	Ghost Bat	V	x	x	x
	Mesembriomys gouldii rattoides	Black-footed Tree-rat (north Queensland)	V	x	x	x
	Petauroides volans	Greater Glider	V	x	x	x
	Petrogale sharmani	Mount Claro Rock Wallaby	V	x	x	x
	Phascolarctos cinereus	Koala	V	x	x	x
	Pteropus conspicillatus	Spectacled Flying-fox	V	x	x	x
	Pteropus poliocephalus	Grey-headed Flying-fox	V	x	x	x
	Rhinolophus robertsi	Large-eared Horseshoe Bat	E	x	x	x
	Saccolaimus saccolaimus nudicluniatus	Bare-rumped Sheath-tailed Bat	CE	x	x	x
Plants	*Acacia crombiei*	Pink Gidgee	V	x	x	x
	Bulbophyllum globuliforme	Miniature Moss-orchid	V	x	x	x
	Cajanus mareebensis		E	x	x	x
	Dichanthium setosum	Bluegrass	V	x	x	x
	Lindsaea pulchella var. blanda		V	x	x	x
	Marsdenia brevifolia		V	x	x	x
	Phaius australis	Lesser Swamp-orchid	E	x	x	x
	Tephrosia leveillei		V	x	x	x
Reptiles	*Egernia rugosa*	Yakka Skink	V	x	x	x
	Lerista vittata	Mount Cooper Striped Lerista	V	x	x	x
Migratory (marine)	*Apus pacificus*	Fork-tailed Swift	M	x	x	x
Migratory (terrestrial)	*Cuculus optatus*	Oriental Cuckoo	M	x	x	x
	Hirundapus caudacutus	White-throated Needletail	M	x	x	x
	Hirundo rustica	Barn Swallow	M	x	x	x
	Monarcha melanopsis	Black-faced Monarch	M	x	x	x
	Monarcha trivirgatus	Spectacled Monarch	M	x	x	x
	Motacilla cinerea	Grey Wagtail	M	x	x	x
	Motacilla flava	Yellow Wagtail	M	x	x	x
	Myiagra cyanoleuca	Satin Flycatcher	M	x	x	x
	Rhipidura rufifrons	Rufous Fantail	M	x	x	x
Migratory (wetland)	*Calidris ferruginea*	Curlew Sandpiper	M (CE)	x	x	x
	Gallinago hardwickii	Latham's Snipe	M	x	x	x
	Numenius madagascariensis	Eastern Curlew	M (CE)	x	x	x
	Pandion haliaetus	Osprey	M	x	x	x
	Tringa nebularia	Common Greenshank	M	-	x	x

Other MNES	Option A	Option B	Option C
World Heritage properties - Wet Tropics of Queensland	x	-	-
National Heritage properties (natural) - Wet Tropics of Queensland	x	-	-
National Heritage properties (indigenous) - Wet Tropics World Heritage Area (Indigenous Values)	x	-	-

Appendix C

WILDLIFE ONLINE SEARCHES

Search Crit Species List for a Specified Point

Species:	All
Type:	Native
Status:	All
Records:	All
Date:	All
Latitude:	-18.8813
Longitude:	144.1254
Distance:	18
Email:	datov@pbworld.com
Date submitted:	Tuesday 08 Nov 2016 13:49:02
Date extracted:	Tuesday 08 Nov 2016 13:50:03

The number of records retrieved = 287

Disclaimer

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and costs you may incur as a result of the information being inaccurate or incomplete in any way for any reason.

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Description of the CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the Nature Conservation Act 1992. The codes are Extinct in the Wild (PE) Endangered (E) Vulnerable (V) Near Threatened (NT) Least Concern (C) or Not Protected ( ).

A - Indicates the Australian conservation status of each taxon under the Environment Protection and Biodiversity Conservation Act 1999. The values of EPBC are Conservation Dependent (CD) Critically Endangered (CE) Endangered (E) Extinct (EX)

Records – The first number indicates the total number of reco Confirmed or Specimens).
The second number located after the / indicates the number of specimen records for the taxon.

Kingdom	Class	Family	Scientific Name	Common Name	NC Act	EPBC Act	Sighting Re	Specimen Records
plants	cycads	Cycadaceae	Cycas cairnsiana		V	V	5	5

Search Crit Species List for a Specified Point

Species:	All
Type:	Native
Status:	All
Records:	All
Date:	All
Latitude:	-18.9068
Longitude:	144.3146
Distance:	18
Email:	datov@pbworld.com
Date submitted:	Tuesday 08 Nov 2016 13:49:26
Date extracted:	Tuesday 08 Nov 2016 13:50:11

The number of records retrieved = 167

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Records – The first number indicates the total numb Confirmed or Specimens).
The second number located after the / indicates the number of specimen records for the taxon.

Kingdom	Class	Family	Scientific Name	Common Name	NC Act	EPBC Act	Sighting Re	Specimen Records
animals	birds	Estrildidae	Poephila cincta cincta	black-throated finch (white-rumped subspecies)	E	E	3	0

Search Criteria: Species List for a Specified Point

Species:	All
Type:	Native
Status:	All
Records:	All
Date:	All
Latitude:	-18.9175
Longitude:	144.5056
Distance:	18
Email:	datov@pbworld.com
Date submitted:	Tuesday 08 Nov 2016 13:49:45
Date extracted:	Tuesday 08 Nov 2016 13:50:07

The number of records retrieved = 353

Disclaimer

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Records – The first number indicates the total number of rec Confirmed or Specimens).
The second number located after the / indicates the number of specimen records for the taxon.

Kingdom	Class	Family	Scientific Name	Common Name	NC Act	EPBC Act	Sighting Re	Specimen Records
animals	birds	Estrildidae	Poephila cincta cincta	black-throated finch (white-rumped subspecies)	E	E	5	0
animals	mammals	Muridae	Mesembriomys gouldii	black-footed tree-rat	C	V	1	0
animals	mammals	Tachyglossidae	Tachyglossus aculeatus	short-beaked echidna	SL		1	0

Search Crit Species List for a Specified Point

Species:	All
Type:	Native
Status:	All
Records:	All
Date:	All
Latitude:	-18.9253
Longitude:	144.697
Distance:	18
Email:	datov@pbworld.com
Date submitted:	Tuesday 08 Nov 2016 13:50:05
Date extracted:	Tuesday 08 Nov 2016 14:00:43

The number of records retrieved = 198

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A - Indicates the Australian conservation status of each taxon under the Environment Protection and Biodiversity Conservation Act 1999. The values of EPBC are Conservation Dependent (CD) Critically Endangered (CE) Endangered (E) Extinct (EX)

Records – The first number indicates the total number of rec Confirmed or Specimens).
The second number located after the / indicates the number of specimen records for the taxon.

Kingdom	Class	Family	Scientific Name	Common Name	NC Act	EPBC Act	Sighting Re	Specimen Records
animals	birds	Estrildidae	Poephila cincta cincta	black-throated finch (white-rumped subspecies)	E	E	2	0

Search Crit Species List for a Specified Point

Species:	All
Type:	Native
Status:	All
Records:	All
Date:	All
Latitude:	-18.9309
Longitude:	144.8886
Distance:	18
Email:	datov@pbworld.com
Date submitted:	Tuesday 08 Nov 2016 13:50:31
Date extracted:	Tuesday 08 Nov 2016 14:00:17

The number of records retrieved = 347

Disclaimer

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Records – The first number indicates the total number of recc Confirmed or Specimens).
The second number located after the / indicates the number of specimen records for the taxon.

Kingdom	Class	Family	Scientific Name	Common Name	NC Act	EPBC Act	Sighting Re	Specimen Records
animals	birds	Estrildidae	Erythrura gouldiae	Gouldian finch	E	E	1	0
animals	birds	Estrildidae	Poephila cincta cincta	black-throated finch (white-rumped subspecies)	E	E	2	0
animals	birds	Laridae	Hydroprogne caspia	Caspian tern	SL		1	0
animals	birds	Scolopacidae	Calidris ruficollis	red-necked stint	SL		1	0

Search Criteria: Species List for a Specified Point

Species:	All
Type:	Native
Status:	All
Records:	All
Date:	All
Latitude:	-18.9345
Longitude:	145.0795
Distance:	18
Email:	datov@pbworld.com
Date submitted:	Tuesday 08 Nov 2016 13:50:54
Date extracted:	Tuesday 08 Nov 2016 14:00:10

The number of records retrieved = 335

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I - Y indicates that the taxon is introduced to Queensland and has naturalised.

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Records – The first number indicates the total number of reco Confirmed or Specimens).
The second number located after the / indicates the number of specimen records for the taxon.

Kingdom	Class	Family	Scientific Name	Common Name	NC Act	EPBC Act	Sighting Re	Specimen Records
animals	birds	Estrildidae	Poephila cincta cincta	black-throated finch (white-rumped subspecies)	E	E	1	0
animals	birds	Estrildidae	Erythrura gouldiae	Gouldian finch	E	E	1	0
animals	birds	Laridae	Hydroprogne caspia	Caspian tern	SL		1	0
animals	birds	Rhipiduridae	Rhipidura rufifrons	rufous fantail	SL		1	0
animals	birds	Scolopacidae	Calidris ruficollis	red-necked stint	SL		1	0
plants	higher dicots	Myrtaceae	Leptospermum pallidum		NT		5	5
plants	higher dicots	Sapindaceae	Arytera dictyoneura		NT		1	1
plants	monocots	Poaceae	Lepturus minutus		V		1	1

Search Crit Species List for a Specified Point

Species:	All
Type:	Native
Status:	All
Records:	All
Date:	All
Latitude:	-18.8973
Longitude:	145.2662
Distance:	18
Email:	datov@pbworld.com
Date submitted:	Tuesday 08 Nov 2016 13:51:19
Date extracted:	Tuesday 08 Nov 2016 14:00:46

The number of records retrieved = 89

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Records – The first number indicates the total number of recc Confirmed or Specimens).
The second number located after the / indicates the number of specimen records for the taxon.

Kingdom	Class	Family	Scientific Name	Common Name	NC Act	EPBC Act	Sighting Re	Specimen Records
animals	birds	Rhipiduridae	Rhipidura rufifrons	rufous fantail	SL		1	0
plants	higher dicots	Apiaceae	Oenanthe javanica		NT		1	1
plants	higher dicots	Sapindaceae	Arytera dictyoneura		NT		1	1

Search Crit Species List for a Specified Point

Species:	All
Type:	Native
Status:	All
Records:	All
Date:	All
Latitude:	-18.8737
Longitude:	145.4555
Distance:	18
Email:	datov@pbworld.com
Date submitted:	Tuesday 08 Nov 2016 13:51:40
Date extracted:	Tuesday 08 Nov 2016 14:00:49

The number of records retrieved = 95

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Records – The first number indicates the total number of recor Confirmed or Specimens).
The second number located after the / indicates the number of specimen records for the taxon.

Kingdom	Class	Family	Scientific Name	Common Name	NC Act	EPBC Act	Sighting Re	Specimen Records
animals	birds	Apodidae	Hirundapus caudacutus	white-throated needletail	SL		1	0
animals	mammals	Phascolarctidae	Phascolarctos cinereus	koala	V	V	1	0
animals	mammals	Tachyglossidae	Tachyglossus aculeatus	short-beaked echidna	SL		1	0
plants	higher dicots	Apiaceae	Oenanthe javanica		NT		1	1

Search Crit Species List for a Specified Point

Species:	All
Type:	Native
Status:	All
Records:	All
Date:	All
Latitude:	-18.8581
Longitude:	145.6465
Distance:	18
Email:	datov@pbworld.com
Date submitted:	Tuesday 08 Nov 2016 13:52:00
Date extracted:	Tuesday 08 Nov 2016 14:00:03

The number of records retrieved = 508

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Records – The first number indicates the total number of rec Confirmed or Specimens).
The second number located after the / indicates the number of specimen records for the taxon.

Kingdom	Class	Family	Scientific Name	Common Name	NC Act	EPBC Act	Sighting Re	Specimen Records
animals	birds	Apodidae	Hirundapus caudacutus	white-throated needletail	SL		1	0
animals	birds	Monarchidae	Symposiachrus trivirgatus	spectacled monarch	SL		1	0
animals	mammals	Macropodidae	Petrogale sharmani	Sharman's rock-wallaby	V	V	34	30
animals	mammals	Phascolarctidae	Phascolarctos cinereus	koala	V	V	2	0
animals	mammals	Pseudocheiridae	Petauroides volans minor	northern greater glider	C	V	1	0
plants	higher dicots	Mimosaceae	Acacia tingoorensis		V		4	4
plants	monocots	Orchidaceae	Corybas cerasinus		NT		2	2

Search Crit Species List for a Specified Point

Species:	All
Type:	Native
Status:	All
Records:	All
Date:	All
Latitude:	-18.8445
Longitude:	145.8358
Distance:	18
Email:	datov@pbworld.com
Date submitted:	Tuesday 08 Nov 2016 13:52:20
Date extracted:	Tuesday 08 Nov 2016 14:00:14

The number of records retrieved = 615

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Records – The first number indicates the total number of reco Confirmed or Specimens).
The second number located after the / indicates the number of specimen records for the taxon.

Kingdom	Class	Family	Scientific Name	Common Name	NC Act	EPBC Act	Sighting Re	Specimen Records
animals	birds	Cacatuidae	Calyptorhynchus lathami erebus	glossy black-cockatoo (northern)	V		1	0
animals	birds	Casuariidae	Casuarius casuarius johnsonii (southern population)	southern cassowary (southern population)	E	E	2	0
animals	birds	Cuculidae	Cuculus optatus	oriental cuckoo	SL		1	0
animals	birds	Monarchidae	Monarcha melanopsis	black-faced monarch	SL		20	0
animals	birds	Monarchidae	Symposiachrus trivirgatus	spectacled monarch	SL		32	0
animals	birds	Rhipiduridae	Rhipidura rufifrons	rufous fantail	SL		9	0
animals	mammals	Macropodidae	Petrogale sharmani	Sharman's rock-wallaby	V	V	34	30
animals	mammals	Petauridae	Petaurus gracilis	mahogany glider	E	E	15	0
animals	mammals	Phascolarctidae	Phascolarctos cinereus	koala	V	V	3	0
animals	mammals	Pseudocheiridae	Petauroides volans minor	northern greater glider	C	V	1	0
plants	higher dicots	Apiaceae	Oenanthe javanica		NT		1	1
plants	higher dicots	Asteraceae	Glossocardia orthochaeta		E		1	1
plants	higher dicots	Mimosaceae	Acacia tingoorensis		V		4	4
plants	higher dicots	Myrtaceae	Corymbia leptoloma		V	V	1	1
plants	monocots	Orchidaceae	Corybas cerasinus		NT		2	2

Appendix D

WILDLIFE ONLINE DATA COLLATION

Wildlife Online data combined for records searches

Class	Scientific Name	Common Name	NC Act	EPBC Act
Birds	*Calidris ruficollis*	Red-necked Stint	SL	M
Birds	*Calyptorhynchus lathami erebus*	Glossy Black-cockatoo (northern)	V	-
Birds	*Casuarius casuarius johnsonii* (southern population)	Southern Cassowary (southern population)	E	E
Birds	*Cuculus optatus*	Oriental cuckoo	SL	M
Birds	*Erythrura gouldiae*	Gouldian Finch	E	E
Birds	*Hirundapus caudacutus*	White-throated Needletail	SL	M
Birds	*Hydroprogne caspia*	Caspian Tern	SL	M
Birds	*Monarcha melanopsis*	Black-faced Monarch	SL	M
Birds	*Poephila cincta cincta*	Black-throated Finch (white-rumped subspecies)	E	E
Birds	*Rhipidura rufifrons*	Rufous Fantail	SL	M
Birds	*Symposiachrus trivirgatus*	Spectacled Monarch	SL	M
Mammals	*Mesembriomys gouldii*	Black-footed Tree-rat	-	V
Mammals	*Petauroides volans minor*	Northern Greater Glider	-	V
Mammals	*Petaurus gracilis*	Mahogany Glider	E	E
Mammals	*Petrogale sharmani*	Sharman's Rock-wallaby	V	V
Mammals	*Phascolarctos cinereus*	Koala	V	V
Mammals	*Tachyglossus aculeatus*	Short-beaked Echidna	SL	-
Plants	*Acacia tingoorensis*		V	-
Plants	*Arytera dictyoneura*		NT	-
Plants	*Cycas cairnsiana*		V	V
Plants	*Corybas cerasinus*		NT	-
Plants	*Corymbia leptoloma*		V	V
Plants	*Glossocardia orthochaeta*		E	-
Plants	*Leptospermum pallidum*		NT	-
Plants	*Lepturus minutus*		V	-
Plants	*Oenanthe javanica*		NT	-

Appendix E

DSITI AND ALA SPECIES RECORDS SEARCHES

Kidston Corridor Options - Threatened species records searches

Class	Scientific Name	Common Name	EPBC Act	NC Act	Database search	Records search	DSITI Comments
Threatened flora species							
Plant	*Acacia crombiei*	Pink Gidgee	V	V	PMST	DSITI and ALA	
Plant	*Acacia tingoorensis*	-	-	V	Wildlife Online	DSITI and ALA	
Plant	*Arytera dictyoneura*	-	-	NT	Wildlife Online	DSITI and ALA	
Plant	*Bulbophyllum globuliforme*	Miniature Moss-orchid	V	NT	PMST	ALA	Confidential species; unable to download records
Plant	*Cajanus mareebensis*	-	E	E	PMST	DSITI and ALA	
Plant	*Corybas cerasinus*	-	-	NT	Wildlife Online	ALA	Confidential species; unable to download records
Plant	*Corymbia leptoloma*	Yellowjacket	V	V	Wildlife Online	DSITI and ALA	
Other	*Cycas cairnsiana*	-	V	V	Wildlife Online	ALA	Confidential species; unable to download records
Plant	*Dichanthium setosum*	Bluegrass	V	-	PMST	DSITI and ALA	
Plant	*Glossocardia orthochaeta*	-	-	E	Wildlife Online	DSITI and ALA	
Plant	*Leptospermum pallidum*	-	-	NT	Wildlife Online	DSITI and ALA	
Plant	*Lepturus minutus*	-	-	V	Wildlife Online	DSITI and ALA	
Plant	*Lindsaea pulchella var. blanda*	-	V	EX	PMST	ALA	Confidential species; unable to download records
Plant	*Marsdenia brevifolia*	-	V	V	PMST	DSITI and ALA	
Plant	*Oenanthe javanica*	-	-	NT	Wildlife Online	DSITI and ALA	
Plant	*Phaius australis*	Lesser Swamp-orchid	E	E	PMST	ALA	Confidential species; unable to download records
Plant	*Tephrosia leveillei*	-	V	V	PMST	DSITI and ALA	
Threatened fauna species							
Bird	*Calidris ferruginea*	Curlew Sandpiper	CE (M)	SL	PMST	DSITI and ALA	
Bird	*Calyptorhynchus lathami erebus*	Glossy Black-cockatoo (northern)	-	V	Wildlife Online	DSITI and ALA	
Bird	*Casuarius casuarius johnsonii*	Southern Cassowary	E	E	Wildlife Online and PMST	DSITI and ALA	
Mammal	*Dasyurus hallucatus*	Northern Quoll	E	-	PMST	DSITI and ALA	
Mammal	*Dasyurus maculatus gracilis*	Spotted-tailed Quoll (North Queensland)	E	E	PMST	DSITI and ALA	
Reptile	*Egernia rugosa*	Yakka Skink	V	V	PMST	ALA	Confidential species; unable to download records
Bird	*Erythrotriorchis radiatus*	Red Goshawk	V	E	PMST	DSITI and ALA	
Bird	*Erythrura gouldiae*	Gouldian Finch	E	E	Wildlife Online and PMST	ALA	Confidential species; unable to download records
Mammal	*Hipposideros semoni*	Semon's Leaf-nosed Bat	E	E	PMST	DSITI and ALA	
Reptile	*Lerista vittata*	Mount Cooper Striped Lerista	V	V	PMST	DSITI and ALA	
Frog	*Litoria dayi*	Australian Lace-lid	E	E	PMST	DSITI and ALA	
Frog	*Litoria nannotis*	Waterfall Frog	E	E	PMST	DSITI and ALA	
Frog	*Litoria rheocola*	Common Mistfrog	E	E	PMST	DSITI and ALA	
Mammal	*Macroderma gigas*	Ghost Bat	V	V	PMST	DSITI and ALA	
Mammal	*Mesembriomys gouldii rattoides*	Black-footed Tree-rat (north Queensland)	V	-	Wildlife Online and PMST	DSITI and ALA	
Bird	*Numenius madagascariensis*	Eastern Curlew	CE (M)	V	PMST	DSITI and ALA	
Mammal	*Petauroides volans*	Greater Glider	V	-	Wildlife Online and PMST	DSITI and ALA	
Mammal	*Petaurus gracilis*	Mahogany Glider	E	E	Wildlife Online	DSITI and ALA	
Mammal	*Petrogale sharmani*	Sharman's Rock-wallaby	V	V	Wildlife Online and PMST	DSITI and ALA	
Mammal	Phascolarctos cinereus	Koala	V	V	Wildlife Online and PMST	DSITI and ALA	
Bird	*Poephila cincta cincta*	Southern Black-throated Finch	E	E	Wildlife Online and PMST	ALA	Confidential species; unable to download records
Mammal	*Pteropus conspicillatus*	Spectacled Flying-fox	V	V	PMST	DSITI and ALA	
Mammal	*Pteropus poliocephalus*	Grey-headed Flying-fox	V	-	PMST	DSITI and ALA	
Bird	*Rostratula australis*	Australian Painted Snipe	E (M)	V	PMST	DSITI and ALA	
Mammal	Rhinolophus robertsi	Large-eared Horseshoe Bat	E	E	PMST	ALA	Confidential species; unable to download records
Mammal	*Saccolaimus saccolaimus nudicluniatus*	Bare-rumped Sheath-tailed Bat	CE	E	PMST		
Birds	*Tyto novaehollandiae kimberli*	Masked Owl (northern)	V	V	PMST		

Migratory and special least concern fauna species							
Bird (marine)	*Apus pacificus*	Fork-tailed Swift	M	SL	PMST	DSITI and ALA	
Bird (marine)	*Calidris ruficollis*	Red-necked Stint	M	SL	Wildlife Online	DSITI and ALA	
Bird (terrestrial)	*Cuculus optatus*	Oriental cuckoo	M	SL	Wildlife Online and PMST	DSITI and ALA	
Bird (terrestrial)	*Hirundapus caudacutus*	White-throated Needletail	M	SL	Wildlife Online and PMST	DSITI and ALA	
Bird (terrestrial)	*Hirundo rustica*	Barn Swallow	M	SL	PMST	DSITI and ALA	
Bird (marine)	*Hydroprogne caspia*	Caspian Tern	M	SL	Wildlife Online	DSITI and ALA	
Bird (terrestrial)	*Monarcha melanopsis*	Black-faced Monarch	M	SL	Wildlife Online and PMST	DSITI and ALA	
Bird (terrestrial)	*Motacilla cinerea*	Grey Wagtail	M	SL	PMST	DSITI and ALA	
Bird (terrestrial)	Motacilla flava	Yellow Wagtail	M	SL	PMST	DSITI and ALA	
Bird (terrestrial)	*Myiagra cyanoleuca*	Satin Flycatcher	M	SL	PMST	DSITI and ALA	
Bird (wetland)	*Gallinago hardwickii*	Latham's Snipe	M	SL	PMST	DSITI and ALA	
Bird (wetland)	Pandion haliaetus	Osprey	M	SL	PMST	DSITI and ALA	
Bird (terrestrial)	*Rhipidura rufifrons*	Rufous Fantail	M	SL	Wildlife Online and PMST	DSITI and ALA	
Bird (terrestrial)	*Symposiachrus trivirgatus*	Spectacled Monarch	M	SL	Wildlife Online and PMST	DSITI and ALA	
Mammal	*Tachyglossus aculeatus*	Short-beaked Echidna	-	SL	Wildlife Online	DSITI and ALA	
Bird (wetland)	*Tringa nebularia*	Common Greenshank	M	SL	PMST	DSITI and ALA	

Appendix F

THREATENED SPECIES RECORDS

Kidston Corridor Options - NC Act threatened species records for each corridor option

NC Act status	Option A	Option B	Option C
Threatened flora species			
Endangered			
Vulnerable	1		
Near Threatened			
Threatened fauna species			
Endangered	1	1	1
Vulnerable		1	3
Near threatened			
Special least concern		2	1

Kidston Corridor Options - EPBC Act threatened species records for each corridor option

EPBC Act status	Option A	Option B	Option C
Threatened flora species			
Critically endangered			
Endangered			
Vulnerable	1	1	1
Threatened fauna species			
Critically endangered		1	1
Endangered	1	1	1
Vulnerable	1	2	2
Migratory			
Migratory (marine)		1	
Migratory (terrestrial)			
Migratory (wetland)			

Appendix G

MSES SPREADSHEETS

Kidston Corridor Option A - Regulated vegetation

Name	M_Table1_4	M4_RE	M4_VM_POLY	M4_1	Area_ha		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.003842	422	Total Category R regrowth for Option A
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.469059		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.100844		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.195803		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	2.067611		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	12.59236		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.334779		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	7.860174		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	12.2317		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.374102		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.483168		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.700459		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.83997		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.070627		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.043435		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.830378		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.596549		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	2.905288		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	12.21573		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.167738		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	7.47583		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	14.34534		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.259695		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.054286		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.01047		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	5.514016		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.734517		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.020582		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.057303		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	16.09998		
Genex: Option A	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.466693		
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Genex: Option A	REGULATED VEGETATION	7.8.18a	O-dom	hvr_oc	0.720557		
Genex: Option A	REGULATED VEGETATION	7.5.2b	O-dom	hvr_oc	0.084694		
Genex: Option A	REGULATED VEGETATION	7.5.2b	O-dom	hvr_oc	0.888013		
Genex: Option A	REGULATED VEGETATION	7.5.2b	O-dom	hvr_oc	0.034725		
Genex: Option A	REGULATED VEGETATION	7.8.18a	O-dom	hvr_oc	0.476705		
Genex: Option A	REGULATED VEGETATION	7.8.18a	O-dom	hvr_oc	0.890819		
Genex: Option A	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	14.13818	2059	Total OC-dom remnant for Option A
Genex: Option A	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	14.58422		
Genex: Option A	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	5.972214		
Genex: Option A	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	3.9565		
Genex: Option A	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	0.44608		
Genex: Option A	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	0.483626		
Genex: Option A	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	0.630734		
Genex: Option A	REGULATED VEGETATION	7.8.10b	O-dom	rem_oc	0.000002		
Genex: Option A	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	3.211762		
Genex: Option A	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	6.756958		
Genex: Option A	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	0.181751		
Genex: Option A	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	0.097199		
Genex: Option A	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	0.483261		
Genex: Option A	REGULATED VEGETATION	7.3.26a	O-dom	rem_oc	9.568999		
Genex: Option A	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	0.000082		
Genex: Option A	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	1.2572		
Genex: Option A	REGULATED VEGETATION	7.3.39a	O-dom	rem_oc	0.009287		
Genex: Option A	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	1.990015		
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Genex: Option A	REGULATED VEGETATION	7.5.1c	O-dom	rem_oc	0.297036		
Genex: Option A	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	11.56206		
Genex: Option A	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	13.34683		
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Genex: Option A	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	0.589727		
Genex: Option A	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	6.715692		
Genex: Option A	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	1.013457		
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Genex: Option A	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	694.5311		

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Genex: Option A	REGULATED VEGETATION	7.8.7a	O-dom	rem_oc	17.55466
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Genex: Option A	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	4.418021
Genex: Option A	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	0.594067
Genex: Option A	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	0.81655
Genex: Option A	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	8.567495
Genex: Option A	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	62.13517
Genex: Option A	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	4.286205
Genex: Option A	REGULATED VEGETATION	7.3.39a	O-dom	rem_oc	6.221108
Genex: Option A	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	34.09352
Genex: Option A	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	6.059978
Genex: Option A	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	15.98771
Genex: Option A	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	9.11193
Genex: Option A	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	0.001799
Genex: Option A	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	11.76356
Genex: Option A	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	5.563263
Genex: Option A	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	18.22205
Genex: Option A	REGULATED VEGETATION	7.8.17c	O-dom	rem_oc	3.072896

Genex: Option A	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	0.616583		
Genex: Option A	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	3.436127		
Genex: Option A	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	3.278014		
Genex: Option A	REGULATED VEGETATION	7.8.18c	O-dom	rem_oc	4.488125		
Genex: Option A	REGULATED VEGETATION	7.8.18c	O-dom	rem_oc	11.64185		
Genex: Option A	REGULATED VEGETATION	7.8.18c	O-dom	rem_oc	4.444011		
Genex: Option A	REGULATED VEGETATION	7.3.39a	O-dom	rem_oc	6.182993		
Genex: Option A	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	9.199162		
Genex: Option A	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	1.360322		
Genex: Option A	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	8.433969		
Genex: Option A	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	0.434568		
Genex: Option A	REGULATED VEGETATION	7.8.18c	O-dom	rem_oc	0.64519		
Genex: Option A	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	58.61665		
Genex: Option A	REGULATED VEGETATION	7.8.7a	O-dom	rem_oc	15.50554		
Genex: Option A	REGULATED VEGETATION	7.8.7a	O-dom	rem_oc	0.338929		
Genex: Option A	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	18.62776		
Genex: Option A	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	5.381855		
Genex: Option A	REGULATED VEGETATION	9.3.3a/9.3.20/9.3.23	O-subdom	rem_oc	348.0026	1008	Total OC-subdom remnant for Option A
Genex: Option A	REGULATED VEGETATION	9.3.3a/9.3.20/9.3.23	O-subdom	rem_oc	345.7832		
Genex: Option A	REGULATED VEGETATION	9.3.19a/9.3.3a/9.3.23	O-subdom	rem_oc	0.053888		
Genex: Option A	REGULATED VEGETATION	9.3.19a/9.3.3a/9.3.23	O-subdom	rem_oc	0.003095		
Genex: Option A	REGULATED VEGETATION	9.3.19a/9.3.3a/9.3.23	O-subdom	rem_oc	0.418459		
Genex: Option A	REGULATED VEGETATION	9.3.3a/9.3.20/9.3.23	O-subdom	rem_oc	20.80439		
Genex: Option A	REGULATED VEGETATION	9.3.3a/9.3.20/9.3.23	O-subdom	rem_oc	48.92501		
Genex: Option A	REGULATED VEGETATION	9.3.3a/9.3.20/9.3.23	O-subdom	rem_oc	130.6595		
Genex: Option A	REGULATED VEGETATION	9.3.19a/9.3.3a/9.3.23	O-subdom	rem_oc	18.58643		
Genex: Option A	REGULATED VEGETATION	9.3.19a/9.3.3a/9.3.23	O-subdom	rem_oc	94.72298		

Kidston Corridor Option B - Regulated vegetation

Name	M_Table1_4	M4_RE	M4_VM_POLY	M4_1	Area_ha		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	2.004087	296	Total Category R regrowth for Option B
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.146045		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.391259		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.464253		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	2.080121		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.305659		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.313248		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.341295		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.323414		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.326592		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	2.686231		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.67304		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.257651		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.612285		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	2.669419		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.178009		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.351457		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.106444		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.009107		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.686556		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.18859		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.699534		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	6.691298		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	4.45794		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	3.898714		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	13.99839		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	3.504503		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	21.10548		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	2.060778		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	4.36551		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.019771		
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Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	18.16175		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	2.273166		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.644273		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.96434		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.625849		
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Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.457158		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.645064		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.013744		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.284381		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.331178		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.307026		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	4.380483		
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Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.434148		
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Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.46824		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.709577		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.014552		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.475646		
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Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.185744		
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Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.327941		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.659546		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.480604		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.861445		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.632978		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.422231		
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Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.827108		
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Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.773593		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.785154		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.242768		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.615052		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.400008		

Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.468714		
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Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.645599		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.877687		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	3.262705		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.590311		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.464782		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.733858		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.113461		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.388676		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.672468		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.550556		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.543306		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.106496		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	7.708124		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.075444		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	2.20241		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.554833		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.052662		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.595646		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.610715		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	17.18279		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.561512		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.250953		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.162867		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	9.736478		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.068693		
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Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.281566		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.580541		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	4.103995		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.802553		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	6.461723		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.63187		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	42.18013		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.223331		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	3.832999		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.321527		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.424048		
Genex: Option B	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.072922		
Genex: Option B	REGULATED VEGETATION	7.5.2b	O-dom	hvr_oc	0.084694	2.4	Total OC regrowth for Option B
Genex: Option B	REGULATED VEGETATION	7.5.2b	O-dom	hvr_oc	0.888013		
Genex: Option B	REGULATED VEGETATION	7.5.2b	O-dom	hvr_oc	0.034725		
Genex: Option B	REGULATED VEGETATION	7.8.18a	O-dom	hvr_oc	0.476705		
Genex: Option B	REGULATED VEGETATION	7.8.18a	O-dom	hvr_oc	0.890819		
Genex: Option B	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	0.099917	1891	Total OC-dom remnant for Option B
Genex: Option B	REGULATED VEGETATION	7.3.39a	O-dom	rem_oc	1.166763		
Genex: Option B	REGULATED VEGETATION	7.5.1c	O-dom	rem_oc	0.037098		
Genex: Option B	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	15.35428		
Genex: Option B	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	5.626586		
Genex: Option B	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	1.47184		
Genex: Option B	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	10.58911		
Genex: Option B	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	138.478		
Genex: Option B	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	195.4305		
Genex: Option B	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	153.7515		
Genex: Option B	REGULATED VEGETATION	9.5.2	O-dom	rem_oc	5.651613		
Genex: Option B	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	19.62831		
Genex: Option B	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	1.028011		
Genex: Option B	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	1.132719		
Genex: Option B	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	2.647046		
Genex: Option B	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	0.811436		
Genex: Option B	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	9.52291		
Genex: Option B	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	3.28628		
Genex: Option B	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	32.21729		
Genex: Option B	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	4.050669		
Genex: Option B	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	2.310894		
Genex: Option B	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	1.561025		
Genex: Option B	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	2.128498		
Genex: Option B	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	0.81339		
Genex: Option B	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	0.928591		
Genex: Option B	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	1.05823		
Genex: Option B	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	0.413503		
Genex: Option B	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	0.925361		
Genex: Option B	REGULATED VEGETATION	7.5.1c	O-dom	rem_oc	5.784952		
Genex: Option B	REGULATED VEGETATION	7.5.1c	O-dom	rem_oc	0.182818		
Genex: Option B	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	1.321791		
Genex: Option B	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	1.076465		
Genex: Option B	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	0.144677		
Genex: Option B	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	14.87732		
Genex: Option B	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	2.728083		
Genex: Option B	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	27.99035		
Genex: Option B	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	47.06895		
Genex: Option B	REGULATED VEGETATION	7.8.7a	O-dom	rem_oc	4.770745		
Genex: Option B	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	1.478203		
Genex: Option B	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	28.1685		
Genex: Option B	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	4.236403		
Genex: Option B	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	1.381377		
Genex: Option B	REGULATED VEGETATION	7.3.39a	O-dom	rem_oc	0.053238		
Genex: Option B	REGULATED VEGETATION	7.3.39a	O-dom	rem_oc	0.50231		
Genex: Option B	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	9.653945		
Genex: Option B	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	270.0272		
Genex: Option B	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	374.3618		
Genex: Option B	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	0.590697		
Genex: Option B	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	1.771366		

Genex: Option B	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	108.0731		
Genex: Option B	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	1.946469		
Genex: Option B	REGULATED VEGETATION	9.5.2	O-dom	rem_oc	26.87198		
Genex: Option B	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	4.418021		
Genex: Option B	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	0.594067		
Genex: Option B	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	0.81655		
Genex: Option B	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	8.567495		
Genex: Option B	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	62.13517		
Genex: Option B	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	4.286205		
Genex: Option B	REGULATED VEGETATION	7.3.39a	O-dom	rem_oc	6.221108		
Genex: Option B	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	34.09352		
Genex: Option B	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	6.059978		
Genex: Option B	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	15.98771		
Genex: Option B	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	9.11193		
Genex: Option B	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	0.001799		
Genex: Option B	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	11.76356		
Genex: Option B	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	5.563263		
Genex: Option B	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	18.22205		
Genex: Option B	REGULATED VEGETATION	7.8.17c	O-dom	rem_oc	3.072896		
Genex: Option B	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	0.616583		
Genex: Option B	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	3.436127		
Genex: Option B	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	3.278014		
Genex: Option B	REGULATED VEGETATION	7.8.18c	O-dom	rem_oc	4.488125		
Genex: Option B	REGULATED VEGETATION	7.8.18c	O-dom	rem_oc	11.64185		
Genex: Option B	REGULATED VEGETATION	7.8.18c	O-dom	rem_oc	4.444011		
Genex: Option B	REGULATED VEGETATION	7.3.39a	O-dom	rem_oc	6.182993		
Genex: Option B	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	9.199162		
Genex: Option B	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	1.360322		
Genex: Option B	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	8.433969		
Genex: Option B	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	0.434568		
Genex: Option B	REGULATED VEGETATION	7.8.18c	O-dom	rem_oc	0.64519		
Genex: Option B	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	58.61665		
Genex: Option B	REGULATED VEGETATION	7.8.7a	O-dom	rem_oc	15.50554		
Genex: Option B	REGULATED VEGETATION	7.8.7a	O-dom	rem_oc	0.338929		
Genex: Option B	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	18.62776		
Genex: Option B	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	5.381855		
Genex: Option B	REGULATED VEGETATION	9.3.3a/9.3.20/9.3.23	O-subdom	rem_oc	187.4794	442	Total OC-subdom remnant for Option B
Genex: Option B	REGULATED VEGETATION	9.3.3a/9.3.20/9.3.23	O-subdom	rem_oc	46.67159		
Genex: Option B	REGULATED VEGETATION	9.3.5/9.3.3a/9.3.23	O-subdom	rem_oc	6.946683		
Genex: Option B	REGULATED VEGETATION	9.3.3a/9.3.20/9.3.23	O-subdom	rem_oc	4.034855		
Genex: Option B	REGULATED VEGETATION	9.3.3a/9.3.20/9.3.23	O-subdom	rem_oc	28.05193		
Genex: Option B	REGULATED VEGETATION	9.3.3a/9.3.20/9.3.23	O-subdom	rem_oc	59.27586		
Genex: Option B	REGULATED VEGETATION	9.3.5/9.3.3a/9.3.23	O-subdom	rem_oc	85.42147		
Genex: Option B	REGULATED VEGETATION	9.3.5/9.3.3a/9.3.23	O-subdom	rem_oc	21.51575		
Genex: Option B	REGULATED VEGETATION	9.3.3a/9.3.20/9.3.23	O-subdom	rem_oc	2.117612		

Kidston Corridor Option C - Regulated vegetation

Name	M_Table1_4	M4_RE	M4_VM_POLY	M4_1	Area_ha		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.328481	257	Total Category R regrowth for Option C
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.42827		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.926819		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.05916		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.353217		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	12.75876		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.043894		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	2.638457		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.432419		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.716188		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.003291		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.17231		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.711402		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.027479		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.042959		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.229094		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.651188		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.627135		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.280835		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	27.73202		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	5.619303		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.419634		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.3229		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.432317		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.121788		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.307026		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	4.380483		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	2.304279		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.434148		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.434542		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.46824		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.014552		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.108115		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.604932		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.798694		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.938117		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.45894		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.659266		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.70253		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.773593		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.785154		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.242768		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.615052		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.400008		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.468714		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.714711		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	3.262705		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.590311		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.733858		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.113461		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.672468		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	7.708124		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.075444		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.554833		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.052662		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.610715		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	17.18279		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.561512		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.250953		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.162867		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	9.736478		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.068693		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.139407		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.361331		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.234613		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.281566		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.580541		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	4.103995		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.802553		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	6.461723		
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GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	42.18013		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.223331		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	3.832999		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	1.321527		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.424048		
GENEX Option C	REGULATED VEGETATION	<Null>	<Null>	Cat R	0.072922		
GENEX Option C	REGULATED VEGETATION	7.5.2b	O-dom	hvr_oc	0.084694	2.4	Total OC regrowth for Option C
GENEX Option C	REGULATED VEGETATION	7.5.2b	O-dom	hvr_oc	0.888013		
GENEX Option C	REGULATED VEGETATION	7.5.2b	O-dom	hvr_oc	0.034725		
GENEX Option C	REGULATED VEGETATION	7.8.18a	O-dom	hvr_oc	0.476705		
GENEX Option C	REGULATED VEGETATION	7.8.18a	O-dom	hvr_oc	0.890819		
GENEX Option C	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	3.344087	1519	Total OC-dom remnant for Option C
GENEX Option C	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	5.250493		
GENEX Option C	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	2.477648		
GENEX Option C	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	4.760297		
GENEX Option C	REGULATED VEGETATION	7.8.18c	O-dom	rem_oc	5.401995		
GENEX Option C	REGULATED VEGETATION	7.3.39a	O-dom	rem_oc	0.746091		
GENEX Option C	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	0.817491		
GENEX Option C	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	36.82176		
GENEX Option C	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	204.122		
GENEX Option C	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	8.058572		
GENEX Option C	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	1.779746		
GENEX Option C	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	11.61961		
GENEX Option C	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	0.046029		
GENEX Option C	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	5.615905		
GENEX Option C	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	20.59074		
GENEX Option C	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	7.634229		
GENEX Option C	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	0.792089		
GENEX Option C	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	11.75996		
GENEX Option C	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	5.718137		
GENEX Option C	REGULATED VEGETATION	7.8.18c	O-dom	rem_oc	21.60491		
GENEX Option C	REGULATED VEGETATION	7.3.39a	O-dom	rem_oc	1.304391		
GENEX Option C	REGULATED VEGETATION	7.8.18c	O-dom	rem_oc	4.964711		
GENEX Option C	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	7.624219		
GENEX Option C	REGULATED VEGETATION	7.8.7a	O-dom	rem_oc	5.251581		
GENEX Option C	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	2.078499		
GENEX Option C	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	0.414249		
GENEX Option C	REGULATED VEGETATION	7.8.7a	O-dom	rem_oc	0.548143		
GENEX Option C	REGULATED VEGETATION	7.3.39a	O-dom	rem_oc	0.053238		
GENEX Option C	REGULATED VEGETATION	7.3.39a	O-dom	rem_oc	0.50231		
GENEX Option C	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	9.653945		
GENEX Option C	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	270.0272		
GENEX Option C	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	374.3618		

GENEX Option C	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	0.590697		
GENEX Option C	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	1.771366		
GENEX Option C	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	108.0731		
GENEX Option C	REGULATED VEGETATION	9.12.10	O-dom	rem_oc	1.946469		
GENEX Option C	REGULATED VEGETATION	9.5.2	O-dom	rem_oc	26.87198		
GENEX Option C	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	4.418021		
GENEX Option C	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	0.594067		
GENEX Option C	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	0.81655		
GENEX Option C	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	8.567495		
GENEX Option C	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	62.13517		
GENEX Option C	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	4.286205		
GENEX Option C	REGULATED VEGETATION	7.3.39a	O-dom	rem_oc	6.221108		
GENEX Option C	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	34.09352		
GENEX Option C	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	6.059978		
GENEX Option C	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	15.98771		
GENEX Option C	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	9.11193		
GENEX Option C	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	0.001799		
GENEX Option C	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	11.76356		
GENEX Option C	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	5.563263		
GENEX Option C	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	18.22205		
GENEX Option C	REGULATED VEGETATION	7.8.17c	O-dom	rem_oc	3.072896		
GENEX Option C	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	0.616583		
GENEX Option C	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	3.436127		
GENEX Option C	REGULATED VEGETATION	7.5.4f	O-dom	rem_oc	3.278014		
GENEX Option C	REGULATED VEGETATION	7.8.18c	O-dom	rem_oc	4.488125		
GENEX Option C	REGULATED VEGETATION	7.8.18c	O-dom	rem_oc	11.64185		
GENEX Option C	REGULATED VEGETATION	7.8.18c	O-dom	rem_oc	4.444011		
GENEX Option C	REGULATED VEGETATION	7.3.39a	O-dom	rem_oc	6.182993		
GENEX Option C	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	9.199162		
GENEX Option C	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	1.360322		
GENEX Option C	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	8.433969		
GENEX Option C	REGULATED VEGETATION	7.8.18a	O-dom	rem_oc	0.434568		
GENEX Option C	REGULATED VEGETATION	7.8.18c	O-dom	rem_oc	0.64519		
GENEX Option C	REGULATED VEGETATION	7.5.4c	O-dom	rem_oc	58.61665		
GENEX Option C	REGULATED VEGETATION	7.8.7a	O-dom	rem_oc	15.50554		
GENEX Option C	REGULATED VEGETATION	7.8.7a	O-dom	rem_oc	0.338929		
GENEX Option C	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	18.62776		
GENEX Option C	REGULATED VEGETATION	7.5.2b	O-dom	rem_oc	5.381855		
GENEX Option C	REGULATED VEGETATION	9.3.5/9.3.3a/9.3.23	O-subdom	rem_oc	58.16345	334	Total OC-subdom remnant for Option C
GENEX Option C	REGULATED VEGETATION	9.3.5/9.3.3a/9.3.23	O-subdom	rem_oc	7.270749		
GENEX Option C	REGULATED VEGETATION	9.3.5/9.3.3a/9.3.23	O-subdom	rem_oc	0.873508		
GENEX Option C	REGULATED VEGETATION	9.3.5/9.3.3a/9.3.23	O-subdom	rem_oc	24.94581		
GENEX Option C	REGULATED VEGETATION	9.3.3a/9.3.20/9.3.23	O-subdom	rem_oc	11.81889		
GENEX Option C	REGULATED VEGETATION	9.3.5/9.3.3a/9.3.23	O-subdom	rem_oc	63.09471		
GENEX Option C	REGULATED VEGETATION	9.3.3a/9.3.20/9.3.23	O-subdom	rem_oc	59.27586		
GENEX Option C	REGULATED VEGETATION	9.3.5/9.3.3a/9.3.23	O-subdom	rem_oc	85.42147		
GENEX Option C	REGULATED VEGETATION	9.3.5/9.3.3a/9.3.23	O-subdom	rem_oc	21.51575		
GENEX Option C	REGULATED VEGETATION	9.3.3a/9.3.20/9.3.23	O-subdom	rem_oc	2.117612		

Kidston Corridor Option A - Regional ecosystems v8

Name	VM_POLY	VM_STATUS	Area_ha		
Genex: Option A	LeastC	hvr_leastc	14.8125	62	Total LC regrowth for Option A
Genex: Option A	LeastC	hvr_leastc	0.367214		
Genex: Option A	LeastC	hvr_leastc	1.073194		
Genex: Option A	LeastC	hvr_leastc	0.02707		
Genex: Option A	LeastC	hvr_leastc	0.725399		
Genex: Option A	LeastC	hvr_leastc	23.53707		
Genex: Option A	LeastC	hvr_leastc	6.913921		
Genex: Option A	LeastC	hvr_leastc	4.153932		
Genex: Option A	LeastC	hvr_leastc	2.201232		
Genex: Option A	LeastC	hvr_leastc	2.657052		
Genex: Option A	LeastC	hvr_leastc	1.646678		
Genex: Option A	LeastC	hvr_leastc	3.808301		
Genex: Option A	O-dom	hvr_oc	0.47349	3.6	Total OC regrowth for Option A
Genex: Option A	O-dom	hvr_oc	0.72056		
Genex: Option A	O-dom	hvr_oc	0.888013		
Genex: Option A	O-dom	hvr_oc	0.034724		
Genex: Option A	O-dom	hvr_oc	0.084695		
Genex: Option A	O-dom	hvr_oc	0.476706		
Genex: Option A	O-dom	hvr_oc	0.890819		
Genex: Option A	non-rem	non_remnant	121.2521	2675	Total non-remnant for Option A
Genex: Option A	non-rem	non_remnant	25.84752		
Genex: Option A	non-rem	non_remnant	2.629019		
Genex: Option A	non-rem	non_remnant	19.38068		
Genex: Option A	non-rem	non_remnant	0.000169		
Genex: Option A	non-rem	non_remnant	2.304268		
Genex: Option A	non-rem	non_remnant	4.975241		
Genex: Option A	non-rem	non_remnant	112.914		
Genex: Option A	non-rem	non_remnant	0.444669		
Genex: Option A	non-rem	non_remnant	31.96318		
Genex: Option A	non-rem	non_remnant	63.51757		
Genex: Option A	non-rem	non_remnant	1.279065		
Genex: Option A	non-rem	non_remnant	190.1669		
Genex: Option A	non-rem	non_remnant	13.65374		
Genex: Option A	non-rem	non_remnant	6.749425		
Genex: Option A	non-rem	non_remnant	91.04484		
Genex: Option A	non-rem	non_remnant	0.000071		
Genex: Option A	non-rem	non_remnant	122.9623		
Genex: Option A	non-rem	non_remnant	0.000227		
Genex: Option A	non-rem	non_remnant	279.2766		
Genex: Option A	non-rem	non_remnant	151.6287		
Genex: Option A	non-rem	non_remnant	7.245895		
Genex: Option A	non-rem	non_remnant	8.656713		
Genex: Option A	non-rem	non_remnant	393.879		
Genex: Option A	non-rem	non_remnant	2.125011		
Genex: Option A	non-rem	non_remnant	103.4499		
Genex: Option A	non-rem	non_remnant	8.966574		
Genex: Option A	non-rem	non_remnant	6.867542		
Genex: Option A	non-rem	non_remnant	16.25738		
Genex: Option A	non-rem	non_remnant	0.234067		
Genex: Option A	non-rem	non_remnant	282.7614		
Genex: Option A	non-rem	non_remnant	0.000204		
Genex: Option A	non-rem	non_remnant	0.000074		
Genex: Option A	non-rem	non_remnant	8.914747		
Genex: Option A	non-rem	non_remnant	1.286566		
Genex: Option A	non-rem	non_remnant	1.685735		
Genex: Option A	non-rem	non_remnant	0.526879		
Genex: Option A	non-rem	non_remnant	0.121333		
Genex: Option A	non-rem	non_remnant	3.735213		
Genex: Option A	non-rem	non_remnant	117.347		
Genex: Option A	non-rem	non_remnant	468.6799		

Genex: Option A	water	non_remnant	17.22085	20	Total water non-remnant for Option A
Genex: Option A	water	non_remnant	1.779753		
Genex: Option A	water	non_remnant	1.100773		
Genex: Option A	LeastC	rem_leastc	52.57021	50675	Total LC remnant for Option A
Genex: Option A	LeastC	rem_leastc	57.17364		
Genex: Option A	LeastC	rem_leastc	146.5935		
Genex: Option A	LeastC	rem_leastc	1.712134		
Genex: Option A	LeastC	rem_leastc	32.87388		
Genex: Option A	LeastC	rem_leastc	255.2324		
Genex: Option A	LeastC	rem_leastc	1032.305		
Genex: Option A	LeastC	rem_leastc	34.28771		
Genex: Option A	LeastC	rem_leastc	276.3749		
Genex: Option A	LeastC	rem_leastc	18.62152		
Genex: Option A	LeastC	rem_leastc	42.91812		
Genex: Option A	LeastC	rem_leastc	9.551715		
Genex: Option A	LeastC	rem_leastc	54.19333		
Genex: Option A	LeastC	rem_leastc	37.36713		
Genex: Option A	LeastC	rem_leastc	14.77693		
Genex: Option A	LeastC	rem_leastc	52.74941		
Genex: Option A	LeastC	rem_leastc	36.25535		
Genex: Option A	LeastC	rem_leastc	127.1683		
Genex: Option A	LeastC	rem_leastc	27.34685		
Genex: Option A	LeastC	rem_leastc	157.0211		
Genex: Option A	LeastC	rem_leastc	9.903885		
Genex: Option A	LeastC	rem_leastc	26.95378		
Genex: Option A	LeastC	rem_leastc	29.87643		
Genex: Option A	LeastC	rem_leastc	59.37642		
Genex: Option A	LeastC	rem_leastc	347.307		
Genex: Option A	LeastC	rem_leastc	125.124		
Genex: Option A	LeastC	rem_leastc	8.416606		
Genex: Option A	LeastC	rem_leastc	136.8527		
Genex: Option A	LeastC	rem_leastc	23.68275		
Genex: Option A	LeastC	rem_leastc	1152.16		
Genex: Option A	LeastC	rem_leastc	8.13693		
Genex: Option A	LeastC	rem_leastc	21.6886		
Genex: Option A	LeastC	rem_leastc	73.47771		
Genex: Option A	LeastC	rem_leastc	22.65108		
Genex: Option A	LeastC	rem_leastc	68.04189		
Genex: Option A	LeastC	rem_leastc	42.60602		
Genex: Option A	LeastC	rem_leastc	24.16052		
Genex: Option A	LeastC	rem_leastc	22.17645		
Genex: Option A	LeastC	rem_leastc	62.46455		
Genex: Option A	LeastC	rem_leastc	595.0399		
Genex: Option A	LeastC	rem_leastc	1.471328		
Genex: Option A	LeastC	rem_leastc	61.99931		
Genex: Option A	LeastC	rem_leastc	239.4195		
Genex: Option A	LeastC	rem_leastc	68.66814		
Genex: Option A	LeastC	rem_leastc	147.3336		
Genex: Option A	LeastC	rem_leastc	1.401031		
Genex: Option A	LeastC	rem_leastc	251.6928		
Genex: Option A	LeastC	rem_leastc	22.36634		
Genex: Option A	LeastC	rem_leastc	172.1274		
Genex: Option A	LeastC	rem_leastc	67.82442		
Genex: Option A	LeastC	rem_leastc	158.9092		
Genex: Option A	LeastC	rem_leastc	4.672963		
Genex: Option A	LeastC	rem_leastc	105.2463		
Genex: Option A	LeastC	rem_leastc	45.21432		
Genex: Option A	LeastC	rem_leastc	4.683257		
Genex: Option A	LeastC	rem_leastc	43.53392		
Genex: Option A	LeastC	rem_leastc	1.189481		
Genex: Option A	LeastC	rem_leastc	129.4995		
Genex: Option A	LeastC	rem_leastc	185.6366		
Genex: Option A	LeastC	rem_leastc	207.8615		

Genex: Option A	LeastC	rem_leastc	4.923067
Genex: Option A	LeastC	rem_leastc	19.29285
Genex: Option A	LeastC	rem_leastc	406.9075
Genex: Option A	LeastC	rem_leastc	396.7804
Genex: Option A	LeastC	rem_leastc	7.393406
Genex: Option A	LeastC	rem_leastc	42.71687
Genex: Option A	LeastC	rem_leastc	56.29743
Genex: Option A	LeastC	rem_leastc	77.57893
Genex: Option A	LeastC	rem_leastc	294.1476
Genex: Option A	LeastC	rem_leastc	161.5184
Genex: Option A	LeastC	rem_leastc	27.12249
Genex: Option A	LeastC	rem_leastc	1485.42
Genex: Option A	LeastC	rem_leastc	5.900959
Genex: Option A	LeastC	rem_leastc	1230.668
Genex: Option A	LeastC	rem_leastc	91.84999
Genex: Option A	LeastC	rem_leastc	299.5232
Genex: Option A	LeastC	rem_leastc	325.435
Genex: Option A	LeastC	rem_leastc	5.030852
Genex: Option A	LeastC	rem_leastc	36.13185
Genex: Option A	LeastC	rem_leastc	32.00785
Genex: Option A	LeastC	rem_leastc	29.35829
Genex: Option A	LeastC	rem_leastc	179.814
Genex: Option A	LeastC	rem_leastc	0.068167
Genex: Option A	LeastC	rem_leastc	36.75109
Genex: Option A	LeastC	rem_leastc	274.0591
Genex: Option A	LeastC	rem_leastc	0.614416
Genex: Option A	LeastC	rem_leastc	11.44757
Genex: Option A	LeastC	rem_leastc	337.7416
Genex: Option A	LeastC	rem_leastc	0.215319
Genex: Option A	LeastC	rem_leastc	78.6461
Genex: Option A	LeastC	rem_leastc	92.57578
Genex: Option A	LeastC	rem_leastc	1181.485
Genex: Option A	LeastC	rem_leastc	128.7503
Genex: Option A	LeastC	rem_leastc	395.8646
Genex: Option A	LeastC	rem_leastc	14.96748
Genex: Option A	LeastC	rem_leastc	263.8201
Genex: Option A	LeastC	rem_leastc	110.4523
Genex: Option A	LeastC	rem_leastc	18.81884
Genex: Option A	LeastC	rem_leastc	26.17039
Genex: Option A	LeastC	rem_leastc	11.36333
Genex: Option A	LeastC	rem_leastc	5.997836
Genex: Option A	LeastC	rem_leastc	44.11509
Genex: Option A	LeastC	rem_leastc	48.96257
Genex: Option A	LeastC	rem_leastc	8.616055
Genex: Option A	LeastC	rem_leastc	34.58335
Genex: Option A	LeastC	rem_leastc	6.739789
Genex: Option A	LeastC	rem_leastc	159.7099
Genex: Option A	LeastC	rem_leastc	0.689372
Genex: Option A	LeastC	rem_leastc	5.06318
Genex: Option A	LeastC	rem_leastc	723.1585
Genex: Option A	LeastC	rem_leastc	90.37985
Genex: Option A	LeastC	rem_leastc	525.1697
Genex: Option A	LeastC	rem_leastc	61.11363
Genex: Option A	LeastC	rem_leastc	0.189301
Genex: Option A	LeastC	rem_leastc	131.1014
Genex: Option A	LeastC	rem_leastc	1103.557
Genex: Option A	LeastC	rem_leastc	105.9817
Genex: Option A	LeastC	rem_leastc	11.87414
Genex: Option A	LeastC	rem_leastc	59.61115
Genex: Option A	LeastC	rem_leastc	21.74683
Genex: Option A	LeastC	rem_leastc	590.3104
Genex: Option A	LeastC	rem_leastc	168.4664
Genex: Option A	LeastC	rem_leastc	77.45731
Genex: Option A	LeastC	rem_leastc	149.9271
Genex: Option A	LeastC	rem_leastc	98.58277
Genex: Option A	LeastC	rem_leastc	668.4066
Genex: Option A	LeastC	rem_leastc	44.27461
Genex: Option A	LeastC	rem_leastc	1.12957
Genex: Option A	LeastC	rem_leastc	44.22081
Genex: Option A	LeastC	rem_leastc	191.8419
Genex: Option A	LeastC	rem_leastc	261.3817
Genex: Option A	LeastC	rem_leastc	29.57973
Genex: Option A	LeastC	rem_leastc	1586.245
Genex: Option A	LeastC	rem_leastc	132.7455
Genex: Option A	LeastC	rem_leastc	60.33661
Genex: Option A	LeastC	rem_leastc	94.6175
Genex: Option A	LeastC	rem_leastc	132.2248
Genex: Option A	LeastC	rem_leastc	452.7576
Genex: Option A	LeastC	rem_leastc	48.16143
Genex: Option A	LeastC	rem_leastc	25.11292

Genex: Option A	LeastC	rem_leastc	20.66312
Genex: Option A	LeastC	rem_leastc	23.24325
Genex: Option A	LeastC	rem_leastc	15.31929
Genex: Option A	LeastC	rem_leastc	174.3232
Genex: Option A	LeastC	rem_leastc	212.8426
Genex: Option A	LeastC	rem_leastc	313.0483
Genex: Option A	LeastC	rem_leastc	1.196521
Genex: Option A	LeastC	rem_leastc	108.2252
Genex: Option A	LeastC	rem_leastc	36.09727
Genex: Option A	LeastC	rem_leastc	30.38112
Genex: Option A	LeastC	rem_leastc	8.561523
Genex: Option A	LeastC	rem_leastc	88.58386
Genex: Option A	LeastC	rem_leastc	6.175024
Genex: Option A	LeastC	rem_leastc	286.5008
Genex: Option A	LeastC	rem_leastc	42.79844
Genex: Option A	LeastC	rem_leastc	11.98431
Genex: Option A	LeastC	rem_leastc	264.8763
Genex: Option A	LeastC	rem_leastc	226.6269
Genex: Option A	LeastC	rem_leastc	58.80618
Genex: Option A	LeastC	rem_leastc	5.885673
Genex: Option A	LeastC	rem_leastc	1064.296
Genex: Option A	LeastC	rem_leastc	92.68297
Genex: Option A	LeastC	rem_leastc	20.83021
Genex: Option A	LeastC	rem_leastc	37.9357
Genex: Option A	LeastC	rem_leastc	5.468407
Genex: Option A	LeastC	rem_leastc	186.0467
Genex: Option A	LeastC	rem_leastc	49.86623
Genex: Option A	LeastC	rem_leastc	297.9879
Genex: Option A	LeastC	rem_leastc	153.8439
Genex: Option A	LeastC	rem_leastc	180.351
Genex: Option A	LeastC	rem_leastc	660.1058
Genex: Option A	LeastC	rem_leastc	18.96952
Genex: Option A	LeastC	rem_leastc	100.4104
Genex: Option A	LeastC	rem_leastc	62.69539
Genex: Option A	LeastC	rem_leastc	26.27379
Genex: Option A	LeastC	rem_leastc	161.7457
Genex: Option A	LeastC	rem_leastc	1.141023
Genex: Option A	LeastC	rem_leastc	67.52318
Genex: Option A	LeastC	rem_leastc	182.8862
Genex: Option A	LeastC	rem_leastc	34.12553
Genex: Option A	LeastC	rem_leastc	25.81363
Genex: Option A	LeastC	rem_leastc	1075.062
Genex: Option A	LeastC	rem_leastc	155.934
Genex: Option A	LeastC	rem_leastc	12.85443
Genex: Option A	LeastC	rem_leastc	3539.709
Genex: Option A	LeastC	rem_leastc	695.5142
Genex: Option A	LeastC	rem_leastc	28.58443
Genex: Option A	LeastC	rem_leastc	69.74197
Genex: Option A	LeastC	rem_leastc	0.853428
Genex: Option A	LeastC	rem_leastc	0.18627
Genex: Option A	LeastC	rem_leastc	0.001726
Genex: Option A	LeastC	rem_leastc	309.9822
Genex: Option A	LeastC	rem_leastc	11.33468
Genex: Option A	LeastC	rem_leastc	32.23451
Genex: Option A	LeastC	rem_leastc	59.20924
Genex: Option A	LeastC	rem_leastc	25.91885
Genex: Option A	LeastC	rem_leastc	39.92079
Genex: Option A	LeastC	rem_leastc	26.49348
Genex: Option A	LeastC	rem_leastc	151.5962
Genex: Option A	LeastC	rem_leastc	154.6605
Genex: Option A	LeastC	rem_leastc	226.7467
Genex: Option A	LeastC	rem_leastc	185.4138
Genex: Option A	LeastC	rem_leastc	6.451919
Genex: Option A	LeastC	rem_leastc	3.380721
Genex: Option A	LeastC	rem_leastc	473.4424
Genex: Option A	LeastC	rem_leastc	2.155563
Genex: Option A	LeastC	rem_leastc	0.978982
Genex: Option A	LeastC	rem_leastc	154.2547
Genex: Option A	LeastC	rem_leastc	912.1949
Genex: Option A	LeastC	rem_leastc	1.431118
Genex: Option A	LeastC	rem_leastc	46.05539
Genex: Option A	LeastC	rem_leastc	13.67831
Genex: Option A	LeastC	rem_leastc	0.00085
Genex: Option A	LeastC	rem_leastc	42.24882
Genex: Option A	LeastC	rem_leastc	0.250186
Genex: Option A	LeastC	rem_leastc	167.1931
Genex: Option A	LeastC	rem_leastc	18.74343
Genex: Option A	LeastC	rem_leastc	80.59614
Genex: Option A	LeastC	rem_leastc	319.192
Genex: Option A	LeastC	rem_leastc	45.31823

Genex: Option A	LeastC	rem_leastc	68.2613
Genex: Option A	LeastC	rem_leastc	77.81073
Genex: Option A	LeastC	rem_leastc	0.388276
Genex: Option A	LeastC	rem_leastc	109.4388
Genex: Option A	LeastC	rem_leastc	1.866744
Genex: Option A	LeastC	rem_leastc	1411.093
Genex: Option A	LeastC	rem_leastc	12.58193
Genex: Option A	LeastC	rem_leastc	134.5518
Genex: Option A	LeastC	rem_leastc	972.373
Genex: Option A	LeastC	rem_leastc	24.79335
Genex: Option A	LeastC	rem_leastc	52.52491
Genex: Option A	LeastC	rem_leastc	421.2866
Genex: Option A	LeastC	rem_leastc	97.98
Genex: Option A	LeastC	rem_leastc	455.7125
Genex: Option A	LeastC	rem_leastc	1.622995
Genex: Option A	LeastC	rem_leastc	38.69352
Genex: Option A	LeastC	rem_leastc	31.32427
Genex: Option A	LeastC	rem_leastc	7.188786
Genex: Option A	LeastC	rem_leastc	235.663
Genex: Option A	LeastC	rem_leastc	301.155
Genex: Option A	LeastC	rem_leastc	27.47533
Genex: Option A	LeastC	rem_leastc	539.3737
Genex: Option A	LeastC	rem_leastc	6.576623
Genex: Option A	LeastC	rem_leastc	89.62867
Genex: Option A	LeastC	rem_leastc	4.997119
Genex: Option A	LeastC	rem_leastc	22.16766
Genex: Option A	LeastC	rem_leastc	474.5252
Genex: Option A	LeastC	rem_leastc	183.6038
Genex: Option A	LeastC	rem_leastc	256.3734
Genex: Option A	LeastC	rem_leastc	1596.657
Genex: Option A	LeastC	rem_leastc	10.11799
Genex: Option A	LeastC	rem_leastc	376.1155
Genex: Option A	LeastC	rem_leastc	591.401
Genex: Option A	LeastC	rem_leastc	187.4392
Genex: Option A	LeastC	rem_leastc	64.95695
Genex: Option A	LeastC	rem_leastc	44.80492
Genex: Option A	LeastC	rem_leastc	240.1405
Genex: Option A	LeastC	rem_leastc	0.000222
Genex: Option A	LeastC	rem_leastc	6.768497
Genex: Option A	LeastC	rem_leastc	2.94192
Genex: Option A	LeastC	rem_leastc	4.207578
Genex: Option A	LeastC	rem_leastc	1.623035
Genex: Option A	LeastC	rem_leastc	1.398633
Genex: Option A	LeastC	rem_leastc	3.79504
Genex: Option A	LeastC	rem_leastc	2.18134
Genex: Option A	LeastC	rem_leastc	8.046262
Genex: Option A	LeastC	rem_leastc	12.96229
Genex: Option A	LeastC	rem_leastc	1.289661
Genex: Option A	LeastC	rem_leastc	79.01004
Genex: Option A	LeastC	rem_leastc	0.004241
Genex: Option A	LeastC	rem_leastc	46.31915
Genex: Option A	LeastC	rem_leastc	0.037105
Genex: Option A	LeastC	rem_leastc	10.82383
Genex: Option A	LeastC	rem_leastc	0.217139
Genex: Option A	LeastC	rem_leastc	6.178431
Genex: Option A	LeastC	rem_leastc	4.681369
Genex: Option A	LeastC	rem_leastc	7.860195
Genex: Option A	LeastC	rem_leastc	55.38093
Genex: Option A	LeastC	rem_leastc	0.075479

Genex: Option A	LeastC	rem_leastc	95.10482
Genex: Option A	LeastC	rem_leastc	81.64126
Genex: Option A	LeastC	rem_leastc	7.557274
Genex: Option A	LeastC	rem_leastc	13.22293
Genex: Option A	LeastC	rem_leastc	44.78436
Genex: Option A	LeastC	rem_leastc	23.87905
Genex: Option A	LeastC	rem_leastc	73.61523
Genex: Option A	LeastC	rem_leastc	149.9886
Genex: Option A	LeastC	rem_leastc	74.99154
Genex: Option A	LeastC	rem_leastc	3.286117
Genex: Option A	LeastC	rem_leastc	191.8055
Genex: Option A	LeastC	rem_leastc	13.39539
Genex: Option A	LeastC	rem_leastc	60.63732
Genex: Option A	LeastC	rem_leastc	137.9151
Genex: Option A	LeastC	rem_leastc	13.08896
Genex: Option A	LeastC	rem_leastc	612.04
Genex: Option A	LeastC	rem_leastc	61.22569
Genex: Option A	LeastC	rem_leastc	0.257113
Genex: Option A	LeastC	rem_leastc	4.220058
Genex: Option A	LeastC	rem_leastc	10.04527
Genex: Option A	LeastC	rem_leastc	2.741389
Genex: Option A	LeastC	rem_leastc	0.34877
Genex: Option A	LeastC	rem_leastc	0.008478
Genex: Option A	LeastC	rem_leastc	0.289362
Genex: Option A	LeastC	rem_leastc	25.32193
Genex: Option A	LeastC	rem_leastc	200.9618
Genex: Option A	LeastC	rem_leastc	53.11645
Genex: Option A	LeastC	rem_leastc	37.14543
Genex: Option A	LeastC	rem_leastc	32.21486
Genex: Option A	LeastC	rem_leastc	46.3546
Genex: Option A	LeastC	rem_leastc	0.008122
Genex: Option A	LeastC	rem_leastc	44.16289
Genex: Option A	LeastC	rem_leastc	5.923245
Genex: Option A	LeastC	rem_leastc	3.490973
Genex: Option A	LeastC	rem_leastc	131.4287
Genex: Option A	LeastC	rem_leastc	8.152129
Genex: Option A	LeastC	rem_leastc	63.09774
Genex: Option A	LeastC	rem_leastc	1.551911
Genex: Option A	LeastC	rem_leastc	6.945101
Genex: Option A	LeastC	rem_leastc	11.23512
Genex: Option A	LeastC	rem_leastc	3.025342
Genex: Option A	LeastC	rem_leastc	96.39073
Genex: Option A	LeastC	rem_leastc	15.80917
Genex: Option A	LeastC	rem_leastc	192.9281
Genex: Option A	LeastC	rem_leastc	0.037976
Genex: Option A	LeastC	rem_leastc	49.50354
Genex: Option A	LeastC	rem_leastc	125.1382
Genex: Option A	LeastC	rem_leastc	20.527
Genex: Option A	LeastC	rem_leastc	2.774712
Genex: Option A	LeastC	rem_leastc	102.0444
Genex: Option A	LeastC	rem_leastc	4.059098
Genex: Option A	LeastC	rem_leastc	0.453452
Genex: Option A	LeastC	rem_leastc	12.2734
Genex: Option A	LeastC	rem_leastc	8.720471
Genex: Option A	LeastC	rem_leastc	9.605091
Genex: Option A	LeastC	rem_leastc	0.326735
Genex: Option A	LeastC	rem_leastc	0.727728
Genex: Option A	LeastC	rem_leastc	0.288437
Genex: Option A	LeastC	rem_leastc	13.82986
Genex: Option A	LeastC	rem_leastc	57.22385
Genex: Option A	LeastC	rem_leastc	4.842688
Genex: Option A	LeastC	rem_leastc	32.01963
Genex: Option A	LeastC	rem_leastc	0.78514
Genex: Option A	LeastC	rem_leastc	31.26611
Genex: Option A	LeastC	rem_leastc	0.826022
Genex: Option A	LeastC	rem_leastc	0.584156
Genex: Option A	LeastC	rem_leastc	0.600281
Genex: Option A	LeastC	rem_leastc	6.922604
Genex: Option A	LeastC	rem_leastc	51.43218
Genex: Option A	LeastC	rem_leastc	133.6165
Genex: Option A	LeastC	rem_leastc	10.23287

Genex: Option A	O-dom	rem_oc	100.3972	2059	Total OC-dom remnant for Option A
Genex: Option A	O-dom	rem_oc	694.5312		
Genex: Option A	O-dom	rem_oc	33.51078		
Genex: Option A	O-dom	rem_oc	118.4246		
Genex: Option A	O-dom	rem_oc	23.384		
Genex: Option A	O-dom	rem_oc	3.956503		
Genex: Option A	O-dom	rem_oc	0.446083		
Genex: Option A	O-dom	rem_oc	7.45513		
Genex: Option A	O-dom	rem_oc	0.589727		
Genex: Option A	O-dom	rem_oc	21.69239		
Genex: Option A	O-dom	rem_oc	16.01724		
Genex: Option A	O-dom	rem_oc	0.000035		
Genex: Option A	O-dom	rem_oc	3.368585		
Genex: Option A	O-dom	rem_oc	7.426551		
Genex: Option A	O-dom	rem_oc	6.518863		
Genex: Option A	O-dom	rem_oc	3.000528		
Genex: Option A	O-dom	rem_oc	6.153842		
Genex: Option A	O-dom	rem_oc	26.12089		
Genex: Option A	O-dom	rem_oc	0.000001		
Genex: Option A	O-dom	rem_oc	103.7197		
Genex: Option A	O-dom	rem_oc	31.74373		
Genex: Option A	O-dom	rem_oc	0.297039		
Genex: Option A	O-dom	rem_oc	1.185374		
Genex: Option A	O-dom	rem_oc	0.483261		
Genex: Option A	O-dom	rem_oc	3.211757		
Genex: Option A	O-dom	rem_oc	1.2572		
Genex: Option A	O-dom	rem_oc	8.687105		
Genex: Option A	O-dom	rem_oc	1.990018		
Genex: Option A	O-dom	rem_oc	0.630736		
Genex: Option A	O-dom	rem_oc	14.58421		
Genex: Option A	O-dom	rem_oc	0.181752		
Genex: Option A	O-dom	rem_oc	0.483626		
Genex: Option A	O-dom	rem_oc	17.55465		
Genex: Option A	O-dom	rem_oc	1.414196		
Genex: Option A	O-dom	rem_oc	6.715692		
Genex: Option A	O-dom	rem_oc	0		
Genex: Option A	O-dom	rem_oc	0.000082		
Genex: Option A	O-dom	rem_oc	0.946609		
Genex: Option A	O-dom	rem_oc	1.013452		
Genex: Option A	O-dom	rem_oc	0.720073		
Genex: Option A	O-dom	rem_oc	1.988208		
Genex: Option A	O-dom	rem_oc	5.081188		
Genex: Option A	O-dom	rem_oc	6.756952		
Genex: Option A	O-dom	rem_oc	86.20428		
Genex: Option A	O-dom	rem_oc	14.47359		
Genex: Option A	O-dom	rem_oc	9.568996		
Genex: Option A	O-dom	rem_oc	27.99034		
Genex: Option A	O-dom	rem_oc	47.06895		
Genex: Option A	O-dom	rem_oc	0.925363		
Genex: Option A	O-dom	rem_oc	0.182819		
Genex: Option A	O-dom	rem_oc	0.144678		
Genex: Option A	O-dom	rem_oc	8.038469		
Genex: Option A	O-dom	rem_oc	0.001118		
Genex: Option A	O-dom	rem_oc	5.780518		
Genex: Option A	O-dom	rem_oc	2.728088		
Genex: Option A	O-dom	rem_oc	0.792089		
Genex: Option A	O-dom	rem_oc	2.647043		
Genex: Option A	O-dom	rem_oc	1.321795		
Genex: Option A	O-dom	rem_oc	1.075075		
Genex: Option A	O-dom	rem_oc	5.615905		
Genex: Option A	O-dom	rem_oc	11.75996		
Genex: Option A	O-dom	rem_oc	1.028013		
Genex: Option A	O-dom	rem_oc	4.05067		
Genex: Option A	O-dom	rem_oc	9.522925		
Genex: Option A	O-dom	rem_oc	0.001392		
Genex: Option A	O-dom	rem_oc	0.003394		
Genex: Option A	O-dom	rem_oc	20.59073		
Genex: Option A	O-dom	rem_oc	0.001035		
Genex: Option A	O-dom	rem_oc	33.69548		
Genex: Option A	O-dom	rem_oc	1.381382		
Genex: Option A	O-dom	rem_oc	0.928588		
Genex: Option A	O-dom	rem_oc	0.4135		
Genex: Option A	O-dom	rem_oc	3.286292		
Genex: Option A	O-dom	rem_oc	0.813393		
Genex: Option A	O-dom	rem_oc	4.770736		
Genex: Option A	O-dom	rem_oc	21.60491		
Genex: Option A	O-dom	rem_oc	1.561019		
Genex: Option A	O-dom	rem_oc	2.309776		
Genex: Option A	O-dom	rem_oc	9.712734		
Genex: Option A	O-dom	rem_oc	5.799722		

Genex: Option A	O-dom	rem_oc	1.058237		
Genex: Option A	O-dom	rem_oc	0.046029		
Genex: Option A	O-dom	rem_oc	4.964713		
Genex: Option A	O-dom	rem_oc	5.369112		
Genex: Option A	O-dom	rem_oc	5.718127		
Genex: Option A	O-dom	rem_oc	2.128498		
Genex: Option A	O-dom	rem_oc	1.30439		
Genex: Option A	O-dom	rem_oc	14.87732		
Genex: Option A	O-dom	rem_oc	48.60826		
Genex: Option A	O-dom	rem_oc	0.43457		
Genex: Option A	O-dom	rem_oc	58.61665		
Genex: Option A	O-dom	rem_oc	62.13515		
Genex: Option A	O-dom	rem_oc	4.286207		
Genex: Option A	O-dom	rem_oc	8.433967		
Genex: Option A	O-dom	rem_oc	4.418017		
Genex: Option A	O-dom	rem_oc	0.816551		
Genex: Option A	O-dom	rem_oc	1.360325		
Genex: Option A	O-dom	rem_oc	0.61658		
Genex: Option A	O-dom	rem_oc	0.594068		
Genex: Option A	O-dom	rem_oc	9.111942		
Genex: Option A	O-dom	rem_oc	8.567498		
Genex: Option A	O-dom	rem_oc	5.563262		
Genex: Option A	O-dom	rem_oc	58.10314		
Genex: Option A	O-dom	rem_oc	11.76356		
Genex: Option A	O-dom	rem_oc	15.50552		
Genex: Option A	O-dom	rem_oc	4.488126		
Genex: Option A	O-dom	rem_oc	3.278022		
Genex: Option A	O-dom	rem_oc	3.436123		
Genex: Option A	O-dom	rem_oc	11.64185		
Genex: Option A	O-dom	rem_oc	18.22205		
Genex: Option A	O-dom	rem_oc	0.0018		
Genex: Option A	O-dom	rem_oc	4.444007		
Genex: Option A	O-dom	rem_oc	6.059981		
Genex: Option A	O-dom	rem_oc	0.338932		
Genex: Option A	O-dom	rem_oc	15.98738		
Genex: Option A	O-dom	rem_oc	0.645188		
Genex: Option A	O-dom	rem_oc	3.072902		
Genex: Option A	O-dom	rem_oc	0.000344		
Genex: Option A	O-dom	rem_oc	9.199158		
Genex: Option A	O-dom	rem_oc	6.182994		
Genex: Option A	O-dom	rem_oc	6.221117		
Genex: Option A	O-subdom	rem_oc	20.80435	1008	Total OC-subdom remnant for Option A
Genex: Option A	O-subdom	rem_oc	130.6595		
Genex: Option A	O-subdom	rem_oc	345.7833		
Genex: Option A	O-subdom	rem_oc	48.92495		
Genex: Option A	O-subdom	rem_oc	18.5864		
Genex: Option A	O-subdom	rem_oc	348.0027		
Genex: Option A	O-subdom	rem_oc	95.19846		

Kidston Corridor Option B - Regional ecosystems v8

Name	VM_POLY	VM_STATUS	Area_ha		
Genex: Option B	LeastC	hvr_leastc	11.76166	202	Total LC regrowth for Option B
Genex: Option B	LeastC	hvr_leastc	0.071373		
Genex: Option B	LeastC	hvr_leastc	0.032936		
Genex: Option B	LeastC	hvr_leastc	0.275677		
Genex: Option B	LeastC	hvr_leastc	4.030559		
Genex: Option B	LeastC	hvr_leastc	4.565859		
Genex: Option B	LeastC	hvr_leastc	2.294056		
Genex: Option B	LeastC	hvr_leastc	1.055631		
Genex: Option B	LeastC	hvr_leastc	1.583837		
Genex: Option B	LeastC	hvr_leastc	4.886182		
Genex: Option B	LeastC	hvr_leastc	0.483842		
Genex: Option B	LeastC	hvr_leastc	0.022396		
Genex: Option B	LeastC	hvr_leastc	16.55398		
Genex: Option B	LeastC	hvr_leastc	0.847925		
Genex: Option B	LeastC	hvr_leastc	0.452182		
Genex: Option B	LeastC	hvr_leastc	0.355135		
Genex: Option B	LeastC	hvr_leastc	1.329568		
Genex: Option B	LeastC	hvr_leastc	7.449196		
Genex: Option B	LeastC	hvr_leastc	10.2054		
Genex: Option B	LeastC	hvr_leastc	0.252609		
Genex: Option B	LeastC	hvr_leastc	0.004932		
Genex: Option B	LeastC	hvr_leastc	2.193916		
Genex: Option B	LeastC	hvr_leastc	0.628194		
Genex: Option B	LeastC	hvr_leastc	4.798001		
Genex: Option B	LeastC	hvr_leastc	4.892764		
Genex: Option B	LeastC	hvr_leastc	0.857374		
Genex: Option B	LeastC	hvr_leastc	0.016948		
Genex: Option B	LeastC	hvr_leastc	0.026688		
Genex: Option B	LeastC	hvr_leastc	0.489348		
Genex: Option B	LeastC	hvr_leastc	0.001268		
Genex: Option B	LeastC	hvr_leastc	0.733646		
Genex: Option B	LeastC	hvr_leastc	0.001018		
Genex: Option B	LeastC	hvr_leastc	2.958507		
Genex: Option B	LeastC	hvr_leastc	2.596304		
Genex: Option B	LeastC	hvr_leastc	2.274126		
Genex: Option B	LeastC	hvr_leastc	0.860982		
Genex: Option B	LeastC	hvr_leastc	0.17804		
Genex: Option B	LeastC	hvr_leastc	1.002297		
Genex: Option B	LeastC	hvr_leastc	0.00441		
Genex: Option B	LeastC	hvr_leastc	13.17734		
Genex: Option B	LeastC	hvr_leastc	0.224692		
Genex: Option B	LeastC	hvr_leastc	1.836962		
Genex: Option B	LeastC	hvr_leastc	0.523549		
Genex: Option B	LeastC	hvr_leastc	5.202041		
Genex: Option B	LeastC	hvr_leastc	0.41416		
Genex: Option B	LeastC	hvr_leastc	0.004426		
Genex: Option B	LeastC	hvr_leastc	0.175718		
Genex: Option B	LeastC	hvr_leastc	1.371884		
Genex: Option B	LeastC	hvr_leastc	0.720414		
Genex: Option B	LeastC	hvr_leastc	0.086502		
Genex: Option B	LeastC	hvr_leastc	0.349904		
Genex: Option B	LeastC	hvr_leastc	9.197092		
Genex: Option B	LeastC	hvr_leastc	2.849699		
Genex: Option B	LeastC	hvr_leastc	1.297257		
Genex: Option B	LeastC	hvr_leastc	63.51923		
Genex: Option B	LeastC	hvr_leastc	0.000024		
Genex: Option B	LeastC	hvr_leastc	0.000132		
Genex: Option B	LeastC	hvr_leastc	0.000386		
Genex: Option B	LeastC	hvr_leastc	2.657052		
Genex: Option B	LeastC	hvr_leastc	1.646678		
Genex: Option B	LeastC	hvr_leastc	3.808301		
Genex: Option B	LeastC	hvr_leastc	0.001706		

Genex: Option B	O-dom	hvr_oc	0.888013	2.4	Total OC-dom HVR regrowth for Option B
Genex: Option B	O-dom	hvr_oc	0.034724		
Genex: Option B	O-dom	hvr_oc	0.084695		
Genex: Option B	O-dom	hvr_oc	0.476706		
Genex: Option B	O-dom	hvr_oc	0.890819		
Genex: Option B	non-rem	non_remnant	12.82744	2379	Total non-remnant for Option B
Genex: Option B	non-rem	non_remnant	1.191201		
Genex: Option B	non-rem	non_remnant	3.098019		
Genex: Option B	non-rem	non_remnant	6.002011		
Genex: Option B	non-rem	non_remnant	10.64987		
Genex: Option B	non-rem	non_remnant	18.11507		
Genex: Option B	non-rem	non_remnant	7.444218		
Genex: Option B	non-rem	non_remnant	103.7112		
Genex: Option B	non-rem	non_remnant	1.27489		
Genex: Option B	non-rem	non_remnant	1.573922		
Genex: Option B	non-rem	non_remnant	0.416775		
Genex: Option B	non-rem	non_remnant	0.284209		
Genex: Option B	non-rem	non_remnant	0.934327		
Genex: Option B	non-rem	non_remnant	32.73321		
Genex: Option B	non-rem	non_remnant	0.21711		
Genex: Option B	non-rem	non_remnant	7.341556		
Genex: Option B	non-rem	non_remnant	1.536304		
Genex: Option B	non-rem	non_remnant	1.624022		
Genex: Option B	non-rem	non_remnant	1.525838		
Genex: Option B	non-rem	non_remnant	6.35254		
Genex: Option B	non-rem	non_remnant	0.311335		
Genex: Option B	non-rem	non_remnant	7.245895		
Genex: Option B	non-rem	non_remnant	8.656713		
Genex: Option B	non-rem	non_remnant	0.284912		
Genex: Option B	non-rem	non_remnant	0.799373		
Genex: Option B	non-rem	non_remnant	1.586069		
Genex: Option B	non-rem	non_remnant	393.879		
Genex: Option B	non-rem	non_remnant	106.2974		
Genex: Option B	non-rem	non_remnant	3.895228		
Genex: Option B	non-rem	non_remnant	288.9389		
Genex: Option B	non-rem	non_remnant	4.258125		
Genex: Option B	non-rem	non_remnant	0.056622		
Genex: Option B	non-rem	non_remnant	0.167595		
Genex: Option B	non-rem	non_remnant	0.535546		
Genex: Option B	non-rem	non_remnant	0.756154		
Genex: Option B	non-rem	non_remnant	103.4499		
Genex: Option B	non-rem	non_remnant	6.867542		
Genex: Option B	non-rem	non_remnant	347.132		
Genex: Option B	non-rem	non_remnant	0.000275		
Genex: Option B	non-rem	non_remnant	0.000386		
Genex: Option B	non-rem	non_remnant	0.234067		
Genex: Option B	non-rem	non_remnant	282.7614		
Genex: Option B	non-rem	non_remnant	0.000204		
Genex: Option B	non-rem	non_remnant	0.000074		
Genex: Option B	non-rem	non_remnant	8.914747		
Genex: Option B	non-rem	non_remnant	1.286566		
Genex: Option B	non-rem	non_remnant	1.685735		
Genex: Option B	non-rem	non_remnant	0.526879		
Genex: Option B	non-rem	non_remnant	0.121333		
Genex: Option B	non-rem	non_remnant	3.735213		
Genex: Option B	non-rem	non_remnant	117.347		
Genex: Option B	non-rem	non_remnant	468.6799		
Genex: Option B	non-rem	non_remnant	0.001706		
Genex: Option B	water	non_remnant	87.63232	117	Total water non-remnant for Option B
Genex: Option B	water	non_remnant	0.341308		
Genex: Option B	water	non_remnant	11.9254		
Genex: Option B	water	non_remnant	17.22085		
Genex: Option B	LeastC	rem_leastc	26.95741	51121	Total LC remnant for Option B
Genex: Option B	LeastC	rem_leastc	7.493854		
Genex: Option B	LeastC	rem_leastc	255.6705		
Genex: Option B	LeastC	rem_leastc	99.21011		
Genex: Option B	LeastC	rem_leastc	337.5413		
Genex: Option B	LeastC	rem_leastc	19.5728		
Genex: Option B	LeastC	rem_leastc	2.196989		
Genex: Option B	LeastC	rem_leastc	156.2433		

Genex: Option B	LeastC	rem_leastc	2.363897
Genex: Option B	LeastC	rem_leastc	59.46574
Genex: Option B	LeastC	rem_leastc	326.0669
Genex: Option B	LeastC	rem_leastc	42.58946
Genex: Option B	LeastC	rem_leastc	79.24012
Genex: Option B	LeastC	rem_leastc	3.026556
Genex: Option B	LeastC	rem_leastc	14.37214
Genex: Option B	LeastC	rem_leastc	79.46571
Genex: Option B	LeastC	rem_leastc	169.7709
Genex: Option B	LeastC	rem_leastc	188.8082
Genex: Option B	LeastC	rem_leastc	1.809083
Genex: Option B	LeastC	rem_leastc	4.936312
Genex: Option B	LeastC	rem_leastc	41.46687
Genex: Option B	LeastC	rem_leastc	26.04
Genex: Option B	LeastC	rem_leastc	28.90649
Genex: Option B	LeastC	rem_leastc	55.9325
Genex: Option B	LeastC	rem_leastc	3.377138
Genex: Option B	LeastC	rem_leastc	13.57611
Genex: Option B	LeastC	rem_leastc	92.17016
Genex: Option B	LeastC	rem_leastc	27.56209
Genex: Option B	LeastC	rem_leastc	24.13472
Genex: Option B	LeastC	rem_leastc	36.77539
Genex: Option B	LeastC	rem_leastc	26.5067
Genex: Option B	LeastC	rem_leastc	0.114053
Genex: Option B	LeastC	rem_leastc	90.00732
Genex: Option B	LeastC	rem_leastc	8.935729
Genex: Option B	LeastC	rem_leastc	62.61951
Genex: Option B	LeastC	rem_leastc	502.94
Genex: Option B	LeastC	rem_leastc	41.45126
Genex: Option B	LeastC	rem_leastc	27.55622
Genex: Option B	LeastC	rem_leastc	457.4285
Genex: Option B	LeastC	rem_leastc	604.3354
Genex: Option B	LeastC	rem_leastc	13.58892
Genex: Option B	LeastC	rem_leastc	23.97449
Genex: Option B	LeastC	rem_leastc	1.36276
Genex: Option B	LeastC	rem_leastc	41.44455
Genex: Option B	LeastC	rem_leastc	766.9081
Genex: Option B	LeastC	rem_leastc	7.498845
Genex: Option B	LeastC	rem_leastc	1.855243
Genex: Option B	LeastC	rem_leastc	98.11036
Genex: Option B	LeastC	rem_leastc	11.92043
Genex: Option B	LeastC	rem_leastc	2.674089
Genex: Option B	LeastC	rem_leastc	421.3659
Genex: Option B	LeastC	rem_leastc	15.33338
Genex: Option B	LeastC	rem_leastc	0.033028
Genex: Option B	LeastC	rem_leastc	15.38248
Genex: Option B	LeastC	rem_leastc	602.6281
Genex: Option B	LeastC	rem_leastc	539.0101
Genex: Option B	LeastC	rem_leastc	45.58743
Genex: Option B	LeastC	rem_leastc	54.55858
Genex: Option B	LeastC	rem_leastc	26.25275
Genex: Option B	LeastC	rem_leastc	24.49658
Genex: Option B	LeastC	rem_leastc	4.012632
Genex: Option B	LeastC	rem_leastc	32.58558
Genex: Option B	LeastC	rem_leastc	2.735045
Genex: Option B	LeastC	rem_leastc	329.6436
Genex: Option B	LeastC	rem_leastc	78.50426
Genex: Option B	LeastC	rem_leastc	15.35245
Genex: Option B	LeastC	rem_leastc	50.55502
Genex: Option B	LeastC	rem_leastc	54.24811
Genex: Option B	LeastC	rem_leastc	106.3064
Genex: Option B	LeastC	rem_leastc	215.6079
Genex: Option B	LeastC	rem_leastc	2.555068
Genex: Option B	LeastC	rem_leastc	13.52695
Genex: Option B	LeastC	rem_leastc	100.1217
Genex: Option B	LeastC	rem_leastc	267.2011
Genex: Option B	LeastC	rem_leastc	7.561765
Genex: Option B	LeastC	rem_leastc	563.416
Genex: Option B	LeastC	rem_leastc	13.37656
Genex: Option B	LeastC	rem_leastc	698.7491
Genex: Option B	LeastC	rem_leastc	6.465764
Genex: Option B	LeastC	rem_leastc	43.71799
Genex: Option B	LeastC	rem_leastc	426.9156
Genex: Option B	LeastC	rem_leastc	142.4977
Genex: Option B	LeastC	rem_leastc	36.24586
Genex: Option B	LeastC	rem_leastc	0.351853
Genex: Option B	LeastC	rem_leastc	12.18548
Genex: Option B	LeastC	rem_leastc	39.95127

Genex: Option B	LeastC	rem_leastc	43.78872
Genex: Option B	LeastC	rem_leastc	16.76179
Genex: Option B	LeastC	rem_leastc	236.8411
Genex: Option B	LeastC	rem_leastc	45.65808
Genex: Option B	LeastC	rem_leastc	33.08399
Genex: Option B	LeastC	rem_leastc	18.19931
Genex: Option B	LeastC	rem_leastc	74.95996
Genex: Option B	LeastC	rem_leastc	6.095082
Genex: Option B	LeastC	rem_leastc	77.06789
Genex: Option B	LeastC	rem_leastc	80.45791
Genex: Option B	LeastC	rem_leastc	1.01019
Genex: Option B	LeastC	rem_leastc	72.92622
Genex: Option B	LeastC	rem_leastc	82.15856
Genex: Option B	LeastC	rem_leastc	368.5145
Genex: Option B	LeastC	rem_leastc	53.66492
Genex: Option B	LeastC	rem_leastc	40.47175
Genex: Option B	LeastC	rem_leastc	88.70847
Genex: Option B	LeastC	rem_leastc	17.2582
Genex: Option B	LeastC	rem_leastc	40.4714
Genex: Option B	LeastC	rem_leastc	30.47152
Genex: Option B	LeastC	rem_leastc	4.376344
Genex: Option B	LeastC	rem_leastc	349.1754
Genex: Option B	LeastC	rem_leastc	45.56187
Genex: Option B	LeastC	rem_leastc	366.7211
Genex: Option B	LeastC	rem_leastc	27.30528
Genex: Option B	LeastC	rem_leastc	237.8945
Genex: Option B	LeastC	rem_leastc	28.61304
Genex: Option B	LeastC	rem_leastc	21.1362
Genex: Option B	LeastC	rem_leastc	144.4847
Genex: Option B	LeastC	rem_leastc	110.4779
Genex: Option B	LeastC	rem_leastc	30.2618
Genex: Option B	LeastC	rem_leastc	9.529117
Genex: Option B	LeastC	rem_leastc	369.3495
Genex: Option B	LeastC	rem_leastc	302.0024
Genex: Option B	LeastC	rem_leastc	221.8051
Genex: Option B	LeastC	rem_leastc	394.3924
Genex: Option B	LeastC	rem_leastc	813.6089
Genex: Option B	LeastC	rem_leastc	1336.278
Genex: Option B	LeastC	rem_leastc	6.820337
Genex: Option B	LeastC	rem_leastc	42.57597
Genex: Option B	LeastC	rem_leastc	190.512
Genex: Option B	LeastC	rem_leastc	70.1625
Genex: Option B	LeastC	rem_leastc	338.8364
Genex: Option B	LeastC	rem_leastc	4.722484
Genex: Option B	LeastC	rem_leastc	12.75251
Genex: Option B	LeastC	rem_leastc	11.71659
Genex: Option B	LeastC	rem_leastc	11.7374
Genex: Option B	LeastC	rem_leastc	5.838685
Genex: Option B	LeastC	rem_leastc	19.6216
Genex: Option B	LeastC	rem_leastc	12.0518
Genex: Option B	LeastC	rem_leastc	6.919189
Genex: Option B	LeastC	rem_leastc	54.14043
Genex: Option B	LeastC	rem_leastc	19.80428
Genex: Option B	LeastC	rem_leastc	78.62039
Genex: Option B	LeastC	rem_leastc	15.51213
Genex: Option B	LeastC	rem_leastc	117.7604
Genex: Option B	LeastC	rem_leastc	165.1769
Genex: Option B	LeastC	rem_leastc	197.739
Genex: Option B	LeastC	rem_leastc	482.4364
Genex: Option B	LeastC	rem_leastc	66.28895
Genex: Option B	LeastC	rem_leastc	0.199872
Genex: Option B	LeastC	rem_leastc	21.28374
Genex: Option B	LeastC	rem_leastc	219.6841
Genex: Option B	LeastC	rem_leastc	76.77679
Genex: Option B	LeastC	rem_leastc	10.29573
Genex: Option B	LeastC	rem_leastc	380.5413
Genex: Option B	LeastC	rem_leastc	92.48148
Genex: Option B	LeastC	rem_leastc	6.691739
Genex: Option B	LeastC	rem_leastc	526.1154
Genex: Option B	LeastC	rem_leastc	428.0187
Genex: Option B	LeastC	rem_leastc	27.47299
Genex: Option B	LeastC	rem_leastc	34.75991
Genex: Option B	LeastC	rem_leastc	216.618
Genex: Option B	LeastC	rem_leastc	2.482518
Genex: Option B	LeastC	rem_leastc	192.9534
Genex: Option B	LeastC	rem_leastc	108.3536
Genex: Option B	LeastC	rem_leastc	14.38084
Genex: Option B	LeastC	rem_leastc	43.44386

Genex: Option B	LeastC	rem_leastc	0.004241
Genex: Option B	LeastC	rem_leastc	193.8193
Genex: Option B	LeastC	rem_leastc	183.4683
Genex: Option B	LeastC	rem_leastc	105.8241
Genex: Option B	LeastC	rem_leastc	30.87396
Genex: Option B	LeastC	rem_leastc	437.6609
Genex: Option B	LeastC	rem_leastc	26.50336
Genex: Option B	LeastC	rem_leastc	43.01024
Genex: Option B	LeastC	rem_leastc	2.674355
Genex: Option B	LeastC	rem_leastc	145.642
Genex: Option B	LeastC	rem_leastc	45.83799
Genex: Option B	LeastC	rem_leastc	1.750816
Genex: Option B	LeastC	rem_leastc	7.330887
Genex: Option B	LeastC	rem_leastc	80.91222
Genex: Option B	LeastC	rem_leastc	285.9006
Genex: Option B	LeastC	rem_leastc	1.802566
Genex: Option B	LeastC	rem_leastc	59.32959
Genex: Option B	LeastC	rem_leastc	12.23004
Genex: Option B	LeastC	rem_leastc	8.971527
Genex: Option B	LeastC	rem_leastc	13.00588
Genex: Option B	LeastC	rem_leastc	3.75467
Genex: Option B	LeastC	rem_leastc	178.9832
Genex: Option B	LeastC	rem_leastc	107.5745
Genex: Option B	LeastC	rem_leastc	61.24909
Genex: Option B	LeastC	rem_leastc	88.93272
Genex: Option B	LeastC	rem_leastc	8.600226
Genex: Option B	LeastC	rem_leastc	42.1064
Genex: Option B	LeastC	rem_leastc	526.2937
Genex: Option B	LeastC	rem_leastc	4.800436
Genex: Option B	LeastC	rem_leastc	12.7743
Genex: Option B	LeastC	rem_leastc	18.0793
Genex: Option B	LeastC	rem_leastc	70.34255
Genex: Option B	LeastC	rem_leastc	47.25853
Genex: Option B	LeastC	rem_leastc	289.9992
Genex: Option B	LeastC	rem_leastc	2.945584
Genex: Option B	LeastC	rem_leastc	0.027143
Genex: Option B	LeastC	rem_leastc	22.94944
Genex: Option B	LeastC	rem_leastc	241.1351
Genex: Option B	LeastC	rem_leastc	0.037105
Genex: Option B	LeastC	rem_leastc	1.018066
Genex: Option B	LeastC	rem_leastc	148.4483
Genex: Option B	LeastC	rem_leastc	1.735207
Genex: Option B	LeastC	rem_leastc	200.3061
Genex: Option B	LeastC	rem_leastc	6.178431
Genex: Option B	LeastC	rem_leastc	0.283346
Genex: Option B	LeastC	rem_leastc	63.82911
Genex: Option B	LeastC	rem_leastc	9.483077
Genex: Option B	LeastC	rem_leastc	5.112733
Genex: Option B	LeastC	rem_leastc	42.39342
Genex: Option B	LeastC	rem_leastc	217.1046
Genex: Option B	LeastC	rem_leastc	274.7574
Genex: Option B	LeastC	rem_leastc	44.75944
Genex: Option B	LeastC	rem_leastc	34.00366
Genex: Option B	LeastC	rem_leastc	15.84078
Genex: Option B	LeastC	rem_leastc	44.64747
Genex: Option B	LeastC	rem_leastc	122.9537
Genex: Option B	LeastC	rem_leastc	566.3628
Genex: Option B	LeastC	rem_leastc	14.21165
Genex: Option B	LeastC	rem_leastc	28.92059
Genex: Option B	LeastC	rem_leastc	237.4161
Genex: Option B	LeastC	rem_leastc	82.96334
Genex: Option B	LeastC	rem_leastc	60.5029
Genex: Option B	LeastC	rem_leastc	45.99594
Genex: Option B	LeastC	rem_leastc	87.13361
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Genex: Option B	LeastC	rem_leastc	47.59365
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Genex: Option B	LeastC	rem_leastc	14.67879
Genex: Option B	LeastC	rem_leastc	36.05249
Genex: Option B	LeastC	rem_leastc	345.0211
Genex: Option B	LeastC	rem_leastc	166.6805
Genex: Option B	LeastC	rem_leastc	543.976
Genex: Option B	LeastC	rem_leastc	7.497423
Genex: Option B	LeastC	rem_leastc	441.0962
Genex: Option B	LeastC	rem_leastc	13.40562
Genex: Option B	LeastC	rem_leastc	1.641803
Genex: Option B	LeastC	rem_leastc	74.30006
Genex: Option B	LeastC	rem_leastc	1.650331

Genex: Option B	LeastC	rem_leastc	70.1032
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Genex: Option B	LeastC	rem_leastc	247.8017
Genex: Option B	LeastC	rem_leastc	164.7249
Genex: Option B	LeastC	rem_leastc	7.676785
Genex: Option B	LeastC	rem_leastc	497.7703
Genex: Option B	LeastC	rem_leastc	73.2098
Genex: Option B	LeastC	rem_leastc	15.16272
Genex: Option B	LeastC	rem_leastc	30.13856
Genex: Option B	LeastC	rem_leastc	24.79674
Genex: Option B	LeastC	rem_leastc	12.80719
Genex: Option B	LeastC	rem_leastc	30.18079
Genex: Option B	LeastC	rem_leastc	50.3982
Genex: Option B	LeastC	rem_leastc	2.007452
Genex: Option B	LeastC	rem_leastc	5.297635
Genex: Option B	LeastC	rem_leastc	4.628709
Genex: Option B	LeastC	rem_leastc	23.61133
Genex: Option B	LeastC	rem_leastc	73.136
Genex: Option B	LeastC	rem_leastc	95.10482
Genex: Option B	LeastC	rem_leastc	875.1531
Genex: Option B	LeastC	rem_leastc	5.458226
Genex: Option B	LeastC	rem_leastc	5.761792
Genex: Option B	LeastC	rem_leastc	61.16559
Genex: Option B	LeastC	rem_leastc	19.86604
Genex: Option B	LeastC	rem_leastc	144.7855
Genex: Option B	LeastC	rem_leastc	40.26181
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Genex: Option B	LeastC	rem_leastc	6.56791
Genex: Option B	LeastC	rem_leastc	1.495947
Genex: Option B	LeastC	rem_leastc	42.50296
Genex: Option B	LeastC	rem_leastc	81.64126
Genex: Option B	LeastC	rem_leastc	0.284174
Genex: Option B	LeastC	rem_leastc	342.7593
Genex: Option B	LeastC	rem_leastc	90.20453
Genex: Option B	LeastC	rem_leastc	11.22949
Genex: Option B	LeastC	rem_leastc	370.7128
Genex: Option B	LeastC	rem_leastc	2.448721
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Genex: Option B	LeastC	rem_leastc	87.37309
Genex: Option B	LeastC	rem_leastc	11.05859
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Genex: Option B	LeastC	rem_leastc	53.89835
Genex: Option B	LeastC	rem_leastc	17.69808
Genex: Option B	LeastC	rem_leastc	7.514547
Genex: Option B	LeastC	rem_leastc	7.557274
Genex: Option B	LeastC	rem_leastc	508.631
Genex: Option B	LeastC	rem_leastc	427.6424
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Genex: Option B	LeastC	rem_leastc	13.22293
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Genex: Option B	LeastC	rem_leastc	0.859066
Genex: Option B	LeastC	rem_leastc	44.88932
Genex: Option B	LeastC	rem_leastc	10.31003
Genex: Option B	LeastC	rem_leastc	3.907877
Genex: Option B	LeastC	rem_leastc	0.286307
Genex: Option B	LeastC	rem_leastc	3.536081
Genex: Option B	LeastC	rem_leastc	4.302634
Genex: Option B	LeastC	rem_leastc	40.54574
Genex: Option B	LeastC	rem_leastc	46.35656
Genex: Option B	LeastC	rem_leastc	35.1372
Genex: Option B	LeastC	rem_leastc	21.46795
Genex: Option B	LeastC	rem_leastc	63.82186
Genex: Option B	LeastC	rem_leastc	6.597762
Genex: Option B	LeastC	rem_leastc	22.59072
Genex: Option B	LeastC	rem_leastc	14.81235
Genex: Option B	LeastC	rem_leastc	25.26813
Genex: Option B	LeastC	rem_leastc	44.78436
Genex: Option B	LeastC	rem_leastc	15.78862
Genex: Option B	LeastC	rem_leastc	488.7074
Genex: Option B	LeastC	rem_leastc	91.32114
Genex: Option B	LeastC	rem_leastc	17.66116
Genex: Option B	LeastC	rem_leastc	9.664155
Genex: Option B	LeastC	rem_leastc	27.0727
Genex: Option B	LeastC	rem_leastc	47.85526
Genex: Option B	LeastC	rem_leastc	76.16868
Genex: Option B	LeastC	rem_leastc	478.2442
Genex: Option B	LeastC	rem_leastc	4.100452

Genex: Option B	LeastC	rem_leastc	145.1778
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Genex: Option B	LeastC	rem_leastc	0.226342
Genex: Option B	LeastC	rem_leastc	15.25306
Genex: Option B	LeastC	rem_leastc	167.5648
Genex: Option B	LeastC	rem_leastc	0.043366
Genex: Option B	LeastC	rem_leastc	0.249369
Genex: Option B	LeastC	rem_leastc	31.21998
Genex: Option B	LeastC	rem_leastc	21.50388
Genex: Option B	LeastC	rem_leastc	13.38243
Genex: Option B	LeastC	rem_leastc	48.91066
Genex: Option B	LeastC	rem_leastc	7.692077
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Genex: Option B	LeastC	rem_leastc	2.839104
Genex: Option B	LeastC	rem_leastc	65.74696
Genex: Option B	LeastC	rem_leastc	2.994388
Genex: Option B	LeastC	rem_leastc	0.739912
Genex: Option B	LeastC	rem_leastc	23.87905
Genex: Option B	LeastC	rem_leastc	17.49671
Genex: Option B	LeastC	rem_leastc	70.5411
Genex: Option B	LeastC	rem_leastc	13.06975
Genex: Option B	LeastC	rem_leastc	2.843588
Genex: Option B	LeastC	rem_leastc	47.54403
Genex: Option B	LeastC	rem_leastc	54.55183
Genex: Option B	LeastC	rem_leastc	73.61523
Genex: Option B	LeastC	rem_leastc	20.83647
Genex: Option B	LeastC	rem_leastc	22.70387
Genex: Option B	LeastC	rem_leastc	1388.618
Genex: Option B	LeastC	rem_leastc	149.9886
Genex: Option B	LeastC	rem_leastc	2023.063
Genex: Option B	LeastC	rem_leastc	23.4374
Genex: Option B	LeastC	rem_leastc	74.99154
Genex: Option B	LeastC	rem_leastc	16.91414
Genex: Option B	LeastC	rem_leastc	93.94763
Genex: Option B	LeastC	rem_leastc	126.8936
Genex: Option B	LeastC	rem_leastc	330.4297
Genex: Option B	LeastC	rem_leastc	18.47445
Genex: Option B	LeastC	rem_leastc	4.334424
Genex: Option B	LeastC	rem_leastc	7.76446
Genex: Option B	LeastC	rem_leastc	2.66187
Genex: Option B	LeastC	rem_leastc	101.9941
Genex: Option B	LeastC	rem_leastc	33.50958
Genex: Option B	LeastC	rem_leastc	500.0821
Genex: Option B	LeastC	rem_leastc	27.68105
Genex: Option B	LeastC	rem_leastc	50.82704
Genex: Option B	LeastC	rem_leastc	27.28552
Genex: Option B	LeastC	rem_leastc	123.2228
Genex: Option B	LeastC	rem_leastc	367.1263
Genex: Option B	LeastC	rem_leastc	34.76944
Genex: Option B	LeastC	rem_leastc	3.286117
Genex: Option B	LeastC	rem_leastc	107.844
Genex: Option B	LeastC	rem_leastc	191.8055
Genex: Option B	LeastC	rem_leastc	80.41676
Genex: Option B	LeastC	rem_leastc	180.466
Genex: Option B	LeastC	rem_leastc	1.27862
Genex: Option B	LeastC	rem_leastc	24.74313
Genex: Option B	LeastC	rem_leastc	0.952919
Genex: Option B	LeastC	rem_leastc	12.90265
Genex: Option B	LeastC	rem_leastc	0.324657
Genex: Option B	LeastC	rem_leastc	34.31719
Genex: Option B	LeastC	rem_leastc	4.292203
Genex: Option B	LeastC	rem_leastc	12.06587
Genex: Option B	LeastC	rem_leastc	3.785718
Genex: Option B	LeastC	rem_leastc	0.559217
Genex: Option B	LeastC	rem_leastc	170.6071
Genex: Option B	LeastC	rem_leastc	44.47043
Genex: Option B	LeastC	rem_leastc	2.756305
Genex: Option B	LeastC	rem_leastc	81.53098
Genex: Option B	LeastC	rem_leastc	8.319718
Genex: Option B	LeastC	rem_leastc	2.661891
Genex: Option B	LeastC	rem_leastc	13.44255
Genex: Option B	LeastC	rem_leastc	5.069492
Genex: Option B	LeastC	rem_leastc	17.85633
Genex: Option B	LeastC	rem_leastc	15.8381
Genex: Option B	LeastC	rem_leastc	13.39539
Genex: Option B	LeastC	rem_leastc	59.0309
Genex: Option B	LeastC	rem_leastc	60.63732
Genex: Option B	LeastC	rem_leastc	135.982

Genex: Option B	LeastC	rem_leastc	26.17916
Genex: Option B	LeastC	rem_leastc	12.59796
Genex: Option B	LeastC	rem_leastc	29.47318
Genex: Option B	LeastC	rem_leastc	137.9151
Genex: Option B	LeastC	rem_leastc	109.8415
Genex: Option B	LeastC	rem_leastc	149.8079
Genex: Option B	LeastC	rem_leastc	462.3725
Genex: Option B	LeastC	rem_leastc	210.8056
Genex: Option B	LeastC	rem_leastc	96.2025
Genex: Option B	LeastC	rem_leastc	11.50008
Genex: Option B	LeastC	rem_leastc	10.76424
Genex: Option B	LeastC	rem_leastc	183.6566
Genex: Option B	LeastC	rem_leastc	17.68986
Genex: Option B	LeastC	rem_leastc	190.5614
Genex: Option B	LeastC	rem_leastc	12.3432
Genex: Option B	LeastC	rem_leastc	59.1258
Genex: Option B	LeastC	rem_leastc	8.331762
Genex: Option B	LeastC	rem_leastc	13.08896
Genex: Option B	LeastC	rem_leastc	2.857761
Genex: Option B	LeastC	rem_leastc	8.412393
Genex: Option B	LeastC	rem_leastc	612.04
Genex: Option B	LeastC	rem_leastc	604.5275
Genex: Option B	LeastC	rem_leastc	9.989402
Genex: Option B	LeastC	rem_leastc	26.86946
Genex: Option B	LeastC	rem_leastc	1.759112
Genex: Option B	LeastC	rem_leastc	129.2239
Genex: Option B	LeastC	rem_leastc	13.45173
Genex: Option B	LeastC	rem_leastc	2.664493
Genex: Option B	LeastC	rem_leastc	58.33691
Genex: Option B	LeastC	rem_leastc	17.44888
Genex: Option B	LeastC	rem_leastc	7.161197
Genex: Option B	LeastC	rem_leastc	348.5125
Genex: Option B	LeastC	rem_leastc	9.412106
Genex: Option B	LeastC	rem_leastc	1.264701
Genex: Option B	LeastC	rem_leastc	553.999
Genex: Option B	LeastC	rem_leastc	192.4199
Genex: Option B	LeastC	rem_leastc	9.22467
Genex: Option B	LeastC	rem_leastc	7.926539
Genex: Option B	LeastC	rem_leastc	29.46511
Genex: Option B	LeastC	rem_leastc	324.4124
Genex: Option B	LeastC	rem_leastc	4.364596
Genex: Option B	LeastC	rem_leastc	248.962
Genex: Option B	LeastC	rem_leastc	10.31886
Genex: Option B	LeastC	rem_leastc	215.5128
Genex: Option B	LeastC	rem_leastc	64.58989
Genex: Option B	LeastC	rem_leastc	25.19911
Genex: Option B	LeastC	rem_leastc	404.6123
Genex: Option B	LeastC	rem_leastc	0.053489
Genex: Option B	LeastC	rem_leastc	0.589376
Genex: Option B	LeastC	rem_leastc	25.03669
Genex: Option B	LeastC	rem_leastc	0.34877
Genex: Option B	LeastC	rem_leastc	120.4981
Genex: Option B	LeastC	rem_leastc	200.9618
Genex: Option B	LeastC	rem_leastc	192.5669
Genex: Option B	LeastC	rem_leastc	22.14615
Genex: Option B	LeastC	rem_leastc	17.90449
Genex: Option B	LeastC	rem_leastc	37.14543
Genex: Option B	LeastC	rem_leastc	100.6029
Genex: Option B	LeastC	rem_leastc	40.38307
Genex: Option B	LeastC	rem_leastc	16.41434
Genex: Option B	LeastC	rem_leastc	9.77248
Genex: Option B	LeastC	rem_leastc	32.21486
Genex: Option B	LeastC	rem_leastc	46.3546
Genex: Option B	LeastC	rem_leastc	0.008122
Genex: Option B	LeastC	rem_leastc	44.16289
Genex: Option B	LeastC	rem_leastc	5.923245
Genex: Option B	LeastC	rem_leastc	3.490973
Genex: Option B	LeastC	rem_leastc	131.4287
Genex: Option B	LeastC	rem_leastc	8.152129
Genex: Option B	LeastC	rem_leastc	0.000275
Genex: Option B	LeastC	rem_leastc	0.000024
Genex: Option B	LeastC	rem_leastc	63.09774
Genex: Option B	LeastC	rem_leastc	1.551911
Genex: Option B	LeastC	rem_leastc	6.945101
Genex: Option B	LeastC	rem_leastc	0.000132
Genex: Option B	LeastC	rem_leastc	11.23512
Genex: Option B	LeastC	rem_leastc	3.025342
Genex: Option B	LeastC	rem_leastc	96.39073

Genex: Option B	LeastC	rem_leastc	15.80917		
Genex: Option B	LeastC	rem_leastc	192.9281		
Genex: Option B	LeastC	rem_leastc	0.037976		
Genex: Option B	LeastC	rem_leastc	49.50354		
Genex: Option B	LeastC	rem_leastc	125.1382		
Genex: Option B	LeastC	rem_leastc	20.527		
Genex: Option B	LeastC	rem_leastc	2.774712		
Genex: Option B	LeastC	rem_leastc	102.0444		
Genex: Option B	LeastC	rem_leastc	4.059098		
Genex: Option B	LeastC	rem_leastc	0.453452		
Genex: Option B	LeastC	rem_leastc	12.2734		
Genex: Option B	LeastC	rem_leastc	8.720471		
Genex: Option B	LeastC	rem_leastc	9.605091		
Genex: Option B	LeastC	rem_leastc	0.326735		
Genex: Option B	LeastC	rem_leastc	0.727728		
Genex: Option B	LeastC	rem_leastc	0.288437		
Genex: Option B	LeastC	rem_leastc	13.82986		
Genex: Option B	LeastC	rem_leastc	57.22385		
Genex: Option B	LeastC	rem_leastc	4.842688		
Genex: Option B	LeastC	rem_leastc	32.01963		
Genex: Option B	LeastC	rem_leastc	0.78514		
Genex: Option B	LeastC	rem_leastc	31.26611		
Genex: Option B	LeastC	rem_leastc	0.826022		
Genex: Option B	LeastC	rem_leastc	0.584156		
Genex: Option B	LeastC	rem_leastc	0.600281		
Genex: Option B	LeastC	rem_leastc	6.922604		
Genex: Option B	LeastC	rem_leastc	51.43218		
Genex: Option B	LeastC	rem_leastc	133.6165		
Genex: Option B	LeastC	rem_leastc	10.23287		
Genex: Option B	LeastC	rem_leastc	0.001706		
Genex: Option B	O-dom	rem_oc	1.471846	1891	Total OC-dom remnant for Option B
Genex: Option B	O-dom	rem_oc	195.4305		
Genex: Option B	O-dom	rem_oc	153.7515		
Genex: Option B	O-dom	rem_oc	138.478		
Genex: Option B	O-dom	rem_oc	10.5891		
Genex: Option B	O-dom	rem_oc	5.651625		
Genex: Option B	O-dom	rem_oc	0.037097		
Genex: Option B	O-dom	rem_oc	15.35427		
Genex: Option B	O-dom	rem_oc	5.626584		
Genex: Option B	O-dom	rem_oc	0.099917		
Genex: Option B	O-dom	rem_oc	1.166769		
Genex: Option B	O-dom	rem_oc	270.0271		
Genex: Option B	O-dom	rem_oc	374.3618		

Genex: Option B	O-dom	rem_oc	27.99034
Genex: Option B	O-dom	rem_oc	47.06895
Genex: Option B	O-dom	rem_oc	1.946463
Genex: Option B	O-dom	rem_oc	1.771366
Genex: Option B	O-dom	rem_oc	108.0733
Genex: Option B	O-dom	rem_oc	0.590693
Genex: Option B	O-dom	rem_oc	26.872
Genex: Option B	O-dom	rem_oc	0.925363
Genex: Option B	O-dom	rem_oc	0.182819
Genex: Option B	O-dom	rem_oc	0.144678
Genex: Option B	O-dom	rem_oc	9.653946
Genex: Option B	O-dom	rem_oc	0.001118
Genex: Option B	O-dom	rem_oc	5.780518
Genex: Option B	O-dom	rem_oc	2.728088
Genex: Option B	O-dom	rem_oc	2.647043
Genex: Option B	O-dom	rem_oc	1.321795
Genex: Option B	O-dom	rem_oc	1.075075
Genex: Option B	O-dom	rem_oc	1.028013
Genex: Option B	O-dom	rem_oc	4.05067
Genex: Option B	O-dom	rem_oc	9.522925
Genex: Option B	O-dom	rem_oc	0.001392
Genex: Option B	O-dom	rem_oc	0.003394
Genex: Option B	O-dom	rem_oc	0.001035
Genex: Option B	O-dom	rem_oc	33.69548
Genex: Option B	O-dom	rem_oc	1.381382
Genex: Option B	O-dom	rem_oc	0.928588
Genex: Option B	O-dom	rem_oc	0.4135
Genex: Option B	O-dom	rem_oc	3.286292
Genex: Option B	O-dom	rem_oc	0.813393
Genex: Option B	O-dom	rem_oc	4.770736
Genex: Option B	O-dom	rem_oc	1.561019
Genex: Option B	O-dom	rem_oc	2.309776
Genex: Option B	O-dom	rem_oc	1.058237
Genex: Option B	O-dom	rem_oc	5.369112
Genex: Option B	O-dom	rem_oc	2.128498
Genex: Option B	O-dom	rem_oc	0.502309
Genex: Option B	O-dom	rem_oc	0.053237
Genex: Option B	O-dom	rem_oc	14.87732
Genex: Option B	O-dom	rem_oc	48.60826
Genex: Option B	O-dom	rem_oc	0.43457
Genex: Option B	O-dom	rem_oc	58.61665
Genex: Option B	O-dom	rem_oc	62.13515
Genex: Option B	O-dom	rem_oc	4.286207
Genex: Option B	O-dom	rem_oc	8.433967
Genex: Option B	O-dom	rem_oc	4.418017
Genex: Option B	O-dom	rem_oc	0.816551
Genex: Option B	O-dom	rem_oc	1.360325
Genex: Option B	O-dom	rem_oc	0.61658
Genex: Option B	O-dom	rem_oc	0.594068
Genex: Option B	O-dom	rem_oc	9.111942
Genex: Option B	O-dom	rem_oc	8.567498
Genex: Option B	O-dom	rem_oc	5.563262
Genex: Option B	O-dom	rem_oc	58.10314
Genex: Option B	O-dom	rem_oc	11.76356
Genex: Option B	O-dom	rem_oc	15.50552
Genex: Option B	O-dom	rem_oc	4.488126
Genex: Option B	O-dom	rem_oc	3.278022
Genex: Option B	O-dom	rem_oc	3.436123
Genex: Option B	O-dom	rem_oc	11.64185
Genex: Option B	O-dom	rem_oc	18.22205
Genex: Option B	O-dom	rem_oc	0.0018
Genex: Option B	O-dom	rem_oc	4.444007
Genex: Option B	O-dom	rem_oc	6.059981
Genex: Option B	O-dom	rem_oc	0.338932
Genex: Option B	O-dom	rem_oc	15.98738
Genex: Option B	O-dom	rem_oc	0.645188
Genex: Option B	O-dom	rem_oc	3.072902
Genex: Option B	O-dom	rem_oc	0.000344
Genex: Option B	O-dom	rem_oc	9.199158
Genex: Option B	O-dom	rem_oc	6.182994
Genex: Option B	O-dom	rem_oc	6.221117

Genex: Option B	O-subdom	rem_oc	28.0519	442	Total OC-subdom remnant for Option B
Genex: Option B	O-subdom	rem_oc	46.6716		
Genex: Option B	O-subdom	rem_oc	4.034857		
Genex: Option B	O-subdom	rem_oc	187.4794		
Genex: Option B	O-subdom	rem_oc	6.946681		
Genex: Option B	O-subdom	rem_oc	2.117614		
Genex: Option B	O-subdom	rem_oc	59.27586		
Genex: Option B	O-subdom	rem_oc	21.51577		
Genex: Option B	O-subdom	rem_oc	85.42148		

Kidston Corridor Option C - Regional ecosystems v8

Name	VM_POLY	VM_STATUS	Area_ha		
GENEX Option C	LeastC	hvr_leastc	0.042944	266	Total LC regrowth for Option C
GENEX Option C	LeastC	hvr_leastc	1.282108		
GENEX Option C	LeastC	hvr_leastc	3.724701		
GENEX Option C	LeastC	hvr_leastc	3.327094		
GENEX Option C	LeastC	hvr_leastc	0.198184		
GENEX Option C	LeastC	hvr_leastc	0.215019		
GENEX Option C	LeastC	hvr_leastc	0.871264		
GENEX Option C	LeastC	hvr_leastc	0.001538		
GENEX Option C	LeastC	hvr_leastc	0.330203		
GENEX Option C	LeastC	hvr_leastc	20.73632		
GENEX Option C	LeastC	hvr_leastc	5.521453		
GENEX Option C	LeastC	hvr_leastc	3.584613		
GENEX Option C	LeastC	hvr_leastc	0.039661		
GENEX Option C	LeastC	hvr_leastc	0.247062		
GENEX Option C	LeastC	hvr_leastc	0.779189		
GENEX Option C	LeastC	hvr_leastc	4.748415		
GENEX Option C	LeastC	hvr_leastc	1.859195		
GENEX Option C	LeastC	hvr_leastc	10.84232		
GENEX Option C	LeastC	hvr_leastc	0.563293		
GENEX Option C	LeastC	hvr_leastc	0.799334		
GENEX Option C	LeastC	hvr_leastc	0.1578		
GENEX Option C	LeastC	hvr_leastc	0.423847		
GENEX Option C	LeastC	hvr_leastc	0.022131		
GENEX Option C	LeastC	hvr_leastc	1.832039		
GENEX Option C	LeastC	hvr_leastc	2.074049		
GENEX Option C	LeastC	hvr_leastc	11.76166		
GENEX Option C	LeastC	hvr_leastc	0.071373		
GENEX Option C	LeastC	hvr_leastc	0.032936		
GENEX Option C	LeastC	hvr_leastc	0.275677		
GENEX Option C	LeastC	hvr_leastc	4.030559		
GENEX Option C	LeastC	hvr_leastc	4.565859		
GENEX Option C	LeastC	hvr_leastc	2.294056		
GENEX Option C	LeastC	hvr_leastc	1.055631		
GENEX Option C	LeastC	hvr_leastc	1.583837		
GENEX Option C	LeastC	hvr_leastc	4.886182		
GENEX Option C	LeastC	hvr_leastc	0.483842		
GENEX Option C	LeastC	hvr_leastc	0.022396		
GENEX Option C	LeastC	hvr_leastc	16.55398		
GENEX Option C	LeastC	hvr_leastc	0.847925		
GENEX Option C	LeastC	hvr_leastc	0.452182		
GENEX Option C	LeastC	hvr_leastc	0.355135		
GENEX Option C	LeastC	hvr_leastc	1.329568		
GENEX Option C	LeastC	hvr_leastc	7.449196		
GENEX Option C	LeastC	hvr_leastc	10.2054		
GENEX Option C	LeastC	hvr_leastc	0.252609		
GENEX Option C	LeastC	hvr_leastc	0.004932		
GENEX Option C	LeastC	hvr_leastc	2.193916		
GENEX Option C	LeastC	hvr_leastc	0.628194		
GENEX Option C	LeastC	hvr_leastc	4.798001		
GENEX Option C	LeastC	hvr_leastc	4.892764		
GENEX Option C	LeastC	hvr_leastc	0.857374		
GENEX Option C	LeastC	hvr_leastc	0.016948		
GENEX Option C	LeastC	hvr_leastc	0.026688		
GENEX Option C	LeastC	hvr_leastc	0.489348		
GENEX Option C	LeastC	hvr_leastc	0.001268		
GENEX Option C	LeastC	hvr_leastc	0.733646		
GENEX Option C	LeastC	hvr_leastc	0.001018		
GENEX Option C	LeastC	hvr_leastc	2.958507		
GENEX Option C	LeastC	hvr_leastc	2.596304		
GENEX Option C	LeastC	hvr_leastc	2.274126		
GENEX Option C	LeastC	hvr_leastc	0.860982		
GENEX Option C	LeastC	hvr_leastc	0.17804		
GENEX Option C	LeastC	hvr_leastc	1.002297		
GENEX Option C	LeastC	hvr_leastc	0.00441		
GENEX Option C	LeastC	hvr_leastc	13.17734		
GENEX Option C	LeastC	hvr_leastc	0.224692		
GENEX Option C	LeastC	hvr_leastc	1.836962		
GENEX Option C	LeastC	hvr_leastc	0.523549		
GENEX Option C	LeastC	hvr_leastc	5.202041		
GENEX Option C	LeastC	hvr_leastc	0.41416		
GENEX Option C	LeastC	hvr_leastc	0.004426		
GENEX Option C	LeastC	hvr_leastc	0.175718		
GENEX Option C	LeastC	hvr_leastc	1.371884		

GENEX Option C	LeastC	hvr_leastc	0.720414		
GENEX Option C	LeastC	hvr_leastc	0.086502		
GENEX Option C	LeastC	hvr_leastc	0.349904		
GENEX Option C	LeastC	hvr_leastc	9.197092		
GENEX Option C	LeastC	hvr_leastc	2.849699		
GENEX Option C	LeastC	hvr_leastc	1.297257		
GENEX Option C	LeastC	hvr_leastc	63.51923		
GENEX Option C	LeastC	hvr_leastc	0.000024		
GENEX Option C	LeastC	hvr_leastc	0.000132		
GENEX Option C	LeastC	hvr_leastc	0.000386		
GENEX Option C	LeastC	hvr_leastc	2.657052		
GENEX Option C	LeastC	hvr_leastc	1.646678		
GENEX Option C	LeastC	hvr_leastc	3.808301		
GENEX Option C	LeastC	hvr_leastc	0.001706		
GENEX Option C	O-dom	hvr_oc	0.888013	2.4	Total OC-dom HVR regrowth for Option C
GENEX Option C	O-dom	hvr_oc	0.034724		
GENEX Option C	O-dom	hvr_oc	0.084695		
GENEX Option C	O-dom	hvr_oc	0.476706		
GENEX Option C	O-dom	hvr_oc	0.890819		
GENEX Option C	non-rem	non_remnant	28.55118	2458	Total non-remnant for Option C
GENEX Option C	non-rem	non_remnant	4.598363		
GENEX Option C	non-rem	non_remnant	3.133693		
GENEX Option C	non-rem	non_remnant	19.4655		
GENEX Option C	non-rem	non_remnant	11.13507		
GENEX Option C	non-rem	non_remnant	3.84902		
GENEX Option C	non-rem	non_remnant	1.69844		
GENEX Option C	non-rem	non_remnant	29.78413		
GENEX Option C	non-rem	non_remnant	1.037267		
GENEX Option C	non-rem	non_remnant	631.163		
GENEX Option C	non-rem	non_remnant	1.27489		
GENEX Option C	non-rem	non_remnant	1.573922		
GENEX Option C	non-rem	non_remnant	0.416775		
GENEX Option C	non-rem	non_remnant	0.284209		
GENEX Option C	non-rem	non_remnant	0.934327		
GENEX Option C	non-rem	non_remnant	32.73321		
GENEX Option C	non-rem	non_remnant	0.21711		
GENEX Option C	non-rem	non_remnant	7.341556		
GENEX Option C	non-rem	non_remnant	1.536304		
GENEX Option C	non-rem	non_remnant	1.624022		
GENEX Option C	non-rem	non_remnant	1.525838		
GENEX Option C	non-rem	non_remnant	6.35254		
GENEX Option C	non-rem	non_remnant	0.311335		
GENEX Option C	non-rem	non_remnant	0.284912		
GENEX Option C	non-rem	non_remnant	0.799373		
GENEX Option C	non-rem	non_remnant	1.586069		
GENEX Option C	non-rem	non_remnant	106.2974		
GENEX Option C	non-rem	non_remnant	3.895228		
GENEX Option C	non-rem	non_remnant	288.9389		
GENEX Option C	non-rem	non_remnant	4.258125		
GENEX Option C	non-rem	non_remnant	2.125011		
GENEX Option C	non-rem	non_remnant	0.056622		
GENEX Option C	non-rem	non_remnant	0.167595		
GENEX Option C	non-rem	non_remnant	0.535546		
GENEX Option C	non-rem	non_remnant	0.756154		
GENEX Option C	non-rem	non_remnant	8.966574		
GENEX Option C	non-rem	non_remnant	16.25738		
GENEX Option C	non-rem	non_remnant	347.132		
GENEX Option C	non-rem	non_remnant	0.000275		
GENEX Option C	non-rem	non_remnant	0.000386		
GENEX Option C	non-rem	non_remnant	0.234067		
GENEX Option C	non-rem	non_remnant	282.7614		
GENEX Option C	non-rem	non_remnant	0.000204		
GENEX Option C	non-rem	non_remnant	0.000074		
GENEX Option C	non-rem	non_remnant	8.914747		
GENEX Option C	non-rem	non_remnant	1.286566		
GENEX Option C	non-rem	non_remnant	1.685735		
GENEX Option C	non-rem	non_remnant	0.526879		
GENEX Option C	non-rem	non_remnant	0.121333		
GENEX Option C	non-rem	non_remnant	3.735213		
GENEX Option C	non-rem	non_remnant	117.347		
GENEX Option C	non-rem	non_remnant	468.6799		
GENEX Option C	non-rem	non_remnant	0.001706		
GENEX Option C	water	non_remnant	0.341308	29	Total water non-remnant for Option C
GENEX Option C	water	non_remnant	11.9254		
GENEX Option C	water	non_remnant	17.22085		

GENEX Option C	LeastC	rem_leastc	38.01406	52609	Total LC remnant for Option C
GENEX Option C	LeastC	rem_leastc	0.714087		
GENEX Option C	LeastC	rem_leastc	26.02467		
GENEX Option C	LeastC	rem_leastc	170.1283		
GENEX Option C	LeastC	rem_leastc	51.69668		
GENEX Option C	LeastC	rem_leastc	3.551085		
GENEX Option C	LeastC	rem_leastc	7.754542		
GENEX Option C	LeastC	rem_leastc	108.8235		
GENEX Option C	LeastC	rem_leastc	21.73775		
GENEX Option C	LeastC	rem_leastc	418.7269		
GENEX Option C	LeastC	rem_leastc	57.48674		
GENEX Option C	LeastC	rem_leastc	52.76348		
GENEX Option C	LeastC	rem_leastc	7.20723		
GENEX Option C	LeastC	rem_leastc	4.89243		
GENEX Option C	LeastC	rem_leastc	28.01646		
GENEX Option C	LeastC	rem_leastc	4.747283		
GENEX Option C	LeastC	rem_leastc	39.4278		
GENEX Option C	LeastC	rem_leastc	5.172642		
GENEX Option C	LeastC	rem_leastc	137.9748		
GENEX Option C	LeastC	rem_leastc	1.521492		
GENEX Option C	LeastC	rem_leastc	53.50867		
GENEX Option C	LeastC	rem_leastc	46.62655		
GENEX Option C	LeastC	rem_leastc	30.00713		
GENEX Option C	LeastC	rem_leastc	331.3991		
GENEX Option C	LeastC	rem_leastc	332.4453		
GENEX Option C	LeastC	rem_leastc	21.32897		
GENEX Option C	LeastC	rem_leastc	2.386717		
GENEX Option C	LeastC	rem_leastc	102.9591		
GENEX Option C	LeastC	rem_leastc	145.4984		
GENEX Option C	LeastC	rem_leastc	963.089		
GENEX Option C	LeastC	rem_leastc	76.38114		
GENEX Option C	LeastC	rem_leastc	43.23859		
GENEX Option C	LeastC	rem_leastc	47.90637		
GENEX Option C	LeastC	rem_leastc	262.2519		
GENEX Option C	LeastC	rem_leastc	19.36124		
GENEX Option C	LeastC	rem_leastc	38.22447		
GENEX Option C	LeastC	rem_leastc	67.2146		
GENEX Option C	LeastC	rem_leastc	13.1407		
GENEX Option C	LeastC	rem_leastc	319.7845		
GENEX Option C	LeastC	rem_leastc	1.831239		
GENEX Option C	LeastC	rem_leastc	31.41553		
GENEX Option C	LeastC	rem_leastc	1097.731		
GENEX Option C	LeastC	rem_leastc	45.09985		
GENEX Option C	LeastC	rem_leastc	10.77315		
GENEX Option C	LeastC	rem_leastc	11.55033		
GENEX Option C	LeastC	rem_leastc	378.1576		
GENEX Option C	LeastC	rem_leastc	61.16019		
GENEX Option C	LeastC	rem_leastc	8.994313		
GENEX Option C	LeastC	rem_leastc	306.4878		
GENEX Option C	LeastC	rem_leastc	20.92654		
GENEX Option C	LeastC	rem_leastc	35.97101		
GENEX Option C	LeastC	rem_leastc	6.257186		
GENEX Option C	LeastC	rem_leastc	94.1651		
GENEX Option C	LeastC	rem_leastc	74.39137		
GENEX Option C	LeastC	rem_leastc	1.175948		
GENEX Option C	LeastC	rem_leastc	8.255441		
GENEX Option C	LeastC	rem_leastc	110.7072		
GENEX Option C	LeastC	rem_leastc	21.48688		
GENEX Option C	LeastC	rem_leastc	0.579317		
GENEX Option C	LeastC	rem_leastc	22.56373		
GENEX Option C	LeastC	rem_leastc	2.539484		
GENEX Option C	LeastC	rem_leastc	16.5365		
GENEX Option C	LeastC	rem_leastc	224.1086		
GENEX Option C	LeastC	rem_leastc	14.71189		
GENEX Option C	LeastC	rem_leastc	92.26965		
GENEX Option C	LeastC	rem_leastc	117.0921		
GENEX Option C	LeastC	rem_leastc	339.8278		
GENEX Option C	LeastC	rem_leastc	41.16227		
GENEX Option C	LeastC	rem_leastc	21.93453		
GENEX Option C	LeastC	rem_leastc	1.387434		
GENEX Option C	LeastC	rem_leastc	14.70381		
GENEX Option C	LeastC	rem_leastc	29.1314		
GENEX Option C	LeastC	rem_leastc	16.62314		
GENEX Option C	LeastC	rem_leastc	12.50073		
GENEX Option C	LeastC	rem_leastc	7.261978		
GENEX Option C	LeastC	rem_leastc	18.25935		
GENEX Option C	LeastC	rem_leastc	30.77885		
GENEX Option C	LeastC	rem_leastc	29.59063		

GENEX Option C	LeastC	rem_leastc	3.675156
GENEX Option C	LeastC	rem_leastc	6.804901
GENEX Option C	LeastC	rem_leastc	325.6778
GENEX Option C	LeastC	rem_leastc	15.98994
GENEX Option C	LeastC	rem_leastc	257.9476
GENEX Option C	LeastC	rem_leastc	4.391148
GENEX Option C	LeastC	rem_leastc	5.114837
GENEX Option C	LeastC	rem_leastc	9.306435
GENEX Option C	LeastC	rem_leastc	103.875
GENEX Option C	LeastC	rem_leastc	306.8621
GENEX Option C	LeastC	rem_leastc	13.5309
GENEX Option C	LeastC	rem_leastc	23.87092
GENEX Option C	LeastC	rem_leastc	356.2161
GENEX Option C	LeastC	rem_leastc	2.204996
GENEX Option C	LeastC	rem_leastc	157.3748
GENEX Option C	LeastC	rem_leastc	23.59838
GENEX Option C	LeastC	rem_leastc	10.95056
GENEX Option C	LeastC	rem_leastc	2.856698
GENEX Option C	LeastC	rem_leastc	0.394979
GENEX Option C	LeastC	rem_leastc	12.14453
GENEX Option C	LeastC	rem_leastc	83.0943
GENEX Option C	LeastC	rem_leastc	407.5964
GENEX Option C	LeastC	rem_leastc	287.1895
GENEX Option C	LeastC	rem_leastc	3.004676
GENEX Option C	LeastC	rem_leastc	40.44207
GENEX Option C	LeastC	rem_leastc	12.50636
GENEX Option C	LeastC	rem_leastc	28.19659
GENEX Option C	LeastC	rem_leastc	55.5168
GENEX Option C	LeastC	rem_leastc	2.649882
GENEX Option C	LeastC	rem_leastc	1.431883
GENEX Option C	LeastC	rem_leastc	9.169954
GENEX Option C	LeastC	rem_leastc	7.708445
GENEX Option C	LeastC	rem_leastc	92.95
GENEX Option C	LeastC	rem_leastc	94.69141
GENEX Option C	LeastC	rem_leastc	5.433617
GENEX Option C	LeastC	rem_leastc	64.5069
GENEX Option C	LeastC	rem_leastc	2.113
GENEX Option C	LeastC	rem_leastc	3.737052
GENEX Option C	LeastC	rem_leastc	174.1968
GENEX Option C	LeastC	rem_leastc	78.54987
GENEX Option C	LeastC	rem_leastc	44.18646
GENEX Option C	LeastC	rem_leastc	302.4601
GENEX Option C	LeastC	rem_leastc	13.03633
GENEX Option C	LeastC	rem_leastc	0.02649
GENEX Option C	LeastC	rem_leastc	4.129607
GENEX Option C	LeastC	rem_leastc	3.67986
GENEX Option C	LeastC	rem_leastc	41.87516
GENEX Option C	LeastC	rem_leastc	123.6476
GENEX Option C	LeastC	rem_leastc	29.82518
GENEX Option C	LeastC	rem_leastc	709.0444
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GENEX Option C	LeastC	rem_leastc	186.7913
GENEX Option C	LeastC	rem_leastc	44.12555
GENEX Option C	LeastC	rem_leastc	134.2578
GENEX Option C	LeastC	rem_leastc	29.8517
GENEX Option C	LeastC	rem_leastc	14.57555
GENEX Option C	LeastC	rem_leastc	74.74253
GENEX Option C	LeastC	rem_leastc	12.649
GENEX Option C	LeastC	rem_leastc	121.5994
GENEX Option C	LeastC	rem_leastc	8.356103
GENEX Option C	LeastC	rem_leastc	70.14877
GENEX Option C	LeastC	rem_leastc	85.00014
GENEX Option C	LeastC	rem_leastc	8.976845
GENEX Option C	LeastC	rem_leastc	114.0486
GENEX Option C	LeastC	rem_leastc	5.472839
GENEX Option C	LeastC	rem_leastc	34.84204
GENEX Option C	LeastC	rem_leastc	101.7071
GENEX Option C	LeastC	rem_leastc	48.67651
GENEX Option C	LeastC	rem_leastc	32.7168
GENEX Option C	LeastC	rem_leastc	59.34102
GENEX Option C	LeastC	rem_leastc	140.7262
GENEX Option C	LeastC	rem_leastc	49.51686
GENEX Option C	LeastC	rem_leastc	0.707326
GENEX Option C	LeastC	rem_leastc	7.045497
GENEX Option C	LeastC	rem_leastc	34.9477
GENEX Option C	LeastC	rem_leastc	8.480949

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GENEX Option C	LeastC	rem_leastc	28.6392
GENEX Option C	LeastC	rem_leastc	26.53059
GENEX Option C	LeastC	rem_leastc	22.65911
GENEX Option C	LeastC	rem_leastc	5.090376
GENEX Option C	LeastC	rem_leastc	7.380356
GENEX Option C	LeastC	rem_leastc	18.65086
GENEX Option C	LeastC	rem_leastc	8.082343
GENEX Option C	LeastC	rem_leastc	4.497161
GENEX Option C	LeastC	rem_leastc	61.08123
GENEX Option C	LeastC	rem_leastc	475.5428
GENEX Option C	LeastC	rem_leastc	102.9064
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GENEX Option C	LeastC	rem_leastc	41.80824
GENEX Option C	LeastC	rem_leastc	296.3187
GENEX Option C	LeastC	rem_leastc	101.5743
GENEX Option C	LeastC	rem_leastc	73.64092
GENEX Option C	LeastC	rem_leastc	14.84019
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GENEX Option C	LeastC	rem_leastc	14.47524
GENEX Option C	LeastC	rem_leastc	6.594339
GENEX Option C	LeastC	rem_leastc	393.9766
GENEX Option C	LeastC	rem_leastc	101.363
GENEX Option C	LeastC	rem_leastc	0.935278
GENEX Option C	LeastC	rem_leastc	49.06945
GENEX Option C	LeastC	rem_leastc	57.09075
GENEX Option C	LeastC	rem_leastc	0.126688
GENEX Option C	LeastC	rem_leastc	18.24998
GENEX Option C	LeastC	rem_leastc	25.16174
GENEX Option C	LeastC	rem_leastc	34.29543
GENEX Option C	LeastC	rem_leastc	42.10126
GENEX Option C	LeastC	rem_leastc	14.19841
GENEX Option C	LeastC	rem_leastc	7.371037
GENEX Option C	LeastC	rem_leastc	1.347521
GENEX Option C	LeastC	rem_leastc	183.2169
GENEX Option C	LeastC	rem_leastc	31.9329
GENEX Option C	LeastC	rem_leastc	111.3151
GENEX Option C	LeastC	rem_leastc	27.00255
GENEX Option C	LeastC	rem_leastc	9.83722
GENEX Option C	LeastC	rem_leastc	7.45148
GENEX Option C	LeastC	rem_leastc	11.17567
GENEX Option C	LeastC	rem_leastc	82.99118
GENEX Option C	LeastC	rem_leastc	15.84509
GENEX Option C	LeastC	rem_leastc	310.9522
GENEX Option C	LeastC	rem_leastc	34.4065
GENEX Option C	LeastC	rem_leastc	55.20887
GENEX Option C	LeastC	rem_leastc	3.677472
GENEX Option C	LeastC	rem_leastc	371.3333
GENEX Option C	LeastC	rem_leastc	5.444018
GENEX Option C	LeastC	rem_leastc	45.88207
GENEX Option C	LeastC	rem_leastc	0.245078
GENEX Option C	LeastC	rem_leastc	11.2459
GENEX Option C	LeastC	rem_leastc	25.08376
GENEX Option C	LeastC	rem_leastc	124.1548
GENEX Option C	LeastC	rem_leastc	143.1277
GENEX Option C	LeastC	rem_leastc	5.565565
GENEX Option C	LeastC	rem_leastc	49.50317
GENEX Option C	LeastC	rem_leastc	270.3382
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GENEX Option C	LeastC	rem_leastc	17.08195
GENEX Option C	LeastC	rem_leastc	99.73551
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GENEX Option C	LeastC	rem_leastc	48.17882
GENEX Option C	LeastC	rem_leastc	41.22485
GENEX Option C	LeastC	rem_leastc	17.63204
GENEX Option C	LeastC	rem_leastc	11.48561
GENEX Option C	LeastC	rem_leastc	46.26185
GENEX Option C	LeastC	rem_leastc	1.445556
GENEX Option C	LeastC	rem_leastc	16.18249
GENEX Option C	LeastC	rem_leastc	2.159236
GENEX Option C	LeastC	rem_leastc	0.637007
GENEX Option C	LeastC	rem_leastc	264.9616
GENEX Option C	LeastC	rem_leastc	926.4869
GENEX Option C	LeastC	rem_leastc	283.8492
GENEX Option C	LeastC	rem_leastc	1.547627
GENEX Option C	LeastC	rem_leastc	203.148
GENEX Option C	LeastC	rem_leastc	313.6579
GENEX Option C	LeastC	rem_leastc	123.3955

GENEX Option C	LeastC	rem_leastc	1.156638
GENEX Option C	LeastC	rem_leastc	82.71442
GENEX Option C	LeastC	rem_leastc	2.022596
GENEX Option C	LeastC	rem_leastc	60.74509
GENEX Option C	LeastC	rem_leastc	41.10972
GENEX Option C	LeastC	rem_leastc	14.57307
GENEX Option C	LeastC	rem_leastc	25.81795
GENEX Option C	LeastC	rem_leastc	3.825454
GENEX Option C	LeastC	rem_leastc	27.65567
GENEX Option C	LeastC	rem_leastc	54.14819
GENEX Option C	LeastC	rem_leastc	77.56343
GENEX Option C	LeastC	rem_leastc	0.005124
GENEX Option C	LeastC	rem_leastc	0.548982
GENEX Option C	LeastC	rem_leastc	83.46924
GENEX Option C	LeastC	rem_leastc	61.9752
GENEX Option C	LeastC	rem_leastc	22.51092
GENEX Option C	LeastC	rem_leastc	78.81351
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GENEX Option C	LeastC	rem_leastc	23.31453
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GENEX Option C	LeastC	rem_leastc	204.1666
GENEX Option C	LeastC	rem_leastc	260.2845
GENEX Option C	LeastC	rem_leastc	120.4324
GENEX Option C	LeastC	rem_leastc	865.5664
GENEX Option C	LeastC	rem_leastc	29.93223
GENEX Option C	LeastC	rem_leastc	12.69863
GENEX Option C	LeastC	rem_leastc	103.5631
GENEX Option C	LeastC	rem_leastc	312.3949
GENEX Option C	LeastC	rem_leastc	99.10889
GENEX Option C	LeastC	rem_leastc	10.33737
GENEX Option C	LeastC	rem_leastc	31.16894
GENEX Option C	LeastC	rem_leastc	43.44386
GENEX Option C	LeastC	rem_leastc	193.8193
GENEX Option C	LeastC	rem_leastc	183.4683
GENEX Option C	LeastC	rem_leastc	105.8241
GENEX Option C	LeastC	rem_leastc	30.87396
GENEX Option C	LeastC	rem_leastc	437.6609
GENEX Option C	LeastC	rem_leastc	26.50336
GENEX Option C	LeastC	rem_leastc	43.01024
GENEX Option C	LeastC	rem_leastc	2.674355
GENEX Option C	LeastC	rem_leastc	145.642
GENEX Option C	LeastC	rem_leastc	45.83799
GENEX Option C	LeastC	rem_leastc	1.750816
GENEX Option C	LeastC	rem_leastc	7.330887
GENEX Option C	LeastC	rem_leastc	80.91222
GENEX Option C	LeastC	rem_leastc	285.9006
GENEX Option C	LeastC	rem_leastc	1.802566
GENEX Option C	LeastC	rem_leastc	59.32959
GENEX Option C	LeastC	rem_leastc	12.23004
GENEX Option C	LeastC	rem_leastc	8.971527
GENEX Option C	LeastC	rem_leastc	13.00588
GENEX Option C	LeastC	rem_leastc	3.75467
GENEX Option C	LeastC	rem_leastc	178.9832
GENEX Option C	LeastC	rem_leastc	107.5745
GENEX Option C	LeastC	rem_leastc	46.31915
GENEX Option C	LeastC	rem_leastc	61.24909
GENEX Option C	LeastC	rem_leastc	88.93272
GENEX Option C	LeastC	rem_leastc	8.600226
GENEX Option C	LeastC	rem_leastc	42.1064
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GENEX Option C	LeastC	rem_leastc	12.7743
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GENEX Option C	LeastC	rem_leastc	70.34255
GENEX Option C	LeastC	rem_leastc	47.25853
GENEX Option C	LeastC	rem_leastc	289.9992
GENEX Option C	LeastC	rem_leastc	2.945584
GENEX Option C	LeastC	rem_leastc	0.027143
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GENEX Option C	LeastC	rem_leastc	1.735207
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GENEX Option C	LeastC	rem_leastc	4.681369
GENEX Option C	LeastC	rem_leastc	7.860195

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GENEX Option C	LeastC	rem_leastc	5.112733
GENEX Option C	LeastC	rem_leastc	42.39342
GENEX Option C	LeastC	rem_leastc	217.1046
GENEX Option C	LeastC	rem_leastc	274.7574
GENEX Option C	LeastC	rem_leastc	44.75944
GENEX Option C	LeastC	rem_leastc	34.00366
GENEX Option C	LeastC	rem_leastc	15.84078
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GENEX Option C	LeastC	rem_leastc	122.9537
GENEX Option C	LeastC	rem_leastc	566.3628
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GENEX Option C	LeastC	rem_leastc	28.92059
GENEX Option C	LeastC	rem_leastc	237.4161
GENEX Option C	LeastC	rem_leastc	82.96334
GENEX Option C	LeastC	rem_leastc	60.5029
GENEX Option C	LeastC	rem_leastc	45.99594
GENEX Option C	LeastC	rem_leastc	87.13361
GENEX Option C	LeastC	rem_leastc	54.99165
GENEX Option C	LeastC	rem_leastc	47.59365
GENEX Option C	LeastC	rem_leastc	1.813457
GENEX Option C	LeastC	rem_leastc	14.67879
GENEX Option C	LeastC	rem_leastc	36.05249
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GENEX Option C	LeastC	rem_leastc	166.6805
GENEX Option C	LeastC	rem_leastc	55.38093
GENEX Option C	LeastC	rem_leastc	543.976
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GENEX Option C	LeastC	rem_leastc	1.641803
GENEX Option C	LeastC	rem_leastc	74.30006
GENEX Option C	LeastC	rem_leastc	1.650331
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GENEX Option C	LeastC	rem_leastc	30.18079
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GENEX Option C	LeastC	rem_leastc	2.007452
GENEX Option C	LeastC	rem_leastc	5.297635
GENEX Option C	LeastC	rem_leastc	4.628709
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GENEX Option C	LeastC	rem_leastc	5.761792
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GENEX Option C	LeastC	rem_leastc	19.86604
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GENEX Option C	LeastC	rem_leastc	40.26181
GENEX Option C	LeastC	rem_leastc	239.4669
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GENEX Option C	LeastC	rem_leastc	6.56791
GENEX Option C	LeastC	rem_leastc	1.495947
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GENEX Option C	LeastC	rem_leastc	44.88932
GENEX Option C	LeastC	rem_leastc	10.31003
GENEX Option C	LeastC	rem_leastc	3.907877
GENEX Option C	LeastC	rem_leastc	0.286307
GENEX Option C	LeastC	rem_leastc	3.536081
GENEX Option C	LeastC	rem_leastc	4.302634
GENEX Option C	LeastC	rem_leastc	40.54574
GENEX Option C	LeastC	rem_leastc	46.35656
GENEX Option C	LeastC	rem_leastc	35.1372
GENEX Option C	LeastC	rem_leastc	21.46795
GENEX Option C	LeastC	rem_leastc	63.82186
GENEX Option C	LeastC	rem_leastc	6.597762
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GENEX Option C	LeastC	rem_leastc	14.81235
GENEX Option C	LeastC	rem_leastc	25.26813
GENEX Option C	LeastC	rem_leastc	15.78862
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GENEX Option C	LeastC	rem_leastc	91.32114
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GENEX Option C	LeastC	rem_leastc	9.664155
GENEX Option C	LeastC	rem_leastc	27.0727
GENEX Option C	LeastC	rem_leastc	47.85526
GENEX Option C	LeastC	rem_leastc	76.16868
GENEX Option C	LeastC	rem_leastc	478.2442
GENEX Option C	LeastC	rem_leastc	4.100452
GENEX Option C	LeastC	rem_leastc	145.1778
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GENEX Option C	LeastC	rem_leastc	15.25306
GENEX Option C	LeastC	rem_leastc	167.5648
GENEX Option C	LeastC	rem_leastc	0.043366
GENEX Option C	LeastC	rem_leastc	0.249369
GENEX Option C	LeastC	rem_leastc	31.21998
GENEX Option C	LeastC	rem_leastc	21.50388
GENEX Option C	LeastC	rem_leastc	13.38243
GENEX Option C	LeastC	rem_leastc	48.91066
GENEX Option C	LeastC	rem_leastc	7.692077
GENEX Option C	LeastC	rem_leastc	3.140981
GENEX Option C	LeastC	rem_leastc	2.839104
GENEX Option C	LeastC	rem_leastc	65.74696
GENEX Option C	LeastC	rem_leastc	2.994388
GENEX Option C	LeastC	rem_leastc	0.739912
GENEX Option C	LeastC	rem_leastc	17.49671
GENEX Option C	LeastC	rem_leastc	70.5411
GENEX Option C	LeastC	rem_leastc	13.06975
GENEX Option C	LeastC	rem_leastc	2.843588
GENEX Option C	LeastC	rem_leastc	47.54403
GENEX Option C	LeastC	rem_leastc	54.55183
GENEX Option C	LeastC	rem_leastc	20.83647
GENEX Option C	LeastC	rem_leastc	22.70387
GENEX Option C	LeastC	rem_leastc	1388.618
GENEX Option C	LeastC	rem_leastc	2023.063
GENEX Option C	LeastC	rem_leastc	23.4374
GENEX Option C	LeastC	rem_leastc	16.91414
GENEX Option C	LeastC	rem_leastc	93.94763
GENEX Option C	LeastC	rem_leastc	126.8936
GENEX Option C	LeastC	rem_leastc	330.4297
GENEX Option C	LeastC	rem_leastc	18.47445
GENEX Option C	LeastC	rem_leastc	4.334424
GENEX Option C	LeastC	rem_leastc	7.76446
GENEX Option C	LeastC	rem_leastc	2.66187
GENEX Option C	LeastC	rem_leastc	101.9941
GENEX Option C	LeastC	rem_leastc	33.50958
GENEX Option C	LeastC	rem_leastc	500.0821
GENEX Option C	LeastC	rem_leastc	27.68105
GENEX Option C	LeastC	rem_leastc	50.82704
GENEX Option C	LeastC	rem_leastc	27.28552
GENEX Option C	LeastC	rem_leastc	123.2228
GENEX Option C	LeastC	rem_leastc	367.1263
GENEX Option C	LeastC	rem_leastc	34.76944
GENEX Option C	LeastC	rem_leastc	107.844
GENEX Option C	LeastC	rem_leastc	80.41676

GENEX Option C	LeastC	rem_leastc	180.466
GENEX Option C	LeastC	rem_leastc	1.27862
GENEX Option C	LeastC	rem_leastc	24.74313
GENEX Option C	LeastC	rem_leastc	0.952919
GENEX Option C	LeastC	rem_leastc	12.90265
GENEX Option C	LeastC	rem_leastc	0.324657
GENEX Option C	LeastC	rem_leastc	34.31719
GENEX Option C	LeastC	rem_leastc	4.292203
GENEX Option C	LeastC	rem_leastc	12.06587
GENEX Option C	LeastC	rem_leastc	3.785718
GENEX Option C	LeastC	rem_leastc	0.559217
GENEX Option C	LeastC	rem_leastc	170.6071
GENEX Option C	LeastC	rem_leastc	44.47043
GENEX Option C	LeastC	rem_leastc	2.756305
GENEX Option C	LeastC	rem_leastc	81.53098
GENEX Option C	LeastC	rem_leastc	8.319718
GENEX Option C	LeastC	rem_leastc	2.661891
GENEX Option C	LeastC	rem_leastc	13.44255
GENEX Option C	LeastC	rem_leastc	5.069492
GENEX Option C	LeastC	rem_leastc	17.85633
GENEX Option C	LeastC	rem_leastc	15.8381
GENEX Option C	LeastC	rem_leastc	59.0309
GENEX Option C	LeastC	rem_leastc	135.982
GENEX Option C	LeastC	rem_leastc	26.17916
GENEX Option C	LeastC	rem_leastc	12.59796
GENEX Option C	LeastC	rem_leastc	29.47318
GENEX Option C	LeastC	rem_leastc	109.8415
GENEX Option C	LeastC	rem_leastc	149.8079
GENEX Option C	LeastC	rem_leastc	462.3725
GENEX Option C	LeastC	rem_leastc	210.8056
GENEX Option C	LeastC	rem_leastc	96.2025
GENEX Option C	LeastC	rem_leastc	11.50008
GENEX Option C	LeastC	rem_leastc	10.76424
GENEX Option C	LeastC	rem_leastc	183.6566
GENEX Option C	LeastC	rem_leastc	17.68986
GENEX Option C	LeastC	rem_leastc	190.5614
GENEX Option C	LeastC	rem_leastc	12.3432
GENEX Option C	LeastC	rem_leastc	59.1258
GENEX Option C	LeastC	rem_leastc	8.331762
GENEX Option C	LeastC	rem_leastc	2.857761
GENEX Option C	LeastC	rem_leastc	8.412393
GENEX Option C	LeastC	rem_leastc	604.5275
GENEX Option C	LeastC	rem_leastc	9.989402
GENEX Option C	LeastC	rem_leastc	61.22569
GENEX Option C	LeastC	rem_leastc	26.86946
GENEX Option C	LeastC	rem_leastc	1.759112
GENEX Option C	LeastC	rem_leastc	129.2239
GENEX Option C	LeastC	rem_leastc	13.45173
GENEX Option C	LeastC	rem_leastc	2.664493
GENEX Option C	LeastC	rem_leastc	58.33691
GENEX Option C	LeastC	rem_leastc	17.44888
GENEX Option C	LeastC	rem_leastc	7.161197
GENEX Option C	LeastC	rem_leastc	348.5125
GENEX Option C	LeastC	rem_leastc	0.257113
GENEX Option C	LeastC	rem_leastc	9.412106
GENEX Option C	LeastC	rem_leastc	1.264701
GENEX Option C	LeastC	rem_leastc	553.999
GENEX Option C	LeastC	rem_leastc	192.4199
GENEX Option C	LeastC	rem_leastc	9.22467
GENEX Option C	LeastC	rem_leastc	7.926539
GENEX Option C	LeastC	rem_leastc	29.46511
GENEX Option C	LeastC	rem_leastc	324.4124
GENEX Option C	LeastC	rem_leastc	4.364596
GENEX Option C	LeastC	rem_leastc	248.962
GENEX Option C	LeastC	rem_leastc	10.31886
GENEX Option C	LeastC	rem_leastc	215.5128
GENEX Option C	LeastC	rem_leastc	64.58989
GENEX Option C	LeastC	rem_leastc	25.19911
GENEX Option C	LeastC	rem_leastc	404.6123
GENEX Option C	LeastC	rem_leastc	0.053489
GENEX Option C	LeastC	rem_leastc	4.220058
GENEX Option C	LeastC	rem_leastc	10.04527
GENEX Option C	LeastC	rem_leastc	2.741389
GENEX Option C	LeastC	rem_leastc	0.589376
GENEX Option C	LeastC	rem_leastc	25.03669
GENEX Option C	LeastC	rem_leastc	0.008478
GENEX Option C	LeastC	rem_leastc	0.289362
GENEX Option C	LeastC	rem_leastc	25.32193

GENEX Option C	LeastC	rem_leastc	120.4981		
GENEX Option C	LeastC	rem_leastc	192.5669		
GENEX Option C	LeastC	rem_leastc	53.11645		
GENEX Option C	LeastC	rem_leastc	22.14615		
GENEX Option C	LeastC	rem_leastc	17.90449		
GENEX Option C	LeastC	rem_leastc	100.6029		
GENEX Option C	LeastC	rem_leastc	40.38307		
GENEX Option C	LeastC	rem_leastc	16.41434		
GENEX Option C	LeastC	rem_leastc	9.77248		
GENEX Option C	LeastC	rem_leastc	32.21486		
GENEX Option C	LeastC	rem_leastc	46.3546		
GENEX Option C	LeastC	rem_leastc	0.008122		
GENEX Option C	LeastC	rem_leastc	44.16289		
GENEX Option C	LeastC	rem_leastc	5.923245		
GENEX Option C	LeastC	rem_leastc	3.490973		
GENEX Option C	LeastC	rem_leastc	131.4287		
GENEX Option C	LeastC	rem_leastc	8.152129		
GENEX Option C	LeastC	rem_leastc	0.000275		
GENEX Option C	LeastC	rem_leastc	0.000024		
GENEX Option C	LeastC	rem_leastc	63.09774		
GENEX Option C	LeastC	rem_leastc	1.551911		
GENEX Option C	LeastC	rem_leastc	6.945101		
GENEX Option C	LeastC	rem_leastc	0.000132		
GENEX Option C	LeastC	rem_leastc	11.23512		
GENEX Option C	LeastC	rem_leastc	3.025342		
GENEX Option C	LeastC	rem_leastc	96.39073		
GENEX Option C	LeastC	rem_leastc	15.80917		
GENEX Option C	LeastC	rem_leastc	192.9281		
GENEX Option C	LeastC	rem_leastc	0.037976		
GENEX Option C	LeastC	rem_leastc	49.50354		
GENEX Option C	LeastC	rem_leastc	125.1382		
GENEX Option C	LeastC	rem_leastc	20.527		
GENEX Option C	LeastC	rem_leastc	2.774712		
GENEX Option C	LeastC	rem_leastc	102.0444		
GENEX Option C	LeastC	rem_leastc	4.059098		
GENEX Option C	LeastC	rem_leastc	0.453452		
GENEX Option C	LeastC	rem_leastc	12.2734		
GENEX Option C	LeastC	rem_leastc	8.720471		
GENEX Option C	LeastC	rem_leastc	9.605091		
GENEX Option C	LeastC	rem_leastc	0.326735		
GENEX Option C	LeastC	rem_leastc	0.727728		
GENEX Option C	LeastC	rem_leastc	0.288437		
GENEX Option C	LeastC	rem_leastc	13.82986		
GENEX Option C	LeastC	rem_leastc	57.22385		
GENEX Option C	LeastC	rem_leastc	4.842688		
GENEX Option C	LeastC	rem_leastc	32.01963		
GENEX Option C	LeastC	rem_leastc	0.78514		
GENEX Option C	LeastC	rem_leastc	31.26611		
GENEX Option C	LeastC	rem_leastc	0.826022		
GENEX Option C	LeastC	rem_leastc	0.584156		
GENEX Option C	LeastC	rem_leastc	0.600281		
GENEX Option C	LeastC	rem_leastc	6.922604		
GENEX Option C	LeastC	rem_leastc	51.43218		
GENEX Option C	LeastC	rem_leastc	133.6165		
GENEX Option C	LeastC	rem_leastc	10.23287		
GENEX Option C	LeastC	rem_leastc	0.001706		
GENEX Option C	O-dom	rem_oc	36.82174	1519	Total OC-dom remnant for Option C
GENEX Option C	O-dom	rem_oc	204.122		
GENEX Option C	O-dom	rem_oc	11.61961		
GENEX Option C	O-dom	rem_oc	1.779747		
GENEX Option C	O-dom	rem_oc	8.058584		
GENEX Option C	O-dom	rem_oc	0.817491		
GENEX Option C	O-dom	rem_oc	2.47765		
GENEX Option C	O-dom	rem_oc	3.34409		
GENEX Option C	O-dom	rem_oc	5.401993		
GENEX Option C	O-dom	rem_oc	5.250489		
GENEX Option C	O-dom	rem_oc	4.760309		
GENEX Option C	O-dom	rem_oc	0.746089		
GENEX Option C	O-dom	rem_oc	270.0271		
GENEX Option C	O-dom	rem_oc	374.3618		
GENEX Option C	O-dom	rem_oc	1.946463		
GENEX Option C	O-dom	rem_oc	1.771366		
GENEX Option C	O-dom	rem_oc	108.0733		
GENEX Option C	O-dom	rem_oc	0.590693		
GENEX Option C	O-dom	rem_oc	26.872		
GENEX Option C	O-dom	rem_oc	8.038469		
GENEX Option C	O-dom	rem_oc	9.653946		
GENEX Option C	O-dom	rem_oc	0.792089		

GENEX Option C	O-dom	rem_oc	5.615905		
GENEX Option C	O-dom	rem_oc	11.75996		
GENEX Option C	O-dom	rem_oc	20.59073		
GENEX Option C	O-dom	rem_oc	21.60491		
GENEX Option C	O-dom	rem_oc	9.712734		
GENEX Option C	O-dom	rem_oc	5.799722		
GENEX Option C	O-dom	rem_oc	0.046029		
GENEX Option C	O-dom	rem_oc	4.964713		
GENEX Option C	O-dom	rem_oc	5.718127		
GENEX Option C	O-dom	rem_oc	1.30439		
GENEX Option C	O-dom	rem_oc	0.502309		
GENEX Option C	O-dom	rem_oc	0.053237		
GENEX Option C	O-dom	rem_oc	0.43457		
GENEX Option C	O-dom	rem_oc	58.61665		
GENEX Option C	O-dom	rem_oc	62.13515		
GENEX Option C	O-dom	rem_oc	4.286207		
GENEX Option C	O-dom	rem_oc	8.433967		
GENEX Option C	O-dom	rem_oc	4.418017		
GENEX Option C	O-dom	rem_oc	0.816551		
GENEX Option C	O-dom	rem_oc	1.360325		
GENEX Option C	O-dom	rem_oc	0.61658		
GENEX Option C	O-dom	rem_oc	0.594068		
GENEX Option C	O-dom	rem_oc	9.111942		
GENEX Option C	O-dom	rem_oc	8.567498		
GENEX Option C	O-dom	rem_oc	5.563262		
GENEX Option C	O-dom	rem_oc	58.10314		
GENEX Option C	O-dom	rem_oc	11.76356		
GENEX Option C	O-dom	rem_oc	15.50552		
GENEX Option C	O-dom	rem_oc	4.488126		
GENEX Option C	O-dom	rem_oc	3.278022		
GENEX Option C	O-dom	rem_oc	3.436123		
GENEX Option C	O-dom	rem_oc	11.64185		
GENEX Option C	O-dom	rem_oc	18.22205		
GENEX Option C	O-dom	rem_oc	0.0018		
GENEX Option C	O-dom	rem_oc	4.444007		
GENEX Option C	O-dom	rem_oc	6.059981		
GENEX Option C	O-dom	rem_oc	0.338932		
GENEX Option C	O-dom	rem_oc	15.98738		
GENEX Option C	O-dom	rem_oc	0.645188		
GENEX Option C	O-dom	rem_oc	3.072902		
GENEX Option C	O-dom	rem_oc	0.000344		
GENEX Option C	O-dom	rem_oc	9.199158		
GENEX Option C	O-dom	rem_oc	6.182994		
GENEX Option C	O-dom	rem_oc	6.221117		
GENEX Option C	O-subdom	rem_oc	11.81888	334	Total OC-subdom remnant for Option C
GENEX Option C	O-subdom	rem_oc	24.94581		
GENEX Option C	O-subdom	rem_oc	0.873514		
GENEX Option C	O-subdom	rem_oc	63.09472		
GENEX Option C	O-subdom	rem_oc	58.16346		
GENEX Option C	O-subdom	rem_oc	7.270746		
GENEX Option C	O-subdom	rem_oc	2.117614		
GENEX Option C	O-subdom	rem_oc	59.27586		
GENEX Option C	O-subdom	rem_oc	21.51577		
GENEX Option C	O-subdom	rem_oc	85.42148		

Kidston Corridor Option A - Woody vegetation assessment

Name	Class_name	VMA_Status	Area_ha_options		
Genex: Option A	AdjustNC_LeastC	Least concern	0.3024611	37602	Total Least concern remnant for Option A
Genex: Option A	NONREMNANT	Non-remnant	0.0865846	2174	Total non-remnant vegetation for Option A
Genex: Option A	EASE	Non-remnant bare earth and water	0.08631	4670	Total non-remnant bare earth and water for Option A
Genex: Option A	O-dom	Of concern - dominant	0.0896216	1535	Total Of concern-dom remnant for Option A
Genex: Option A	grassOC_O-subdom	Of concern - sub dominant	0.09	549	Total Of concern-subdom for Option A
Genex: Option A	ScatNC_LeastC	Potential least concern	0.0945669	9002	Total Potential Least concern remnant for Option A
Genex: Option A	ScatNC_O-dom	Potential of concern - dominant	0.1799997	240	Total Potential Of concern-dom remnant for Option A
Genex: Option A	ScatOC_O-subdom	Potential of concern - subdominant	0.36	364	Total Potential Of concern-subdom remnant vegetation for Option A
Genex: Option A	REGROWTH	Potential regrowth	0.18	235	Total Potential regrowth for Option A
Genex: Option A	Regrowth_LeastC	Regrowth Least concern	1.2600001	48	Total Least concern regrowth for Option A
Genex: Option A	Regrowth_O-dom	Regrowth Of concern dominant	1.2599993	6.9	Total Of concern-dom regrowth for Option A

Kidston Corridor Option B - Woody vegetation assessment

Name	Class_name	VMA_Status	Area_ha_options		
Genex: Option B	AdjustNC_LeastC	Least concern	0.3024611	37969	Total Least concern remnant for Option B
Genex: Option B	NONREMNANT	Non-remnant	0.0865846	1812	Total non-remnant vegetation for Option B
Genex: Option B	EASE	Non-remnant bare earth and water	0.08631	5428	Total non-remnant bare earth and water for Option B
Genex: Option B	O-dom	Of concern - dominant	0.0896216	1460	Total Of concern-dom remnant for Option B
Genex: Option B	AdjustOC_O-subdom	Of concern - sub dominant	0.09	295	Total Of concern-subdom for Option B
Genex: Option B	ScatNC_LeastC	Potential least concern	0.0945669	8439	Potential Least concern remnant for Option B
Genex: Option B	ScatOC_O-dom	Potential of concern - dominant	1.2775804	344	Total Potential Of concern-dom remnant for Option B
Genex: Option B	dryOC_O-subdom	Potential of concern - subdominant	0.1759937	87	Total Potential Of concern-subdom remnant for Option B
Genex: Option B	REGROWTH	Potential regrowth	0.18	219	Total Potential regrowth for Option B
Genex: Option B	Regrowth_LeastC	Regrowth Least concern	1.2600001	214	Total Least concern regrowth for Option B
Genex: Option B	NONREMNANT	Regrowth Of concern dominant	0.09	6.6	Total Of concern-dom regrowth for Option B

Kidston Corridor Option C - Woody vegetation assessment

Name	Class_name	VMA_Status	Area_ha_options		
GENEX Option C	AdjustNC_LeastC	Least concern	0.3024611	38808	Total Least concern remnant for Option C
GENEX Option C	NONREMNANT	Non-remnant	0.0865846	1718	Total non-remnant vegetation for Option C
GENEX Option C	EASE	Non-remnant bare earth and water	0.08631	5771	Total non-remnant bare earth and water for Option C
GENEX Option C	O-dom	Of concern - dominant	0.0896216	1223	Total Of concern-dom remnant for Option C
GENEX Option C	AdjustOC_O-subdom	Of concern - sub dominant	0.09	618	Total Of concern-subdom for Option C
GENEX Option C	ScatNC_LeastC	Potential least concern	0.0945669	8494	Total Potential Least concern remnant for Option C
GENEX Option C	ScatOC_O-dom	Potential of concern - dominant	1.2775804	431	Total Potential Of concern-dom remnant for Option C
GENEX Option C	dryOC_O-subdom	Potential of concern - subdominant	0.1759937	37	Total Potential Of concern-subdom remnant vegetation for Option C
GENEX Option C	REGROWTH	Potential regrowth	0.18	291	Total Potential regrowth for Option C
GENEX Option C	Regrowth_LeastC	Regrowth Least concern	1.2600001	172	Total Least concern regrowth for Option C
GENEX Option C	Regrowth_O-dom	Regrowth Of concern dominant	1.2599993	28.8	Total Of concern-dom regrowth for Option C

Kidston Corridor Option A - Regulated remnant watercourse vegetation

Name	Scale	Bioregion_type	SO_group	Buffer_m	Area_ha		
Genex: Option A	100000	Non-coastal	1 or 2	25	2579.422		
Genex: Option A	250000	Non-coastal	1 or 2	25	520.0739		
Genex: Option A	100000	Non-coastal	1 or 2	25	45.31245		
Genex: Option A	100000	Non-coastal	1 or 2	25	21.86686		
Genex: Option A	100000	Non-coastal	1 or 2	25	243.4169		
Genex: Option A	100000	Non-coastal	1 or 2	25	11.34511		
Genex: Option A	250000	Non-coastal	1 or 2	25	4.666213		
Genex: Option A	250000	Non-coastal	1 or 2	25	5.498384		
Genex: Option A	250000	Non-coastal	1 or 2	25	0.118428		
Genex: Option A	100000	Non-coastal	1 or 2	25	0.414786		
Genex: Option A	100000	Non-coastal	1 or 2	25	5.22667		
Genex: Option A	100000	Non-coastal	1 or 2	25	2.777769		
Genex: Option A	100000	Non-coastal	1 or 2	25	173.8444		
Genex: Option A	100000	Non-coastal	1 or 2	25	3.009753		
Genex: Option A	100000	Non-coastal	1 or 2	25	1.857839	3619	Total SO 1 or 2
Genex: Option A	100000	Non-coastal	3 or 4	50	815.3475		
Genex: Option A	250000	Non-coastal	3 or 4	50	304.8283		
Genex: Option A	100000	Non-coastal	3 or 4	50	45.31245		
Genex: Option A	100000	Non-coastal	3 or 4	50	13.60399		
Genex: Option A	100000	Non-coastal	3 or 4	50	64.05599		
Genex: Option A	250000	Non-coastal	3 or 4	50	4.666213		
Genex: Option A	250000	Non-coastal	3 or 4	50	15.28811		
Genex: Option A	100000	Non-coastal	3 or 4	50	0.414786		
Genex: Option A	100000	Non-coastal	3 or 4	50	5.22667		
Genex: Option A	100000	Non-coastal	3 or 4	50	1.382051		
Genex: Option A	100000	Non-coastal	3 or 4	50	14.05157		
Genex: Option A	250000	Non-coastal	3 or 4	50	13.67417		
Genex: Option A	100000	Non-coastal	3 or 4	50	3.009753	1301	Total SO 3 or 4
Genex: Option A	100000	Non-coastal	5 or greater	100	569.3731		
Genex: Option A	100000	Non-coastal	5 or greater	100	21.86686		
Genex: Option A	100000	Non-coastal	5 or greater	100	13.60399		
Genex: Option A	100000	Non-coastal	5 or greater	100	44.12056		
Genex: Option A	100000	Non-coastal	5 or greater	100	0.414786		
Genex: Option A	100000	Non-coastal	5 or greater	100	2.777769		
Genex: Option A	100000	Non-coastal	5 or greater	100	1.382051		
Genex: Option A	100000	Non-coastal	5 or greater	100	9.204484		
Genex: Option A	100000	Non-coastal	5 or greater	100	1.857839	665	Total SO 5 or greater

Name	Scale	Bioregion_type	SO_group	Buffer_m	Area_ha		
Genex: Option A	100000	Coastal	1 or 2	10	32.52427		
Genex: Option A	100000	Coastal	1 or 2	10	1.026032		
Genex: Option A	100000	Coastal	1 or 2	10	9.624821		
Genex: Option A	100000	Coastal	1 or 2	10	2.416613		
Genex: Option A	100000	Coastal	1 or 2	10	0.273101		
Genex: Option A	100000	Coastal	1 or 2	10	0.132366		
Genex: Option A	100000	Coastal	1 or 2	10	18.08111		
Genex: Option A	100000	Coastal	1 or 2	10	0.545677	65	Total SO 1 or 2
Genex: Option A	100000	Coastal	3 or 4	25	25.12747		
Genex: Option A	100000	Coastal	3 or 4	25	1.026032		
Genex: Option A	100000	Coastal	3 or 4	25	5.460993		
Genex: Option A	100000	Coastal	3 or 4	25	7.603141		
Genex: Option A	100000	Coastal	3 or 4	25	0.273101		
Genex: Option A	100000	Coastal	3 or 4	25	0.132366		
Genex: Option A	100000	Coastal	3 or 4	25	13.3057		
Genex: Option A	100000	Coastal	3 or 4	25	0.545677	53	Total SO 3 or 4

Kidston Corridor Option B - Regulated remnant watercourse vegetation

Name	Scale	Bioregion_type	SO_group	Buffer_m	Area_ha		
Genex: Option B	100000	Non-coastal	1 or 2	25	1060.103		
Genex: Option B	250000	Non-coastal	1 or 2	25	177.1531		
Genex: Option B	100000	Non-coastal	1 or 2	25	21.94918		
Genex: Option B	100000	Non-coastal	1 or 2	25	7.799067		
Genex: Option B	100000	Non-coastal	1 or 2	25	243.4169		
Genex: Option B	100000	Non-coastal	1 or 2	25	1370.482		
Genex: Option B	250000	Non-coastal	1 or 2	25	5.498384		
Genex: Option B	250000	Non-coastal	1 or 2	25	400.4101		
Genex: Option B	100000	Non-coastal	1 or 2	25	5.22667		
Genex: Option B	100000	Non-coastal	1 or 2	25	32.08263		
Genex: Option B	100000	Non-coastal	1 or 2	25	2.777769		
Genex: Option B	100000	Non-coastal	1 or 2	25	9.573953		
Genex: Option B	100000	Non-coastal	1 or 2	25	173.8444		
Genex: Option B	250000	Non-coastal	1 or 2	25	2.500361		
Genex: Option B	100000	Non-coastal	1 or 2	25	0.164711		
Genex: Option B	100000	Non-coastal	1 or 2	25	3.009753		
Genex: Option B	100000	Non-coastal	1 or 2	25	1.857839	3518	Total SO 1 or 2
Genex: Option B	100000	Non-coastal	3 or 4	50	521.8199		
Genex: Option B	250000	Non-coastal	3 or 4	50	60.40728		
Genex: Option B	100000	Non-coastal	3 or 4	50	21.94918		
Genex: Option B	100000	Non-coastal	3 or 4	50	7.825659		
Genex: Option B	100000	Non-coastal	3 or 4	50	64.05599		
Genex: Option B	100000	Non-coastal	3 or 4	50	426.1213		
Genex: Option B	250000	Non-coastal	3 or 4	50	144.8488		
Genex: Option B	100000	Non-coastal	3 or 4	50	5.22667		
Genex: Option B	100000	Non-coastal	3 or 4	50	32.08263		
Genex: Option B	100000	Non-coastal	3 or 4	50	1.382051		
Genex: Option B	100000	Non-coastal	3 or 4	50	5.80639		
Genex: Option B	100000	Non-coastal	3 or 4	50	14.05157		
Genex: Option B	250000	Non-coastal	3 or 4	50	2.500361		
Genex: Option B	250000	Non-coastal	3 or 4	50	13.67417		
Genex: Option B	100000	Non-coastal	3 or 4	50	0.164711		
Genex: Option B	100000	Non-coastal	3 or 4	50	3.009753	1325	Total SO 3 or 4
Genex: Option B	100000	Non-coastal	5 or greater	100	313.161		
Genex: Option B	100000	Non-coastal	5 or greater	100	7.799067		
Genex: Option B	100000	Non-coastal	5 or greater	100	7.825659		
Genex: Option B	100000	Non-coastal	5 or greater	100	44.12056		
Genex: Option B	100000	Non-coastal	5 or greater	100	300.0754		
Genex: Option B	100000	Non-coastal	5 or greater	100	2.777769		
Genex: Option B	100000	Non-coastal	5 or greater	100	9.573953		
Genex: Option B	100000	Non-coastal	5 or greater	100	1.382051		
Genex: Option B	100000	Non-coastal	5 or greater	100	5.80639		
Genex: Option B	100000	Non-coastal	5 or greater	100	9.204484		
Genex: Option B	100000	Non-coastal	5 or greater	100	0.164711		
Genex: Option B	100000	Non-coastal	5 or greater	100	1.857839	704	Total SO 5 or greater

Name	Scale	Bioregion_type	SO_group	Buffer_m	Area_ha		
Genex: Option B	100000	Coastal	1 or 2	10	0.844454		
Genex: Option B	100000	Coastal	1 or 2	10	9.624821		
Genex: Option B	100000	Coastal	1 or 2	10	0.502938		
Genex: Option B	100000	Coastal	1 or 2	10	0.273101		
Genex: Option B	100000	Coastal	1 or 2	10	18.08111		
Genex: Option B	100000	Coastal	1 or 2	10	0.545677	30	Total SO 1 or 2
Genex: Option B	100000	Coastal	3 or 4	25	5.460993		
Genex: Option B	100000	Coastal	3 or 4	25	0.273101		
Genex: Option B	100000	Coastal	3 or 4	25	13.3057		
Genex: Option B	100000	Coastal	3 or 4	25	0.545677	20	Total SO 3 or 4

Kidston Corridor Option C - Regulated remnant watercourse vegetation

Name	Scale	Bioregion_type	SO_group	Buffer_m	Area_ha		
GENEX Option C	100000	Non-coastal	1 or 2	25	1196.949		
GENEX Option C	250000	Non-coastal	1 or 2	25	269.3936		
GENEX Option C	100000	Non-coastal	1 or 2	25	32.64234		
GENEX Option C	100000	Non-coastal	1 or 2	25	5.424669		
GENEX Option C	100000	Non-coastal	1 or 2	25	11.34511		
GENEX Option C	100000	Non-coastal	1 or 2	25	1370.482		
GENEX Option C	250000	Non-coastal	1 or 2	25	1.467238		
GENEX Option C	250000	Non-coastal	1 or 2	25	0.118428		
GENEX Option C	250000	Non-coastal	1 or 2	25	400.4101		
GENEX Option C	100000	Non-coastal	1 or 2	25	32.08263		
GENEX Option C	100000	Non-coastal	1 or 2	25	9.573953		
GENEX Option C	100000	Non-coastal	1 or 2	25	173.8444		
GENEX Option C	250000	Non-coastal	1 or 2	25	2.500361		
GENEX Option C	100000	Non-coastal	1 or 2	25	0.164711		
GENEX Option C	100000	Non-coastal	1 or 2	25	3.009753		
GENEX Option C	100000	Non-coastal	1 or 2	25	1.857839	3511	Total SO 1 or 2
GENEX Option C	100000	Non-coastal	3 or 4	50	608.131		
GENEX Option C	250000	Non-coastal	3 or 4	50	70.14473		
GENEX Option C	100000	Non-coastal	3 or 4	50	32.64234		
GENEX Option C	100000	Non-coastal	3 or 4	50	8.930733		
GENEX Option C	100000	Non-coastal	3 or 4	50	426.1213		
GENEX Option C	250000	Non-coastal	3 or 4	50	1.467238		
GENEX Option C	250000	Non-coastal	3 or 4	50	15.28811		
GENEX Option C	250000	Non-coastal	3 or 4	50	144.8488		
GENEX Option C	100000	Non-coastal	3 or 4	50	32.08263		
GENEX Option C	100000	Non-coastal	3 or 4	50	5.80639		
GENEX Option C	100000	Non-coastal	3 or 4	50	14.05157		
GENEX Option C	250000	Non-coastal	3 or 4	50	2.500361		
GENEX Option C	250000	Non-coastal	3 or 4	50	13.67417		
GENEX Option C	100000	Non-coastal	3 or 4	50	0.164711		
GENEX Option C	100000	Non-coastal	3 or 4	50	3.009753	1379	Total SO 3 or 4
GENEX Option C	100000	Non-coastal	5 or greater	100	261.5098		
GENEX Option C	100000	Non-coastal	5 or greater	100	5.424669		
GENEX Option C	100000	Non-coastal	5 or greater	100	8.930733		
GENEX Option C	100000	Non-coastal	5 or greater	100	300.0754		
GENEX Option C	100000	Non-coastal	5 or greater	100	9.573953		
GENEX Option C	100000	Non-coastal	5 or greater	100	5.80639		
GENEX Option C	100000	Non-coastal	5 or greater	100	9.204484		
GENEX Option C	100000	Non-coastal	5 or greater	100	0.164711		
GENEX Option C	100000	Non-coastal	5 or greater	100	1.857839	603	Total SO 5 or greater

Name	Scale	Bioregion_type	SO_group	Buffer_m	Area_ha		
GENEX Option C	100000	Coastal	1 or 2	10	1.590327		
GENEX Option C	100000	Coastal	1 or 2	10	2.416613		
GENEX Option C	100000	Coastal	1 or 2	10	0.502938		
GENEX Option C	100000	Coastal	1 or 2	10	0.132366		
GENEX Option C	100000	Coastal	1 or 2	10	18.08111		
GENEX Option C	100000	Coastal	1 or 2	10	0.545677	23	Total SO 1 or 2
GENEX Option C	100000	Coastal	3 or 4	25	7.603141		
GENEX Option C	100000	Coastal	3 or 4	25	0.132366		
GENEX Option C	100000	Coastal	3 or 4	25	13.3057		
GENEX Option C	100000	Coastal	3 or 4	25	0.545677	22	Total SO 3 or 4

Kidston Corridor Options - Regulated remnant wetland vegetation

Name	RE	PERCENT	VM_POLY	Area_ha		
Genex: Option A	9.11.15a	100	LeastC	1.926624		
Genex: Option A	9.3.25	100	LeastC	0.175368		
Genex: Option A	9.3.19a/9.3.3a/9.3.23	70/20/10	O-subdom	2.611455	4.7	Total remnant wetland vegetation for Option A
Genex: Option B	9.3.26	100	LeastC	3.298466		
Genex: Option B	9.8.1a/9.8.13	80/20	LeastC	7.444698		
Genex: Option B	9.8.13/9.8.1a/9.8.1b/9.3.10b	60/20/15/5	LeastC	3.873757		
Genex: Option B	9.8.1a/9.8.13	80/20	LeastC	3.716969		
Genex: Option B	9.8.1a/9.8.13	80/20	LeastC	3.716969		
Genex: Option B	9.8.1a/9.8.13	80/20	LeastC	0.039454		
Genex: Option B	9.8.1a/9.8.13	80/20	LeastC	0.039454		
Genex: Option B	9.8.1a/9.8.13	80/20	LeastC	6.792229		
Genex: Option B	9.8.1a/9.8.13	80/20	LeastC	6.792229		
Genex: Option B	9.8.13/9.8.1a/9.8.1b/9.3.10b	60/20/15/5	LeastC	0.692628		
Genex: Option B	9.8.13/9.8.1a/9.8.1b/9.3.10b	60/20/15/5	LeastC	0.692628		
Genex: Option B	9.8.13/9.8.1a/9.8.1b/9.3.10b	60/20/15/5	LeastC	2.587155		
Genex: Option B	9.8.13/9.8.1a/9.8.1b/9.3.10b	60/20/15/5	LeastC	2.587155	42.3	Total remnant wetland vegetation for Option B
GENEX Option C	9.8.1a/9.8.13	80/20	LeastC	3.716969		
GENEX Option C	9.8.1a/9.8.13	80/20	LeastC	3.716969		
GENEX Option C	9.8.1a/9.8.13	80/20	LeastC	0.039454		
GENEX Option C	9.8.1a/9.8.13	80/20	LeastC	0.039454		
GENEX Option C	9.8.1a/9.8.13	80/20	LeastC	6.792229		
GENEX Option C	9.8.1a/9.8.13	80/20	LeastC	6.792229		
GENEX Option C	9.8.13/9.8.1a/9.8.1b/9.3.10b	60/20/15/5	LeastC	0.692628		
GENEX Option C	9.8.13/9.8.1a/9.8.1b/9.3.10b	60/20/15/5	LeastC	0.692628		
GENEX Option C	9.8.13/9.8.1a/9.8.1b/9.3.10b	60/20/15/5	LeastC	2.587155		
GENEX Option C	9.8.13/9.8.1a/9.8.1b/9.3.10b	60/20/15/5	LeastC	2.587155	27.7	Total remnant wetland vegetation for Option C

Kidston Corridor Options - MSES Protected areas

Name	M_Table1_1	M1_1	M1_1_Type	M1_1_Name	Area_ha		
Genex: Option A	STATE CONSERVATION AREAS	Protected Areas	NR	Newcastle Range-The Oaks Nature Refuge	439.8409	439.8	Newcastle Range-The Oaks Nature Refuge
Genex: Option A	STATE CONSERVATION AREAS	Protected Areas	NR	Liefway Nature Refuge	1.316996	4.7	Liefway Nature Refuge
Genex: Option A	STATE CONSERVATION AREAS	Protected Areas	NR	Liefway Nature Refuge	0.323124		
Genex: Option A	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	36.85525	213.7	Girringun National Park
Genex: Option A	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	0.000382		
Genex: Option A	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	1.478203		
Genex: Option A	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	28.1685		
Genex: Option A	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	4.236403		
Genex: Option A	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	1.381377		
Genex: Option A	STATE CONSERVATION AREAS	Protected Areas	NR	Liefway Nature Refuge	2.078499		
Genex: Option A	STATE CONSERVATION AREAS	Protected Areas	NR	Liefway Nature Refuge	0.414249		
Genex: Option A	STATE CONSERVATION AREAS	Protected Areas	NR	Liefway Nature Refuge	0.548143		
Genex: Option A	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	117.5568		
Genex: Option A	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	18.62776		
Genex: Option A	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	5.381855	658.2	Total hectares for Option A
Genex: Option B	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	36.85525		
Genex: Option B	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	0.000382	214.4	Girringun National Park
Genex: Option B	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	1.478203		
Genex: Option B	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	28.1685		
Genex: Option B	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	4.236403		
Genex: Option B	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	1.381377		
Genex: Option B	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	0.719896		
Genex: Option B	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	117.5568		
Genex: Option B	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	18.62776		
Genex: Option B	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	5.381855	214.4	Total hectares for Option B
GENEX Option C	STATE CONSERVATION AREAS	Protected Areas	NR	Liefway Nature Refuge	2.078499		
GENEX Option C	STATE CONSERVATION AREAS	Protected Areas	NR	Liefway Nature Refuge	0.414249	3.0	Liefway Nature Refuge
GENEX Option C	STATE CONSERVATION AREAS	Protected Areas	NR	Liefway Nature Refuge	0.548143		
GENEX Option C	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	0.719896	142.3	Girringun National Park
GENEX Option C	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	117.5568		
GENEX Option C	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	18.62776		
GENEX Option C	STATE CONSERVATION AREAS	Protected Areas	NP	Girringun National Park	5.381855	145.3	Total hectares for Option C

Kidston Corridor Options - MSES Wildlife habitat

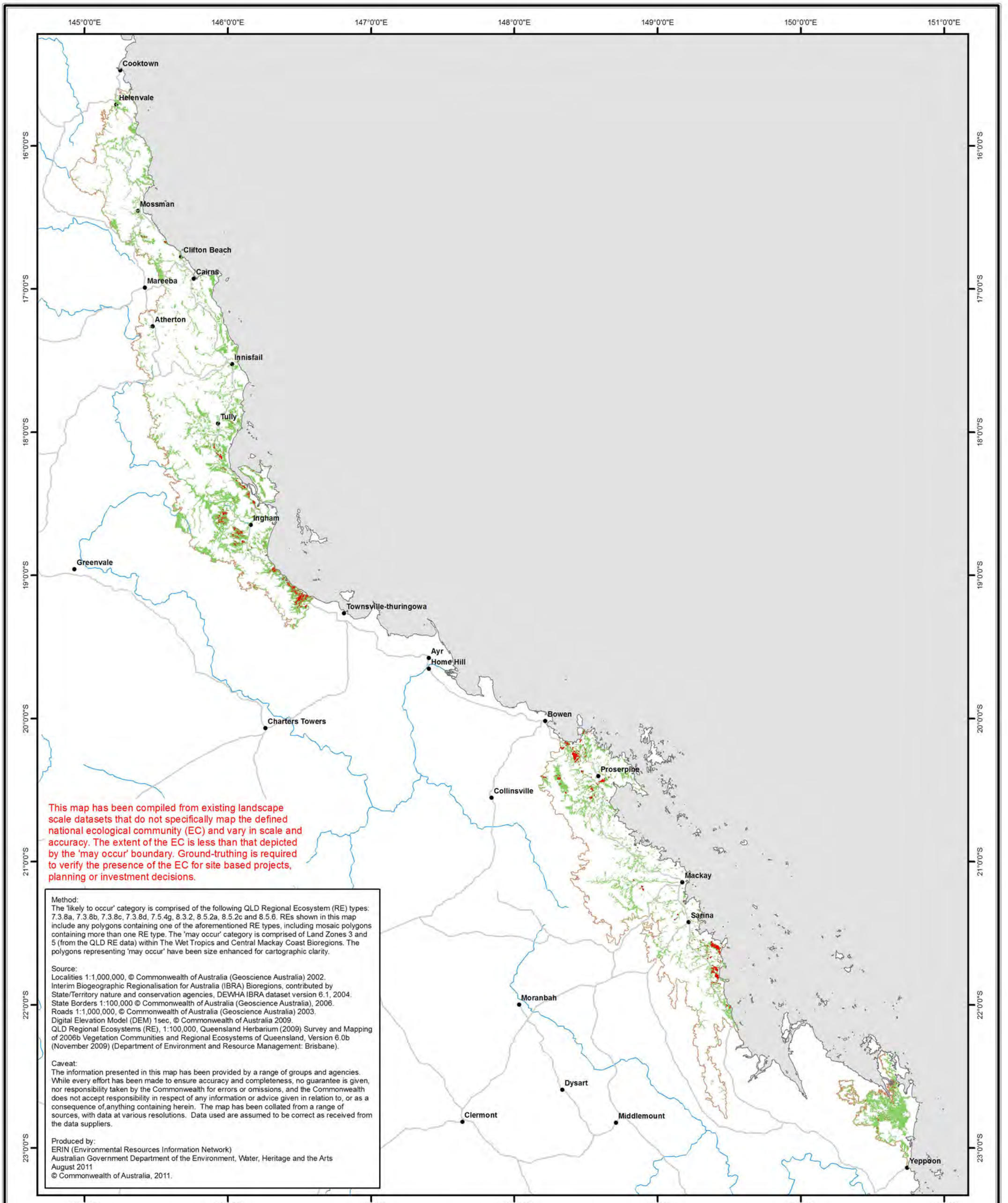
Name	M3_1	M3_1_SpecA	M3_1_EssHb	Area_ha		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	<Null>	0.000635		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	<Null>	0.000012		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	<Null>	0.15312		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.187874		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.000084		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.00069		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	34.16968		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	Essential	163.847		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	<Null>	0.016774		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	<Null>	0.054965		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	<Null>	0.115602		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	<Null>	0.00036		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.72007		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	17.55466		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.623486		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.15235		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.000056		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.023917		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.024483		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.063902		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.161254		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.23368		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.402452		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	Essential	7.455134		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	Essential	11.3936		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	Essential	3.36858		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	Essential	0.147912		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	Essential	1.962138		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	Essential	0.280448		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	Essential	1.301988		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	Essential	14.64406		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	Essential	6.153846		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	Essential	3.000527		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	Essential	6.518854		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	Essential	9.905173		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	Essential	2.436735		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	Essential	0.473492		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	Essential	0.720557		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.323124		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	<Null>	0.507933		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	176.209		
Genex: Option A	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	Essential	28.24693		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	4.770746		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	5.251581		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.548143		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	1.705626		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	15.50554		
Genex: Option A	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.338929	522	Total hectares for Option A
Genex: Option B	Threat wildlife & Spec LeastC animals	<Null>	Essential	11.73615		
Genex: Option B	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	<Null>	0.507933		
Genex: Option B	Threat wildlife & Spec LeastC animals	<Null>	Essential	176.209		
Genex: Option B	Threat wildlife & Spec LeastC animals	Acacia tingoorensis, Acacia tingoorensis	Essential	28.24693		
Genex: Option B	Threat wildlife & Spec LeastC animals	<Null>	Essential	4.770746		
Genex: Option B	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.542304		
Genex: Option B	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.600522		
Genex: Option B	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.323699		
Genex: Option B	Threat wildlife & Spec LeastC animals	<Null>	Essential	90.21954		
Genex: Option B	Threat wildlife & Spec LeastC animals	Petrogale sharmani	Essential	78.60185		
Genex: Option B	Threat wildlife & Spec LeastC animals	Petrogale sharmani	Essential	2.106798		
Genex: Option B	Threat wildlife & Spec LeastC animals	<Null>	Essential	1.705626		
Genex: Option B	Threat wildlife & Spec LeastC animals	<Null>	Essential	15.50554		
Genex: Option B	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.338929	411	Total hectares for Option B
GENEX Option C	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.150997		
GENEX Option C	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.000249		
GENEX Option C	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.013628		
GENEX Option C	Threat wildlife & Spec LeastC animals	Petrogale sharmani	Essential	188.7237		
GENEX Option C	Threat wildlife & Spec LeastC animals	Petrogale sharmani	<Null>	0.000008		
GENEX Option C	Threat wildlife & Spec LeastC animals	Petrogale sharmani	<Null>	0.460741		
GENEX Option C	Threat wildlife & Spec LeastC animals	<Null>	Essential	5.251581		
GENEX Option C	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.548143		
GENEX Option C	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.542304		
GENEX Option C	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.600522		
GENEX Option C	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.323699		
GENEX Option C	Threat wildlife & Spec LeastC animals	<Null>	Essential	90.21954		
GENEX Option C	Threat wildlife & Spec LeastC animals	Petrogale sharmani	Essential	78.60185		
GENEX Option C	Threat wildlife & Spec LeastC animals	Petrogale sharmani	Essential	2.106798		
GENEX Option C	Threat wildlife & Spec LeastC animals	<Null>	Essential	1.705626		
GENEX Option C	Threat wildlife & Spec LeastC animals	<Null>	Essential	15.50554		
GENEX Option C	Threat wildlife & Spec LeastC animals	<Null>	Essential	0.338929	385	Total hectares for Option C

Kidston Corridor Options - HES Wetlands

Name	M_Table1_2	M2_1	M2_1_Des	M2_1_Dat	Area_ha		
Genex: Option B	WETLANDS AND WATERWAYS	HES wetlands	WPA wetland	wetland protection area-wetland	1.127498	1.1	Total hectares for Option B

Appendix H

TEC DISTRIBUTION MAP



This map has been compiled from existing landscape scale datasets that do not specifically map the defined national ecological community (EC) and vary in scale and accuracy. The extent of the EC is less than that depicted by the 'may occur' boundary. Ground-truthing is required to verify the presence of the EC for site based projects, planning or investment decisions.

Method:
The 'likely to occur' category is comprised of the following QLD Regional Ecosystem (RE) types: 7.3.8a, 7.3.8b, 7.3.8c, 7.3.8d, 7.5.4g, 8.3.2, 8.5.2a, 8.5.2c and 8.5.6. REs shown in this map include any polygons containing one of the aforementioned RE types, including mosaic polygons containing more than one RE type. The 'may occur' category is comprised of Land Zones 3 and 5 (from the QLD RE data) within The Wet Tropics and Central Mackay Coast Bioregions. The polygons representing 'may occur' have been size enhanced for cartographic clarity.

Source:
Localities 1:1,000,000, © Commonwealth of Australia (Geoscience Australia) 2002.
Interim Biogeographic Regionalisation for Australia (IBRA) Bioregions, contributed by State/Territory nature and conservation agencies, DEWHA IBRA dataset version 6.1, 2004.
State Borders 1:100,000 © Commonwealth of Australia (Geoscience Australia), 2006.
Roads 1:1,000,000, © Commonwealth of Australia (Geoscience Australia) 2003.
Digital Elevation Model (DEM) 1sec, © Commonwealth of Australia 2009.
QLD Regional Ecosystems (RE), 1:100,000, Queensland Herbarium (2009) Survey and Mapping of 2006b Vegetation Communities and Regional Ecosystems of Queensland, Version 6.0b (November 2009) (Department of Environment and Resource Management: Brisbane).

Caveat:
The information presented in this map has been provided by a range of groups and agencies. While every effort has been made to ensure accuracy and completeness, no guarantee is given, nor responsibility taken by the Commonwealth for errors or omissions, and the Commonwealth does not accept responsibility in respect of any information or advice given in relation to, or as a consequence of,anything containing herein. The map has been collated from a range of sources, with data at various resolutions. Data used are assumed to be correct as received from the data suppliers.

Produced by:
ERIN (Environmental Resources Information Network)
Australian Government Department of the Environment, Water, Heritage and the Arts
August 2011

Melaleuca viridiflora Woodlands in High Rainfall Coastal North Queensland

Likely
May
Localities
Major Roads
Drainage
IBRA regions

N

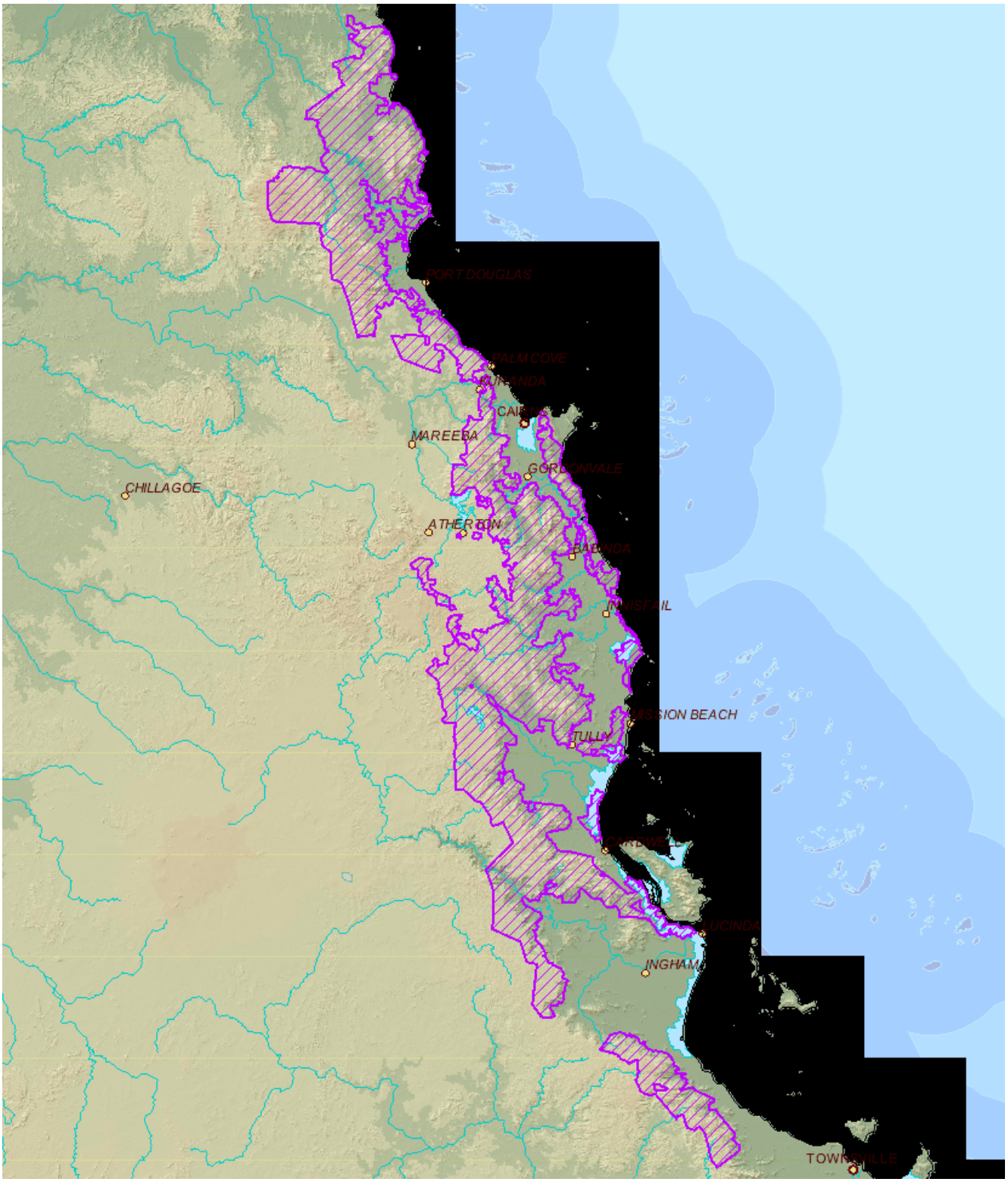
0 25 50 100 Km

Projection: Geographic
Datum: GDA 1994
1:2,750,000

Australian Government
Department of Sustainability, Environment, Water, Population and Communities

Appendix I

WORLD HERITAGE PROPERTIES



Place Details

Scale 1:2000000

Place Name:	Wet Tropics of Queensland		
Place ID:	105689	**Street Name:**	
Heritage List:	National Heritage List	**Suburb or Town:**	Cairns
Class:	Natural	**State**	QLD
Status:	Listed place		

Printed by: LWALL
Jul 23, 2007 10:11:07 AM

Australian Government
Department of the Environment and Water Resources

Attachment 2 – Remote Sensing Report

Genex Kidston Final Corridor Selection Project – Brief Report Woody Vegetation Mapping

The Virtual GIS Group Pty Ltd

53 Wesley Street, Lutwyche QLD 4030 – Commercial in confidence

CONTENTS

TABLES

FIGURES

Introduction

Powerlink have been commissioned to provide final corridor options for the Genex Kidston upgrade. To assist the assessment of potential ecological and environmental relative to the three options being considered, the extent of woody vegetation needed to be mapped. This report summarises the process to map woody vegetation for the Genex Kidston project.

Overview

The purpose of this project was to map the extent of woody vegetation using best available broad scale satellite imagery to assist in subsequent assessment of the ecological value of remnant vegetation near three potential corridor routes.

The work conducted included a review and acquisition of freely available satellite imagery to form the basis of the desktop mapping of woody vegetation. Analysis was conducted using Landsat multispectral satellite imagery at a 30-metre spatial resolution.

The project provides a high-level overview of current woody vegetation cover in relation to existing State mapping, highlighting areas where current mapping may be improved through further investigation. Areas that could be regrowth due to absence of vegetated cover around 15 years ago together with areas where the distribution of canopy could indicate poor condition in existing remnant areas were mapped.

The results of this mapping will be used to assist Parsons Brinckerhoff ecological consultants to produce a desktop assessment of the ecological value of remnant vegetation in and near the proposed easement options and to inform Powerlink of any potential issues in relation to the EPBC Act reporting obligations.

Project Extent

The area of interest is presented in Figure 1. The extent of the project was derived from a one kilometre buffer around the external limits of the provided corridor options, which start in the east near Mount Fox and run westwards for approximately 185 kilometres through the Greenvale and Conjuboy districts in North Queensland. The project extent covers an area of approximately 1,520 km^2. The project is in a region of relatively dry, scrubby country. The current regional ecosystem mapping indicates that the project extends across bioregions 9 (Einasleigh Uplands) and 7 (Wet Tropics), with most of the area west of Mt Fox falling into the former bioregion. The area is bisected by waterways which tend to run north-south across the project extent and dominant landzones are 3, 5 and 11. Landzone 11 are hills and lowlands on metamorphic rocks. Landzone 5 represents areas of tertiary-early Quaternary loamy and sandy plains and plateaus. Landzone 3 incorporates recent Quaternary alluvial systems along river and creek flats. Landzones 7,8, 10 and 12 are also present across the project extent.

The current regional ecosystem mapping indicates that the project extent, away from the waterways, is dominated by vegetation communities with a scattered canopy. When mapping at a broad scale, this presents as vegetation with low greenness, particularly when the groundcover is very dry grassland. Different images were used to assist in the mapping, particularly to consider changes reflecting the moisture regime at the time of image acquisition.

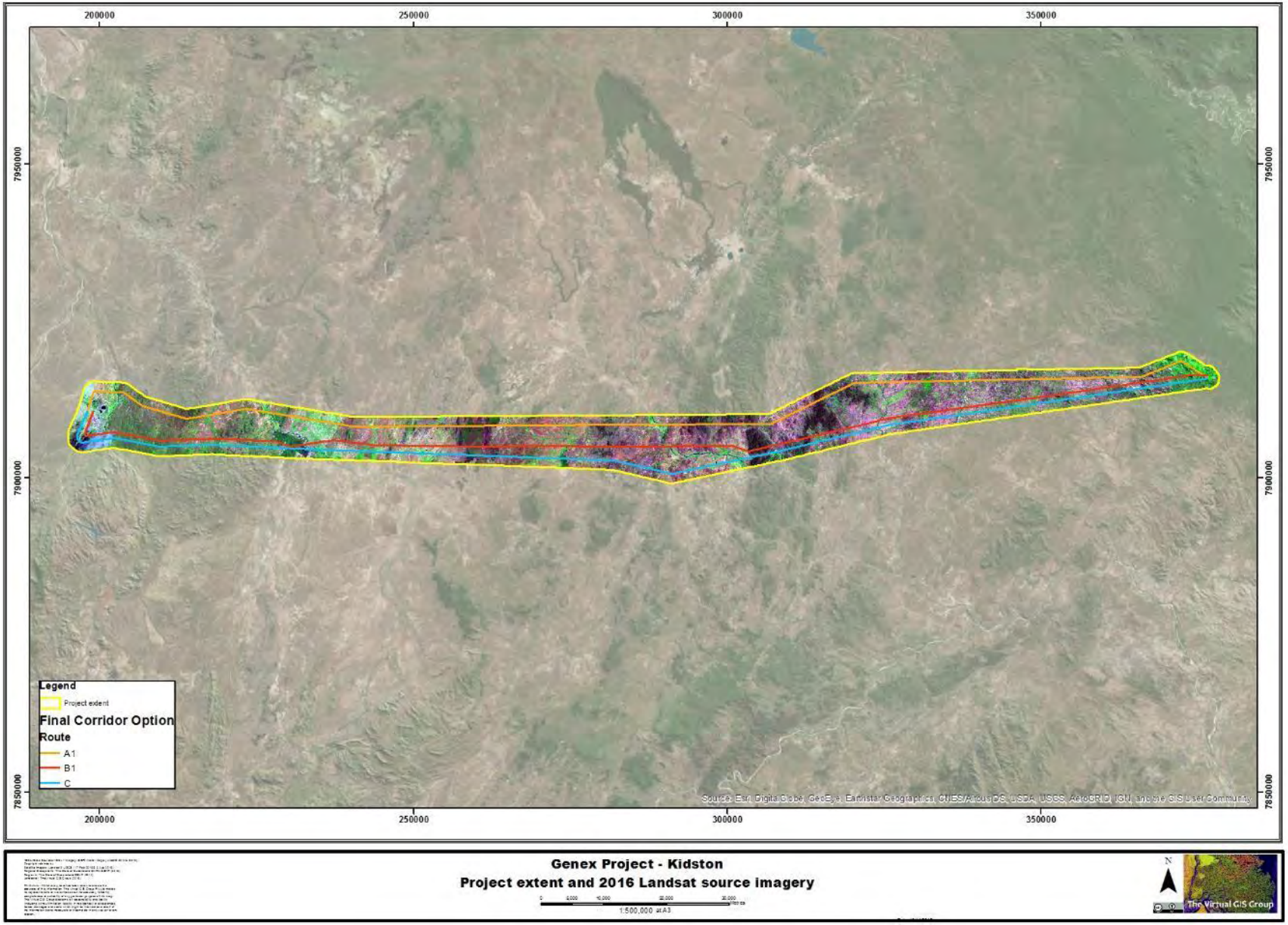


Figure 1: GENEX Kidston project extent and 2016 Landsat source imagery

Source data

Remotely sensed data

This project requires the use of remotely sensed imagery to detect and map woody vegetation across the project extent. Remotely sensed data can be sourced from satellite imagery and aerial photography and the suitability for this project is determined by availability of access, frequency of capture, distribution of cloud cover, availability of legacy or archive data for temporal assessment.

As the project extended over an area of approximately 1,520 square kilometres, a remotely sensed solution based on aerial photography was not considered and satellite imagery was used.

Satellite imagery

Satellite imagery is widely available from a range of international custodians. Most commercial operators charge on an area coverage basis. No budget had been allocated for the purchase of satellite imagery, so available commercial satellites who charge for their data were not considered.

Availability of access

Access was determined for this project by cost and timeframe for the supply. Due to the extent of the project and the need for the project to commence immediately, multi-temporal Landsat data is free to download from the NASA/USGS website and provides broad scale imagery at 30-metre spatial resolution with multispectral coverage. Landsat imagery was sourced from the United States Geological Society (USGS). Two image scenes cover the project extent from Path/Row 96/73 and 95/73.

Frequency of capture

Both Landsat 8 and 7 are currently operational. Landsat 8 is the preferred satellite and has a repeat cycle over the project extent every 16 days. Landsat 7 provides optional infill coverage and legacy coverage from early 2000s.

Distribution of cloud cover

Although the repeat cycle is 16 days for each satellite, the suitability of the imagery is determined by the presence and extent of cloud over the project extent. To select suitable imagery, each capture was reviewed in relation to the GENEX Kidston corridor options to identify which recent scenes would be suit the assessment of woody vegetation.

Availability of legacy or archive satellite imagery

As the Landsat programme has been operational since 1972, legacy data from 2000-2002 was acquired to provide an overview on whether clearing or cultivation had occurred in the past 15 years within the project area. Landsat is the only programme which provides free consistent legacy data at the same spatial resolution over such an extended period.

Suitable cloud-free imagery was available during 2016, to provide a current view on the extent and spatial distribution of the woody vegetation. Additional Landsat scenes for each tile were used to compare different moisture conditions and to infill the 96/73 scene which did include a small amount of cloud in the far western region. Only the primary scene across the full corridor was analysed, to keep costs to a minimum. Legacy scenes were acquired to provide a baseline reference for determining if the vegetated cover is likely to be remnant. Although this is an extension to mapping woody vegetation, it does contribute to the overall assessment of the ecological value of the mapped areas.

The images acquired for the GENEX Kidston assessment are listed in Table 1:

Table 1: Landsat scenes acquired for the GENEX woody vegetation assessment

Landsat scene (Path/Row)	Primary scene date	Reference scene date	Legacy scene date
96/73 (western)	17 Feb 2016	28 Aug 2016	23 July 2000
95/73 (eastern)	5 August 2016	17 July 2015	5 July 2002

Standard ortho-ready image products were used which contain some variability due to terrain distortions but are usually within 1 pixel accuracy in the horizontal. Where available, surface reflectance imagery was acquired to mitigate the impact of differing atmospheric conditions. This was only available for some sourced imagery and not for all required source data. Adjustments in the methodology were deployed to compensate for these differences. The imagery was therefore not pre-processed, relying on the geometric and radiometric accuracies of the source data. The imagery is suitable for analysis to detect and map woody vegetation at a broad scale.

The methodology used to map the woody vegetation can be deployed using any multispectral source imagery if budget or finer resolution imagery becomes available once the final corridor selection has been made.

Other geospatial datasets

Reference geospatial datasets were sourced to expedite the mapping of woody vegetation. These included:

- Remnant vegetation over the Einasleigh bioregion
- Remnant vegetation over the North-west bioregion
- Regrowth vegetation over the scene extent
- Queensland 1:25,000 drainage
- Queensland Major rivers
- Queensland Statewide landcover and tree study (2000 to 2015) (SLATS)

Other spatial datasets were also generated using finer resolution backdrop only imagery. These data, which were digitised from the screen, included:

- Built structures
- Linear easements, including roads, tracks, powerlines and fences
- Dams
- Waterways

These additional datasets were specifically designed to be aligned with the source imagery and to assist in the assessment of woody vegetation.

SLATS data was aggregated across the 2000 to 2015 assessment period, with all clearance types except damage due to natural disaster being flagged as non-remnant (1,370 sites).

All project-related datasets were prepared and reprojected into GDA 1994 Zone 55.

Methodology

The methodology deployed captured the extent and spatial distribution of current woody vegetation using an object based image classification process. This methodology has been previously deployed




at a wide range of scales and using different remotely sensed source datasets for organisations across Australia and internationally.

The scale of the source imagery determined the granularity achievable for mapping woody vegetation. Given the type of vegetation present within the project extent, woody vegetation was mapped using an approach that enabled the separate discrimination of areas presenting a range of greenness indicators.

The methodology was based on an eCognition Geographic Object Based Image Analysis (GEOBIA) approach which isolated undisturbed, woody areas from other landcovers. Using GEOBIA enabled the use of neighbourhood functions to isolate features, which is critical when discriminating between spectrally similar regions which are contextually different.

2016 vegetation cover mapping

State Government datasets, both existing remnant and regrowth datasets, were used to inform the process, which identified areas which were consistent with current remnant and regrowth vegetation cover mapping. Areas mapped as cleared in the SLATS mapping program from 2000 to 2015 were also attributed as non-remnant, except where those areas were specifically noted as being subject to natural disaster damage in any given year.

Additionally, those areas which appeared to be very scattered with lower levels of vegetated cover were separately identified as potential woody vegetation. The remnant areas were grouped by their VMA status in State Government regional ecosystem mapping and attributed as either remnant or potentially remnant. This interim dataset was used as part of the process to inform woody vegetation mapping and was not included as one of the final deliverables.

Areas where the imagery pattern appeared to be consistent with other areas that have been verified as non-remnant and were adjacent to those areas were mapped as non-remnant. Areas which did not appear to have consistency in the imagery with other areas mapped as remnant were flagged as potential remnant. Some areas of fire scarring were detected but were not separately mapped.

Objects that were identified as nonvegetated 15 years ago but now mapped as woody vegetation were separated from those which were consistently mapped as woody vegetation, to separate potential regrowth zones from remnant and potential remnant areas.

The methodology adopted thresholds to assign classes into remnant, potential remnant or scattered using the spectral characteristics in the Landsat imagery. This was refined through visual reference to the larger scale reference imagery presented above.

2016 woody vegetation mapping

Within the project extent, landcover was mapped to separately identify remnant vegetation cover, from which woody vegetation was aggregated.

The assessment sequence was consistent with the method described by (Neldner, Wilson, E.J.Thompson, & Dillewaard, 2012) for vegetation assessment from imagery only and included an inspection of the legacy scenes across each tile to check for baseline disturbance and/or cultivation in the last 15 years.

Minor variations in vegetation cover were not captured due to the scale of the imagery and the minimum mappable area associated with the spatial resolution of the source Landsat imagery.




The mapping products generated within the GEOBIA environment were exported into vector shapefiles for delivery.

Results and discussion

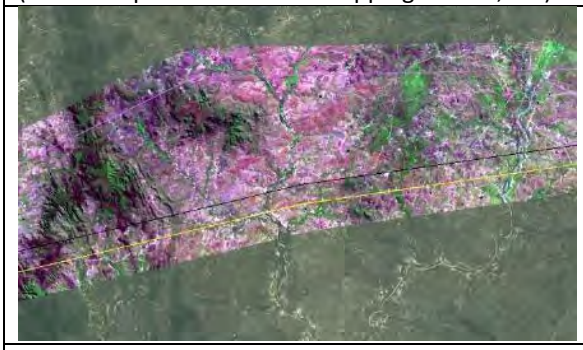
The Landsat satellite imagery was used to derive landcover classification for the project extent from which indicative regional ecosystem mapping was generated. This was then aggregated into the mapping of woody vegetation for the project.

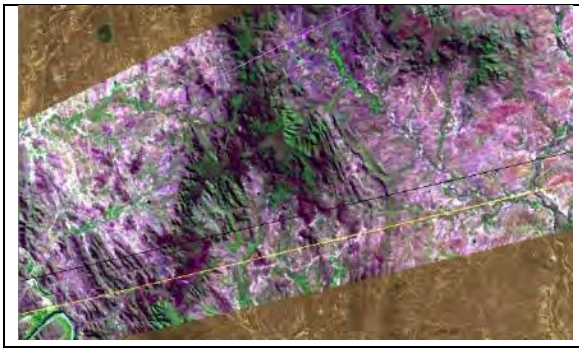
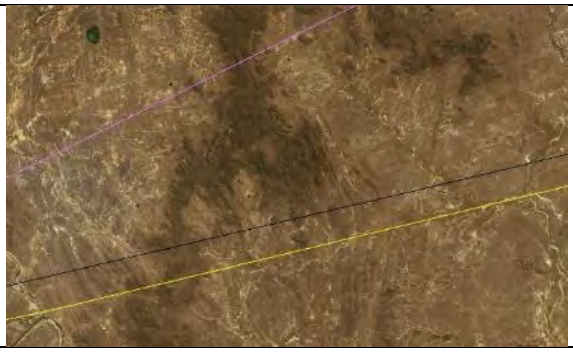
Although the methodology was consistent with that implemented in other major infrastructure projects in central Queensland, the lack of availability of high resolution multispectral imagery limited the ability to reliably discriminate between non-vegetated and dry, scrubby vegetation.

To highlight these limitations, the following set of examples have been generated to demonstrate the resolvable landcover using Landsat data compared to higher resolution imagery. Table 2 contains a set of screen snapshots over the project area captured at a range of viewing scales. The left-hand column contains the Landsat imagery used in this project, while the right-hand column contains examples obtained from the view-only world imagery available through the ESRI ArcGIS online web service.

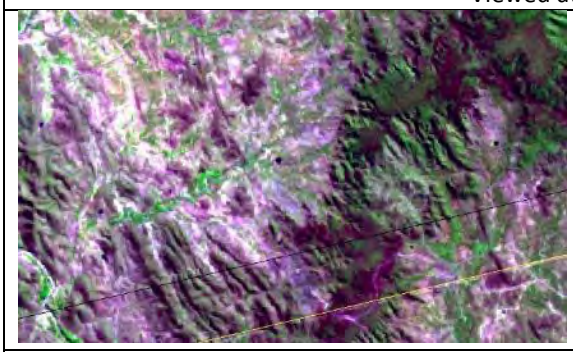
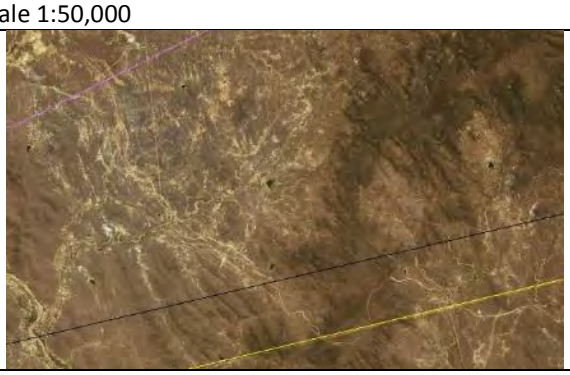
The examples used include scales from the recommended publication scale of 1:80,000 for Landsat 7 and 8 at 30-metre resolution (Geoimage, 2016) and demonstrate how the reliability of mapping woody vegetation using Landsat imagery only will deteriorate as the scale of mapping required becomes larger. In the Landsat imagery, the spectral bands displayed are 7,5,2 to RGB. Healthy vegetation appears green whereas areas dominated by exposed soil or very dry grasses appear light pink. Woody vegetation with low chlorophyll levels present as dark magenta. In the alternative, higher spatial resolution true-colour reference data, the heavily vegetated areas appear darker than the surrounding grassland and exposed soils.

Table 2: Examples of imagery at viewing scale

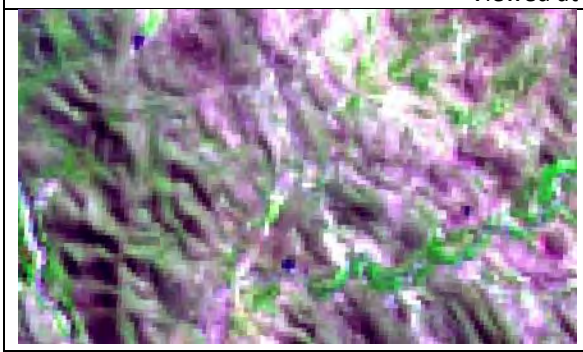
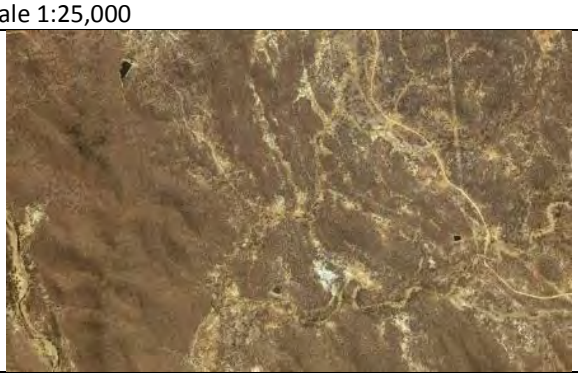
Landsat imagery (30-metre pixel suitable for mapping to 1:80,000)	ESRI ArcGIS online world imagery (indeterminate source date and resolution)
	
Viewed at scale 1:80,000	

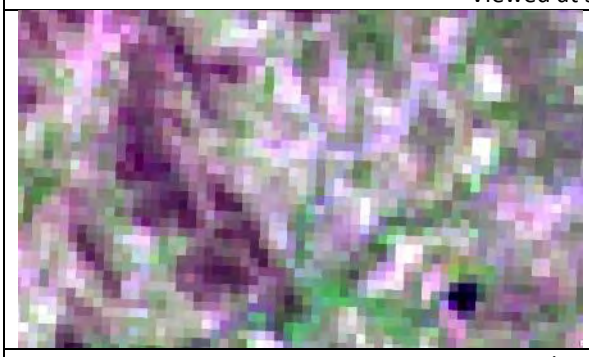
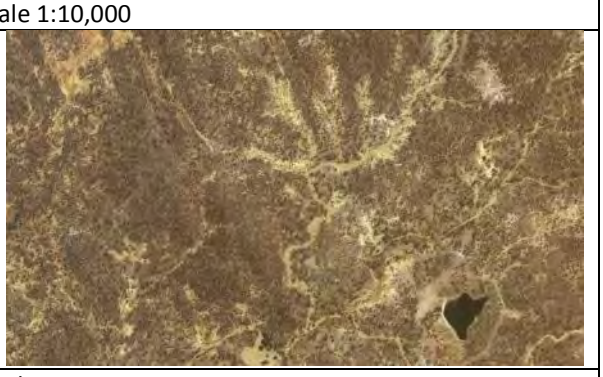
Viewed at scale 1:50,000

Viewed at scale 1:25,000

Viewed at scale 1:10,000

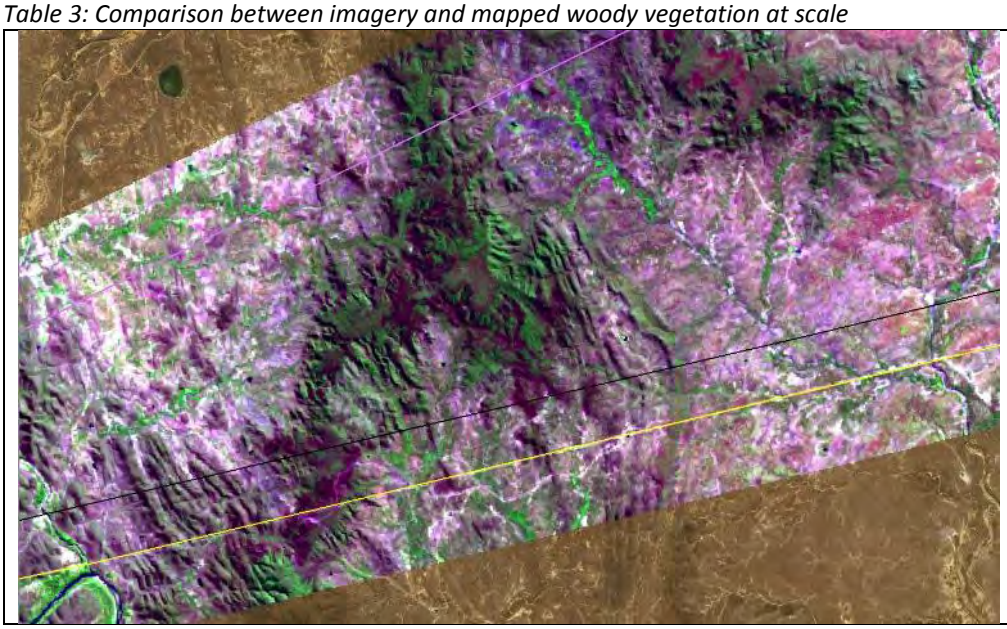
Viewed at scale 1:5,000

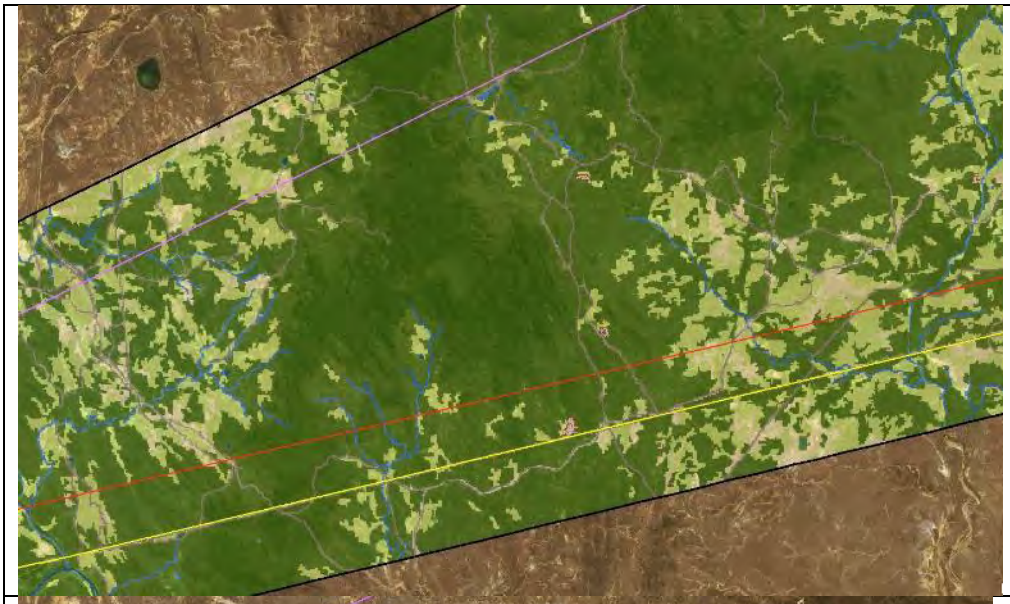
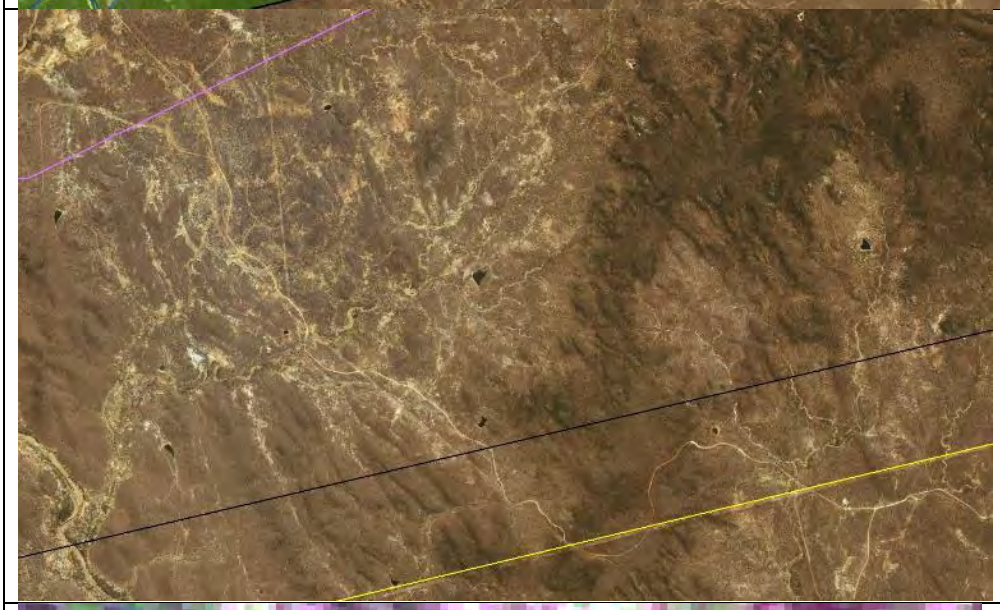
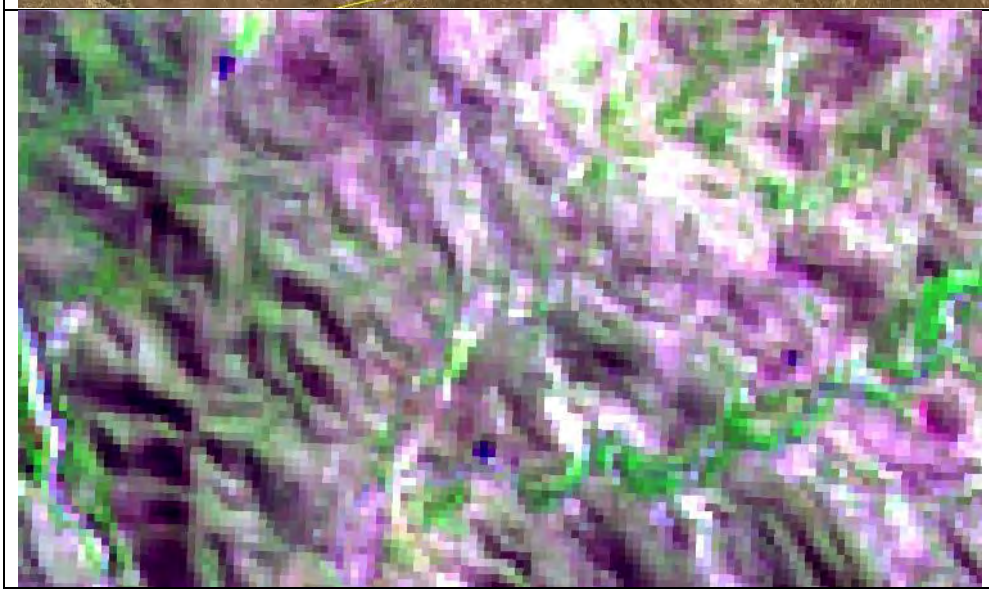
As the viewing scale gets larger, the differences in ability to discriminate woody vegetation from non-vegetated areas becomes harder. The detail available in the ESRI data clearly shows vegetation whereas the Landsat pixels are dominated by the groundcover and vegetation contain low chlorophyll levels rather than highly reflective woody vegetation.

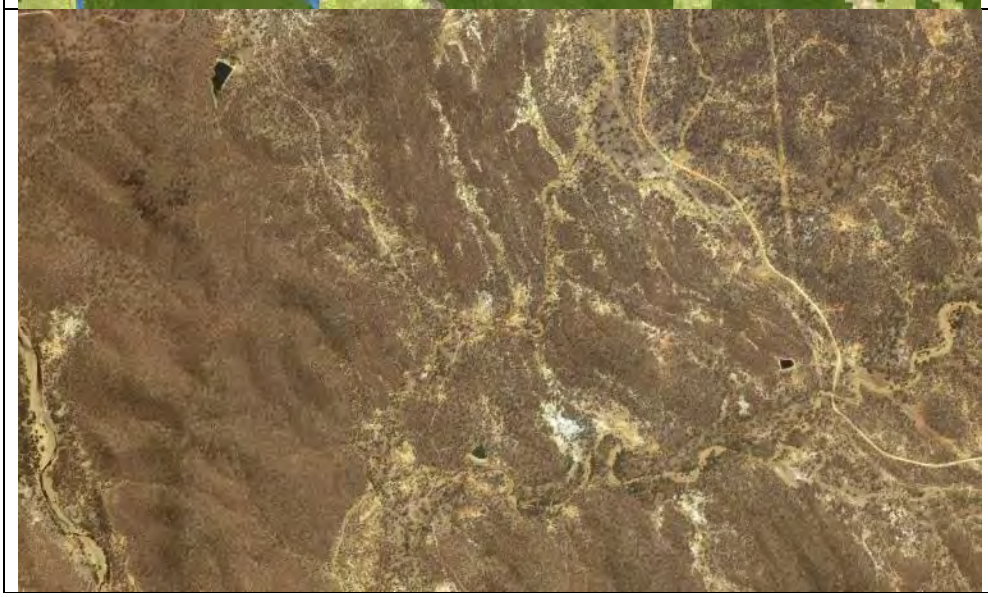
This is partly due to the spatial resolution but also to the leaf composition of the dominant vegetation communities on all landzones except landzone 3. This is evident in the example at 1:5,000 scale imagery, where only the riparian corridor appears as healthy, green vegetation and the upland areas expected to be dominated by regional ecosystem 9.7.1 and 9.11.5 are not reflecting well in the near infrared part of the spectrum compared to the red channel. This results in low vegetation index levels which usually present across regions which are not vegetated. The two regional ecosystems expected in this small area in the 1:5000 scale example are both sparse structurally. 9.7.1 community contains Eucalyptus persistens woodland on lateritised and deeply weathered surfaces on undulating terrain. 9.11.5 contains Eucalyptus persistens +/- E. crebra woodland on low metamorphic hills. E. crebra is commonly known as narrow leaf ironbark, which goes some way to explaining why the leaves are not reflecting well in the multispectral imagery.

The data presented in Table 3 demonstrates how Landsat is fit for purpose when mapping woody vegetation at a broad scale and how the quality of the result reduces as the viewing scale is increased. Landsat supports mapping typically to 1:80,000 so even the examples shown in this table exceed the suitability of the data for discriminating vegetation cover. In saying that, it is evident that the results are differentiating between areas that are dominated by vegetation and areas which experience higher levels of soil erosion gullies and other disturbances.

Table 3: Comparison between imagery and mapped woody vegetation at scale

	1:50,000 Landsat imagery

	Mapped woody and potential woody vegetation at 1:50,000
	Reference imagery at 1:50,000 viewing scale
	Landsat at 1:10,000 viewing scale

	Mapped woody vegetation at 1:10,000 viewing scale
	Reference imagery at 1:10,000 viewing scale

The results generated for this study must be applied at a scale which is fit for purpose. This is 1:80,000 or at best 1:50,000 when considering woody vegetation only.

Please note that the data captured from the ESRI web services cannot be used for analytical purposes and therefore can only support the project through visual verification.

Landcover mapping was undertaken initially to map the distribution of vegetation cover across the project extent. This was conducted in two steps: 2016 vegetation cover mapping followed by 2016 woody vegetation mapping. These steps were performed independently of the SLATS clearance mapping, presented in Figure 2. A large area in the central-western section of the project extent was impacted by natural disaster damage during the 2010-20111 assessment period covering an area of 1,178 hectares. This is presented as cyan in Figure 2. This was not assigned as non-remnant due to the type of clearance mapped.

Of the remaining area mapped by the SLATS program as being cleared between 2000 and 2015, only 678 hectares were identified. Where these areas were mapped as remnant in the vegetation cover and the woody vegetation mapping, they were recorded as areas of non-remnant in the metrics and mapping, except where they fell below the minimum mapping area in size.

2016 vegetation cover mapping

Due to the nature of the distributed and scattered vegetation across most of the project extent, the aggregation of vegetation with very low vegetation greenness indices was incrementally applied to bring dry, scrubby areas into the mapped remnant category. Given the characteristics of the vegetation, some areas remained classified as potential remnant due to the scattered, dry or grassland dominated nature of those communities. These differences in vegetation cover density were provided to assist the PB ecologists review the remnant vegetation status and were generated without further field verification or input from an ecological perspective. Results are shown in Figure 3 and metrics reported in Table 4.

The SLATS data shown in Figure 2 was used to reassign the areas mapped as potential remnant to adjusted remnant where they had been impacted by disturbance caused by natural disaster damage.

Some minor areas of disturbance were observed in the 2000-2002 images which were initially mapped as remnant. These were reassigned potential regrowth accordingly. No evidence of cultivation was detected other than plantations already mapped as non-remnant in the eastern section of the project extent.

The classes of vegetation mapped are listed in Table 4, which were used to aggregate up into woody vegetation.

2016 woody vegetation mapping

Using the derived regional ecosystem mapping, the woody vegetation was aggregated into the class groupings described in Table 4 and the results are mapped in Figure 4. The groupings combine all remnant classes into the Woody vegetation class and the Scattered vegetation classes described in the table.

Table 4: Landcover classes used to map woody vegetation

Woody veg class grouping	Woody veg area (ha) within project extent (after MMU removal)	RE class grouping	Class description	RE area (ha) within project extent (before MMU removal)
Woody vegetation	108503	Remnant O-dom	Woody vegetation spatially coincident with Of concern dominant REs including lower and higher vegetation indices	2336
		O-subdom	Woody vegetation spatially coincident with Of concern sub-dominant REs including lower and higher vegetation indices	1531
		LeastC	Woody vegetation spatially coincident with Least Concern REs including lower and higher vegetation indices	101550

Scattered vegetation	23818	Scattered or dry O-dom	Scattered or dry dominated areas spatially coincident with Of concern dominant REs	769
		Scattered or dry O-subdom	Scattered or dry dominated areas spatially coincident with Of concern sub-dominant REs	731
		Scattered or dry LeastC	Scattered or dry dominated areas spatially coincident with Least concern dominant REs	24163
Regrowth	500	Regrowth	Areas mapped by State Government as regrowth (2014)	476
Potential regrowth	245	Potential regrowth	Areas mapped a remnant but which did not appear to contain woody vegetation in 2000 and 2002 depending on the image scene referenced	240
Non-remnant	3888	Non-remnant	Areas mapped by State Government as non-remnant	3836
Non-vegetated	12129	Bare	Areas with no or very low greenness considered to comprise very dry grassland, bare, exposed soil, cleared or eroded areas	4117
		Built structures	Buildings, sheds, other structures	8
		Easements	Including roads, tracks, power easements and fence lines	5927
		Water	Dams and waterways	3399
Total	**149084**			**149084**

The results of this mapping are presented in Figure 3 and Figure 4.

Minimum mapping area tolerances were applied to retain the integrity of the results, consistent with the source data used to generate the outcomes. Mapping products have been generated at 1:500,000 at A3 to cover the full proposed project extent and support the digital data supplied as a deliverable.

Regional ecosystem RE_Label attribution has been retained on the resultant digital datasets, with merging of class groups being limited by the RE extents.

Field verification will support the refinement and improvement of outcomes but does need to be aligned with the source imagery. This requires field-based observations to be aggregated based on dominant cover over a sample extent equivalent to the MMU for the imagery. Field-based observations were not available in support of this desktop-only project.

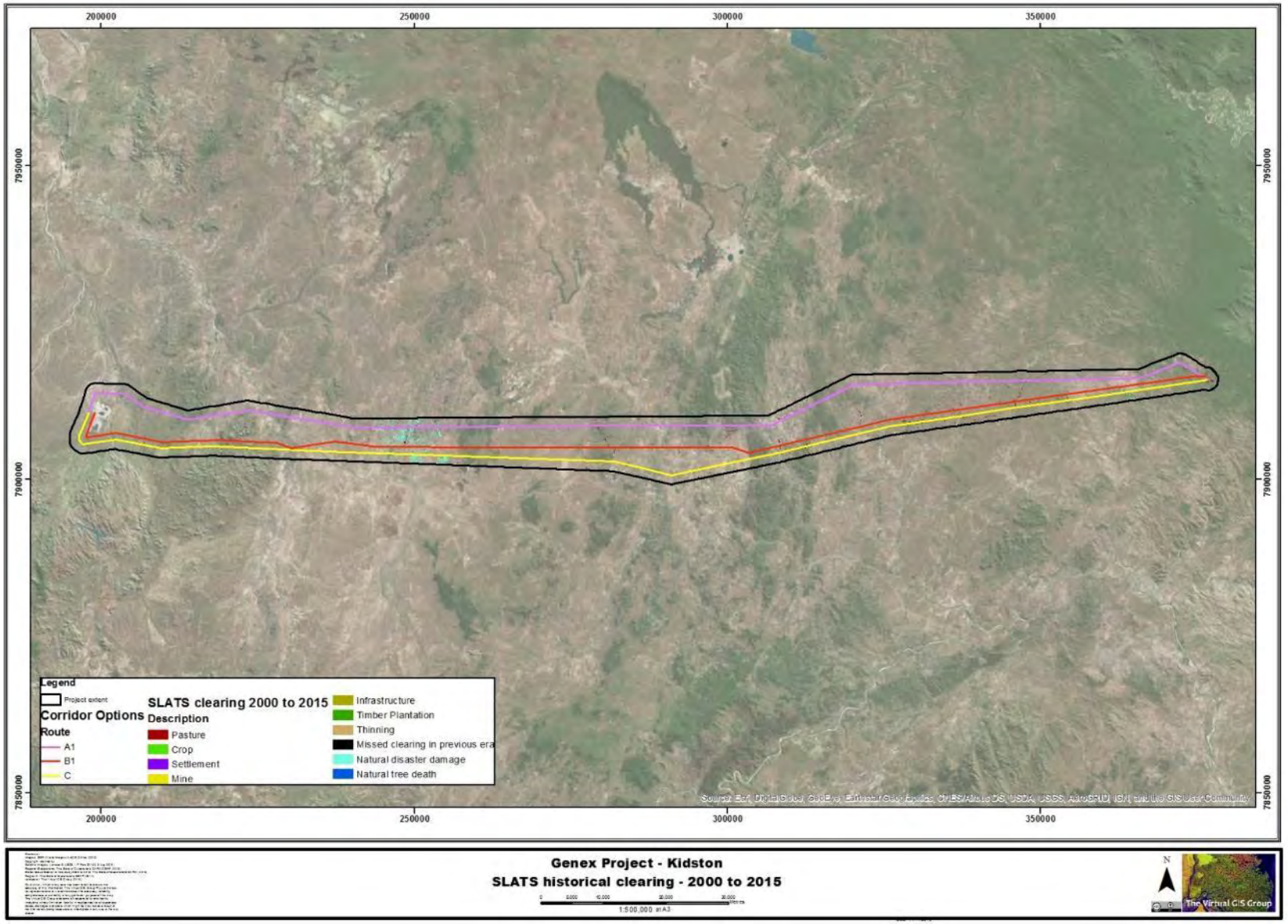


Figure 2: Statewide Landcover and Tree Study clearance 2000 to 2015

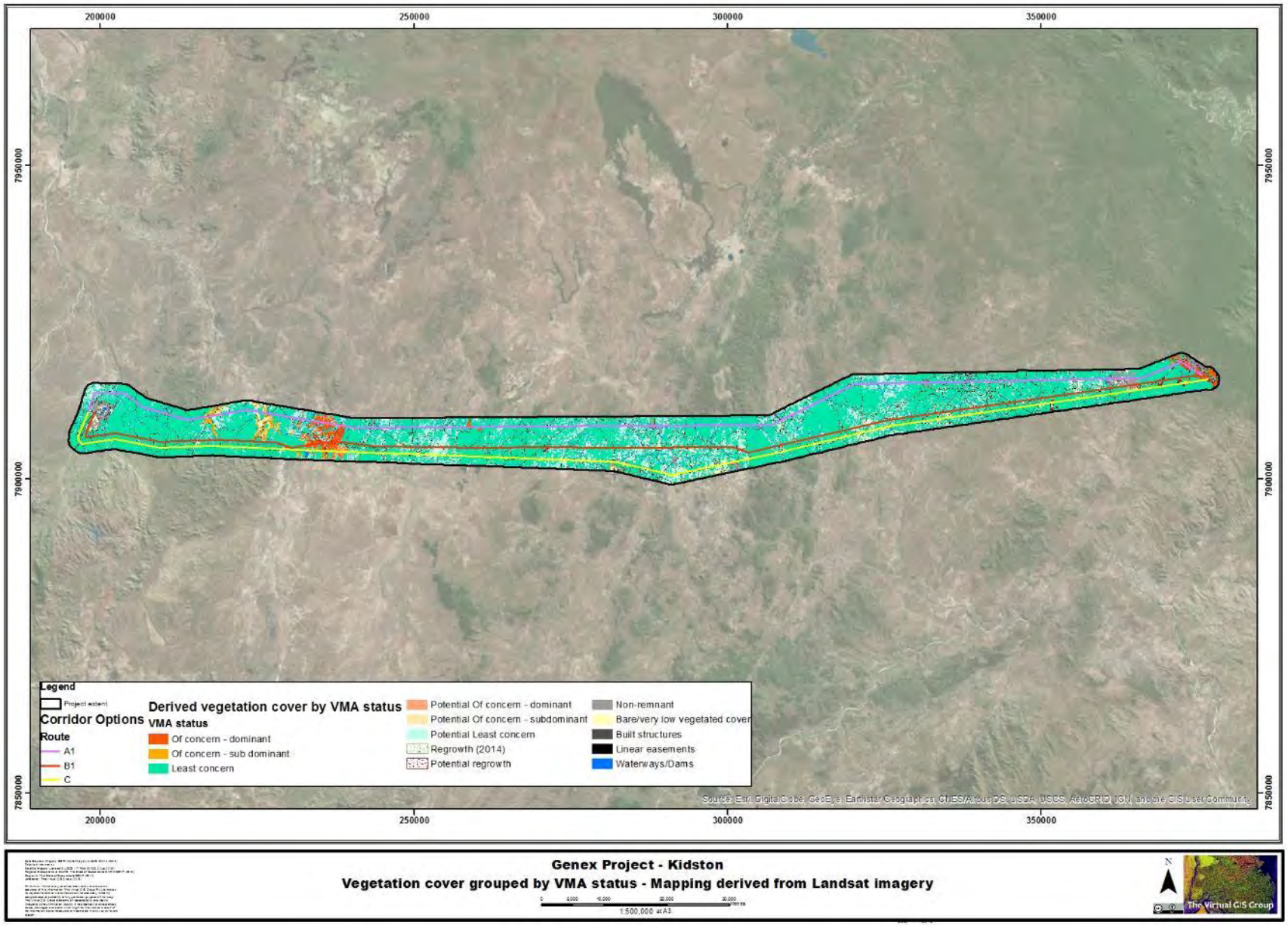


Figure 3: Derived vegetation cover symbolised by VMA status

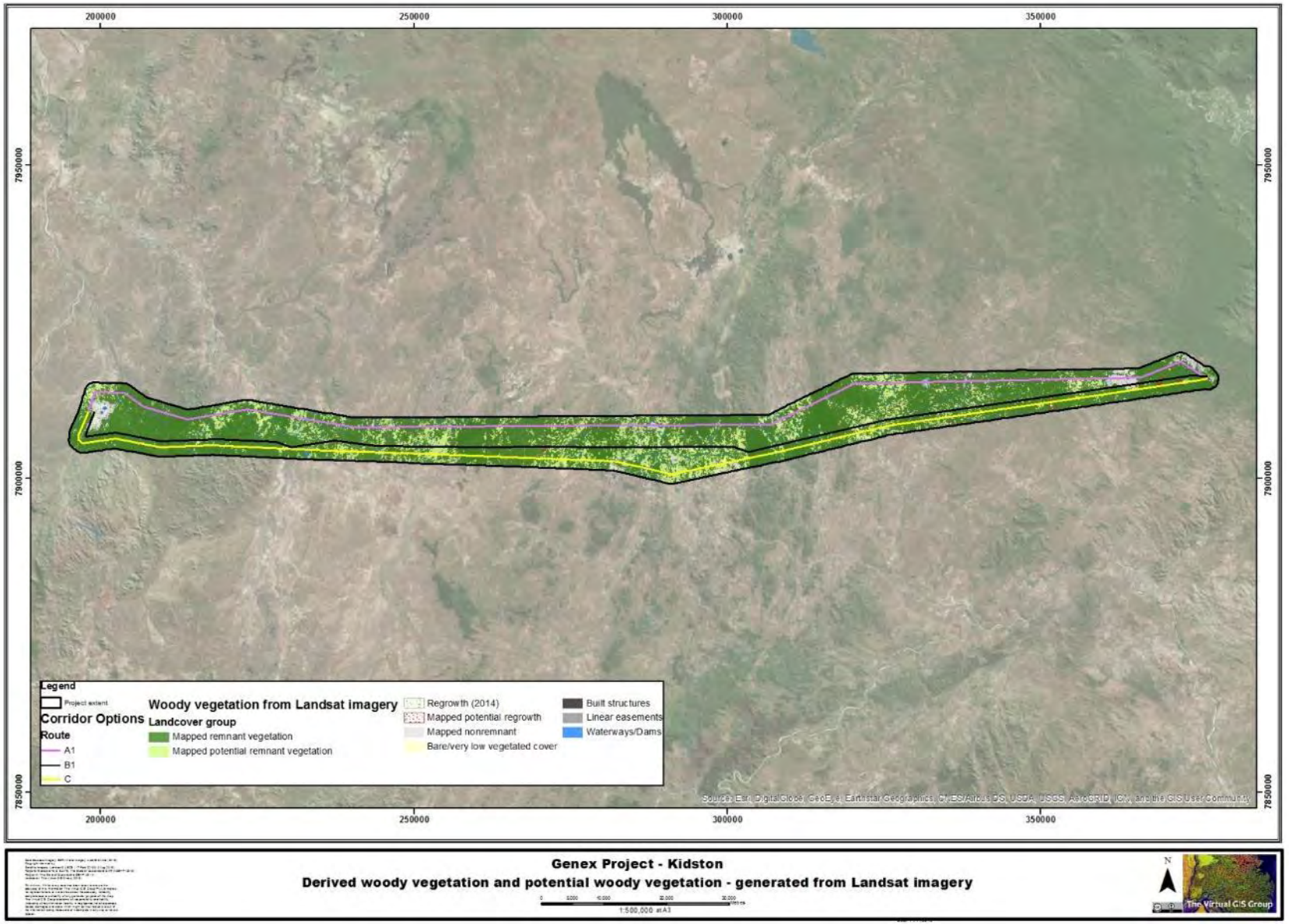


Figure 4: Derived woody vegetation and potential woody vegetation

Quality Assurance

As with most remotely sensed approaches to mapping landcover, accuracy of results increases with careful review of the results, and where necessary, the manual improvement of outcomes in areas of mixed pixels and/or mixed landcovers. Although the process does not require extensive manual intervention, some of the targets in this project are expected to be below the minimum mapping unit in size and so will be eliminated through quality control. Where the integrity of the data reduces with the removal of MMU areas, such as around waterways, easements and adjacent to areas mapped from State Government data, these areas may be retained. Dam, buildings, easements and waterways are not dissolved by MMU due to being point or linear features.

Formal accuracy assessment was not possible due to lack of field-based documentation but the results should be suitable to assist the assessment of potential ecological and environmental relative to the three options being considered.

Quality Assurance will be performed throughout the project. These functions will include geometric and attribute tests to ensure the data is clean and suitable for delivery. Standard checks for geometric errors such as undershoots, overshoots, closed polygons were performed as well as checking for duplicate objects.

To meet the timeframe and budgetary limitations associated with this project, a series of limitations, assumptions and exclusions were identified at the proposal stage and these were consistent with the project outcomes. Please refer to the proposal for a summary of these.

Future options

Further benefit could be gained by conducting analytics using both the current Landsat imagery and legacy imagery from 2000 and 2002, to be able to map change in vegetation cover.

Additionally, finer resolution satellite imagery would enable more detailed mapping of areas which could be considered non-remnant based on vegetation cover and density which may be inconsistent with the expectations of the regional ecosystems mapped by the State Government.

As with any desktop solution, particularly one which has relied on broad scale imagery without the benefit of field verification data, any results could be improved with the acquisition of field data confirming the vegetation cover, dominant regional ecosystem and woody vegetation status.

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Attachment 3 – Likelihood of Occurrence Assessment

POWERLINK

Preliminary Desktop-Based Likelihood of Occurrence Assessment

KIDSTON POWER TRANSMISSION LINE

PUBLIC

FEBRUARY 2017

WSP | PARSONS BRINCKERHOFF

Preliminary Desktop-Based Likelihood of Occurrence Assessment

KIDSTON POWER TRANSMISSION LINE

Powerlink

Public

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A	10/02/2017	Draft
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AUTHOR, REVIEWER AND APPROVER DETAILS

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1 INTRODUCTION

Powerlink is investigating corridor options for a powerline to connect a renewable energy generator (Genex) at Kidston in Far North Queensland, to the electricity transmission grid at Mount Fox, approximately 200 km east of Kidston (the Project). The site at Kidston will contain a mix of solar and pumped storage (hydro) technology.

The connection point to Kidston is at Mount Fox, approximately 200 km east of Kidston. It is most likely that a 275 kV transmission line will be required to provide adequate capacity for the connection distance. Powerlink was commissioned by Genex to produce a Corridor Selection Report, to identify a preferred corridor option from a broad study area, and a preliminary alignment for the connection. As part of this work an Initial Desktop Assessment and Preliminary Ecological Constraints Advice report was prepared for Powerlink. It identified the Matters of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES) of relevance to each corridor option.

The Project is located in a region of Queensland that is relatively remote and where very little to no ecological studies have been conducted. This was apparent by the low number of threatened species records revealed by Wildlife Online database searches. The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool also identified a number of threatened species predicted with potential to occur in the corridor options.

Subsequent to this work, the Department of Environment and Heritage Protection (DEHP) suggested the provision of a likelihood of occurrence assessment of threatened flora and fauna species listed under the *Nature Conservation Act 1994* (NC Act), to identify those species that maybe of relevance to the corridor options. This Preliminary Desktop-based Likelihood of Occurrence Assessment has been prepared for Powerlink in response to this request. To ensure completeness, this assessment also includes a likelihood of occurrence assessment for threatened flora and fauna species and threatened ecological communities listed under the EPBC Act.

1.1 Purpose

The study area for the Project is located in a region where little to no ecological studies have been undertaken and as a result records for threatened species are limited.

In support of the Initial Desktop Assessment and Preliminary Ecological Constraints Advice, this Preliminary Desktop-based Likelihood of Occurrence Assessment identifies the threatened species and ecological communities listed under the NC Act and/or EPBC Act that may potentially occur in the corridor options, for which future ecological surveys can be targeted. Essentially, it helps fill the gap in information resulting from the lack of species records in the study area.

The findings of this Preliminary Desktop-based Likelihood of Occurrence Assessment will also be useful in terms of identifying the threatened species and ecological communities that may be subject to project related impacts.

1.2 Study limitations

The likelihood of occurrence assessment presented herein is based upon a desktop assessment only, no field surveys have been undertaken to verify the presence and extent of the broad vegetation groups, regional ecosystems and/or fauna habitats within the corridor options.

It is a high level assessment, and on that basis the assessment has been conducted using a conservative approach. Therefore, the subsequent number of species with a moderate or high likelihood of occurrence is higher than the number that would likely result if field verification surveys of vegetation and habitats had been performed.

This assessment has relied on database searches conducted to the extent of local government area (LGA) boundaries, and State published broad vegetation group (BVG) mapping to predict the extent of potential habitats that may be supporting threatened species.

This likelihood of occurrence assessment will be updated at the impact assessment stage of the Project as field studies occur, with the potential that species may be both removed and added to the assessment.

2 METHODS

The methods used to inform the desktop-based likelihood of occurrence assessment have involved database searches and an assessment against publically available information to inform the habitat types that may potentially support threatened species.

The database searches included of the Protected Matters Search Tool and Wildlife Online covering the local government area (LGA) searches for the following LGAs:

- Hinchinbrook Shire Council
- Charters Towers Regional Council
- Etheridge Shire Council.

Because of the lack of records obtained from the search areas used for the Initial Desktop Assessment and Preliminary Ecological Constraints Advice, LGA wide database searches have been conducted to identify the species that may occur within the vegetation and habitats associated with the corridor options.

The publically available information included:

- State Department of Natural Resources and Mines – regional ecosystem mapping (Version 8) to identify Broad Vegetation Groups (BVGs) for assessing the likelihood of occurrence.
- Species or ecological community information (i.e. habitat requirements and distribution) from:
  - State Department of Science, Information Technology and Innovation's – Species profile search
  - Commonwealth Government administered Species Profile (SPRAT)
  - Commonwealth Government administered Atlas of Living Australia
  - Royal Botanic Gardens NSW administered PlantNET.

2.1 Determination of potential habitats within the corridor options

The regional ecosystem mapping associated with the corridor options was interrogated to identify the BVGs of relevance to the corridor options, as presented in Appendix A. Given the current scale of the project and associated desktop assessment, the BVGs are an effective way to identify the type of habitats available for threatened flora and fauna species.

The assessment for threatened flora species habitats was determined in reference to the 1: 1,000,000 scale BVG groups and sub-types associated with the corridor options. This approach accounts for the vegetation community associations and geology that is required for the threatened flora species to potentially occur.

The assessment for threatened fauna species is also determined in reference to the 1: 1,000,000 scale BVG groups with the corridor options, but only in the context of vegetation structural types (e.g. open forest, tussock grasslands, woodlands etc.). BVG sub-types are only used if the species is a specialist and very habitat specific (e.g. Green-eyed Tree Frog (*Litoria serrata*) only found in rainforest).

2.2 Assessment criteria

The likelihood of occurrence for threatened species and ecological communities listed under the EPBC Act and/or NC Act, has been assessed against the criteria outlined below in Table 2.1.

Note: In the absence of publically available species and habitat information, a conservative ranking of **'*Moderate*'** is applied. This is only relevant to some NC Act listed flora species revealed by database searches and does not apply to EPBC Act listed flora or fauna.

Table 2.1 Likelihood of occurrence assessment criteria

LIKELIHOOD OF OCCURRENCE	ASSESSMENT CRITERIA
Low	One or more of the following criteria is met: → suitable habitat unlikely to be present in the corridor options → species considered extinct in the wild.
Moderate	The following criteria is met: → suitable habitat potentially present in the corridor options.
High	The following criteria is met: → suitable habitat likely to be present in the corridor options area → previous records in study area.

3 SUMMARY OF LIKELIHOOD OF OCCURRENCE

The threatened flora and fauna species and migratory fauna species that are of moderate or high likelihood of occurrence in the corridor options are presented in the following sections.

None of the threatened ecological communities revealed by database searches are likely to occur in the corridor options. This low likelihood of occurrence is primarily on the basis of the bioregions they are restricted to under the EPBC Act, or because they are only found in near coastal environments:

- Brigalow (*Acacia harpophylla* dominant and codominant) - restricted to Brigalow Belt and Mulga Lands bioregions
- Broad leaf tea-tree (*Melaleuca viridiflora*) woodlands in high rainfall coastal north Queensland – restricted to coastal floodplains of the wet tropics bioregion
- Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions – restricted to the Brigalow Belt and Nandewar bioregions
- Littoral Rainforest and Coastal Vine Thickets of Eastern Australia – restricted to coastline.

3.1 Threatened flora species

The outcome of the likelihood of occurrence for threatened flora species of moderate or high likelihood in the corridor options, is presented in Table 3.1. The complete likelihood of occurrence for threatened flora species is presented in Appendix B.

Table 3.1 Threatened flora species assessed as having of moderate or high likelihood of occurrence in the corridor options

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS	NC ACT STATUS	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Acacia armitii	–	–	NT	Moderate
Acacia crombiei	–	V	V	Moderate
Acacia guymeri	–	–	V	Moderate
Acacia longipedunculata	–	–	NT	Moderate
Acacia tingoorensis	–	–	V	High
Ammannia robertsii	–	–	E	Moderate
Aristida thompsonii	–	–	E	Moderate
Arytera dictyoneura	–	–	NT	Moderate
**Borya inopinata*	–	–	E	Moderate
Cajanus mareebensis	–	E	E	Moderate
Canarium acutifolium var. acutifolium	–	V	V	Moderate
Cerbera dumicola	–	–	NT	Moderate
**Corchorus subargenteus*	–	–	V	Moderate
Corybas cerasinus	–	–	NT	Moderate

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS	NC ACT STATUS	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Corymbia leptoloma	–	V	V	Moderate
Croton magneticus	–	–	V	Moderate
Cycas cairnsiana	–	V	V	Moderate
Cycas couttsiana	–	–	NT	Moderate
Cycas cupida	–	–	V	Moderate
Cycas desolata	–	–	V	Moderate
Cycas platyphylla	–	V	V	Moderate
Dichanthium queenslandicum	–	E	V	Moderate
Dichanthium setosum	–	V	NT	High
Diuris oporina	–	–	NT	Moderate
Dodonaea uncinata	–	–	NT	Moderate
Drosera adelae	–	–	NT	Moderate
**Drummondita calida*	–	–	V	Moderate
Elaeocarpus coorangooloo	–	–	NT	Moderate
Eucalyptus paedoglauca	–	V	V	Moderate
Eucalyptus raveretiana	–	V	V	Moderate
Euphorbia carissoides	–	V	V	Moderate
**Gastrodia urceolata*	–	–	V	Moderate
Genoplesium tectum	–	E	E	Moderate
**Glossocardia orthochaeta*	–	–	E	Moderate
Graptophyllum excelsum	–	–	NT	Moderate
Grevillea glossadenia	–	V	V	Moderate
Habenaria rumphii	–	–	NT	Moderate
Homoranthus porteri	–	V	V	Moderate
Ipomoea saintronanensis	–	–	V	Moderate
Kardomia squarrulosa	–	–	V	Moderate
**Kunzea calida*	–	–	E	Moderate
Labichea brassii	–	–	NT	Moderate
**Lawrencia buchananensis*	–	–	V	Moderate
**Leptospermum pallidum*	–	–	NT	Moderate
**Lepturus minutus*	–	–	V	Moderate
Lindsaea pulchella var. blanda	–	V	PE	Moderate

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS	NC ACT STATUS	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Livistona drudei	–	–	V	Moderate
Livistona lanuginosa	–	V	V	Moderate
Macropteranthes leiocaulis	–	–	NT	Moderate
Macropteranthes montana	–	V	V	Moderate
Marsdenia brevifolia	–	V	V	Moderate
**Micromyrtus rotundifolia*	–	–	V	Moderate
**Oenanthe javanica*	–	–	NT	Moderate
Oldenlandia polyclada	–	–	NT	Moderate
Omphalea celata	–	V	V	Moderate
Parsonsia largiflorens	–	–	E	Moderate
Paspalidium udum	–	–	V	Moderate
Peristylus banfieldii	–	–	E	Moderate
**Pluchea punctata*	–	–	E	Moderate
**Solanum angustum*	–	–	E	Moderate
Solanum carduiforme	–	–	V	Moderate
Solanum graniticum	–	–	E	Moderate
Solanum sporadotrichum	–	–	NT	Moderate
Tephrosia leveillei	–	V	V	Moderate

Key: * indicates where species and habitat information is not publically available and a conservative ranking of **'*Moderate*'** is applied to the species in the likelihood of occurrence assessment.

3.2 Threatened and migratory fauna species

The outcome of the likelihood of occurrence for threatened and/or migratory fauna species of moderate or high likelihood in the corridor options, is presented in Table 3.2. The complete likelihood of occurrence for threatened and/or migratory fauna species is presented in Appendix C.

Table 3.2 Threatened and/or migratory fauna species assessed as having of moderate or high likelihood of occurrence in the corridor options

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS	NC ACT STATUS	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Amphibians				
Litoria nannotis	Torrent Tree Frog	E	E	Moderate
Litoria nyakalensis	Nyakala Frog	CE	E	Moderate
Litoria rheocola	Common Mistfrog	E	E	Moderate

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS	NC ACT STATUS	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Birds (threatened under EPBC Act and/or NC Act)				
Calidris ferruginea	Curlew Sandpiper	M	E	Moderate
Calyptorhynchus lathami erebus	Glossy Black-Cockatoo	–	V	Moderate
Casuarius casuarius johnsonii (southern population)	Southern Cassowary	E	E	Moderate
Cyclopsitta diophthalma macleayana	Macleay's Fig-Parrot	–	V	Moderate
Epthianura crocea macgregori	Yellow Chat (Dawson)	CE	E	Moderate
Erythrotriorchis radiatus	Red Goshawk	V (M)	E	Moderate
Erythrura gouldiae	Gouldian Finch	E	E	Moderate
Erythrura trichroa	Blue-faced Parrot-finch	–	NT	Moderate
Falco hypoleucos	Grey Falcon	–	V	Moderate
Geophaps scripta scripta	Squatter Pigeon (southern subspecies)	V	V	High
Grantiella picta	Painted Honeyeater	V	V	High
Neochmia ruficauda ruficauda	Star Finch (eastern subspecies)	E	E	Moderate
Poephila cincta cincta	Black-Throated Finch (White-Rumped subspecies)	E	E	High
Rostratula australis (syn. R. benghalensis)	Australian Painted Snipe	V	V	High
Turnix olivii	Buff-breasted Button-quail	E	E	Moderate
Tyto novaehollandiae kimberli	Masked Owl (northern)	V	V	Moderate
Birds (migratory under EPBC Act and special least concern under NC Act)				
Actitis hypoleucos	Common Sandpiper	M	SLC	Moderate
Apus pacificus	Fork-tailed Swift	M	SLC	High
Calidris acuminata	Sharp-tailed Sandpiper	M	SLC	Moderate
Calidris ruficollis	Red-necked Stint	M	SLC	Moderate
Charadrius ruficapillus	Red-capped Plover	M	SLC	Moderate
Charadrius veredus	Oriental Plover	M	SLC	Moderate
Chlidonias leucopterus	White-winged Black Tern	M	SLC	Moderate
Cuculus opatus (syn. Cuculus saturatus)	Oriental Cuckoo	M	SLC	High
Gallinago hardwickii	Latham's Snipe	M	SLC	High
Gallinago megala	Swinhoe's Snipe	M	SLC	High
Gallinago stenura	Pintail Snipe	M	SLC	High

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS	NC ACT STATUS	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Gelochelidon nilotica (syn. Sterna nilotica)	Gull-billed Tern	M	SLC	High
Glareola maldivarum	Oriental Pratincole	M	SLC	Moderate
Hirundapus caudacutus	White-throated Needletail	M	SLC	High
Hirundo rustica	Barn Swallow	M	SLC	High
Hydroprogne caspia (syn. Sternia caspia)	Caspian Tern	M	SLC	Moderate
Monarcha frater	Black-winged Monarch	M	SLC	Moderate
Monarcha melanopsis	Black-faced Monarch	M	SLC	Moderate
Motacilla cinerea	Grey Wagtail	M	SLC	Moderate
Myiagra cyanoleuca	Satin Flycatcher	M	SLC	High
Numenius minutus	Little Curlew	M	SLC	Moderate
Plegadis falcinellus	Glossy Ibis	M	SLC	High
Rhipidura rufifrons	Rufous Fantail	M	SLC	High
Tringa glareola	Wood Sandpiper	M	SLC	Moderate
Tringa nebularia	Common Greenshank	M	SLC	Moderate
Tringa stagnatilis	Marsh Sandpiper	M	SLC	Moderate
Mammals				
Dasyurus hallucatus	Northern Quoll	E	–	High
Dasyurus maculatus gracilis	Spotted-Tailed Quoll (Northern Subspecies)	E	E	Moderate
Hipposideros diadema reginae	Diadem Leaf-Nosed Bat	–	NT	Moderate
Hipposideros semoni	Semon's Leafnosed-bat	E	E	Moderate
Macroderma gigas	Ghost Bat	V	V	Moderate
Macrotis lagotis	Greater Bilby	V	E	High
Onychogalea fraenata	Bridled Nailtail Wallaby	E	E	Moderate
Ornithorhynchus anatinus	Platypus	–	SLC	High
Petauroides volans	Greater Glider	V	V	High
Petaurus gracilis	Mahogany Glider	E	E	High
Phascolarctos cinereus	Koala	V	V	High
Pteropus conspicillatus	Spectacled Flying-fox	V	V	Moderate
Rhinolophus robertsi	Large-eared Horseshoe-bat	E	E	Moderate
Sminthopsis archeri	Chestnut Dunnart	–	NT	Moderate
Tachyglossus aculeatus	Short-beaked Echidna	–	SLC	High

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS	NC ACT STATUS	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Reptiles				
Acanthophis antarcticus	Common Death Adder	–	V	Moderate
Delma mitella	–	V	NT	Moderate
Egernia rugosa	Yakka Skink	V	V	Moderate
Lampropholis mirabilis	–	–	NT	Moderate
Lerista cinerea	Vine-thicket Fine-lined Slider	–	V	Moderate
Lerista hobsoni	Hobson's fine-liner slider	–	V	Moderate
Lerista vanderduysi	Leaden-bellied fine-line slider	V	V	Moderate
Lerista vittata	–	V	V	Moderate

The numbers of threatened and/or migratory species listed under the EPBC Act and/or NC Act that are of moderate or high likelihood of occurring in habitats potentially supported by the corridor options are presented below:

EPBC ACT

Threatened flora species:

- **1** threatened flora species as having a high likelihood of occurrence, including:
  - 1 vulnerable
- **19** threatened flora species as having a moderate likelihood of occurrence, including:
  - 3 endangered
  - 16 vulnerable

Threatened fauna species:

- **9** threatened fauna species as having a high likelihood of occurrence, including:
  - 3 endangered
  - 6 vulnerable
- **20** threatened fauna species as having a moderate likelihood of occurrence, including:
  - 2 critically endangered
  - 10 endangered
  - 8 vulnerable
- Migratory fauna species:
  - **11** migratory fauna species as having a high likelihood of occurrence
  - **15** migratory fauna species as having a moderate likelihood of occurrence

NC ACT

Threatened flora species:

- **2** threatened flora species as having a high likelihood of occurrence, including:
  - 1 vulnerable
  - 1 near threatened
- **62** threatened flora species as having a moderate likelihood of occurrence, including:
  - 1 presumed extinct
  - 12 endangered
  - 31 vulnerable
  - 18 near threatened

Threatened fauna species (including special least concern):

- **21** threatened fauna species as having a high likelihood of occurrence, including:
  - 3 endangered
  - 5 vulnerable
  - 13 special least concern
- **46** threatened fauna species as having a moderate likelihood of occurrence, including:
  - 14 endangered
  - 12 vulnerable
  - 5 near threatened
  - 15 special least concern.

4 CONCLUSION

This preliminary desktop-based likelihood of occurrence has identified the threatened flora and fauna species, and migratory fauna species, listed under the EPBC Act and/or NC Act that have a moderate to high likelihood of occurring in the Project's study area.

It has identified the species of conservation significance that should be considered when designing field surveys. It also identifies those species with a high ranking that may be at risk of project related impacts.

The findings of this assessment will be beneficial in planning the next phase of the Project.

Appendix A

BROAD VEGETATION GROUPS (1:1,000,000 SCALE)

1:1,000,000 scale - Broad vegetation groups (BVG) used for likelihood of occurrence a

BVG_1M	BVG DESCRIPTION
1:1 Million	
7	**Semi-evergreen to deciduous microphyll vine thicket**
7a	Semi-evergreen vine thickets on wide range of substrates. (land zones 8, 9, 11, 12, 5, 4, 3, 10, [7]) (BRB, EIU, SEQ, CQC, [WET, GUP]) (Tracey 1982 11)
	EUCALYPT WOODLANDS TO OPEN FORESTS (mainly eastern Qld)
9	**Moist to dry eucalypt open forests to woodlands usually on coastal lowlands and ranges**
9c	Open forests of *Corymbia clarksoniana* (grey bloodwood) (or *C. intermedia* (pink bloodwood) or *C. novoguinensis*), *C. tessellaris* (carbeen) ± *Eucalyptus tereticornis* (blue gum) predominantly on coastal ranges. Other frequent tree species include *Eucalyptus drepanophylla* (grey ironbark), *E. pellita* (large-fruited red mahogany), *E. brassiana* (Cape York red gum) and *Lophostemon suaveolens* (swamp box). (land zones 12, 11, 8, 5). (WET, CQC, CYP, BRB, [SEQ])
9d	Moist to dry open forest to woodland dominated by *Eucalyptus portuensis, Corymbia intermedia* (pink bloodwood)*, E. drepanophylla, E. resinifera* or *E. reducta +/- Syncarpia glomulifera* (turpentine) or *E. cloeziana* (Gympie messmate) on ranges. Also includes mixed forests with *Eucalyptus pellita* or *C. torelliana* (cadaghi) emergents and rainforest understories (land zones 12, 11, 3, 5, 9, 8). (WET, CQC, EIU)
9e	Open forests, woodlands and open woodlands dominated by *Corymbia clarksoniana* (grey bloodwood) (or *C. novoguinensis* or *C. intermedia* (pink bloodwood) or *C. polycarpa* (long-fruited bloodwood)) frequently with *Erythrophleum chlorostachys* (red ironwood) or *Eucalyptus platyphylla* (poplar gum) predominantly on coastal sandplains and alluvia. (land zones 3, 5, 2) (CYP, BRB, CQC, WET, EIU)
11	**Moist to dry eucalypt open forests to woodlands mainly on basalt areas**
11b	Moist to dry open forests to woodlands dominated by *Eucalyptus crebra* (narrow-leaved red ironbark) or *E. tereticornis* (blue gum), frequently with *Corymbia* species or *E. microneura* (Gilbert River box) on red krasnozems on undulating terrain. (land zone 8) (EIU)
11c	Moist woodlands dominated by *Eucalyptus leptophleba* (Molloy red box) ± *Corymbia papuana* (ghost gum) ± *C. tessellaris* (carbeen). (land zones 8, 11) (EIU, CYP)
12	**Dry eucalypt woodlands to open woodlands, mostly on shallow soils in hilly terrain (mainly on sandstone and weathered rocks)**
12b	Woodlands and open woodlands dominated by *Eucalyptus crebra* (sens. lat) (narrow-leaved red ironbark) and/or *Corymbia* spp. such as *C. clarksoniana* (grey bloodwood), *C. stockeri, C. setosa* (rough leaved bloodwood) or *C. peltata* (yellowjacket) on hilly terrain. (land zones 7, 10, 11) (GUP, EIU, DEU, CYP)
13	**Dry to moist eucalypt woodlands and open forests, mainly on undulating to hilly terrain of mainly metamorphic and acid igneous rocks**
13a	Woodlands and open woodlands dominated by ironbarks such *Eucalyptus cullenii* (Cullen's ironbark), *E. staigeriana* (lemon-scented ironbark) or *E. melanophloia* (silver-leaved ironbark) and bloodwoods such as *Corymbia stockeri* subsp. *peninsularis, C. clarksoniana* (grey bloodwood) or *C. leichhardtii* (rustyjacket). (land zones 11, 12, 7, 5) (EIU, CYP, GUP)
13b	Woodlands to open woodlands dominated by *Eucalyptus microneura* (Gilbert River box) on shallow soils on rolling hills. (land zones 12, 11, 9) (EIU, GUP)
13c	Woodlands of *Eucalyptus crebra* (sens. lat.) (narrow-leaved red ironbark), *E. drepanophylla* (grey ironbark), *E. fibrosa* (dusky-leaved ironbark)*, E. shirleyi* (Shirley's silver-leaved ironbark) on granitic and metamorphic ranges (land zones 12, 11, 9, [5]) (BRB, EIU, SEQ, NET, CQC)
	EUCALYPT OPEN FORESTS TO WOODLANDS ON FLOODPLAINS
16	***Eucalyptus* spp. dominated open forest and woodlands drainage lines and alluvial plains**
16a	Open forest and woodlands dominated by *Eucalyptus camaldulensis* (river red gum) (or *E. tereticornis* (blue gum)) and/or *E. coolabah* (coolabah) (or *E. microtheca* (coolabah)) fringing drainage lines. Associated species may include *Melaleuca* spp., *Corymbia tessellaris* (carbeen), *Angophora* spp., *Casuarina cunninghamiana* (riveroak). Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (MGD, BRB, GUP, CHC, MUL, DEU, EIU, NWH, SEQ, [NET, WET]) (All bioregions except CYP and CQC)
16b	Woodlands dominated by *Eucalyptus leptophleba* (Molloy red box), with *Corymbia tessellaris* (carbeen) or *C. clarksoniana* (grey bloodwood) or *C. dallachiana* . On sandy levees. (land zones 3, 5) (GUP, EIU, CYP)
16c	Woodlands and open woodlands dominated by *Eucalyptus coolabah* (coolabah) or *E . microtheca (* coolabah) or *E . largiflorens* (black box) or *E. tereticornis* (blue gum) or *E . chlorophylla* on floodplains. Does not include alluvial areas dominated by herb and grasslands or alluvial plains that are not flooded. (land zone 3) (All bioregions except WET, principally GUP, BRB, MUL, SEQ)
16d	River beds, open water or sand, or rock, frequently unvegetated. (land zone 3) (GUP, EIU, BRB, CYP, WET, SEQ, DEU, [CQC, MUL])
	EUCALYPT DRY WOODLANDS ON INLAND DEPOSITIONAL PLAINS
17	***Eucalyptus populnea* (poplar box) or *E. melanophloia* (silver-leaved ironbark) (or *E. whitei* (White's ironbark)) dry woodlands to open woodlands on sandplains or depositional plains**
17a	Woodlands dominated by *Eucalyptus populnea* (poplar box) (or *E. brownii* (Reid River box)) on alluvium, sand plains and footslopes of hills and ranges. (land zones 3, 5, 10, 9, 4, 11, 12, [8]) (BRB, MUL, DEU, EIU)
17b	Woodlands to open woodlands dominated by *Eucalyptus melanophloia* (silver-leaved ironbark) (or *E. shirleyi* (shirley's silver-leaved ironbark)) on sand plains and footslopes of hills and ranges. (land zones 5, 12, 3, 11, 9, 7) (BRB, DEU, EIU, SEQ, NET, GUP, NWH)
18	**Dry eucalypt woodlands to open woodlands primarily on sandplains or depositional plains**

Appendix B

FLORA LIKELIHOOD OF OCCURRENCE

Flora likelihood of occurrence

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Acacia armitii	–	–	NT	Only known from the Einasleigh R. area in central-northern Qld and on a sandstone plateau S of Goomadeer, as well as Coopers Ck at Nabarlek, N.T. Locally common in sandy or shallow, rocky soils, on creek banks and river flats {Department of the Environment and Energy, 2017 #7537}.	Wildlife Online - Charters Towers LGA, Etheridge LGA	***Moderate*** (Potential to occur in BVGs 16 associated subtypes)
Acacia crombiei	–	V	V	Occurs in small isolated subpopulations in central Queensland. It occurs in the Burke, Mitchell, and North Kennedy pastoral regions. It inhabits wooded downs in woodland and open woodland often associated with gidgee (Acacia cambagei) and whitewood (Atalaya hemiglauca), on alluvial, sandstone and basalt derived soils {Department of the Environment and Energy, 2017 #7538}.	PMST - Charters Towers LGA, Etheridge LGA Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVGs 24 and 27 and associated subtypes)
Acacia guymeri	–	-	V	The species grows in skeletal soils on rocky ridges in disturbed areas and eucalypt woodland. Commonly associated plants include Eucalyptus cullenii, Lamprolobium fruticosum, and a range of different Eucalyptus and Corymbia species {Department of the Environment and Energy, 2017 #7539}.	Wildlife Online - Etheridge LGA	***Moderate*** (Potential to occur in BVGs 12 and associated subtypes)
Acacia longipedunculata	–	-	NT	Restricted an area near Herberton and in the Paluma Ra., north-eastern Qld. Grows on shallow sandy and rocky soils, in open forest {Department of the Environment and Energy, 2017 #7537}.	Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVGs 9, 12 and 13 and associated subtypes)
Acacia tingoorensis	–	-	V	Grows in eucalypt woodland or forest, on deep red loam, shallow loamy or sandy soils.	Wildlife Online - Charters Towers LGA	**High** (Potential to occur in BVGs 9,11,12,13 and associated subtypes)
Ammannia robertsii	–	-	E	Low open woodland of Acacia cambagei on alluvial clay plain.	Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVGs 16, 24 , 27 and associated subtypes)

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Aristida thompsonii	–	-	E	Restricted distribution around North Kennedy in Queensland. Inhabits patchy heath of Kunzea callida on rocky areas.	Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVGs 12 and associated subtypes)
Arytera dictyoneura	–	-	NT	Recorded from scattered locations in northern and southern Queensland. In northern Queensland A. dictyoneura occurs in Girringun National Park, on the Cardwell Range, Cardwell Forest Reserve, near Meunga Creek, Clement State Forest and Paluma Range. There is also one record of the species from Strathdickie, near Proserpine. In southern Queensland, there are numerous records of A. dictyoneura in Bulburin National Park, two records in Mount Colosseum National Park, one population near 'shirley' Miriam Vale and one population in Eurimbula National Park. Found in semi-evergreen rainforest, on granite boulder slopes/ soil derived from granite {Department of the Environment and Energy, 2017 #7537}.	Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVG 7a)
Borya inopinata	–	-	E	Species and habitat information is not publically available.	Wildlife Online - Charters Towers LGA	***Moderate*** Conservative ranking applied, due to lack of species and habitat information.
Bulbophyllum globuliforme	Hoop Pine Orchid	V	NT	Restricted to the MacPherson Range and north to Gladstone, e.g. Grady's Creek (Border Ranges). In NSW occurs at altitudes between 300 - 600 m where it grows on Hoop Pines (Araucaria cunninghamii) in upland subtropical rainforest. Usually found on the upper trunk and branches of emergent trees {NSW National Parks and Wildlife Service, 2002 #93; Harden, 1993 #4}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA, Wildlife Online - Charters Towers LGA	Low (Suitable habitat is unlikely to occur)
Cajanus mareebensis	–	E	E	Occurs in grassy woodlands of Melaleuca-Acacia, Eucalyptus-Callitris and Eucalyptus-Corymbia woodlands on sandy soils derived from granite with a lower horizon of impeded drainage {Department of the Environment Water Heritage and the Arts, 2008 #7540}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA	***Moderate*** (Potential to occur in BVG 13 and associated subtypes)

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Canarium acutifolium var. acutifolium	–	V	V	Its distribution occurs between Mossman and Tully in Queensland. Altitudinal range very small, from sea level to 100 m. almost confined to creek and river banks in lowland rain forest {Department of the Environment Water Heritage and the Arts, 2008 #7541}.	PMST - Charters Towers LGA	***Moderate*** (Potential to occur in BVG 16 and associated subtypes)
Cerbera dumicola	–	-	NT	Occurs across a range of habitats in central and southern Queensland. Associated vegetation and species include: sandstone hills in open E. umbra subsp. carnea; on plateaus, in woodland of Acacia shirleyi with Corymbia dolichocarpa; acidic soils in mine rehabilitation area; woodland of A. catenulata and A. shirleyi with E. thozetiana on a slope of sand/clay soil; semi-deciduous notophyll-microphyll vine forest of Brachychiton australis, Gyrocarpus americanus, Flindersia australis, Pleiogynium timorense, Drypetes deplanchei and Sterculia quadrifida on rhyolite hillslopes; open-woodland of E. melanophloia with occasional Acacia shirleyi, E. populnea and E. brownii; semi-evergreen vine thicket with Corymbia citriodora and Corymbia aureola emergents; woodland of A. rhodoxylon on brown, sandy loam; and in Corymbia tessellaris - Acacia aneura open woodland {Queensland Herbarium, 2011 #7542}.	Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVGs 7, 9, and 12 and associated subtypes)
Corchorus subargenteus	–	-	V	Species and habitat information is not publically available.	Wildlife Online - Charters Towers LGA	***Moderate*** Conservative ranking applied, due to lack of species and habitat information.
Corybas cerasinus	–	-	NT	Occurs in north-eastern Queensland with a distribution from Cooktown to the Herbert River near Ingham and also on Dunk Island. Occurs in moist to wet forests on exposed ridges and in drier forests. It grows in well-drained sand and gravelly loam{Department of Sustainability Environment water Population and Communities, 2010 #7543}.	Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	***Moderate*** (Potential to occur in BVGs 9 and 11 and associated subtypes)

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Corymbia leptoloma	–	V	V	Corymbia leptoloma is known only from a small area north-west of Townsville, Queensland. The species grows in wet sclerophyll forest in association with Turpentine (Syncarpia glomulifera), Red Mahogany (Eucalyptus resinifera) and Pink Bloodwood (Corymbia intermedia) in gullies or on hill slopes. It occurs in coarse sandy soils derived from granite {Department of the Environment Water Heritage and the Arts, 2008 #7544}.	PMST - Charters Towers LGA, Hinchinbrook LGA, Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	***Moderate*** (Potential to occur in BVGs 9 and 11 and associated subtypes)
Croton magneticus	–	-	V	The species is endemic to eastern Queensland. It is distributed mainly between Townsville and Proserpine, but is known to extend inland to Greenvale and Collinsville. Croton magneticus is found in Araucarian microphyll or notophyll vineforest, or semi-evergreen vine thickets, on a range of substrates including sandstone, granite and granodiorite. It is sometimes found along rocky seashores. Altitudes range from 5 to 540m.	Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVG 7a)
Cyathea celebica	–	-	NT	Cyathea celebica occurs on steep slopes and river banks in rainforest, vine forest and forest margins, above 100m altitude. It grows on granitic soil, reddish soils and over metamorphic rock {Department of the Environment and Energy, 2017 #7537}.	Wildlife Online - Hinchinbrook LGA	Low (Suitable habitat is unlikely to occur)
Cycas cairnsiana	–	V	V	Known from only two rather extensive and scattered populations about the Newcastle Range in the drier country of north-eastern Queensland, on shallow to skeletal gritty soils over siliceous granites. Plants from the population near Forsayth have slightly wider leaflets than those from near Mt Surprise {Royal Botanic Gardens, 2010 #7525}.	PMST - Charters Towers LGA, Etheridge LGA, Wildlife Online - Charters Towers LGA, Etheridge LGA	***Moderate*** (Potential to occur in BVGs 12b, 13b,)
Cycas couttsiana	–	-	NT	Known from several populations in the southern Gregory Range, Qld. Occurs in open grassy woodlands in red sandy loams derived from basalt or dolerite {Department of the Environment and Energy, 2017 #7537}.	Wildlife Online - Charters Towers LGA, Etheridge LGA	***Moderate*** (Potential to occur in BVGs 11b and 11c)

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Cycas cupida	–	-	V	This species is known from a single, quite extensive population in the Terrace Range south of Charters Towers, South Kennedy District, Queensland. Found widely scattered in open woodland on low sandstone hills.	Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVGs and 12 and associated subtypes)
Cycas desolata	–	-	V	Known only from a single stand near Charters Towers, eastern Qld. Grows on Eucalypt woodland on shallow skeletal soils or low rocky outcrops in flat country of open ironbark woodland.	Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVGs and 12 and associated subtypes)
Cycas platyphylla	–	V	V	The main population of C. platyphylla is known from the Petford district, west of the Atherton Tableland, Queensland. There are three smaller quite disjunct populations recorded from Taravale, Wandovale, and at White Mountains, north of Torrens Creek. Occurs in sparse Eucalyptus sideroxylon woodland with a grassy understorey, often on rocky slopes in shallow red stony loams.	PMST - Charters Towers LGA, Etheridge LGA, Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVGs 9 and 11 and associated subtypes)
Cyperus cephalotes	–	E	E	Known from Rockingham Bay, near Cardwell and Trebonne Creek south-east of Ingham in Queensland. It occurs on floating islands in rivers, with the roots entangled in a mass of decaying vegetation.	PMST - Hinchinbrook LGA, Wildlife Online - Hinchinbrook LGA	Low (Suitable habitat is unlikely to occur)
Dendrobium bigibbum	–	V	V	Subpopulations of the Cooktown orchid group are epiphytic (growing on branches) and epilithic (growing on rocks), and occurs at sites with moderate light intensity. The area where it occurs has moderate to high rainfall that is seasonal (more rainfall in summer and autumn). Collections have been made from sea level (including on branches overhanging salt water) to altitudes of at least 250 m above sea level. Many collections have been made along creeks or on rocky hillsides where fire cannot penetrate. Vegetation associations where it occurs include closed forest (low deciduous scrub, coastal dunes, gallery forest), open monsoon forest, mangrove, heath and inland dry scrub	PMST - Etheridge LGA	Low (Suitable habitat is unlikely to occur)

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Dendrobium lithocola	–	E	-	Subpopulations of the Cooktown orchid group are epiphytic (growing on branches) and epilithic (growing on rocks), and occurs at sites with moderate light intensity. The area where it occurs has moderate to high rainfall that is seasonal (more rainfall in summer and autumn). Collections have been made from sea level (including on branches overhanging salt water) to altitudes of at least 250 m above sea level. Many collections have been made along creeks or on rocky hillsides where fire cannot penetrate. Vegetation associations where it occurs include closed forest (low deciduous scrub, coastal dunes, gallery forest), open monsoon forest, mangrove, heath and inland dry scrub	PMST - Etheridge LGA	Low (Suitable habitat is unlikely to occur)
Dichanthium queenslandicum	–	E	V	Occurs within the South Eastern Queensland, Brigalow Belt South, Brigalow Belt North, Central Mackay Coast, Desert Uplands, Mitchell Grass Downs and Einasleigh Uplands Bioregions; and the South East Queensland, Condamine, Border Rivers Maranoa-Balonne, Burnett Mary, Fitzroy, Burdekin, Mackay Whitsunday, Southern Gulf and Desert Channels Natural Resource Management Regions.	PMST - Charters Towers LGA, Etheridge LGA	***Moderate*** (Potential to occur in BVGs 30b and 32a)
Dichanthium setosum	–	V	NT	Grows in woodland and grassland {Harden, 1993 #4}. On the New England Tablelands and North West Slopes it grows on stony red-brown hard-setting soils over basalt, or on black soil {Department of Environment and Conservation, 2006 #1093}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA	**High** (Potential to occur in BVGs 11,16,17,30,32 and associated subtypes)
Diuris oporina	–	-	NT	Found in Queensland on ridges and slopes in sparse grassy forests at elevations of 700 to 1200 meters as a miniature to small sized, warm to cool growing terrestrial species.	Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVGs 11,12 and 13 and associated subtypes)
Dodonaea uncinata	–	-	NT	Confined to the Mt Spec area NW of Townsville, Qld. Grows in open forest or woodland, usually in sandstone soils {Department of the Environment and Energy, 2017 #7537}.	Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVGs 12 and associated subtypes)

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Drosera adelae	–	-	NT	An endemic species that occurs in a restricted area in NEQ from Tully southwards to Hitchenbrook Island. Altitudinal range from 50-800 m. Occurs on creek beds and on moss-covered rocks along creeks in rainforest, open forest, mesophyll vine forest and in Eucalypt forest.	Wildlife Online - Hinchinbrook LGA	***Moderate*** (Potential to occur in BVGs 16 and associated subtypes)
Drummondita calida	–	-	V	Species and habitat information is not publically available.	Wildlife Online - Etheridge LGA	***Moderate*** Conservative ranking applied, due to lack of species and habitat information.
Elaeocarpus coorangooloo	–	-	NT	Endemic to NEQ, known only from the Windsor Tableland, Atherton Tableland and another site southwest of Paluma. Altitudinal range from 700-1000 m. Grows in drier rain forest often associated with Kauri Pine (Agathis robusta).	Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVG 7a)
Eriocaulon carsonii	–	E	E	Grows in running water and forms dense mats in wet soil around shallow springs. The species is an endemic of active or flowing artesian mound springs on the margins of the Great Artesian Basin. Mound springs are natural outlets of the Basin, associated with fractures and fault lines, often having mounds of various sizes. Accumulated evaporite and mud deposits form mounds 1 to 10 metres high and 2 to 100+ metres in diameter. The faults provide direct access for the artesian water to reach the surface. These landforms are probably one of the rarest habitats in Australia. Originally restricted to a single mound at Peery Lake in NSW, in an area of many mounds. More recently the plant has spread to adjacent mounds, indicating that the plant can survive for long periods as a small population and then spontaneously expand. The population structure of Eriocaulon carsonii changed after fencing at Elizabeth Springs in Qld, with large numbers of small immature plants replaced by a smaller number of larger plants. Observations of density of kangaroo scats at Peery Lake suggest that kangaroos heavily graze the mounds. Kangaroo grazing apparently limits the growth of sedges on the mounds, reducing competition, thus benefiting Eriocaulon carsonii. The species is often recorded growing in dense mats of numerous individuals {Harden, 1993 #4} {Royal Botanic Gardens, 2006 #990}.	PMST Etheridge LGA Wildlife Online - Etheridge LGA	Low (Suitable habitat is unlikely to occur)

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Eriocaulon carsonii subsp. orientale	–	E	E	Entirely restricted to vents and tails of mound spring wetlands, particularly springs with shallow standing water with slow flow. It is generally associated with vegetated mounds that, over considerable time, have formed organic fen soils (alkaline equivalent of the acidic peat bog).	Wildlife Online - Etheridge LGA	Low (Suitable habitat is unlikely to occur)
Eryngium fontanum	–	E	E	Known from two spring wetland complexes (Moses (Doongmabulla) and Edgbaston-Myross) in central Queensland in the Barcaldine spring super-group (larger regional groups of springs). Occurs in very restricted habitat in shallow permanent ponded water of wetlands associated with artesian springs {Department of the Environment and Energy, 2017 #7539}.	PMST - Charters Towers LGA	Low (Suitable habitat is unlikely to occur)
Eucalyptus paedoglauca	–	V	V	Occurs only in the Townsville area of north-east Queensland. Situated on ridges or hill slopes on shallow sandy-loam soil.	PMST - Charters Towers LGA	***Moderate*** (Potential to occur in BVGs 11,12 and 13 and associated subtypes)
Eucalyptus raveretiana	–	V	V	Wide distribution in coastal and sub-coastal areas of Queensland, from south of Townsville to Nebo, around Rockhampton and areas 100km west of the city. Usually grows along watercourses, and sometimes on river flats or open woodland. Soil varies from sand through to heavy clay.	PMST - Charters Towers LGA	***Moderate*** (Potential to occur in BVGs 16 and associated subtypes)
Euphorbia carissoides	–	V	V	Chamaesyce carissoides is restricted to north-east Queensland where it is known from near Georgetown and east to Stannary Hills, with a disjunct occurrence near Hopevale. The species grows on clifflines, among rocky outcrops and hillsides in shrubland and eucalypt low open woodland communities in generally shallow soils derived from sandstone, granite and rhyolite substrates.	PMST - Etheridge LGA Wildlife Online - Etheridge LGA	***Moderate*** (Potential to occur in BVGs 13 and associated subtypes)
Gastrodia urceolata	–	-	V	Species and habitat information is not publically available.	Wildlife Online - Charters Towers LGA	***Moderate*** Conservative ranking applied, due to lack of species and habitat information.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Genoplesium tectum	–	E	E	Known only from a small area south of Cardwell in north-eastern Queensland. Occurs in dense scrub not far from a creek among dense sedges and low shrubs in woodland dominated by Melaleuca viridiflora. Soils are seasonally inundated sandy loams {Department of the Environment and Energy, 2017 #7539}.	PMST - Hinchinbrook LGA	***Moderate*** (Potential to occur in BVG 21a)
Glossocardia orthochaeta	–	-	E	Species and habitat information is not publically available.	Wildlife Online - Charters Towers LGA	***Moderate*** Conservative ranking applied, due to lack of species and habitat information.
Graptophyllum excelsum	–	-	NT	Occurs in NEQ and coastal central Queensland. Altitudinal range in NEQ from 350-600 m. Often grows on limestone in monsoon forest and vine thickets.	Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVG 7a)
Grevillea glossadenia	–	V	V	Occurs in north-east Queensland mainly in the Einasleigh Uplands(IBRA) bioregion, with a few collections from the Wet Tropics Bioregion. Grows in eucalypt woodland or low open forest, in shallow to skeletal granitic soils on rolling hills, gravel terraces near stream beds, and along roadsides and mining tracks {Department of the Environment and Energy, 2017 #7539}.	PMST - Charters Towers LGA	***Moderate*** (Potential to occur in BVGs 12 and 13 and associated subtypes)
Habenaria rumphii	–	-	NT	Grows on sandy soils in seasonally-flooded grassy areas in open forest and woodland. Found both in Queensland and the Northern Territory.	Wildlife Online - Hinchinbrook LGA	***Moderate*** (Potential to occur in BVGs 16 and 17 and associated subtypes)
Homoranthus porteri	–	V	V	Restricted to north-east Queensland from near Mareeba southwards to near Ravenshoe. Occurs in shallow soils on a variety of rock types (including rhyolite), usually in woodland or heath. It has been recorded on sandstone pavement, rock outcrops and scree slopes, on the edge of rocky escarpments and rocky hillsides {Department of the Environment and Energy, 2017 #7539}.	PMST - Charters Towers LGA, Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVGs 12 and 13 and associated subtypes)

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Ipomoea saintronanensis	–	-	V	Endemic to NEQ. Altitudinal range from 600-900 m. Grows in vine thicket and monsoon forest.	Wildlife Online - Charters Towers LGA, Etheridge LGA	***Moderate*** (Potential to occur in BVG 7a)
Kardomia squarrulosa	–	-	V	On sandstone outcrops, with Acacia shirleyi.	Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVGs 12 and associated subtypes)
Kunzea calida	–	-	E	Species and habitat information is not publically available.	Wildlife Online - Charters Towers LGA	***Moderate*** Conservative ranking applied, due to lack of species and habitat information.
Labichea brassii	–	-	NT	Confined to northern Qld. Known from Mt Mulligan in the north south-west to Agate Creek. Recorded growing along creek and river beds {Department of the Environment and Energy, 2017 #7537}.	Wildlife Online - Etheridge LGA	***Moderate*** (Potential to occur in BVGs 16 and 17 and associated subtypes)
Lawrencia buchananensis	–	-	V	Species and habitat information is not publically available.	PMST - Charters Towers LGA Wildlife Online - Charters Towers LGA	***Moderate*** Conservative ranking applied, due to lack of species and habitat information.
Leptospermum pallidum	–	-	NT	Species and habitat information is not publically available.	Wildlife Online - Charters Towers LGA, Etheridge LGA	***Moderate*** Conservative ranking applied, due to lack of species and habitat information.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Lepturus minutus	–	-	V	Species and habitat information is not publically available.	Wildlife Online - Charters Towers LGA, Etheridge LGA	***Moderate*** Conservative ranking applied, due to lack of species and habitat information.
Lindsaea pulchella var. blanda	–	V	PE	Known in Australia from a single specimen collected at 'Rockingham, 4000ft alt.. This is a very poorly known taxon in Australia with only one record from an uncertain locality, but possibly in the Rockingham Bay Range, Queensland. This species occurs within the Wet Tropics (Queensland) Natural Resource Management Region.	PMST - Charters Towers LGA, Hinchinbrook LGA	***Moderate*** Conservative ranking applied, due to lack of species and habitat information.
Livistona drudei	–	-	V	Occurs in NEQ from Tully to Conway Beach. Altitudinal range from near sea level to 300 m. Grows along stream banks and coastal plains in Melaleuca swamp forest to fringes of gallery rainforest and rainforest to eucalypt forest.	Wildlife Online - Hinchinbrook LGA	***Moderate*** (Potential to occur in BVGs 21 and 22 and associated subtypes)
Livistona lanuginosa	–	V	V	Endemic to the Burdekin-Ravenswood-Cape River area inland from Ayr, where it is found on the tributaries of the Burdekin River. Forms colonies along streambanks and gullies well inland from the coast and is found at altitudes of 150–300m above sea level. Its habitat is open woodland on sandy river and creek channels which flow for part of the year, with permanent pools or soaks {Department of the Environment and Energy, 2017 #7539}.	PMST - Charters Towers LGA, Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVGs 16 and 17 and associated subtypes)
Macropteranthes leiocaulis	–	-	NT	Occur in the semi-evergreen vine thickets.	Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVG 7a)
Macropteranthes montana	–	V	V	Known from a small area just south of Cape York Peninsula, Queensland. As far north as Hutchinson (inland from Cape Tribulation) and from localities near Mount Mulligan, Chillagoe, Dimbulah, Petford, Irvinebank, Elizabeth Creek Gorge, Bulleringa National Park and south west as far as the northern Newcastle Range. Occurs in shallow soil in low woodland or vine thicket and occurs within the Northern Gulf and Wet Tropics (Queensland) Natural Resource Management Regions {Department of the Environment and Energy, 2017 #7539}.	PMST - Etheridge LGA Wildlife Online - Etheridge LGA	***Moderate*** (Potential to occur in BVG 7a)

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Marsdenia araujacea	–	X	PE	Was endemic to far northern Queensland between Cooktown and Ingham, south of Cairns. Grew in lowland rainforest	Wildlife Online - Hinchinbrook LGA	Low (Suitable habitat is unlikely to occur)
Marsdenia brevifolia	–	V	V	Occurs in north and central Queensland where it is known from near Townsville, Springsure and north of Rockhampton. Grows on serpentine rock outcrops or crumbly black soils derived from serpentine in eucalypt woodland, often with Broad-leaved Ironbark (Eucalyptus fibrosa) and Corymbia xanthope {Department of the Environment and Energy, 2017 #7539}.	PMST - Charters Towers LGA, Hinchinbrook LGA Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVGs 11 and associated subtypes)
Micromyrtus rotundifolia	–	-	V	Species and habitat information is not publically available.	Wildlife Online - Charters Towers LGA	***Moderate*** Conservative ranking applied, due to lack of species and habitat information.
Myrmecodia beccarii	–	V	V	Occurs in coastal woodland and mangrove between Cooktown and Ingham in Queensland. It is a unique epiphyte that has a special association with the golden ant which lives in the chambers of the tuber, and the Apollo Jewel Butterfly which lays its eggs on the plant.	PMST - Hinchinbrook LGA	Low (Suitable habitat is unlikely to occur)
Oenanthe javanica	–	-	NT	Species and habitat information is not publically available.	Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	***Moderate*** Conservative ranking applied, due to lack of species and habitat information.
Oldenlandia polyclada	–	-	NT	Occurs in NEQ with a restricted distribution from Cooktown to Townsville. Altitudinal range from 160-300 m. Grows along drainage lines in forest and vine thicket, occasionally in woodland.	Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVGs 16 and 17 and associated subtypes)

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Omphalea celata	–	V	V	Known from three sites in central east Queensland. Locations include Hazlewood Gorge, near Eungella; Gloucester Island, near Bowen; and Cooper Creek in the Homevale Station area, north-west of Nebo. Grows in fragmented semi-evergreen vine thicket along a watercourse on weathered metamorphics in a steep-sided gorge at an altitude of 560m {Department of the Environment and Energy, 2017 #7539}.	PMST - Charters Towers LGA	***Moderate*** (Potential to occur in BVG 7a)
Parsonsia largiflorens	–	-	E	Grows in rainforest, including drier types; from the Cairns area south to the Tweed River, now apparently extinct in NSW {Royal Botanic Gardens, 2017 #3885}.	Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVG 7a)
Paspalidium udum	–	-	V	Endemic to tropical Australia. Rare in NT. Occurs on black soil plains.	Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVGs 11 and associated subtypes)
Peristylus banfieldii	–	-	E	Grows in open forest and on swamp margins in seasonally wet (monsoon season) soils.	Wildlife Online - Hinchinbrook LGA	***Moderate*** (Potential to occur in BVGs 16, 21 and 22 and associated subtypes)
Phaius australis	Southern Swamp Orchid	E	E	Previously occurred as far south as Port Macquarie but is now thought to only occur north of Coffs Harbour. Grows in coastal areas in swampy grassland or forest including rainforest, eucalypt o paperbark forest. Flowers sept-oct (Harden 1993; NPWS 2002).	PMST - Charters Towers LGA, Hinchinbrook LGA	Low (Suitable habitat is unlikely to occur)
Phaius pictus	–	V	V	Occurs in north-east Queensland, sporadically from the McIlwraith Range, Bloomfield River to Kirrama Range. It is highly localised, restricted to rainforests from 0–600m altitude, and usually occurs in sheltered humid sites close to streams and seepage among forest litter on boulders {Department of the Environment and Energy, 2017 #7539}.	PMST - Charters Towers LGA, PMST Hinchinbrook LGA	Low (Suitable habitat is unlikely to occur)

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Phalaenopsis amabilis subsp. rosenstromii	–	E	E	The Native Moth Orchid is found in humid rainforest areas, close to waterfalls or streams, in deep gorges, sheltered slopes or gullies in notophyll vine thickets, deciduous vine thickets and in open forest. The Native Moth Orchid grows in shaded or partially shaded positions, on trees and less commonly on rocks. The species is found at altitudes from 200–500 m above sea level {Department of the Environment, 2015 #7233}	PMST - Charters Towers LGA, Hinchinbrook LGA	Low (Suitable habitat is unlikely to occur)
Phlegmariurus phlegmarioides	–	-	V	The Layered Tassel Fern occurs in the lowland tropical rainforest of north eastern Queensland, Australia.	Wildlife Online - Charters Towers LGA	Low (Suitable habitat is unlikely to occur)
Pluchea punctata	–	-	E	Species and habitat information is not publically available.	Wildlife Online - Etheridge LGA	***Moderate*** Conservative ranking applied, due to lack of species and habitat information.
Solanum angustum	–	-	E	Species and habitat information is not publically available.	Wildlife Online - Etheridge LGA	***Moderate*** Conservative ranking applied, due to lack of species and habitat information.
Solanum carduiforme	–	-	V	Known from 15 populations in a disjunct distribution from Queensland, the Northern Territory and Western Australia. In Queensland, the distributional range is 600 km and it occurs in two main areas: Bowthorne, Boodjamulla (Lawn Hill) National Park, and nearby 'Musselbrook' (north-west Queensland) and Cobbold Gorge, Forsayth and Richmond (southern Gulf). Known to occur on conglomerate rock formations. Other locations are on sandstone or deeper sandy soil adjacent to sandstone outcrops {Department of the Environment and Energy, 2017 #7539}.	Wildlife Online - Etheridge LGA	***Moderate*** (Potential to occur in BVGs 11, 12 and 13 and associated subtypes)
Solanum graniticum	–	-	E	Found in Qld on the mainland in the Bowen area and on adjacent Gloucester Island and also in the Eungulla Dam area. Occurs in Eucalypt woodland on soils derived from granite or granodiorite.	Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVGs 13 and associated subtypes)

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Solanum sporadotrichum	–	-	NT	Grows in association with semi-evergreen vine thicket, notophyll rainforest or littoral rainforest with Brachychiton australis, Gyrocarpus americanus, Flindersia collina, Araucaria cunninghamii, Acacia fasciculifera and Drypetes deplanchei, or in eucalypt open forest or woodland. Soils are moderately to very fertile.	Wildlife Online - Charters Towers LGA	***Moderate*** (Potential to occur in BVG 7a)
Tephrosia leveillei	–	V	V	Known from the area between Chillagoe and Forty Mile Scrub with one specimen further south, near Ravenswood. Recorded growing on alluvial plains in Eucalyptus cullenii woodland with Corymbia erythrophloia, Erythrophleum chlorostachys and Grevillea glauca, and in tall open forest of Eucalyptus and Corymbia species over dense Heteropogon contortus on red sand.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA, Wildlife Online - Etheridge LGA	***Moderate*** (Potential to occur in BVGs 11, 12 and 13 and associated subtypes)
Tropilis callitrophilis	–	V	V	Distributed in north-eastern Queensland from Mount Finnigan to the Evelyn Tableland. Occurs in rainforests and rainforest margins at high altitudes. It favours Stringybark Cypress Pine (Callitris macleayana) as a host, but also grows on various shrubby myrtles, such as Rhodamnia and Austromyrtus. Flowering between August-September. {Department of the Environment and Energy, 2017 #7521}	PMST - Charters Towers LGA, Hinchinbrook LGA	Low (Suitable habitat is unlikely to occur)
Zeuxine polygonoides	–	V	V	In Australia, the Velvet Jewel Orchid grows in moist shady sites in rainforests (mesophyll vine forests and simple notophyll vine forests) in leaf litter on the ground or on large boulders adjacent to streams. Altitudinal range is 450–820 m above sea level. Found mostly from moist, cloudy or very wet rainfall zones on metamorphic substrates, granite or rhyolite. The species can be found in humus on flat topped rocks in association with Anoectochilus yatesiae, Goodyera viridiflora and Liparis simmondsii {Department of the Environment and Energy, 2017 #7526}	PMST - Hinchinbrook LGA	Low (Suitable habitat is unlikely to occur)

Key: X = Extinct, PE= Presumed Extinct, CE = Critically Endangered, E = Endangered, V= Vulnerable, NT = Near Threatened

Appendix C

FAUNA LIKELIHOOD OF OCCURRENCE

Fauna likelihood of occurrence

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Amphibians						
Litoria dayi (syn. Nyctimystes dayi)	Australian Lacelid, Day's Frog	E	E	The Lace-eyed Tree Frog is a rainforest species, endemic to the Wet Tropics Bioregion. The Lace-eyed Tree Frog occurred throughout the Wet Tropics Bioregion from Paluma to Cooktown, northern Queensland, at altitudes between 0 and 1200 m. It is associated with rainforests and rainforest margins. In montane areas the species prefers fast-flowing rocky streams although they also frequent slower watercourses where ample vegetation exists along the margins. At low elevations, the Lace-eyed Tree Frog favours rock soaks, narrow ephemeral streams and rock outcrops in larger watercourses. It may also be found on rocks, boulders and vegetation in or adjacent to streams {Department of the Environment and Energy, 2017 #7520}.	PMST - Charters Towers LGA, Hinchinbrook LGA Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	Low Rainforest not present.
Litoria nannotis	Torrent Tree Frog	E	E	The Torrent Tree Frog occurs throughout the Wet Tropics Bioregion, North Queensland, from Paluma to Cooktown, but only has stable populations at lowland sites (180-400 m). It is restricted to rocky stream habitats in rainforest or wet sclerophyll forest where there is fast flowing water, waterfalls and cascades {Department of the Environment and Energy, 2017 #7527}.	PMST - Charters Towers LGA, Hinchinbrook LGA Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	***Moderate*** May occur in open forest riparian habitats (BVG 16 and subsets).
Litoria nyakalensis	Nyakala Frog	CE	E	Endemic to the Wet Tropics Bioregion in Far North Queensland. Adults occur in rainforest and wet sclerophyll forest, next to white water sections of fast flowing streams. Often found on rocks adjacent to the stream or overhanging vegetation (Department of the Environment and Water Resources, 2007).	PMST - Charters Towers LGA, Hinchinbrook LGA	***Moderate*** May occur in open forest riparian habitats (BVG 16 and subsets).

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Litoria rheocola	Common Mistfrog	E	E	Endemic to the Wet Tropics Bioregion (Williams & Hero 1998, 2001). The species is restricted to fast flowing rocky creeks and streams in rainforest as well as wet sclerophyll forest (Liem 1974; McDonald 1992). Within these streams this species are often found in the slower more open sections, away from waterfalls (Hodgkison & Hero 2002). Individuals can be found on rocks, logs and vegetation in or adjacent to streams (Hero & Fickling 1994).	PMST - Charters Towers LGA, Hinchinbrook LGA Wildlife Online - Hinchinbrook LGA	***Moderate*** May occur in open forest riparian habitats (BVG 16 and subsets).
Litoria serrata	Green-eyed Tree Frog	-	V	Occurs from Paluma to Big Tableland in north-eastern Queensland in rainforest habitats.	Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	Low Rainforest not present.
Birds						
Actitis hypoleucos	Common Sandpiper	M	SLC	The Common Sandpiper frequents a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity. It is mostly encountered along muddy margins or rocky shores and rarely on mudflats. It has been recorded in estuaries and deltas of streams, banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow, and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags {Geering, 2007 #3752}{Higgins, 1996 #648}. Roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves. The species is known to perch on posts, jetties, moored boats and other artificial structures, and to sometimes rest on mud or 'loaf' on rocks {Higgins, 1996 #648}.	PMST - Hinchinbrook LGA Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	***Moderate*** May occur in wetland habitats.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Apus pacificus	Fork-tailed Swift	M	SLC	Breeds in the northern hemisphere, wintering south to Australia. It is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground. It mostly occurs over inland plains but sometimes above foothills or in coastal areas over cliffs, beaches, islands and well out to sea. It also occurs over towns and cities. It mostly occurs over dry and/or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh, grassland, spinifex sandplains, farmland and sand-dunes. It sometimes occurs above forests. It probably roosts aerially, but has occasionally been observed to land {Higgins, 1999 #531}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA Wildlife Online - Etheridge LGA, Hinchinbrook LGA	**High** Likely to occur periodically in or above all habitats.
Calidris (Crocethia) alba	Sanderling	M	SLC	A coastal species found on low and open sand beaches exposed to open sea-swells. A migratory species, it has been recorded in NSW from September to May {Pizzey, 1997 #24}.	Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	Low Coastal habitats not present.
Calidris acuminata	Sharp-tailed Sandpiper	M	SLC	Occurs in a variety of habitats: tidal mudflat, mangrove swamps, saltmarshes, shallow fresh, brackish, salt inland swamps and lakes; flooded and irrigated paddocks, sewage farms and commercial saltfields {Pizzey, 2007 #24}.	PMST - Charters Towers LGA, Hinchinbrook LGA Wildlife Online - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA	***Moderate*** May occur periodically in wetland habitats.
Calidris canutus	Red Knot	E (M)	SLC	In Australasia the Red Knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. They rarely use inland lakes or swamps {Higgins, 1996 #648}.	PMST - Hinchinbrook LGA Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	Low Coastal habitats not present.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Calidris ferruginea	Curlew Sandpiper	M	E	Occurs in inter-tidal mudflats of estuaries, lagoons, mangrove channels and also around lakes, dams, floodwaters and flooded saltbush surrounding inland lakes {Morcombe, 2003 #992}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA Wildlife Online - Etheridge LGA, Hinchinbrook LGA	***Moderate*** May occur periodically in wetland habitats.
Calidris ruficollis	Red-necked Stint	M	SLC	Mostly found in coastal areas, including sheltered inlets, bays lagoons and estuaries. They also occur in shallow wetlands near the coast or inland, including lakes, waterholes and dams {Higgins, 1996 #648}. They forage in mudflats, shallow water, sandy open beaches, flooded paddocks and in samphire feeding along the edges. The species roosts on sheltered beaches, spits, banks or islets, of sand, mud, coral or shingle. Occasionally they roost on exposed reefs or shoals {Higgins, 1996 #648} and amongst seaweed, mud and cow-pats {Hobbs, 1961 #3753}. During high tides they may also use sand dunes and claypans.	PMST - Charters Towers LGA, Hinchinbrook LGA Wildlife Online - Etheridge LGA, Hinchinbrook LGA	***Moderate*** May occur periodically in wetland habitats.
Calidris tenuirostris	Great Knot	CE (M)	SLC	Generally a coastal species found on tidal mudflats and sandy ocean shores. A migratory species visiting Australian waters between September and March {Pizzey, 2007 #24}.	PMST - Charters Towers LGA, Hinchinbrook LGA Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	Low Coastal habitats not present.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Calyptorhynchus lathami erebus	Glossy Black-Cockatoo	-	V	Calyptorhynchus lathami erebus is occurs in the north and central east coast of Queensland. This subspecies ranges from the Dawson-Mackenzie-Isaac Rivers basin, north to the Connors-Clarke Ranges, south to Dawes and Many Peaks Ranges, and inland to the Expedition, Peak and Denham Ranges, including the Blackdown Tableland. It prefers woodland areas dominated by she-oak Allocasuarina, or open sclerophyll forests and woodlands with a stratum of Allocasuarina beneath Eucalyptus, Corymbia or Angophora. An obligate hollow nester, glossy black-cockatoos require large old trees (living or dead), usually eucalypts, for breeding. As such, nesting sites are mainly in areas containing large old trees {C.Hourigan, 2012 #7528}.	Wildlife Online - Charters Towers LGA	***Moderate*** May occur in habitats supporting Casuarina and Allocasuarina flora species.
Casuarius casuarius johnsonii (southern population)	Southern Cassowary	E	E	Although occurring primarily in rainforest and associated vegetation, the cassowary also uses woodland, swamp and disturbed habitats for a year-round supply of fleshy fruits. It occurs in three broad populations. In the Wet Tropics it is distributed widely from Cooktown to just north of Townsville. Core habitat is coastal lowlands between Ingham and Mossman, and uplands in the southern Atherton Tablelands and other ranges. On Cape York, it occurs as two disjunct populations in vine-forest communities: one in MacIlwraith and Iron Ranges, the other in Shelburne Bay {P.Latch, 2007 #7529}.	PMST Charters Towers LGA, Hinchinbrook LGA Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	***Moderate*** May occur in SEVT, open forest and woodland habitats.
Charadrius leschenaultii	Greater Sand Plover	V (M)	SLC	Entirely coastal in NSW foraging on intertidal sand and mudflats in estuaries, and roosting during high tide on sand beaches or rocky shores. A migratory species it is found in New South Wales generally during the summer months {Pizzey, 2007 #24}.	PMST Hinchinbrook LGA Wildlife Online - Hinchinbrook LGA	Low Coastal habitats not present.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Charadrius mongolus	Lesser Sand Plover	E (M)	SLC	Migratory bird that migrates from the northern hemisphere to coastal areas of northern and east coast of Australia {Garnett, 2000 #21}. The species is almost strictly coastal during the non-breeding season, preferring sandy beaches, mudflats of coastal bays and estuaries, sand-flats and dunes near the coast, occasionally frequenting mangrove mudflats (IUCN Redlist entry).	PMST Hinchinbrook LGA Wildlife Online - Hinchinbrook LGA	Low Coastal habitats not present.
Charadrius ruficapillus	Red-capped Plover	M	SLC	A shoreline species inhabiting both coastal and inland wetland habitats; including broad sandy and shelly beaches, intertidal flats, broad flat margins of saline and freshwater lakes and rivers, saltmarsh, dues and occasionally shallow coastal fresh or saline wetlands {Pizzey, 2012 #3921}. It is distributed widely throughout Australia and Tasmania where suitable habitats occur {Pizzey, 2012 #3921}.	PMST - Charters Towers LGA	***Moderate*** May occur periodically in wetland habitats.
Charadrius veredus	Oriental Plover	M	SLC	Oriental Plovers are found in coastal habitats, including estuarine mudflats and sandbanks, on sandy or rocky ocean beaches, nearby reefs, or near-coastal grasslands. They also disperse further inland inhabiting flat, open, semi-arid or arid grasslands, where the grass is short and sparse, and interspersed with hard, bare ground, such as claypans, dry paddocks, playing fields, lawns and cattle camps or open areas that have been recently burnt. Oriental Plovers may move to lightly wooded grasslands in wet season and sometimes roost on soft wet mud or in shallow waters of ocean or mudflats and also occasionally in dry, open habitats, such as saltmarsh or paddocks {McCrie, 1984 #3674}{Park, 1983 #3676}{Patterson, 1983 #3677}.	PMST Etheridge LGA Wildlife Online - Hinchinbrook LGA	***Moderate*** May occur periodically in wetland habitats.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Chlidonias leucopterus	White-winged Black Tern	M	SLC	In Australia, and elsewhere in their non-breeding range, the species mostly inhabits fresh, brackish or saline, and coastal or subcoastal wetlands. It frequents tidal wetlands, such as harbours, bays, estuaries and lagoons, and their associated tidal sandflats and mudflats. Terrestrial wetlands, including swamps, lakes, billabongs, rivers, floodplains, reservoirs, saltworks, sewage ponds and outfalls are also inhabited. They rarely occur on inland wetlands in Australia {Chan, 2007 #3655}{Chan, 2008 #3656}{Chatto, 2006 #3657}{Cramp, 1985 #3658}{Dening, 2003 #3659}{Gochfeld, 1996 #3660}{Higgins, 1996 #648}{Johnstone, 1998 #3661}{Urban, 1986 #3662}.	Wildlife Online - Hinchinbrook LGA	***Moderate*** May occur periodically in wetland habitats.
Cuculus opatus (syn. Cuculus saturatus)	Oriental Cuckoo, Himalayan Cuckoo	M	SLC	A non-breeding migrant to Australia, it often inhabits rainforest, vine thickets, wet sclerophyll forest and open woodland and sometimes occurs in mangroves, wooded swamps and as vagrants in gardens {Higgins, 1999 #531}. The population trend appears to be stable {BirdLife International, 2009 #3694}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA Wildlife Online - Etheridge LGA, Hinchinbrook LGA	**High** Likely to occur in open forest to woodland habitats.
Cyclopsitta diophthalma macleayana	Macleay's Fig-Parrot	-	V	Found in upland and lowland rainforests, usually containing fig trees (Ficus); including dry cool subtropical and littoral rainforests, tropical semi-deciduous vine forests and gallery forests. Usually in large tracts of forest, particularly near edges, and rarely in partly cleared and fragmented rainforest {Higgins, 1999 #531}.	Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	***Moderate*** May occur in SEVT along the great dividing range.
Epthianura crocea macgregori	Yellow Chat (Dawson)	CE	E	Inhabits marine plain wetlands that experience inundations of both fresh and saltwater tidal influences (Barnard 1913; Houston et al. 2004a, 2004b; Jaensch et al. 2004a). Specifically occupies areas that contain networks of shallow drainage channels and nearby grassland depressions. It breeds, shelters and forages in grasslands and dense beds of rush and sedge, but it also forages in more open habitats nearby, especially more sparse grasslands and Samphire vegetation (Houston et al. 2004a, 2004b; Jaensch et al. 2004a).	Wildlife Online - Etheridge LGA	***Moderate*** May occur in wetland habitats.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Erythrotriorchis radiatus	Red Goshawk	V (M)	E	Lives in coastal and sub-coastal tall open forests and woodlands, tropical savannas traversed by wooded or forested rivers and along edges of rainforest. Nests are only built in trees taller than 20 meters which occur within 1 kilometre of a watercourse or wetland. Has a home range of 200 square kilometres and hunts for medium to large birds in open forests and gallery forest {Garnett, 2000 #21}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	***Moderate*** May occur in open forest riparian habitats (BVG 16 and subsets)
Erythrura gouldiae	Gouldian Finch	E	E	The Gouldian Finch inhabits open woodlands that are dominated by Eucalyptus trees and support a ground cover of Sorghum and other grasses. It has also been recorded in undescribed thickets of vegetation along streams and gorges, and at the margins of stands of mangroves. It sometimes occurs around homesteads and townships. The Gouldian Finch drinks regularly and thus is often seen at watering points and associated habitat such as beds of grass and grass-covered banks around shallow waterholes, watercourses, soaks and springs {Department of the Environment and Energy, 2017 #7530}.	PMST - Charters Towers LGA, Etheridge LGA Wildlife Online - Charters Towers LGA, Etheridge LGA	***Moderate*** May occur in grassland and open grassy woodland habitats near water.
Erythrura trichroa	Blue-faced Parrot-finch	-	NT	The Blue-faced Parrot Finch inhabits Hill forest and montane forest and forest edge, rainforest, and dense secondary growth often observed eating the seeds of introduced grasses such as Signal Grass (*Brachiaria decumbens*) and Guinea or Hamil Grass (*Megathyrsus maximus*).	Wildlife Online - Charters Towers LGA	***Moderate*** May occur in SEVT toward range.
Esacus neglectus	Beach Stone-curlew	CE	-	Found on beaches within species range, including short stretches of muddy sand among mangroves, coralline sands on atolls and prime surf beaches. Does not occupy long stretches of continuous mangroves or cliffs though beaches associated with estuaries or near mangroves are favoured {Garnett, 2000 #21}.	Wildlife Online - Hinchinbrook LGA	Low Coastal habitats not present.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Falco hypoleucos	Grey Falcon	-	V	Generally centred on inland drainage systems where the average rainfall is less than 500 millimetres. It is found in timbered lowland plains that are crossed by tree-lined water courses. Nests in the old nests of other birds, particularly raptors {Garnett, 2000 #21}.	Wildlife Online - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA	***Moderate*** May occur in open forest riparian habitats (BVG 16 and subsets)
Gallinago hardwickii	Latham's Snipe	M	SLC	Occurs in freshwater or brackish wetlands generally near protective vegetation cover. This species feeds on small invertebrates, seeds and vegetation. It migrates to the northern hemisphere to breed {Garnett, 2000 #21}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA Wildlife Online - Etheridge LGA, Hinchinbrook LGA	**High** Likely to occur in wetland habitats.
Gallinago megala	Swinhoe's Snipe	M	SLC	During the non-breeding season Swinhoe's Snipe occurs at the edges of wetlands, such as wet paddy fields, swamps and freshwater streams. The species is also known to occur in grasslands, drier cultivated areas (including crops of rapeseed and wheat) and market gardens. Habitat specific to Australia includes the dense clumps of grass and rushes round the edges of fresh and brackish wetlands. This includes swamps, billabongs, river pools, small streams and sewage ponds. They are also found in drying claypans and inundated plains pitted with crab holes {Environment, 2015 #3579}.	PMST - Hinchinbrook LGA	**High** Likely to occur in wetland habitats.
Gallinago stenura	Pintail Snipe	M	SLC	During non-breeding period the Pin-tailed Snipe occurs most often in or at the edges of shallow freshwater swamps, ponds and lakes with emergent, sparse to dense cover of grass/sedge or other vegetation. The species is also found in drier, more open wetlands such as claypans in more arid parts of species' range. It is also commonly seen at sewage ponds; not normally in saline or inter-tidal wetlands {Department of the Environment, 2015 #3580}.	PMST - Hinchinbrook LGA	**High** Likely to occur in wetland habitats.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Gelochelidon nilotica (syn. Sterna nilotica)	Gull-billed Tern	M	SLC	Prefer shallow, often ephemeral, terrestrial wetlands, either fresh or saline, especially lakes, swamps and lagoons, particularly those with mudflats; sometimes on inundated ground, including saltpans, claypans and saltmarsh or watercourses and associated floodplains. Also occur in sheltered coastal embayments, estuaries and river deltas with tidal sandflats, mudflats or beaches. Inland, often occur well away from water, on dry samphire, grassy plains or even gibber. Usually breed on large, often ephemeral, inland lakes and swamps, on low exposed islands, banks, flats or spits of dry mud, sand or, occasionally, rocks; either bare or vegetated with sparse dry grass, reeds and rushes or scattered samphire {Higgins, 1997 #2274}.	Wildlife Online - Etheridge LGA, Hinchinbrook LGA	**High** Likely to occur in wetland habitats.
Geophaps scripta scripta	Squatter Pigeon (Southern Subspecies)	V	V	The Squatter Pigeon (southern) occurs mainly in grassy woodlands and open forests that are dominated by eucalypts. It has also been recorded in sown grasslands with scattered remnant trees, disturbed habitats (i.e. around stockyards, along roads and railways, and around settlements), in scrub and acacia growth, and remains common in heavily-grazed country north of the Tropic of Capricorn. The species is commonly observed in habitats that are located close to bodies of water {Department of Sustainability Environment Water Population and Communities, 2011 #3366}.	PMST - Charters Towers LGA, Wildlife Online - Charters Towers LGA	**High** Likely to occur in grassland and open grassy woodland habitats.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Glareola maldivarum	Oriental Pratincole	M	SLC	Within Australia the Oriental Pratincole is widespread in northern areas, especially along the coasts of the Pilbara Region and the Kimberley Division in Western Australia, the Top End of the Northern Territory, and parts of the Gulf of Carpentaria. It is also widespread but scattered inland, mostly north of 20° S. In non-breeding grounds in Australia, the Oriental Pratincole usually inhabits open plains, floodplains or short grassland (including farmland or airstrips), often with extensive bare areas. They often occur near terrestrial wetlands, such as billabongs, lakes or creeks, and artificial wetlands such as reservoirs, saltworks and sewage farms, especially around the margins. The species also occurs along the coast, inhabiting beaches, mudflats and islands, or around coastal lagoons {Department of the Environment and Energy, 2017 #7531}.	PMST - Etheridge LGA	***Moderate*** Likely to occur in grassland, grazing land and open grassy woodland habitats.
Grantiella picta	Painted Honeyeater	V	V	Lives in dry forests and woodlands. Primary food is the mistletoes in the genus Amyema, though it will take some nectar and insects. Its breeding distribution is dictated by presence of mistletoes which are largely restricted to older trees. Less likely to be found in in strips of remnant box-ironbark woodlands, such as occur along roadsides and in windbreaks, than in wider blocks {Garnett, 2000 #21}.	PMST - Charters Towers LGA, Wildlife Online - Etheridge LGA	**High** Likely to occur in forests to open grassy woodland habitats.
Hirundapus caudacutus	White-throated Needletail	M	SLC	Occurs in airspace over forests, woodlands, farmlands, plains, lakes, coasts and towns. Breeds in the northern hemisphere and migrates to Australia in October-April {Pizzey, 2007 #24}.	PMST - Hinchinbrook LGA, Charters Towers LGA Wildlife Online - Hinchinbrook LGA, Etheridge LGA	**High** Likely to occur periodically in or above all habitats.
Hirundo rustica	Barn Swallow	M	SLC	Usually found in airspace over open grassland and wetland habitats such as ponds, freshwater wetlands swimming pools, coastal lagoons and tidal pools. This species is a regular visitor to northern Australia in Qld, NT and WA. This species has been occasional records in NSW at Newcastle, Mullumbimby and Nowra {Higgins, 2006 #2278}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA Wildlife Online - Hinchinbrook LGA	**High** Likely to occur periodically in or above all habitats.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Hydroprogne caspia (syn. Sternia caspia)	Caspian Tern	M	SLC	The Caspian Tern is found in sheltered coastal embayments preferring sandy or muddy margins. Also found in near-coastal or inland terrestrial wetlands. It forages in open wetlands, preferring sheltered shallow water near the margins. It usually breeds in low islands, cays, spits, banks, ridges, beaches of sand or shell, terrestrial wetlands and stony or rocky islets or banks and occasionally among beach-cast debris above the high-water mark or at artificial sites, including islands in reservoirs, or on dredge-spoil. Generally roosting occurs on bare exposed sand or shell spits, banks or shores. {Higgins, 1996 #648}.	Wildlife Online - Etheridge LGA, Hinchinbrook LGA	***Moderate*** May occur in wetland habitats.
Limosa lapponica	Bar-tailed Godwit	M	SLC	Occurs in coastal mudflats, sandbars, shores of estuaries, salt marsh and sewage ponds {Morcombe, 2003 #992}.	PMST - Hinchinbrook LGA, Wildlife Online - Hinchinbrook LGA	Low Coastal habitats not present.
Limosa limosa	Black-tailed Godwit	M	SLC	A coastal species found on tidal mudflats, swamps, shallow river margins and sewage farms. Also found inland on larger shallow fresh or brackish waters. A migratory species visiting Australia between September and May {Pizzey, 2007 #24}.	PMST - Charters Towers LGA Wildlife Online - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA	Low Coastal habitats not present.
Monarcha frater	Black-winged Monarch	M	SLC	Found along the coast of eastern Australia, becoming less common further south. It is found in rainforests, eucalypt woodlands, coastal scrub and damp gullies. It may be found in more open woodland when migrating.	Wildlife Online - Hinchinbrook LGA	***Moderate*** May occur in SEVT toward range.
Monarcha melanopsis	Black-faced Monarch	M	SLC	Occurs in rainforests, eucalypt woodlands, coastal scrubs, damp gullies in rainforest, eucalypt forest and in more open woodland when migrating {Pizzey, 2007 #24}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA Wildlife Online - Hinchinbrook LGA	***Moderate*** May occur periodically in open forest to woodland habitats.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Motacilla cinerea	Grey Wagtail	M	SLC	A scarce but regular visitor to northern Australia, generally arriving in October and departing around March. The species has a strong association with water. In their normal breeding range, Grey Wagtails are found across a variety of wetlands, especially water courses, but also on the banks of lakes and marshes, as well as artificial wetlands such as sewage farms, reservoirs and fishponds. This association with water extends into non-breeding habitats with all confirmed Australian records being associated with water; especially creeks, rivers and waterfalls. On migration they may forage on rocky tidal flats.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA	***Moderate*** May occur in wetland and riverine habitats.
Motacilla flava	Yellow Wagtail	M	SLC	This species occurs in a range of habitats including estuarine habitats such as sand dunes, mangrove forests and coastal saltmarshes. This species also occurs in open grassy areas including disturbed sites such as sports grounds and has been recorded on the edges of wetlands, swamps, lakes and farm dams. This species migrates from Asia to Australia in spring-summer. It has been recorded in the estuarine areas of the Hunter River in Newcastle NSW and in QLD and the north of NT and WA {Higgins, 2006 #2278}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA Wildlife Online - Hinchinbrook LGA	Low Coastal habitats not present.
Myiagra cyanoleuca	Satin Flycatcher	M	SLC	Widespread in eastern Australia. In Queensland, it is widespread but scattered in the east. In NSW, they are widespread on and east of the Great Divide and sparsely scattered on the western slopes, with very occasional records on the western plains. In Victoria, the species is widespread in the south and east. Inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests. Satin Flycatchers mainly inhabit eucalypt forests, often near wetlands or watercourses. They generally occur in moister, taller forests, often occurring in gullies. They also occur in eucalypt woodlands with open understorey and grass ground cover, and are generally absent from rainforest {Department of the Environment, 2016 #7313}{Pizzey, 2007 #24}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA Wildlife Online - Etheridge LGA, Hinchinbrook LGA	**High** Likely to occur in riparian forests, open forests to woodlands.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Neochmia ruficauda ruficauda	Star Finch (Eastern Subspecies)	E	E	The Star Finch (eastern) occurs mainly in grasslands and grassy woodlands that are located close to bodies of fresh water. It also occurs in cleared or suburban areas such as along roadsides and in towns {Department of Sustainability Environment Water Population and Communities, 2011 #3375}.	PMST - Charters Towers LGA, Etheridge LGA	***Moderate*** May occur in grassland and open grassy woodland habitats near water.
Numenius madagascariensis	Eastern Curlew	CE (M)	V	Inhabits coastal estuaries, mangroves, mud flats and sand pits. It is a migratory shorebird which generally inhabits sea and lake shore mud flats, deltas and similar areas, where it forages for crabs and other crustaceans, clam worms and other annelids, molluscs, insects and other invertebrates. Its migration route ranges from its wintering grounds in Australia to its breeding grounds in northern China, Korea and Russia {Pizzey, 2007 #24}.	PMST - Charters Towers LGA, Hinchinbrook LGA Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	Low Coastal habitats not present.
Numenius minutus	Little Curlew	M	SLC	On passage the species shows a preference for foraging and resting in swampy meadows near lakes and along river valleys. It overwinters on dry inland grassland, bare cultivation, dry mudflats and coastal plains of black soil with scattered shallow pools of freshwater, swamps, lakes or flooded ground. It shows a preference for short grass swards of less than 20 cm tall, and occasionally occurs in dry saltmarshes, coastal swamps, mudflats or sandflats in estuaries, or on the beaches of sheltered coasts {BirdLife International, 2009 #3757}.	PMST - Charters Towers LGA, Hinchinbrook LGA Wildlife Online - Etheridge LGA, Hinchinbrook LGA	***Moderate*** May occur in wetland habitats.
Numenius phaeopus	Whimbrel	M	SLC	Migrates to Taiwan, Philippines, PNG, and a race breeding in NE Siberia is found on the north and south-eastern coastlines of Australia. Juveniles arrive to Australia from spring to early summer. Usually only juveniles remain in Australia but very occasionally adults in breeding plumage may be seen in Australian winters {Pizzey, 2007 #24}.	PMST - Hinchinbrook LGA Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	Low Coastal habitats not present.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Pandion cristatus (syn. P. haliaetus)	Eastern Osprey	M	SLC	Generally a coastal species, occurring in estuaries, bays, inlets, islands and surrounding waters, coral atolls, reefs, lagoons, rock cliffs and stacks. Sometimes ascends larger rivers to far inland. Builds nests high in tree, on pylon or on ground on islands. Feeds on fish {Pizzey, 2007 #24}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA Wildlife Online - Hinchinbrook LGA	Low Coastal habitats not present
Plegadis falcinellus	Glossy Ibis	M	SLC	It feeds in very shallow water and nests in freshwater or brackish wetlands with tall dense stands of emergent vegetation (e.g. reeds or rushes) and low trees or bushes. It shows a preference for marshes at the edges of lakes and rivers, as well as lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and irrigated cultivation. It less often occurs in coastal locations such as estuaries, deltas, saltmarshes and coastal lagoons. Roosting sites are often large trees that may be far from water. The nest is a platform of twigs and vegetation usually positioned less than 1 m above water in tall dense stands of emergent vegetation (e.g. reeds or rushes), low trees or bushes over water {BirdLife International, 2009 #3757}.	Wildlife Online - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA	**High** Likely to occur in wetland habitats.
Pluvialis fulva	Pacific Golden Plover	M	SLC	Prefers sandy, muddy or rocky shores, estuaries and lagoons, reefs, saltmarsh, and or short grass in paddocks and crops. The species is usually coastal, including offshore islands; rarely far inland. Often observed on beaches and mudflats, sandflats and occasionally rock shelves, or where these substrates intermingle; harbours, estuaries and lagoons {Higgins, 1993 #534}.	PMST - Charters Towers LGA, Hinchinbrook LGA Wildlife Online - Hinchinbrook LGA	Low Coastal habitats not present

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Pluvialis squatarola	Grey Plover	M	SLC	In non-breeding grounds in Australia, Grey Plovers occur almost entirely in coastal areas, where they usually inhabit sheltered embayments, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons. They also occur around terrestrial wetlands such as near-coastal lakes and swamps, or salt-lakes. The species is also very occasionally recorded further inland, where they occur around wetlands or salt-lakes {Marchant, 1993 #534}. They usually forage on large areas of exposed mudflats and beaches and occasionally in pasture and on muddy margins of inland wetlands {Marchant, 1993 #534}. They usually roost in sandy areas, such as on unvegetated sandbanks or sand-spits on sheltered beaches or other sheltered environments {Jaensch, 1988 #3754}{Pegler, 1983 #3755}.	PMST - Hinchinbrook LGA Wildlife Online - Hinchinbrook LGA	Low Coastal habitats not present
Poephila cincta cincta	Black-Throated Finch (White-Rumped Subspecies)	E	E	Occurs in grassy woodland dominated by eucalypts, paperbarks or acacias where there are seeding grasses and water. Nests in tree hollows or builds domed nests in trees {Garnett, 2000 #21}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA Wildlife Online - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA	**High** Likely to occur in grassy open woodland habitats near water. Previous records in corridor options.
Rhipidura rufifrons	Rufous Fantail	M	SLC	Occurs in a range of habitats including the undergrowth of rainforests/wetter eucalypt forests/gullies, monsoon forests paperbarks, sub-inland and coastal scrubs, mangroves, watercourses, parks and gardens. When migrating they may also be recorded on farms, streets and buildings. Migrates to SE Australia in October-April to breed, mostly in or on the coastal side of the Great Dividing Range {Pizzey, 2007 #24}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA Wildlife Online - Etheridge LGA	**High** Likely to occur in riparian and moist forest habitats.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Rostratula australis (syn. R. benghalensis)	Australian Painted Snipe (Painted Snipe)	V	V	Inhabits shallow, vegetated, temporary or infrequently filled wetlands, including where there are trees such as Eucalyptus camaldulensis (River Red Gum), E. populnea (Poplar Box) or shrubs such as Muehlenbeckia florulenta (Lignum) or Sarcocornia quinqueflora (Samphire). Feeds at the water's edge and on mudlflats on seeds and invertebrates, including insects, worms, molluscs and crustaceans. Males incubate eggs in a shallow scrape nest {Garnett, 2000 #21}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA Wildlife Online - Charters Towers LGA, Etheridge LGA	**High** Likely to occur in wetland habitats.
Sterna albifrons	Little Tern	M	E	Little Terns inhabit sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets. They nest on sand-spits, sandbanks, ridges or islets in these habitats or gently sloping sandy ocean beaches and occasionally in sand-dunes {Garnett, 2000 #21}.	PMST - Hinchinbrook LGA, Wildlife Online - Hinchinbrook LGA	Low Coastal habitats not present
Sterna dougallii	Roseate Tern	M	SLC	In Queensland, scattered records occur in the south-east Gulf of Carpentaria and west Cape York Peninsula, but birds are possibly more widespread, with large numbers nesting on south-east Bountiful Island. Birds are widespread along the east coast of Australia, south to about Hervey Bay. They are more sparsely distributed, further south, occasionally reaching north Fraser Island. It occurs in coastal and marine areas in subtropical and tropical seas. The species inhabits rocky and sandy beaches, coral reefs, sand cays and offshore islands. Birds rarely occur in inshore waters or near the mainland, usually venturing into these areas only accidentally, when nesting islands are nearby {Higgins, 1997 #2274}.	Wildlife Online - Hinchinbrook LGA	Low Coastal habitats not present
Sterna hirundo	Common Tern	M	SLC	A non-breeding migrant to Australia, occurring mainly on the east coast and inhabiting marine, pelagic and coastal habitats. Mostly oceanic but often recorded in bays, harbours and estuaries and occasionally in coastal wetlands. Roosting occurs on unvegetated intertidal sandy ocean beaches, shores of estuaries, lagoons and sand bars {Higgins, 1996 #648}.	Wildlife Online - Hinchinbrook LGA	Low Coastal habitats not present

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Sterna sumatrana	Black-naped Tern	M	SLC	In Australia, Black-naped Terns are found mainly in the central north and north-east of the country, in central and eastern Northern Territory, the Gulf of Carpentaria and Torres Strait and through the islands and waters of the Great Barrier Reef and Coral Sea. The species is rarely found in inshore waters except when breeding. Black-naped Terns breed and roost on islands, which are very occasionally close to or attached to the mainland at low tides, and forage in seas surrounding colonies. Black-naped Terns are mainly associated with small, offshore sand and coral cays, coral reefs and lagoons, and sandy and rocky islands and islets, and in the surrounding seas. The species is only occasionally recorded in inshore waters away from their breeding colonies or coastal mainland Australia, such as harbours or bays, with their occurrence inshore probably being influenced by climatic conditions {Higgins, 1997 #2274}.	Wildlife Online - Hinchinbrook LGA	Low Coastal habitats not present
Tringa brevipes (syn. Heteroscelus brevipes)	Grey-tailed Tattler	M	SLC	It is often found on sheltered coasts with reefs, rock platforms or with intertidal mudflats. It is also found at intertidal rocky, coral or stony reefs, platforms and islets that are exposed at low tide. It has also been found in embayments, estuaries and coastal lagoons, especially fringed with mangroves. It is rarely seen on open beaches and occasionally found around near-coastal wetlands, such as lagoons, lakes and ponds in sewage farms and saltworks. Inland records for the species are rare {Higgins, 1996 #648}. The species forages in shallow water, hard intertidal substrates, rock pools, intertidal mudflats, mangroves, banks of seaweed and among rocks and coral rubble, over which water may surge. The species roosts in mangroves, dense stands of shrubs, snags, rocks, beaches, reefs, artificial structures (sea walls, oyster racks), occasionally in near-coastal saltworks and sewage ponds and rarely on sandy beaches or sand banks {Higgins, 1996 #648}{Rogers, 1999 #3758}.	PMST - Hinchinbrook LGA Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	Low Coastal habitats not present

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Tringa glareola	Wood Sandpiper	M	SLC	Found in well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reeds, shrubs, or dead or live trees and often with fallen timber. They also inhabit inundated grasslands, short herbage or wooded floodplains, where floodwaters are temporary or receding, and irrigated crops. This species uses artificial wetlands, including open sewage ponds, reservoirs, large farm dams, and bore drains and occasionally found in stony wetlands. The species forages on mud at the edges of wetlands, either along shores, among open scattered aquatic vegetation, or in clear shallow water {Higgins, 1996 #648}.	PMST - Charters Towers LGA, Wildlife Online - Etheridge LGA, Hinchinbrook LGA	***Moderate*** May occur in wetland habitats.
Tringa incana	Wandering Tattler	CE (M)	SLC	Generally found on rocky coasts with reefs and platforms, points, spits, piers, offshore islands and shingle beaches or beds. Occasionally seen on coral reefs or beaches, and tends to avoid mudflats Foraging habitat is among rocks or shingle, or in shallow pools at edges of reefs or beaches, mainly along the tideline. Wandering Tattlers have been recorded roosting or perching on top of boulders surrounded by or close to water {Higgins, 1996 #648}.	Wildlife Online - Hinchinbrook LGA	Low Coastal habitats not present
Tringa nebularia	Common Greenshank	M	SLC	Occurs in a range of inland and coastal environments. Inland, it occurs in both permanent and temporary wetlands, billabongs, swamps, lakes floodplains, sewage farms, saltworks ponds, flooded irrigated crops. On the coast, it occurs in sheltered estuaries and bays with extensive mudflats, mangrove swamps, muddy shallows of harbours and lagoons, occasionally rocky tidal ledges. It generally prefers wet and flooded mud and clay rather than sand {Morcombe, 2003 #992}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA Wildlife Online - Etheridge LGA, Hinchinbrook LGA	***Moderate*** May occur in wetland habitats.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Tringa stagnatilis	Marsh Sandpiper	M	SLC	Occurs in coastal and inland wetlands (salt or fresh water), estuarine and mangrove mudflats, beaches, shallow or swamps, lakes, billabongs, temporary floodwaters, sewage farms and saltworks ponds {Morcombe, 2003 #992}.	PMST - Charters Towers LGA, Hinchinbrook LGA Wildlife Online - Etheridge LGA, Hinchinbrook LGA	***Moderate*** May occur in wetland habitats.
Turnix olivii	Buff-breasted Button-quail	E	E	Poorly recorded species occurring in Northeast Queensland, from Iron Range and near Coen, Cooktown, Musgrave, Mount Molloy, Mareeba, Chillagoe and Ingham, although most recent records are form the Mt Molloy area. Said to prefer sparse short grassy areas on stony ground, and avoiding densely grassed areas (DoE 2015)	Wildlife Online - Hinchinbrook LGA	***Moderate*** May occur in rocky open grassy habitats.
Tyto novaehollandiae kimberli	Masked Owl (northern)	V	V	In Queensland, there are historical records from the Normanton region, and from Pascoe, Archer, Chester and Watson Rivers on Cape York Peninsula. It occurs along the southern rim of the Gulf of Carpentaria, Cape York Peninsula and south to Atherton Tablelands and the Einasleigh-Burdekin divide. Individuals have been recorded from riparian forest, rainforest, open forest, Melaleuca swamps and the edges of mangroves, as well as along the margins of sugar cane fields {Higgins, 1999 #531}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	***Moderate*** May occur in riparian forest and open forest to woodland habitats.
Xenus cinereus	Terek Sandpiper	M	SLC	Found on tidal mudflats and estuaries and on shores and reefs of offshore islands {Pizzey, 2007 #24}.	PMST - Hinchinbrook LGA, Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	Low Coastal habitats not present

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Fish						
Pristis pristis (syn. Pristis microdon)	Freshwater Sawfish	V	-	The Freshwater Sawfish may potentially occur in all large rivers of northern Australia from the Fitzroy River, Western Australia, to the western side of Cape York Peninsula, Queensland. It is mainly confined to the main channels of large rivers. It is a marine/estuarine species that spends its first three–four years in freshwater growing to about half its adult size (4 m+). Juveniles and sub-adult Freshwater Sawfish predominantly occur in rivers and estuaries, while large mature animals tend to occur more often in coastal and offshore waters up to 25 m depth. The preferred habitat of this species is mud bottoms of river embayments and estuaries, but they are also found well upstream. They are not found near riparian vegetation. They are usually found in turbid channels of large rivers over soft mud bottoms more than 1 m deep, but they will move into shallow waters when travelling upstream or while hunting prey {Department of the Environment and Energy, 2017 #7522}	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA	Low Unlikely to occur in riverine habitats.
Invertebrates						
Hypochrysops apollo apollo	Apollo Jewel (Wet Tropics Subspecies)	-	V	Shares a mutualistic relationship with Golden Ant (Iridiomyrmex cordatus) and Ant Plant (Myrmecodia beccarii), which occur in coastal woodlands between Cooktown and Ingham in Queensland.	Wildlife Online - Hinchinbrook LGA	Low Outside of species known range

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Mammals						
Bettongia tropica	Northern Bettong	E	E	The Northern Bettong currently occurs in three geographically isolated locations: the Lamb Range, Paluma and Mt Zero, Queensland. Mt Windsor Tableland was known to have an existing population as recently as January 1989. However, despite considerable effort no Northern Bettongs have been seen since this time. Its preferred habitat is tall and medium open eucalypt forest with grassy understorey. These habitat types occur as a narrow fragmented strip along the western edge of wet tropical rainforests {Department of the Environment and Energy, 2017 #7533}.	PMST - Charters Towers LGA, Hinchinbrook LGA, Wildlife Online - Charters Towers LGA	Low Outside of species known range
Dasyurus hallucatus	Northern Quoll	E	-	The Northern Quoll occupies a diversity of habitats across its range which includes rocky areas, eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert. Northern Quoll are also known to occupy non rocky lowland habitats such as beachscrub communities in central Queensland. Northern Quoll habitat generally encompasses some form of rocky area for denning purposes with surrounding vegetated habitats used for foraging and dispersal. Rocky habitats are usually of high relief, often rugged and dissected but can also include tor fields or caves in low lying areas such as in Western Australia. Eucalypt forest or woodland habitats usually have a high structural diversity containing large diameter trees, termite mounds or hollow logs for denning purposes. Dens are made in rock crevices, tree holes or occasionally termite mounds. Northern Quolls sometimes occur around human dwellings and campgrounds. Northern Quolls appear to be most abundant in habitats within 150 km of the coast {Department of Sustainability Environment Water Population and Communities, 2011 #3587}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA	**High** Likely to occur in forest and woodland habitats supporting rocky areas for denning / breeding.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Dasyurus maculatus gracilis	Spotted-Tailed Quoll (Northern Subspecies)	E	E	The northern subspecies is now thought to be confined to two extant populations: one centered on the Windsor and Carbine Tablelands, Thornton Peak, Mount Finnegan and associated smaller ranges; and the other centered on the Atherton Tablelands and associated mountain ranges. Its habitat is mostly confined to the relatively cool, wet and climatically equable upland closed-forests (mostly above 900 m altitude) that occur in the upper catchments of rivers draining east and west of the Eastern Escarpment in the Wet Tropics bioregion of north-eastern Queensland. It utilises dens for resting and for raising young. Dens have been found in tree hollows, logs, rock crevasses and even among building materials. Maternal dens often have long entrances {Department of the Environment and Energy, 2017 #7534}.	PMST - Charters Towers LGA, Hinchinbrook LGA Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	***Moderate*** May occur in forest to open woodland habitats in elevated areas.
Hipposideros diadema reginae	Diadem Leaf-Nosed Bat	-	NT	This subspecies is endemic to Queensland, occurring from Cape York Peninsula south to Townsville and inland to Chillagoe, with records from Iron Range, Hinchinbrook Island, Cape Melville, Chillagoe, Cairns and Coen. It roosts throughout the year in caves and disused mines, preferring those with large chambers, high domed ceilings and multiple entrances. They have also been recorded roosting in buildings and culverts. It occurs in a variety of habitat types including lowland rainforest, Melaleuca forests, eucalypt woodland, deciduous vine thickets, and open woodland; where suitable roosts are available throughout its range. Typical foraging sites are at vegetation edges or gaps adjacent to open space {C.Hourigan, 2011 #7535}.	Wildlife Online - Charters Towers LGA, Etheridge LGA	***Moderate*** Likely to occur in forest and open woodland habitats on landforms that supporting cave roosting sites.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Hipposideros semoni	Semon's Leafnosed-bat	E	E	Distribution for Semon's Leaf-nosed Bat includes coastal Queensland from Cape York to just south of Cooktown. Semon's Leaf-nosed Bat is found in tropical rainforest, monsoon forest, wet sclerophyll forest and open savannah woodland. This species does not have an obligatory requirement for cave roosts. Daytime roost sites include tree hollows, deserted buildings in rainforest, road culverts and shallow caves amongst granite boulders or in fissures {Department of the Environment and Energy, 2017 #7536}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA	***Moderate*** May occur in open forest habitats associated with hollow bearing trees and cave roosting sites.
Macroderma gigas	Ghost Bat	V	V	Ghost bats occur in a wide range of habitats from rainforest, monsoon and vine scrub, to open woodlands in arid areas. These habitats are used for foraging, while roost habitat is more specific. Favoured roosting sites of the ghost bat are undisturbed caves or mineshafts which have several openings {Department of Environment and Heritage Protection, 2013 #7230}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA Wildlife Online - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA	***Moderate*** Likely to occur in forest and open woodland habitats on landforms that supporting cave roosting sites.
Macrotis lagotis	Greater Bilby	V	E	This species is restricted predominantly to the Tanami Desert, Northern Territory, the Great Sandy and Gibson Deserts, Western Australia and an outlying population between Boulia and Birdsville in south-west Queensland. The species occurs in a variety of habitats, usually on landforms with level to low slope topography and light to medium soils. It occupies three major vegetation types; open tussock grassland on uplands and hills, mulga woodland/shrubland growing on ridges and rises, and hummock grassland in plains and alluvial areas{Department of the Environment, 2015 #3988}.	PMST - Charters Towers LGA	**High** Likely to occur in tussock grassland habitats.
Mesembriomys gouldii rattoides	Black-footed Tree-rat	V	-	It has been recorded mostly from eucalypt forests and woodlands (but not rainforests) around Mareeba, but there are records sparsely across Cape York Peninsula. In north Queensland, this species mostly occurs in eucalypt forests and woodlands, especially where hollows are relatively plentiful.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA	Low Outside of species known range

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Murina florium	Tube-nosed Insectivorous Bat	-	V	Occurs within the wet tropics, and further north in the Iron Range on Cape York Peninsula. The limits to its distribution in Queensland are not well known. It has been recorded from a range of rainforest types, and from rainforest with emergent *Eucalyptus grandis*, at altitudes from near sea level to 1200m {Department of Environment and Heritage Protection, 2016 #7547}.	Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	Low Rainforest habitats not present.
Onychogalea fraenata	Bridled Nailtail Wallaby	E	E	The species is recorded in habitats west of the Great Dividing Range in a mixture of tall shrubland and grassy woodland, and on the fertile soils which support open eucalypt forest and woodland, and Brigalow scrub. The species has a preference for scrub edges and adjacent vegetation, grazing and sheltering in the shrubland and grazing the grassy woodland {Strahan, 1995 #185}.	Wildlife Online - Charters Towers LGA	***Moderate*** May occur in open grassy woodland, tussock grassland and woody shrublands.
Ornithorhynchus anatinus	Platypus	-	SLC	Inhabits freshwater creeks and occasionally lakes in the coastal ranges of eastern Australia and throughout Tasmania. Largely crepuscular in habits, but may be seen throughout the day. Shelters in burrows dug into stream banks and feeds on aquatic invertebrates.	Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	**High** Likely to occur in waterways / streams.
Petauroides volans	Greater Glider	V	V	The Greater Glider has a restricted distribution in eastern Australia, from the Windsor Tableland in north Queensland to central Victoria, with an elevated range from sea level to 1200m above sea level. The species is largely restricted to eucalypt forests and woodlands, with a diet comprising of eucalypt leaves and occasional flowers. It is found in abundance in montane eucalypt forest with relatively old trees and an abundance of hollows. It also favours forests with a diversity of eucalypts to cater for seasonal variation in food abundance {Department of the Environment, 2015 #7227}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA	**High** Likely to occur in riparian forest and open forest to woodland habitats.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Petaurus gracilis	Mahogany Glider	E	E	Restricted to the coastal southern Wet Tropics region of northern Queensland. They live in a narrow and highly fragmented band of lowland sclerophyll forest extending around 140 km from Toomulla, north of Townsville, to Tully and up to 40 km inland. Most recorded sightings have been at altitudes below 120 m. The main canopy and sub-canopy trees are eucalypts, bloodwoods and paperbarks and less commonly swamp mahogany and turpentine with an open mid-stratum of smaller trees and shrubs (e.g. wattles, forest siris, golden parrot tree, black she-oak, pandanus) and a grassy ground stratum in which grass trees may be present. The mahogany glider requires a relatively open forest structure for efficient gliding and tends to avoid dense vegetation such as rainforest {Department of Environment and Heritage Protection, 2017 #7548}.	PMST - Charters Towers LGA, Hinchinbrook LGA Wildlife Online - Hinchinbrook LGA	**High** Likely to occur in riparian forest and open forest to woodland habitats.
Petrogale sharmani	Sharman's Rock-Wallaby	V	V	Sharman's rock-wallaby has a restricted distribution, centred on the Seaview and Coane Ranges, west of Ingham in north-east Queensland. It inhabits rocky slopes, rocky outcrops, boulder piles, cliff lines and gorges, usually associated with tropical woodland with a grassy understorey {Department of Environment and Heritage Protection, 2015 #7232}.	PMST - Charters Towers LGA, Hinchinbrook LGA Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	Low Outside of species known range.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Phascolarctos cinereus	Koala (NSW, ACT & QLD - excluding SE QLD)	V	V	The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. Inhabits eucalypt woodlands and forests. Koalas Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. The preferred tree species vary widely on a regional and local basis. Some preferred species include Forest Red Gum Eucalyptus tereticornis, Grey Gum E. punctata. In coastal areas, Tallowwood E. microcorys and Swamp Mahogany E. robusta are important food species, while in inland areas White Box E. albens, Bimble Box E. populnea and River Red Gum E. camaldulensis are favoured {NSW National Parks and Wildlife Service, 1999 #43; NSW National Parks and Wildlife Service, 2003 #31}{Office of Environment & Heritage, 2015 #7299}. Hawks Nest and Tea Gardens Population and population in the Pittwater LGA listed as Endangered under the NSW TSC Act{Office of Environment & Heritage, 2016 #7300}{Office of Environment & Heritage, 2013 #7301}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA Wildlife Online - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA	**High** Likely to occur in riparian forest and open forest to woodland habitats. Previous records in corridor options.
Pteropus conspicillatus	Spectacled Flying-fox	V	V	The Spectacled Flying-fox occurs in north-eastern Queensland, north of Cardwell with past records from Brisbane and Chillagoe. The Spectacled Flying-fox feeds on fruits and blossom, primarily in the canopy vegetation of a wide range of vegetation communities, including closed forest, gallery forest, eucalypt open forest and woodland, Melaleuca thickets, coastal swamps, mangroves, vegetation in urban settings, and commercial fruit crops. It roosts in large camps {Department of the Environment, 2015 #3675}.	PMST - Charters Towers LGA, Hinchinbrook LGA Wildlife Online - Charters Towers LGA, Hinchinbrook LGA	***Moderate*** May occur in riparian, open forest and woodland habitats.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Pteropus poliocephalus	Grey-headed Flying-fox	V	-	Occurs in the coastal belt from Rockhampton in central Queensland to Melbourne in Victoria. The species is widespread throughout their range in summer, whilst in autumn it occupies coastal lowlands and is uncommon inland. Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines {Office of Environment & Heritage, 2015 #7341} {Department of the Environment, 2016 #7342}.	PMST - Hinchinbrook LGA	Low Outside of species known range.
Rhinolophus robertsi	Large-eared Horseshoe-bat	E	E	The Greater Large-eared Horseshoe Bat occurs only in northern Queensland, from the Iron Range southwards to Townsville and west to the karst regions of Chillagoe and Mitchell-Palmer. The Greater Large-eared Horseshoe Bat is found in lowland rainforest, along gallery forest-lined creeks within open eucalypt forest, Melaleuca forest with rainforest understorey, open savannah woodland and tall riparian woodland of Melaleuca, Forest Red Gum (E. tereticornis) and Moreton Bay Ash (E. tesselaris). Daytime roosting habitat for the Greater Large-eared Horseshoe Bat includes caves and underground mines located in rainforest, and open eucalypt forest and woodland. Roosts have also been observed in road culverts, and it is suspected that the species uses basal hollows of large trees, dense vegetation, rockpiles and areas beneath creekbanks {Department of the Environment and Energy, 2017 #7524} {Churchill, 2008 #6883}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA Wildlife Online - Charters Towers LGA	***Moderate*** May occur in open forest habitats associated with hollow bearing trees and cave roosting sites.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Saccolaimus saccolaimus nudicluniatus	Bare-rumped Sheathtail Bat	CE	E	Known to occur in north-eastern Queensland and the monsoonal tropics of the Northern Territory. In Queensland, it occurs from Ayr to the Iron Range, including Magnetic and possibly Prince of Wales Islands. Most records are near-coastal mostly in eucalypt forests and woodlands. Known to be associated with coastal lowland rainforests, and more open forests dominated by Eucalyptus or Corymbia species interspersed with coastal lowland rainforest {Department of the Environment and Energy, 2017 #7539}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA Wildlife Online - Hinchinbrook LGA	Low Rainforest habitats not present.
Sminthopsis archeri	Chestnut Dunnart	-	NT	This predator was thought to be restricted to southern Papua New Guinea and Cape York, until it was recorded woodlands 200 km west of Townsville. It is found in open woodland to tall open forest and heathlands {Van Dyck and Strahan, 2008}.	Wildlife Online - Etheridge LGA	***Moderate*** May occur in open woodland and tall open forest habitats
Sminthopsis douglasi	Julia Creek Dunnart	E	E	Endemic to north-western Queensland, where it occurs in the Mitchell Grass Downs and Desert Uplands bioregions. It is closely associated with tussock grasslands on cracking clay soils, with habitat quality associated particularly with increasing densities of cracks and holes, and with the extent and density of grass cover {Department of the Environment and Energy, 2017 #7539}.	PMST - Charters Towers LGA	Low Outside of species known range.
Tachyglossus aculeatus	Short-beaked Echidna	-	SLC	Occurs throughout most terrestrial habitats across mainland Australia and Tasmania, where its favoured ant and termite prey are available.	Wildlife Online - Etheridge LGA, Hinchinbrook LGA	**High** Likely to occur in all terrestrial habitats.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Taphozous australis	Coastal Sheathtail-bat	-	V	Occurs along a very narrow coastal zone in Queensland from Shoalwater Bay, through Cape York Peninsula, to Moa Island in the Torres Strait. Taphozous australis also occurs on numerous coastal islands off Queensland throughout its range. Its presence depends on coastal roosts, preferring sea caves and rocky clefts. Also known to roost in disused mines, boulder piles, rock fissures, concrete bunkers, and occasionally in buildings. It forages above the canopy in areas of coastal dune scrubland, melaleuca swamps, open eucalypt forest, grasslands, coastal heathland, monsoon forests, and mangroves on lowlands and foothills {Department of the Environment and Energy, 2017 #7539}.	Wildlife Online - Hinchinbrook LGA	Low Coastal habitats not present
Xeromys myoides	False Water-rat	V	V	The only known False Water Rat populations in Australia are in coastal areas of the Northern Territory and Queensland. It is found in coastal wetlands such as lagoons, swamps and sedged lakes close to fore dunes. It forages amongst the mangroves at night when the tide is low, and when the tide rises it returns to the adjacent sedgelands for shelter. The False Water Rat builds large mud nests like termite mounds, up to 60 centimetres high and usually in areas where they can escape the highest of tides. They often use exposed tree roots to form the foundation for the mounds {Australian Government, 2003 #3581}	PMST - Hinchinbrook LGA	Low Coastal habitats not present

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Reptiles						
Acanthophis antarcticus	Common Death Adder	-	V	The Common Death Adder occurs from the Gulf region of the Northern Territory across to central and eastern Queensland and New South Wales, and through to the southern parts of South Australia and Western Australia. Once abundant in many areas, this species has experienced a dramatic reduction in numbers. Within this range the species is found in a wide variety of habitats in association with deep leaf litter, including rainforests, wet sclerophyll forests, woodland, grasslands, chenopod dominated shrublands, and coastal heathlands {Department of Environment and Resource Management, 2011 #3598}.	Wildlife Online - Charters Towers LGA, Wildlife Online - Etheridge LGA	***Moderate*** May occur in forest and SEVT habitats.
Delma mitella		V	NT	The Atherton Delma is known from the eastern side of the Atherton Tablelands in northeastern Queensland. The Atherton Delma is known only from tall open forests and rainforest interfaces in the Herberton, Ravenshoe and Paluma districts {Australian Government, 2008 #3979}.	Wildlife Online - Charters Towers LGA	***Moderate*** May occur in open forest habitats
Denisonia maculata	Ornamental Snake	V	V	The species is known only from the Brigalow Belt North and parts of the Brigalow Belt South biogeographical regions. The core of the species' distribution occurs within the drainage system of the Fitzroy and Dawson Rivers. The Ornamental Snake's preferred habitat is within, or close to, habitat that is favoured by its prey - frogs. The species is known to occur in RE 11.4.3, 11.4.6, 11.4.8, 11.4.9, 11.3.3, and 11.5.16 {Department of the Environment, 2015 #3980}.	PMST - Charters Towers LGA, Etheridge LGA Wildlife Online - Charters Towers LGA	Low Outside of species known range (Brigalow Belt).

SCIENTIFIC NAME	COMMON NAME	EPBC ACT	NC ACT	HABITAT	DATA SOURCE	LIKELIHOOD OF OCCURRENCE IN CORRIDOR OPTIONS
Egernia rugosa	Yakka Skink	V	V	The Yakka Skink is commonly found in cavities under and between partly buried rocks, logs or tree stumps, root cavities and abandoned animal burrows. The species often takes refuge in large hollow logs and has been known to excavate deep burrow systems, sometimes under dense ground vegetation. In cleared habitat, this species can persist where there are shelter sites such as raked log piles, deep gullies, tunnel erosion/sinkholes and rabbit warrens. The species has also been found sheltering under sheds and loading ramps. This species is not generally found in trees or rocky habitats {Department of Sustainability Environment Water Population and Communities, 2011 #2273}.	PMST - Charters Towers LGA, Etheridge LGA, Hinchinbrook LGA Wildlife Online - Charters Towers LGA	***Moderate*** May occur in forest to open woodland habitats.
Lampropholis mirabilis	-	-	NT	Distributed from Magnetic Island and parts of adjacent mainland, QLD. Found among granitic rocks at the edges of, or in clearings, rain- and monsoon forest, vine thickets and denser woodland habitats {Cogger, 2000 #20}.	Wildlife Online - Charters Towers LGA	***Moderate*** May occur in SEVT.
Lerista ameles	-	-	V	Known from one locality 30km east of Mt Surprise, QLD. Inhabits woodland in loose soil beneath rocks on low, weathered granite outcrops {Cogger, 2000 #20}.	Wildlife Online - Etheridge LGA	Low Outside of species known range
Lerista cinerea	Vine-thicket Fine-lined Slider	-	V	Occurs in leaf litter and loose soils in vine-thickets and adjacent forests (Greer 1983).	Wildlife Online - Charters Towers LGA	***Moderate*** May occur in SEVT habitats.
Lerista hobsoni	Hobson's fine-liner slider	-	V	Found in scattered open forest localities in the Upper Burdekin Drainage Basin. In associated IBRA regions of Brigalow Belt North, Desert Uplands and Einasleigh Uplands.	Wildlife Online - Charters Towers LGA	***Moderate*** May occur in open forest habitats.
Lerista vanderduysi	Leaden-bellied fine-line slider	V	V	Typically found in semi-evergreen vine thickets.	Wildlife Online - Etheridge LGA	***Moderate*** May occur in SEVT habitats.

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Lerista vittata	-	V	V	Lerista vittata was first described at Mount Cooper Station, approximately 80 km south-east of Charters Towers, Queensland. It has since been discovered 100–200 km NNW of Hughenden on the Chudleigh Plateau, though populations are fragmented and appear to be distinctively different. The species is found in Semi-evergreen Vine Thickets of the Brigalow Belt (North and South) and Nandewar Bioregions, an ecological community listed under the Environment Protection and Biodiversity Conservation Act 1999 as Endangered. It is also found more broadly, in spinifex communities as well as eucalyptus dominated woodlands with well-developed grassy understories {Department of the Environment, 2015 #3978}.	PMST - Charters Towers LGA, Etheridge LGA Wildlife Online - Charters Towers LGA	***Moderate*** May occur in SEVT habitats.
Lygisaurus rococo (syn. Carlia rococo)	Chillagoe litter-skink	-	NT	Currently known only from limestone rock outcrops near Chillagoe, north-east QLD. Found amongst ground litter which has accumulated between rock outcrops {Cogger, 2000 #20}.	Wildlife Online - Etheridge LGA	Low Outside of species known range
Phyllurus gulbaru	Gulbaru Gecko	-	E	Has a very restricted distribution in Queensland, found in rocky slopes and gullies in rainforest habitat. The species is located near a UNESCO World Heritage site. The Gulbaru gecko was discovered in 2001. The species has only been found at three sites despite extensive survey {Department of the Environment and Energy, 2017 #7539}.	PMST - Charters Towers LGA	Low Outside of species known range

Key: CE = Critically Endangered, E = Endangered, V= Vulnerable, NT = Near Threatened, M = Migratory, SLC = Special Least Concern