NORTHERN GOLDFIELDS INTERCONNECT PIPELINE

Environmental Offsets Strategy

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Environmental Offsets Strategy

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APA
Ministerial Statement 1184

Northern Goldfields Interconnector Pipeline
30 July 2024

Environmental Offsets Strategy

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Executive Summary

Proposal Name	Northern Goldfields Interconnect Pipeline
Proponent Name	APA Northern Goldfields Interconnect Pty Ltd, an entity of the APA Group (APA).
Ministerial Statement No.	Ministerial Statement No. 1184 (MS 1184).
Purpose of the EMP	Provide offset management actions for terrestrial fauna, the Carnaby Cockatoo (*Calyptorhynchus latirostris*) in accordance with the outcomes of Condition 6-1 of MS 1184.
Key Environmental Factor(s), Outcome(s) and/or Objectives	**Key environmental factor(s):** Terrestrial Fauna **Environmental Objectives:** 1) The proponent shall implement offset measures to achieve the objective of counterbalancing the significant residual impact to 0.25 ha of foraging habitat for Carnaby's Cockatoo (*Calyptorhynchus latirostris*). 2) The offset strategy shall: a) identify any area(s) to be acquired and/or for on-ground management (Proposed Offset Conservation Area), which contains the environmental values identified in condition 6-1 of MS 1184, or similar values of equivalent conservation significance agreed by the CEO, and b) demonstrate how the proposed offset counterbalances the significant residual impact to the environmental value identified in condition 6-1 of MS 1184 through application of the principles of the *WA Environmental Offsets Policy* (2011) and completion of the *WA Offsets Template* and the *EPBC Act Offset assessment guide* (the calculator) as described in the *WA Environmental Offsets Guidelines* (2014), and the *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy Assessment Guide* (2012), or any subsequent revisions of these documents. 3) specify, if on-ground management is proposed: a) how the Proposed Offset Conservation Area will be acquired, b) a timeframe and works associated with establishing the Proposed Offset Conservation Area, including plans for maintaining the offset for at least twenty (20) years after completion of purchase, and c) each relevant management body for the on-going management of the Proposed Offset Conservation Area, including its role, and confirmation in writing that the relevant management body accepts responsibility for its role. 4) specify, if on-ground management is proposed: a) state the targets to be achieved, including completion criteria, which result in a tangible improvement to the environmental value being offset, b) demonstrate the consistency of the objective/s and target/s with the objectives of the National Recovery Plans for Carnaby's cockatoo (*Calyptorhynchus latirostris*), or any subsequent revision of this plan,

	c) detail the on-ground management actions with associated timeframes for implementation, to achieve the objective/s and target/s identified in condition 6-3(5)(a) of MS 1184, and d) detail the monitoring, reporting and evaluation mechanisms for the objective/s, target/s and actions identified under conditions 6-3(5)(a) and 6-3(5)(c) of MS 1184.
Condition Clauses (if applicable)	MS 1184 Conditions 6-1 to 6-8 (detailed in **Section 1.3**).
Key Components in the EMP (if applicable)	Not applicable. Key requirements of the offset strategy have been addressed using the requested formats: ▪ WA Environmental Protection Authority (EPA) template for environmental management plans (EPA, 2024a). ▪ WA Environmental Offsets Policy (GoWA, 2011). ▪ WA Offsets Template (EPA, 2024b). ▪ WA Environmental Offsets Guideline (GoWA, 2014). ▪ Environmental Offsets Policy Assessment Guide (CoA, 2012). ▪ EPBC Act Offset assessment guide (the calculator) (DCCEEW, 2012).
Proposed Construction Date	N/A construction completed.
EMP Required Pre-Construction?	No

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Acronyms and abbreviations

Acronym / abbreviation	Definition
APA	APA Group
BC Act	*Biodiversity and Conservation Act* (2016)
BOM	Bureau of Meteorology
BsCaW	Banksia Woodlands
CEO	Chief Executive Officer
CoA	Commonwealth of Australia
COGG	City of Greater Geraldton
EbW	Eucalypt Woodlands
EPA	Environmental Protection Authority
EP Act	*The Environmental Protection Act 1986*
EPBC Act	*Environmental Protection and Biodiversity Conservation Act* (1999)
FVC	Focussed Vision Consulting
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEC	Department of Environment and Conservation
DWER	Department of Water, Environmental and Regulation
DPW	Department of Parks and Wildlife
GGP	Goldfields Gas Pipeline
GoWA	Government of Western Australia
ha	hectares
km	kilometre
m	metres
m^2	metres squared
MS	Ministerial Statement
NGI	Northern Goldfields Interconnect Pipeline
No	Number
PO	Postal Office
Qty	Quantity
SW	South-west
WA	Western Australia

1. Context, Scope and Rationale

1.1 The Proposal

APA Northern Goldfields Interconnect Pty Ltd, an entity of the APA Group (APA), has completed construction of the Northern Goldfields Interconnect (NGI) Pipeline; a buried pipeline approximately 580 km in length, commencing at Ambania (located approximately 50 km east of Geraldton), connecting into the existing Goldfields Gas Pipeline (GGP) at approximately 40 km south of Leinster (the Proposal). The Proposal includes associated above ground facilities sparsely located along the route of the pipeline, including a new compressor station at Ambania and other stations such as valve stations and scraper stations.

The Proposal was referred to the Environmental Protection Authority (EPA) under section 38 of the *Environmental Protection Act 1986* (the EP Act) in January 2021, and amended through a section 43a process that was approved in September 2021. EPA approval of the Proposal was granted through Ministerial Statement 1184 (MS 1184) on February 2, 2022.

1.1.1 Purpose of this Offset Strategy

The purpose of this offset strategy is to detail the actions APA will undertake to ensure the revegetation of the nominated offset site achieves a satisfactory standard as an offset.

This offset strategy was prepared in accordance with the following documents:

- The EPA's '*Instructions: How to prepare Environmental Protection Act 1986 Part IV environmental management plans*' (EPA, 2024a) and '*WA Offsets Template'* (EPA, 2024b),
- The Government of Western Australia's (GoWA) '*WA Environmental Offsets Policy*' (GoWA, 2011) and '*WA Environmental Offsets Guideline* (GoWA, 2014), and
- The Commonwealth of Australia's (CoA) '*Environmental Offsets Policy Assessment Guide*' (CoA, 2012).

1.2 Key Environmental Factor

The key environmental factor this offset strategy addresses is Terrestrial Fauna, due to clearing of 0.25 ha of Carnaby's Cockatoo foraging habitat. Carnaby's Cockatoo is listed as Endangered under the *Environment Protection and Biodiversity Act 1999* (the EPBC Act) and the *Biodiversity Conservation Act 2016* (the BC Act).

The 0.25 ha of cleared foraging habitat for Carnaby's Cockatoo associated with the Proposal consists of two remnant strips of vegetation, Banksia Woodlands (BsCaW) and Eucalyptus Woodlands (EbW) within otherwise cleared agricultural lands (**Figure 1-1**). The area of vegetation cleared was predominately assessed as degraded (FVC, 2020). This impact area near Mullewa is located on the northernmost modelled extent of the breeding and non-breeding distribution of Carnaby's Cockatoo (DPW, 2013).

1.3 Condition Requirements

This offset strategy has been prepared in accordance with conditions 6-1 to 6-8 of MS 1184, proposing on-ground revegetation actions to counterbalance the 0.25 ha of cleared foraging habitat for Carnaby's Cockatoo.

The conditions of MS 1184 and where they are addressed within this document is outlined in **Table 1-1** below.

Table 1-1: Condition Requirements

Reference	Condition	Condition Requirement	Section Reference
Ministerial Statement No. 1184.	Condition 6-1	APA shall implement offset measures to achieve the objective of counterbalancing the significant residual impact to 0.25 ha of foraging habitat for Carnaby's Cockatoo.	Addressed in **Section 2**.
	Condition 6-2	Within twelve (12) months from the date of this Statement APA shall prepare and submit an offset strategy to the requirements of the CEO.	This document meets the requirement of MS 1184 Condition 6-2.
	Condition 6-3(1)	The offset strategy shall demonstrate that the objective in condition 6-1 will be met.	This document meets the requirement of MS 1184 Condition 6-3(1).
	Condition 6-3(2)	The offset strategy shall identify any area(s) to be acquired and/or for on-ground management (Proposed Offset Conservation Area), which contains the environmental values identified in condition 6-1, or similar values of equivalent conservation significance agreed by the CEO.	Addressed in **Section 2.1**.
	Condition 6-3(3)	Demonstrate how the proposed offset counterbalances the significant residual impact to the environmental value identified in condition 6-1 though application of the principles of the WA Environmental Offsets Policy (2011) and completion of the WA Offsets Template and the EPBC Act Offset assessment guide (the calculator) as described in the WA Environmental Offset Guidelines (2014), and the Environmental Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy Assessment Guide (2012), or any subsequent revisions of these documents.	Addressed in **Section 1.4.4**.
		The offset strategy shall specify if land acquisition is proposed:	Addressed in **Section 2**.

Reference	Condition	Condition Requirement	Section Reference
		a) how the Proposed Offset Conservation Area will be acquired, b) a timeframe and works associated with establishing the Proposed Offset Conservation Area, including plans for maintain the offset for at least twenty (20) years after completion of purchase, and c) each relevant management body for the on-going management of the Proposed Offset Conservation Area, including its role, and confirmation in writing that the relevant management body accepts responsibility for its role.	
		The offset strategy shall specify, if on-ground management is proposed: a) state the targets to be achieved, including completion criteria, which result in a tangible improvement to the environmental value being offset, b) demonstrate the consistency of the objective(s) and target(s) with the objectives of the National Recovery Plans for Carnaby's Cockatoo, or any subsequent revision of this plan, c) detail the on-ground management actions with associated timeframes for implementation, to achieve the objective(s) and target(s) identified in condition 6-3(5), and d) detail monitoring, reporting and evaluation mechanisms for the objective(s), target(s) and actions identified under condition 6-3(5)(a) and 6-3(5)(c).	Addressed in **Section 2** and **Section 4**.

Reference	Condition	Condition Requirement	Section Reference
	Condition 6-5	APA shall implement the latest version of the offset strategy approved by the CEO.	This document meets the requirement of MS 1184 Condition 6-5.
	Condition 6-6	APA shall continue to implement the offset strategy until the CEO has confirmed by notice in writing that APA has demonstrated that the objective in condition 6-1 has been met.	This document meets the requirement of MS 1184 Condition 6-6.
	Condition 6-7	Should the actions, objectives or targets in the offset strategy be unable to be met, APA shall notify the CEO within thirty (30) days of it being identified and provide details and timing of contingency actions to be undertaken, to the satisfaction of the CEO.	This document meets the requirement of MS 1184 Condition 6-7.
	Condition 6-8	APA shall report to the CEO on the outcomes of the contingency actions as required by the condition 6-7 within sixty (60) days of completion.	This document meets the requirement of MS 1184 Condition 6-8.

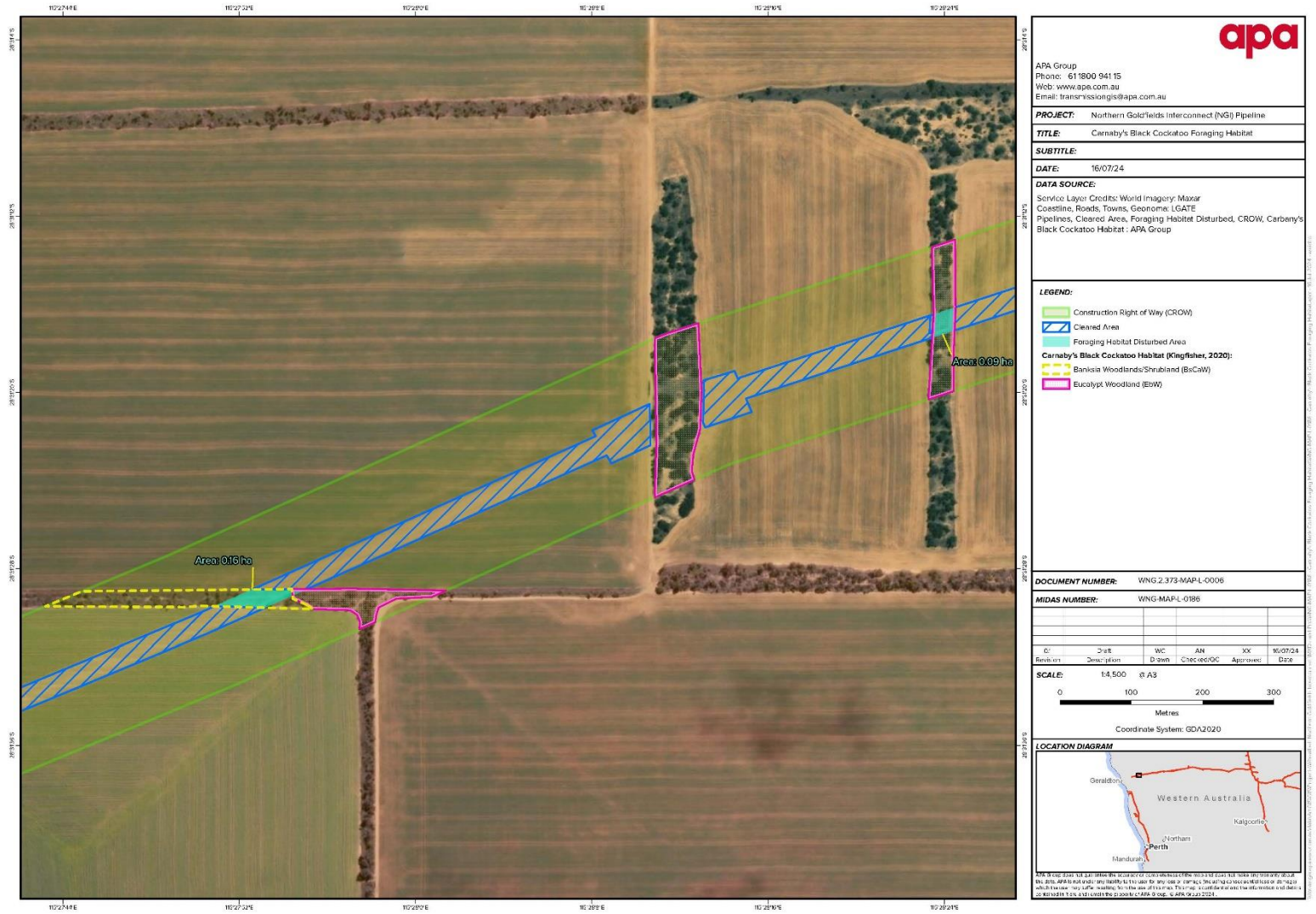

Figure 1-1 Impact Area

1.4 Rationale and Approach

This section provides a summary of the rationale and approach to developing the mitigation and management strategies including:

- management objectives and activities proposed,
- survey and study findings,
- key assumptions and uncertainties, and
- rationale for choice of provisions.

1.4.1 Management Objectives

This offset strategy has been prepared to achieve the objective of counterbalancing the significant residual impact to 0.25 ha of foraging habitat for the Carnaby's Cockatoo in accordance with Condition 6-1 of MS 1184.

The objectives for the proposed revegetation activities within the offset area are to:

- increase Carnaby's Cockatoo foraging habitat within the offset area,
- increase connectivity of the offset area with surrounding bushland, and
- increase the aesthetic value of the offset area, contributing to the Wildflower Walk.

The following activities are proposed:

- site preparation (including an initial weed control event),
- initial revegetation via installation of native tubestock and direct seeding, and
- monitoring and maintenance for a 15-year period.

Refer to **Section 2** for further detail on the proposed management actions.

1.4.2 Survey and Study Findings

Focused Vision Consulting (FVC) conducted a detailed flora and vegetation assessment in 2020 for the Proposal. This assessment was conducted in accordance with the EPA's '*Technical Guidance for Flora and Vegetation Surveys*' (EPA, 2016a) and the EPA's '*Environmental Factor guidelines for Flora and Vegetation*' (EPA, 2016b).

Kingfisher Environmental conducted a fauna assessment for the Proposal. This assessment was undertaken in accordance with the EPA's '*Environmental Factor Guidance for Terrestrial Fauna*' (EPA, 2016c) and EPA's '*Technical Guidance for Terrestrial Vertebrate Fauna Surveys*' (EPA, 2020).

These studies are briefly discussed within **Table 1-2.**

Table 1-2. Overview of surveys and studies undertaken within for the Proposal

Factor	Survey/Study	Consultant	Description
Flora and Vegetation	Northern Goldfields Interconnect Pipeline Project Detailed Flora and Vegetation Assessment	Focused Vision Consulting (FVC), 2020	Scope of works: Desktop assessment of project area for flora and vegetation values. Field survey including: Targeted searches for and description of populations of conservation significant species and DBCA priority list. Targeted searches for and description of populations of introduced plant species, particularly DP and WoNs. Definition and mapping of vegetation types, including mapping boundaries of TECs and PECs Review of local and regional significance of the recorded vegetation types Definition and mapping of vegetation condition.
Terrestrial fauna	Northern Goldfields Interconnect Pipeline Fauna Assessment	Kingfisher Environmental, 2020	Scope of works: Desktop review of technical reports and relevant databases to determine potential fauna and habitats. Field Survey including: Compilation of fauna recorded (or expected). Targeted searches for species of conservation significance. Habitat assessment.

1.4.3 Key Assumptions and Uncertainties

Predicted impacts on the key environmental factor has been determined based upon the information obtained from site specific surveys and investigations.

The on-ground management activities proposed within this document have the potential to be unsuccessful. Revegetation can be limited to factors beyond control (such as poor weather conditions).

However, this offset strategy has reduced these uncertainties by the application of both State and Commonwealth Government offset tools (see **Section 1.4.4** below) and prescribing contingency measures defined in **Section 2.5**.

1.4.4 Rationale for Choice of Provisions

Residual impacts associated with the Proposal have been determined through application of the residual impact significance model detailed in the *WA Environmental Offsets Guideline* (GoWA, 2014). Significant residual impacts for which APA proposes environmental offsets are detailed in **Table 1-3**.

Table 1-3. Environmental Offsets

Northern Goldfields Interconnector Pipeline									
Existing environment/ Impact	**Mitigation**			**Significant Residual Impact**	**Offset Calculation Methodology**				
	Avoid and minimise	**Rehabilitation**	**Likely Rehab Success**		**Type**	**Risk**	**Likely offset success**	**Time Lag**	**Offset Quantification**
0.25 ha clearing native vegetation/Carnaby's Cockatoo foraging habitat.	Avoid clearing Carnaby's Cockatoo foraging habitat where possible for the Proposal by utilising cleared areas.	Respread of cleared topsoil and revegetation to encourage natural regeneration. No rehabilitation credit has been allowed in calculating offset requirements.	No rehabilitation credit has been allowed in calculating offset requirements as such no further information in relation to success is included.	**Extent**: 0.25 ha **Quality**: Vegetation is in Degraded to Degraded-Good condition across the two impact areas (FVC, 2020). Remnant vegetation in otherwise cleared landscape. Foraging value for Carnaby's Cockatoo **Conservation Significance**: Endangered **Land Tenure:** Freehold (private) land. **Timescale**: Permanent The residual impact is considered significant as land clearance is a recognised threatening process for Carnaby Cockatoos.	Revegetation / On ground management.	Proposed site is a crown reserve under a management order with City of Greater Geraldton (COGG). APA is currently developing agreement with COGG (low risk).	<u>Can the values be defined and measured?</u> Yes – area of offset that provides foraging habitat to Carnaby's Cockatoo can be measured. <u>Operator experience/Evidence?</u> Revegetation, maintenance and monitoring will be undertaken by a reputable, experienced local revegetation sub-contractor and managed by APA. <u>What is the type of vegetation being revegetated?</u> Habitat suitable for foraging by Carnaby's Cockatoo.	8 – 10 years for Carnaby's Cockatoo foraging species to become productive for foraging (Calver, 2010); 1 - 5 years for other management actions.	Total offset of 1 ha of revegetation.

Environmental offsets for the Proposal have been considered in accordance with the '*WA Environmental Offsets Policy*' (GoWA, 2011) and the '*WA Environmental Offsets Metric Guideline*' (DWER, 2021). Offset requirements have been calculated using the DWER Environmental Offset Calculator.

Offset calculations are provided in **Appendix A**. The inputs and justifications are provided in **Table 1-4** below.

Table 1-4. Offset Calculator Input Values and Justifications – Carnaby's Cockatoo

Offset Guide Item	Input Value	Justification
Conservation Status	Endangered	Current BC Act and EPBC Act listing.
Impact area (ha)	0.25	Total amount of clearing undertaken for the Proposal.
Quality of impact area	5.00	The quality of the impact area for Carnaby's Cockatoo has been determined based on the value of the habitat as potential foraging and/or dispersal habitat. Despite the site being classified as 'degraded to degraded-good condition' the site provides habitat in a highly cleared landscape, increasing the value of the area.
Time until ecological benefit	15 years	It is considered that the revegetation will achieve a quality score of 5 as Carnaby's foraging habitat within 15 years. It is known that foraging species reach an age/size capable of supporting Carnaby's Cockatoo foraging at 8 - 10 years post planting in the SW regions of the State (Calver, 2010). Additional time has been added to account for the potential slower growth rate of seedlings due to the different climatic conditions of Mullewa.
Current quality of offset site	3.00	Area to be revegetated is degraded from previous water harvesting actions. Some vegetation has naturally revegetated and may provide some foraging value for Carnaby Cockatoos. The degraded portion to be revegetated (the offset area) is surrounded by vegetation in more intact condition, which forms part of the Mullewa Wildflower Walk Trail.
Future quality without offset	2.00	Without active management it is likely that vegetation will further degrade and any remaining value for Carnaby Cockatoos will be reduced and/or lost.
Future quality with offset	5.00	APA will organise an experienced and reputable sub-contractor company to undertake collection of local seed, propagation of seedlings, revegetation, maintenance and monitoring. It is therefore expected that the revegetation will achieve a reasonable quality as foraging habitat for Carnaby's Cockatoo.
Time until offset site secured (years)	0	The revegetation will occur within an existing reserve R46355 (Water and Landscape Protection purpose) therefore no additional security is proposed.
Risk of loss (%) without offset	30	While the area is highly degraded, some values remain. Without active management it is likely that vegetation will further degrade and any remaining value for Carnaby's Cockatoos will be reduced or lost. The COGG has not indicated any intention to revegetate the water harvesting area prior to APA proposing this revegetation project.
Risk of loss (%) with offset	5	Although the reserve is currently managed for a conservation and recreation purpose, there is a small risk of future loss, such as due to changes of tenure or infrastructure proposals.

Offset Guide Item	Input Value	Justification
Confidence (%) in result (averted risk)	80	There is a high level of confidence that the revegetation will achieve a quality score of 5 within 15 years.

2. Offset Strategy Components

2.1 Offset Location

The City of Greater Geraldton Reserve 46355 (the reserve) is controlled by the City of Greater Geraldton (COGG) and is located between Lovers Lane and Geraldton Mount Magnet Road in Mullewa, WA. APA is proposing to rehabilitate a 1 ha portion of this reserve that is currently in a degraded condition. This offset area is located approximately 4.5 km from the impact area. Two indicative locations for the offset are shown in **Figure 2-1**. The specific portion of the reserve to be revegetated will be determined based on assessment of suitability from the local revegetation sub-contractor.

The proposed offset area has historically been used for water harvesting. This involved removal of vegetation and shaping the landform. The area is currently degraded with a medium to high weed burden and minimal existing vegetation. Without rehabilitation, it is expected that weed coverage would increase and the area would become further degraded.

A 2,820 m circuit walk (the Mullewa Wildflower Walk) has been developed around the perimeter of the reserve with a portion passing through the degraded water harvesting area. This Wildflower Walk is a tourist attraction for the COGG. Revegetating the proposed offset area will not only provide foraging value to the Carnaby's Cockatoo but will add aesthetic value to the area and have a positive impact on tourism.

The crown reserve is under a management order with the COGG for the purposes of water and landscape protection. To ensure a third party (APA) can access the reserve to undertaken ongoing revegetation, monitoring and maintenance activities, a formal lease agreement will be established between APA and the COGG.

This process requires Council approval, and subsequent obtainment of ministerial consent to execute a lease agreement within Crown land. APA and the COGG have commenced this process, however it will likely take several months to complete.

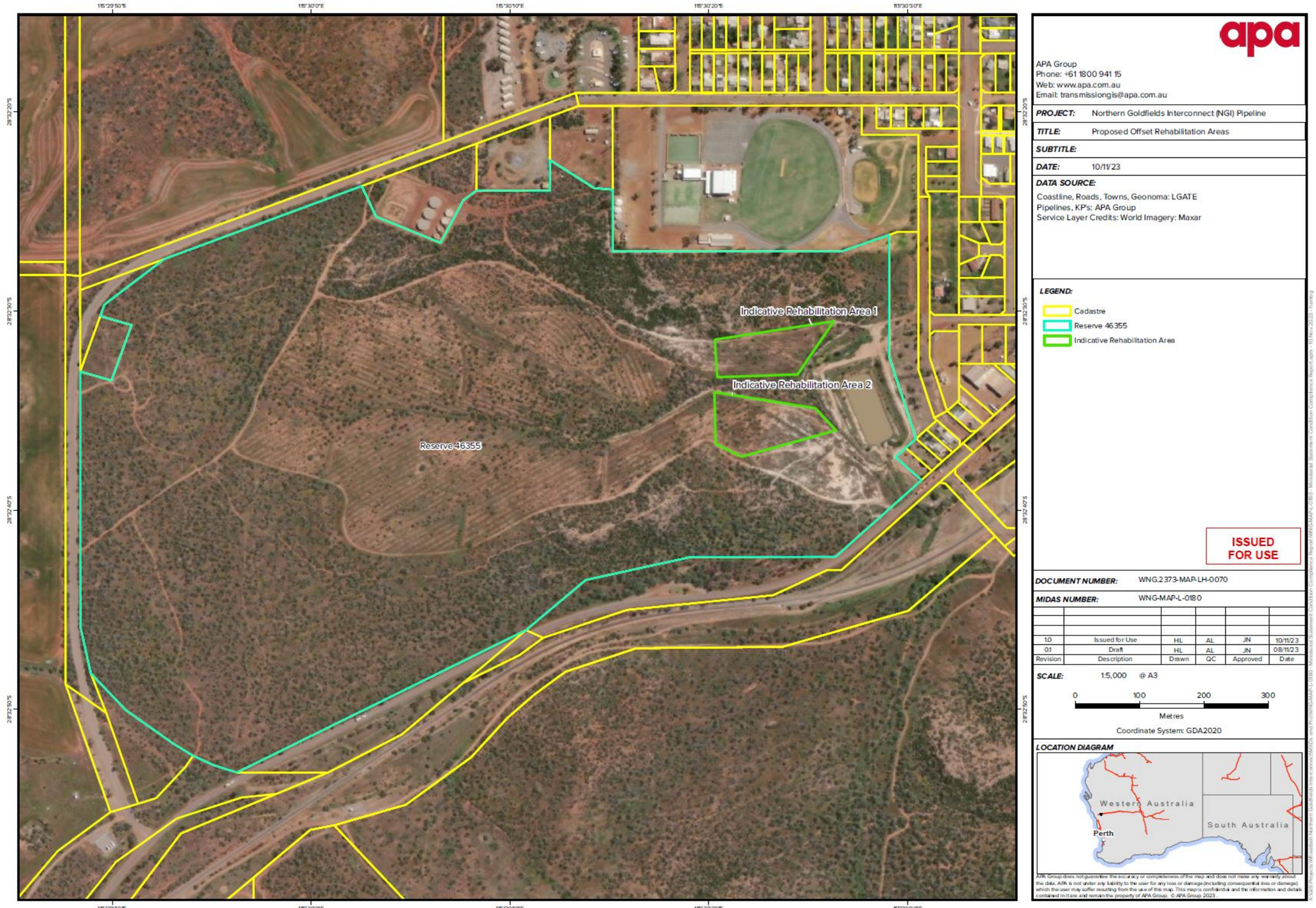

Figure 2-1. Offset Location

2.2 Management Actions

To comply with relevant environmental legislation and manage impacts to the local environment, APA has defined how the terrestrial fauna environmental objectives (**Table 2-1**) will be achieved.

Table 2-1: Measures to address terrestrial fauna environmental objectives

	EPA factor/s and objective/s: Terrestrial Fauna 'To protect terrestrial fauna so that biological diversity and ecological integrity are maintained'. **Objective/s:** Condition 6-3 - APA shall implement offset measures to achieve the objective of counterbalancing the significant residual impact to 0.25 ha of foraging habitat for Carnaby's Cockatoo. **Key environmental values:** Carnaby Cockatoo foraging habitat **Key impacts and risks:** Fauna habitat loss			
Objective-based				
Management targets	**Management actions**	**Monitoring**	**Timing / frequency of actions**	**Reporting**
Condition 6-3 - APA shall implement offset measures to achieve the objective of counterbalancing the significant residual impact to 0.25 ha of foraging habitat for Carnaby's Cockatoo.				
▪ A minimum of 5 Carnaby's Cockatoo foraging species present within offset area. ▪ Weed coverage is to be +/- 5% of the reference site. ▪ The establishment of 1 plant per m2 or 70% native vegetation foliage cover. ▪ A minimum of species richness of 15 native species present from the species list. *For further detail on management targets and how these will be achieved refer to below information in Section 2.*	▪ Increase Carnaby's Cockatoo foraging habitat within the offset area to counterbalance the significant residual impact to 0.25 ha of foraging habitat for Carnaby's Cockatoo. ▪ Increase connectivity of the offset area with surrounding bushland. ▪ Increase the aesthetic value of the offset area, contributing to the Wildflower Walk.	Bi-annual monitoring events in spring and autumn of the offset area. *For further detail on monitoring, including timing and reporting refer to Section 2.4.*	Bi-annual monitoring for a minimum of 5 years or until completion criteria are achieved.	Bi-annual monitoring reports.

2.2.1 Site Preparation

As there is existing native vegetation within the offset area, ripping cannot be economically undertaken without risking damage to existing native species. Therefore, site preparation will be limited to an initial weed control event prior to revegetation activities.

Due to the previous disturbance history of the area, the offset area is likely to have a medium to heavy weed burden which could affect the survivability of the native revegetation. Some weed species found during a recent informal site inspection on 24 August 2023 (refer to **Appendix B**) included Wild Oats (*Avena fatua*), Paterson's Curse (*Echium plantagineum*) and a Fountain Grass (*Pennisetum* sp.). Weed control will be undertaken in favourable weather conditions, with care taken to avoid damage to existing native vegetation. Weed control will be undertaken by experienced herbicide technicians spot spraying broad leaf weeds and introduced grasses with a selective herbicide (Glyphosate) and potentially a grass selective (Flusilade) application if required. The use of weed control will be specified by the local revegetation sub-contractor.

2.2.2 Revegetation Techniques

Revegetation is recommended to occur in May after the first significant rainfall event, with timing of revegetation to be flexible to weather conditions. Revegetation will be undertaken using tube stock planting and potentially direct seeding. Tubestock plants will be planted in a layout reflecting the surrounding existing vegetation, using the following methodology:

- Handheld augers or pottiputkis will be used to dig holes throughout the offset area, with holes dug to a depth that ensures the entire root ball of the plant is covered.
- Native tubestock will be placed into the holes with a suitable native soil conditioner.
- Holes will be backfilled, ensuring no air pockets are present.

Mullewa presents a harsh climate for seedlings to survive. Limited rain has been recorded in 2023 compared to previous years (1986 to 2022) (BOM, 2023). Therefore, the proposed initial planting density is proposed to be higher at two plants per square metre (m^2) to account for the potentially lower success rate. This totals to up 20,000 native tubestock species within the 1 ha offset area.

Based on expectations for lower success rates, infill planting of up to 30% (of the initial number planted) will be undertaken in May annually for the next two-year period (two events), with up to 6,000 tubestock species expected to be required. However, the actual number of seedlings required will be decided after the spring monitoring events and recommendations from the experienced local revegetation sub-contractor.

2.2.3 Species List

The proposed species list comprises of native species from the locality of the offset area and is outlined below in **Table 2-2**. The list is predominately made up of species that will provide foraging value for Carnaby's Cockatoo (DEC, 2011). The species list comprises of approximately 25% overstorey, 25% understorey and 50% middle storey species; reflecting the surrounding vegetation of the offset area. Majority of the understorey species comprise of native wildflower species that are local to the area, resulting in this offset strategy not only providing foraging value but aesthetic value to the area.

Table 2-2. Proposed Species List

Species	Common Name	Qty	Type
Borya sphaerocephala	Pincushions	250	Tubestock
Brachyscome iberidifolia	Swan River Daisy	250	Tubestock
Cephalipterum drummondii	Pompom Head	250	Tubestock

Species	Common Name	Qty	Type
Lawrencella rosea	-	150	Tubestock
Laxmannia sessiliflora	Nodding Lily	150	Tubestock
Ptilotus chamaecladus	-	150	Tubestock
Ptilotus gaudichaudii	-	150	Tubestock
Schoenia cassiniana	Schoenia	250	Tubestock
Trachymene ornata	Spongefruit	150	Tubestock
Waitzia acuminata	Orange Immortelle	150	Tubestock
Waitzia nitida	-	250	Tubestock
Hemigenia botryphylla	-	100	Tubestock
Banksia fraseri	Dryandra	300	Tubestock
Grevillea paradoxa	Bottlebrush Grevillea	300	Tubestock
Hakea circumalata	Coastal Hakea	300	Tubestock
Hakea incrassata	Marble Hakea	300	Tubestock
Allocasuarina campestris	-	150	Tubestock
Eremophila clarkei	Turpentine Bush	150	Tubestock
Grevillea didymobotrya subsp *didymobotrya*	-	50	Tubestock
Grevillea dielsiana	Diels Grevillea	50	Tubestock
Hakea bucculenta	Red Pokers	50	Tubestock
Hakea recurva subsp arida	-	50	Tubestock
Hibbertia glomerosa	Guinea-flower	50	Tubestock
Hibbertia stenophylla	-	50	Tubestock
Malleostemon tuberculatus	-	50	Tubestock
Melaleuca radula	Graceful Honeymyrtle	100	Tubestock
Philotheca brucei	-	50	Tubestock
Philotheca sericea	-	50	Tubestock
Pileanthus peduncularis	Coppercups	50	Tubestock
Prostanthera magnifica	Magnificent Prostanthera	150	Tubestock
Ptilotus obovatus	Cotton Bush	150	Tubestock
Ricinocarpos velutinus	-	50	Tubestock
Ricinocarpos velutinus	-	200	Tubestock
Senna artemisioides	-	150	Tubestock
Seringia hermanniifolia	Crinkle-leaved firebush	200	Tubestock
Thryptomene denticulata	-	50	Tubestock
Verticordia spicata	Spiked Featherflower	50	Tubestock

Species	Common Name	Qty	Type
Solanum lasiophyllum	Flannel Bush	150	Tubestock
Allocasuarina acutivalvis subsp. prinsepiana	-	100	Tubestock
Dodonaea inaequifolia	-	100	Tubestock
Eremophila oldfieldii	Pixie Bush	50	Tubestock
Acacia acuminata	Jam	600	Tubestock
Acacia tetragonophylla	Kurara	250	Tubestock
Grevillea obliquistigma	-	50	Tubestock
Eremophila glabra	Tarbush	200	Tubestock
Grevillea paniculata	Kerosene Bush	200	Tubestock
Grevillea petrophiloides	Pink Poker	200	Tubestock
Hakea preissii	Needle Tree	200	Tubestock
Hakea scoparia	Kangaroo Bush	200	Tubestock
Acacia aneura	-	200	Tubestock
Acacia saligna	Orange Wattle	300	Tubestock
Banksia ashbyi	Ashby's Banksia	300	Tubestock
Eucalyptus beardiana	Beard's Mallee	250	Tubestock
Eucalyptus cometae-vallis	Comet Vale Mallee	200	Tubestock
Eucalyptus eudesmioides	Malallie	300	Tubestock
Eucalyptus ewartiana	Ewart's Mallee	50	Tubestock
Eucalyptus horistes	Pointed-Bud Mallee	50	Tubestock
Eucalyptus jucunda	Yuna Mallee	50	Tubestock
Eucalyptus kochii	Oil Mallee	50	Tubestock
Eucalyptus leptopoda	Tammin Mallee	50	Tubestock
Eucalyptus loxophleba	York Gum	300	Tubestock
Eucalyptus obtusiflora	Dongara Mallee	50	Tubestock
Eucalyptus oldfieldii	Oldfield's Mallee	50	Tubestock
Eucalyptus petraea	Granite Rock Box	50	Tubestock
Eucalyptus subangusta	-	50	Tubestock
Eucalyptus subangusta subsp. *Pusilla*	Ember Mallee	50	Tubestock

**Note the proposed species and quantities is subject to change depending on availability during seed collection events.*

2.2.3.1 Species Source

Species are proposed to be sourced from Greenoil Tree Nursery, a reputable local revegetation company that is able to collect seed from species within or surrounding the offset area, increasing the likelihood of propagated species survival. Greenoil Tree Nursery maintain a collection of seed from local species to be used in regional revegetation projects. Further, the local supplier will determine if any of the collected species will

be suited for direct seeding. Additional native seed mix may be broadcasted throughout the offset area if appropriate.

2.2.4 Maintenance

Maintenance events will be undertaken within the offset area following initial revegetation to increase the likelihood of success and that the completion criteria (**Section 2.3**) are being met. Bi-annual maintenance events in spring and autumn are recommended for a 5-year period following the initial revegetation event based on assessments during monitoring events. If monitoring events find the completion criteria are not being met, maintenance events may continue beyond the recommended 5-year period until completion criteria have been met for at least two monitoring events.

Maintenance events should be adaptable to site conditions observed during monitoring events and may include the following activities:

- weed control,
- pest control (e.g. rabbit control),
- waste management, and
- infill planting (if required).

The frequency of maintenance events and activities required at each event will be determined based on the outcomes of revegetation monitoring.

2.3 Targets and Completion Criteria

The targets and completion criteria defined in **Table 2-3** were developed in order to achieve a successful self-sustaining revegetation area that provides foraging value for Carnaby's Cockatoo.

Table 2-3. Targets and Completion Criteria for the Offset Strategy

Criterion	Completion targets	Completion criteria
A	Establish Carnaby's Cockatoo foraging value to the offset area.	A minimum of 5 Carnaby's Cockatoo foraging species present within offset area.
B	Weed cover is no greater than in the reference sites.	Weed coverage ≤5% of the reference sites.
C	Revegetation is successful.	The establishment of 1 plant per m^2 or 70% native vegetation foliage cover.
D	Species richness is established within offset area.	A minimum of species richness of 15 native species present from the species list.

2.4 Monitoring, Reporting and Evaluation

APA will sub-contract a suitable and experienced revegetation specialist to undertake bi-annual monitoring events in spring and autumn of the offset area against the completion criteria. Monitoring will also include the establishment of an appropriate reference site (informal assessment) to establish if the area has any other issues that need to be addressed, such as evidence of pest species.

The selected reference site will:

- contain Carnaby Cockatoo foraging habitat.

- be representative of the vegetation of the region.
- occur on the same or similar soil type as the offset site.
- have similar slope and aspect characteristics of the offset site.
- be in close proximity (within 1 km) to the offset area. It is expected that the reference site will be established within the vegetated area adjacent to the offset site.

Should it not be possible to establish a reference site that meets the above criteria within 1 km of the offset site, justification for the reference site selected will be included in the first monitoring report.

Monitoring of rehabilitation outcomes will be undertaken through the establishment of 20 x 20 m quadrats to assess:

- number of target species,
- survival rates of planted individuals;
- species diversity, and
- weed coverage.

A minimum of six quadrats will be sampled within the offset area.

A report will be provided on monitoring results for each monitoring event undertaken.

2.5 Contingency Measures

The contingency measures outlined in **Table 2-4** will be implemented should monitoring indicate the completion criteria defined in **Section 2.3** may not be met. **Table 2-4** outlines potential risks of the offset and the contingency measures that can be implemented to mitigate each risk.

Table 2-4. Risks and contingency measures

Risk	Contingency measure
Low survival rate of revegetation	If revegetation is not meeting the survival rate several options can be considered including: watering revegetation throughout summer months; and infill planting (utilising species with a high success rate).
Grazing on revegetation by pest species (e.g. rabbits)	If revegetation is being grazed on by pest species, the following actions could be implemented to mitigate the risk: installation of tree guards or a rabbit proof fence; and infill planting.
Weed burden is higher than in reference site	If the weed burden is higher than in reference site and isn't being controlled by bi-annual events, additional weed control events can be undertaken.

3. Adaptive Management and Review

The adaptive management approach aims to reduce impacts by embedding a cycle of monitoring, reporting and implementing change (where required). This offset strategy will apply the principles of adaptive management through monitoring, corrective actions and implementing changes. This offset strategy will be updated to reflect changes in management practices and the social and natural environment with time. This will allow flexibility to respond to new technologies / management measures.

In line with the concept of adaptive management, the management actions presented in **Section 2.2** shall be monitored, reviewed and updated (as required), considering the following:

- monitoring identifies a non-conformance with the offset strategy,
- new and relevant data/information gained as a result of implementing this offset strategy, or from external sources,
- significant changes to industry standard management practices, and
- changes in State and Commonwealth legislation or policy.

Technical review and evaluation of the management actions outlined in this offset strategy will be conducted every five years to ensure the management actions are adequately addressing the key risks and meeting EPA objectives. If, as a result of any review, any significant changes are required to be made to this offset strategy, a revised offset strategy will be provided to the EPA for approval (if required).

4. Consistency with Policies and Recovery Plans

4.1 WA Environmental Offsets Policy

The WA Environmental Offsets Policy (GoWA, 2011) requires the following Principles are considered when developing an offset proposal:

1. Environmental offsets will only be considered after avoidance and mitigation options have been pursued.
2. Environmental offsets are not appropriate for all projects.
3. Environmental offsets will be cost-effective, as well as relevant and proportionate to the significance of the environmental value being impacted.
4. Environmental offsets will be based on sound environmental information and knowledge.
5. Environmental offsets will be applied within a framework of adaptive management.
6. Environmental offsets will be focussed on longer term strategic outcomes.

Details of how this Offset Strategy meets each of the above principles is outlined below in **Table 4-1** below.

Table 4-1. WA Environmental Offset Policy Principles

Principle	How this offset strategy satisfies each principle
1. Environmental offsets will only be considered after avoidance and mitigation options have been pursued	APA have implemented several avoidance and mitigations measures when constructing the Northern Goldfields Interconnect Pipeline. One of the measures undertaken included utilising horizontal directional drilling to avoid damaging additional areas of the Eucalyptus Woodlands (EbW). Additionally, APA avoiding clearing native species such as the threatened *Eucalyptus beardiana* where possible. Lastly, APA ensured the completion of rehabilitation within short time frames to maximise the benefit of topsoil and stripped vegetation respreading.
2. Environmental offsets are not appropriate for all projects	Carnaby's Cockatoo is listed as threatened species under the BC Act, with one of the key threats to the survival of the species within the recovery plan listed as the loss of habitat, including foraging habitat (DPW, 2013). Environmental offsets are considered appropriate for offsetting impacts to biodiversity and ecological values. Additionally, an environmental offset that includes on-ground management actions that focuses on habitat creation will be more beneficial for the species than indirect offsets. Revegetation will increase the species connectivity and their distribution within the area and can provide foraging habitat for the species.
3. Environmental offsets will be cost-effective, as well as relevant and proportionate to the significance of the environmental value being impacted	Rehabilitating the offset area with Carnaby's Cockatoo foraging species will directly replace habitat lost. The offset strategy has been prepared in order to maximise the success of the revegetation, meaning the offset area will have a greater chance of becoming self-sustaining

Principle	How this offset strategy satisfies each principle
	and provide long-term benefits to the species. This will result in cost-effectiveness overall.
4. Environmental offsets will be based on sound environmental information and knowledge	This proposed environmental offset strategy aligns with the Carnaby's Cockatoo Recovery Plan. Section 4.2 below outlines how this offset strategy meets the recommended recovery actions outlined within the Recovery Plan. The offsets strategy is based on research and knowledge of plant species used by Carnaby's Cockatoo for foraging in the Mullewa area.
5. Environmental offsets will be applied within a framework of adaptive management	This offset strategy is adaptive to site conditions and will ensure the best management practices are utilised based on the findings during the monitoring events. Adaptive management in the form of contingency measures has been included in this offset strategy.
6. Environmental offsets will be focused on longer term strategic outcomes	The monitoring and maintenance of the proposed offset site for a 5-year period sets the offset area up for long term success, with the aim of the area to provide foraging value to Carnaby's Cockatoo within an 8–10-year period.

4.2 Recovery Plan for Carnaby's Cockatoo

This Offset Strategy aligns with the Carnaby's Cockatoo Recovery Plan's objective to stop further decline in the distribution and abundance of Carnaby's Cockatoo by the creation of habitat including habitat connectivity for the species. **Table 4-2** below outlines how this offset strategy meets each of the recovery actions outlined within the Recovery Plan.

Table 4-2. Recovery Plan Actions

Recovery Action	How this offset strategy satisfies each action
Action 1: Protect and Manage Important Habitat	The protection and management of the full extent of the Carnaby's Cockatoo habitat is not possible. Therefore, it is important to minimise the impacts of habitat loss where possible. This offset strategy meets this recovery action by working with the existing vegetation found within the proposed offset area, such that revegetation of further Carnaby's Cockatoo habitat doesn't impact any existing habitat. This offset strategy will protect and improve the existing habitat through the management of weeds and feral animals as required, and the prevention of further degradation of habitat. Further this offset strategy will revegetate the bare or weed burdened areas within the proposed offset area, an area in close proximity to Carnaby's Cockatoo foraging habitat.
Action 2: Undertake Regular Monitoring	This offset strategy will involve bi-annual monitoring of the offset area for a 5-year period and will include recording the vegetation condition of the foraging species. Monitoring of Carnaby's Cockatoo numbers

Recovery Action	How this offset strategy satisfies each action
	in the Mullewa region is not relevant to this offset proposal.
Action 3: Conduct Research to Inform Management	This offset strategy does not include a research component and this action is therefore not relevant to the offset strategy.
Action 4: Manage Other Impacts	This offset strategy does not manage other impacts such as vehicle collisions or illegal activities and is therefore not relevant to the offset strategy.
Action 5: Engage with the Broader Community	This offset strategy has the potential to engage with the broader community via its proximity to the Town of Mullewa's Wild Flower Walk. This walk brings in tourism to the area, and revegetating the proposed offset area adjacent to it may foster discussions about the species. Further, this offset strategy will manage land owned by the COGG within the Town of Mullewa and help revegetate the Carnaby's Cockatoo habitat.
Action 6: Undertake Information and Communication Activities	This offset strategy proposes to establish a joint management agreement with the COGG of land that is potentially used by Carnaby's Cockatoos. With the COGG providing the land to be revegetated and APA managing the revegetation, monitoring and maintenance. The offset strategy presents an opportunity for additional interpretive signage along the Wildflower Walk to inform and educate walkers on Carnaby's Cockatoo.

5. Stakeholder Consultation

Stakeholder consultation was undertaken throughout the environmental assessment of the Proposal, including with State government departments, local government, and local residents. An overview of the stakeholder consultation is outlined in **Table 5-1** below.

Table 5-1: Stakeholder Consultation

Stakeholder	Date	Type of consultation	Stakeholder comments received / APA's response
DWER (EPA Services)	Various – from Q4 2022 to present	Emails, letters, Applications	**Stakeholder comments:** ▪ APA submitted an environmental offset strategy (relating to Carnaby's Cockatoos) to DWER on 1 February 2023, in accordance with the requirements of Condition 6-1 of Ministerial Statement 1184. The strategy proposed a partnership funding approach with DBCA Murchison District for Research Projects Offsets that would improve the overall viability of the local Carnaby's Cockatoo communities and provide a net positive conservation outcome through better targeted conservation programs and improved management of habitat and breeding areas in the Murchison District. The proposed survey and research program would be undertaken within Kalbarri National Park. Development of the offset strategy reflected discussions with DWER (see below) regarding the challenges of identifying suitable land for offset conservation areas, and discussions with DBCA Murchison Region. ▪ DWER subsequently requested amendments to the environmental offset strategy submitted by APA, via letter on 4 April 2023. DWER requested a greater focus on local on-ground management actions that would address Carnaby Cockatoo foraging habitat development, rather than the proposed breeding enhancement management actions. DWER acknowledged the difficulties with regard to the acquisition of land to fulfil the offset requirement but noted that the proposed research program was primarily focussed on breeding habitat rather than on foraging habitat (as impacted by the Proposal). It was also noted that the proposed research program did not provide sufficient justification as to how it would achieve a tangible improvement in Carnaby Cockatoo habitat, and that the short duration of the program (2 years) did not provide confidence in ensuring an enduring outcome. ▪ DWER were strongly supportive of on-ground management measures, focussed on habitat creation or improvement; noting that there were several reserves in the nearby area that could be suitable for revegetation or rehabilitation. DWER noted their preference for direct rather than indirect offsets.

Stakeholder	Date	Type of consultation	Stakeholder comments received / APA's response
			▪ A Request for Information was received from DWER on 14 May 2024, requesting further information on the amended offset strategy. ▪ Upon being presented to DWER (EPA Services) as the Project offset strategy, this was subsequently rejected, as the proposed offset was not within the local area of the NGI pipeline. DWER requested a focus on local on-ground management actions that would address Carnaby Cockatoo foraging habitat development, rather than the proposed breeding enhancement management actions (see DWER stakeholder commentary above, for further detail). **APA's response:** ▪ APA subsequently confirmed on 12 May 2023 that it was investigating other options in which to meet the offset condition and requested a six-month extension in which to prepare and submit an amended offset strategy. APA subsequently resubmitted a revised offset strategy to DWER on 10 November 2023, which comprised revegetation and on ground management of a crown reserve (Reserve 46355) in Mullewa. The revised offset strategy is currently pending review and approval by DWER. ▪ This stakeholder engagement table forms part of the RFI response that will be provided by APA.
DBCA	Various – from Q4 2021 to Q4 2023	Email, virtual meetings	**Stakeholder comments:** ▪ Consultation and advice in the development of suitable options for consideration in the environmental offset strategy. ▪ DBCA discussed potential for APA to support survey research into Carnaby's Cockatoo distribution and breeding, to better understand local breeding populations. ▪ DBCA subsequently assisted in preparation of a brief summary report, which it considered would be beneficial in understanding Carnaby Cockatoo conservation at the northern extent of their range. This proposed a Carnaby's Cockatoo survey and research program within Kalbarri National Park, due to the limited information on the Kalbarri Carnaby Cockatoo population including their genetics, movements, and interactions with other populations. Discussion also occurred regarding habitat improvement within the Moresby Range Conservation Park. **APA's response:** ▪ APA highlighted to DBCA that given the small area involved, a land acquisition approach would be problematic to both acquire and maintain.

Stakeholder	Date	Type of consultation	Stakeholder comments received / APA's response
			▪ APA noted they would need to confirm that the EPA would be comfortable with the proposed Research Program Partnership.
City of Greater Geraldton	Various – from 08/05/2023 to present	Emails, letters, phone calls, virtual presentation and meeting	**Stakeholder comments:** ▪ Initial contact made with CoGG to discuss potential reserves in the vicinity of Mullewa where tree planting and improvements to foraging habitat for Carnaby's Cockatoo could occur. ▪ CoGG Environment and Sustainability Officer subsequently highlighted Reserve 46355 as suitable for potential rehabilitation. The Reserve was noted as having a medium to high conservation value, as defined within the CoGG Natural Areas Management Strategy. A site visit was subsequently recommended. ▪ CoGG noted that a Partnership Agreement would be required between CoGG and APA, to confirm the responsibilities of each party for the rehabilitation of the section of Reserve 46355. ▪ CoGG noted that as Reserve 46355 is a Crown reserve under a management order with the City for the purposes of water and landscape protection. This would require permission from the Minister to undertake works, as well as the drafting and execution of a lease agreement. The process would require drafting an item to Council requesting approval, followed by obtaining Ministerial consent and drafting/execution of the lease agreement. ▪ CoGG progressed with finalising internal reviews of the offset request, prior to presenting the proposal to the Executive Management Team for consideration. **APA's response:** ▪ APA have started the process of the partnership agreement with CoGG.
Northern Agricultural Catchment Council (NACC)	Various – from Q2 2023 to Q3 2023	Email, phone calls and a meeting	**Stakeholder comments:** ▪ APA contacted NACC to understand approach to revegetation in the northern wheatbelt. NACC provided guidance based on their experience with assisting with DBCA revegetation programs and other revegetation programs in the region. ▪ NACC provided guidance on propagation approach, preparation and protection of rehabilitation sites, suitable species for revegetation in the northern wheatbelt. **APA's response:** ▪ APA have incorporated NACC's advice into this offset strategy. ▪

Stakeholder	Date	Type of consultation	Stakeholder comments received / APA's response
Don Miller, Gordon Munn, Judith Williams and Susan Merry (Mullewa residents)	25/08/2023	In person meeting	**Stakeholder comments:** ▪ APA undertook onsite conversations with Mullewa residents, Don Miller, Gordon Munn, Judith Williams and Susan Merry. ▪ Residents provided information on the existing vegetation, suggested seed collection approach, soil depth and suggestions on proposed planting mixes for Reserve 46355. Residents suggested several tree species that could be included in mix, however noted that not all would be cockatoo foraging species. **APA's response:** ▪ APA have incorporated the Mullewa resident's advice into species selection in this offset strategy.

6. References

Bureau of Meteorology, 2023. Climate statistics for Australian locations. Accessed at http://www.bom.gov.au/climate/data/.

Commonwealth of Australia (CoA), 2012. *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy. Department of Sustainability, Environment, Water, Population and Communities.

Department of Environment and Conservation (DEC), 2011. Plants Used by Carnaby's Black Cockatoo.

Department of Climate Change, Energy, Environment and Water (DCCEEW), 2012. EPBC Act Offset Assessment Guide (the calculator).

Department of Parks and Wildlife (DPW), 2013. Carnaby's cockatoo (Calyptorhynchus latirostris) Recovery Plan. Department of Parks and Wildlife, Perth, Western Australia.

Department of Water and Environmental Regulation (DWER), 2021. Environmental offsets metric: Quantifying environmental offsets in Western Australia. Government of Western Australia, Joondalup, WA.

Doherty Tim S., Wingfield Briana N., Stokes Vicki L., Craig Michael D., Lee Jessica G. H., Finn Hugh C., Calver Michael C., 2016. Successional changes in feeding activity by threatened cockatoos in revegetated mine sites. Wildlife Research 43, 93-104.

Environmental Protection Authority (EPA), 2016a. Technical Guidance for Flora and Vegetation Surveys for Environmental Impact Assessment. The Government of Western Australia.

EPA, 2016b. Environmental Factor Guidelines for Flora and Vegetation. The Government of Western Australia.

EPA, 2016c. Environmental Factor Guidance for Terrestrial Fauna. The Government of Western Australia.

EPA, 2020. Technical Guidance for Terrestrial Vertebrate Fauna Surveys. The Government of Western Australia.

EPA, 2024a. Instructions: How to prepare *Environmental Protection Act 1986* Part IV environmental management plans. EPA, Western Australia.

EPA, 2024b. WA Environmental Offsets Template. Accessed at https://www.epa.wa.gov.au/policies-guidance/wa-environmental-offsets-policy-framework.

Focused Vision Consulting (FVC), 2020. Northern Goldfields Pipeline Project Detailed Flora and Vegetation Assessment. Unpublished report prepared for APA Group Pty Ltd, Perth, Western Australia.

Government of Western Australia (GoWA), 2011. WA Environmental Offsets Policy. Accessed at https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/WAEnvOffsetsPolicy-270911.pdf

GoWA, 2014. WA Environmental Offsets Guidelines. Accessed at https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/WA%20Environmental%20Offsets%20Guideline%20August%202014.pdf.

Kingfisher Environmental, 2020. Northern Goldfields Interconnect Pipeline Fauna Assessment. Prepared for APA Group Pty Ltd, Perth, Western Australia.

Lee, J., Finn, H. and Calver, M., 2010. Mine-site revegetation monitoring detects feeding by threatened black-cockatoos within 8 years. Ecological Management and Restoration Vol 11 (2), 141 - 143.

Appendix A. Offset Calculations

WA Environmental Offsets Calculator

Step 1: Determining conservation significance

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores (Or, if appropriate, manual data entry permitted)

***Area / feature* (Impact site)**

Conservation significance determination for the environmental value impacted		
Conservation significance	Description	Carnaby's Foraging Habitat
	Type of environmental value	Species (flora/fauna)
	Conservation significance of environmental value	Rare/threatened species - endangered
	Conservation significance score	1.2%

Please select *area* or *feature* for the calculations	Area

WA Environmental Offsets Calculator

Step 2: Calculating significant residual impact

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

Environmental value (step 1)	Carnaby's Foraging Habitat

Area (impact site)

Part A: Significant impact calculation *Area*

Significant impact	Description	Quantum of impact	
	Clearing of foraging habitat for Carnaby's Cockatoo	Significant impact (hectares)	0.25
		Quality (scale)	5.00
		Total quantum of impact	0.13

Part B: Rehabilitation credit calculation *Area* (onsite)

Rehabilitation Credit	Description	Proposed rehabilitation (area in hectares)		Time until ecological benefit (years)	
	No rehabilitation credit has been applied	Current quality of rehabilitation site (scale)		Confidence in rehabilitation result (%)	
		Future quality WITHOUT rehabilitation (scale)		Rehabilitation credit	0.00
		Future quality WITH rehabilitation (scale)			

Part C: Significant residual impact calculation *Area*

Significant residual impact		
	Total quantum of impact	0.13
	Rehabilitation credit	0.00
	Significant residual impact	0.13

WA Environmental Offsets Calculator

Step 3: Calculating offsets

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

Environmental value (step 1)	Carnaby's Foraging Habitat	Significant impact (step 2, part A)	0.25
		Rehabilitation credit (step 2, part B)	0.00
		Significant residual impact (step 2, part C)	0.13

***Area* (offset site)**

Offset calculation *Area*							
Offsets calculation	Description	Proposed offset (area in hectares)	1.00	Duration of offset implementation (maximum 20 years)	20.00	Offset value	0.27
	Rehabilitation of degraded land at Mullewa, previously used for water harvesting and adjacent to the Wildflower Walk.	Current quality of offset site (scale)	3.00	Time until offset site secured (years)	0.00		212.4%
		Future quality WITHOUT offset (scale)	2.00	Risk of future loss WITHOUT offset (%)	30.0%		
		Future quality WITH offset (scale)	5.00	Risk of future loss WITH offset (%)	5.0%		
		Time until ecological benefit (years)	15.00				
		Confidence in offset result (%)	80.0%			OFFSET ADEQUATE?	YES

WA Environmental Offsets Calculator

Rationale for scores used in the offsets calculator

Environmental value to be offset			
Calculation	***Score (Area)***		***Rationale***
Conservation significance			
Description	Carnaby's Foraging Habitat		Impact to 0.25 ha of foraging habitat for Carnaby's Cockatoo
Type of environmental value	Species (flora/fauna)		Drop down list
Conservation significance of environmental value	Rare/threatened species - endangered		Drop down list
Landscape-level value impacted	yes/no		
Significant impact			
Description	Clearing of foraging habitat for Carnaby's Cockatoo		Clearing of 0.25 ha of native vegetation that provides foraging habitat for Carnaby's Cockatoo
Significant impact (hectares) / Type of feature	0.25		The area of foraging habitat that will be impacted by the proposal
Quality (scale) / Number	5.00		Although the vegetation is in Degraded condition, it potentially provides foraging habitat for Carnaby's Cockatoo in a highly cleared landscape.
Rehabilitation credit			
Description	No rehabilitation credit has been applied		No rehabilitation credit is proposed.
Proposed rehabilitation (area in hectares)	0.00		
Current quality of rehabilitation site / Start number (of type of feature)	0.00		
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00		
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00		
Time until ecological benefit (years)	0.00		
Confidence in rehabilitation result (%)	0		
Offset			
Description	Rehabilitation of degraded land at Mullewa, previously used for water harvesting and adjacent to the Wildflower Walk.		
Proposed offset (area in hectares)	1.00		Revegetation of 1 ha using foraging species suitable for Carnaby's Cockatoo
Current quality of offset site / Start number (of type of feature)	3.00		Area to be revegetated is degraded from previous use to harvest water for Mullewa town water supply. Some vegetation remains and is assumed to provide some foraging value for Carnaby's Cocaktoos. The degraded portion to be revegetated (the offset area) is surrounded by vegetation in more intact condition, which is part of the Mullewa Wildflower Walk Trail.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	2.00		Without active management it is likely that vegetation will further degrade and any remaining value for Carnaby's Cockatoos will be reduced and/or lost.
Future quality WITH offset (scale) / Future number WITH offset	5.00		APA will organise an experienced and reputable sub-contractor company to undertake collection of local seed, propagation of seedlings, revegetation, maintenance and monitoring. It is therefore expected that the revegetation will achieve a reasonable quality as foraging habitat for Carnaby's Cockatoo.
Time until ecological benefit (years)	15.00		It is considered that the revegetation will achieve a quality score of 5 as Carnaby's Cockatoo foraging habitat within 15 years.It is known that foraging species reach an age/size capable of supporting Carnaby's Cockatoo foraging at 8 - 10 years post planting in the SW regions of the State (Calver, 2010). Additional time has been added to account for the potential slower growth rate of seedlings due to the different climatic conditions of Mullewa.
Confidence in offset result (%)	0.8		There is a high level of confidence that the revegetation will achieve a quality score of 5 within 15 years.
Duration of offset implementation (maximum 20 years)	20.00		The revegetation will be established and monitored for a period of 5 years by APA and then managed for a period of 20 years by the local government authority.
Time until offset site secured (years)	0.00		The revegetation will occur within an existing reserve R46355 (Water and Landscape Protection purpose) therefore no additional security is proposed.
Risk of future loss WITHOUT offset (%)	30.0%		While there area is highly degraded, some values remain. Without active management it is likely that vegetation will further degrade and any remaining value for Black Cockatoos will be reduced or lost. The COGG has not indicated any intention to revegetate the water harvesting area.
Risk of future loss WITH offset (%)	5.0%		Although the reserve is currently managed for a conservation and recreation purpose, there is a small risk of future loss, such as due to changes of tenure or infrastructure proposals.
Offset ratio (Conservation area only)	N/A		N/A

Appendix B. Site Visit

The informal site visit was undertaken by James Nelson (Access and Approvals Lead, APA) on the 24 August 2023. The site visit was undertaken during clear weather conditions with a maximum temperature of 29°Celcius.

The site visit investigated nine potential areas for on-ground revegetation activities within Reserve 46355 in Mullewa WA. The areas investigated are shown in **Figure B-6-1**, with photos of these areas shown in **Figure B-6-2**.

After the informal site visit, 2 areas were shortlisted and are shown in **Figure B-6-3**.

The site visit identified native species growing within the region to inform species selection of this offset strategy. Existing native species present within the Wildflower Walk which surrounds the reserve in which the proposed offset areas are located, included:

- *Ptilotus obavatus*
- *Prostanthera magnifica*
- *Calytrix* sp.
- *Pterostylis macrocalymma*
- *Caladenia* sp.
- *Cephalipterum drummondii*
- *Schoenia cassiniana*
- *Brachyscome iberidifolia*
- *Podolepis canescens*
- *Borya shaerocephala*
- *Trachymene ornate*
- *Solanum lasiophyllum*
- *Riciniocarpus velutinus*
- *Waitzia nitida*
- *Keraudrenia hermanniifolia*

Other species noted within the wider reserve included *Grevillea didymobotrya* subsp. *didymobotrya*.

Additionally, species suggested by Mullewa residents for inclusion in the revegetation species list included:

- Eucalyptus - River Red Gum (*Eucalyptus camaldulensis*)
- Quandong (*Santalum acuminatum*)
- Kurrajong (it is noted that *Brachychiton* spp are not endemic to the Mullewa area).
- Geraldton Wax (*Chamelaucium uncinatum*)

Photos of species recorded during the informal assessment are provided in **Figure B-4**.

Figure B-6-1 Potential areas for revegetation activities within Reserve 46355

Location 1: Looking North

Location 1: Looking East

Location 1: Looking South

Location 1: Looking West

Location 2: Looking North

Location 2: Looking East

Location 2: Looking South

Location 2: Looking West

Location 3: Looking North

Location 3: Looking East

Location 3: Looking South

Location 3: Looking West

Location 4: Looking North

Location 4: Looking East

Location 4: Looking South

Location 4: Looking West

Location 5: Looking North

Location 5: Looking East

Location 5: Looking South

Location 5: Looking West

Location 6: Looking North

Location 6: Looking East

Location 6: Looking South

Location 6: Looking West

Location 7: Looking North

Location 7: Looking East

Location 7: Looking South

Location 7: Looking West

Location 8: Looking North

Location 8: Looking East

Location 8: Looking South

Location 8: Looking West

Location 9: Looking South

Location 9: Looking East

Location 9: Looking West

Figure B-6-2 Photographic assessment of potential revegetation locations

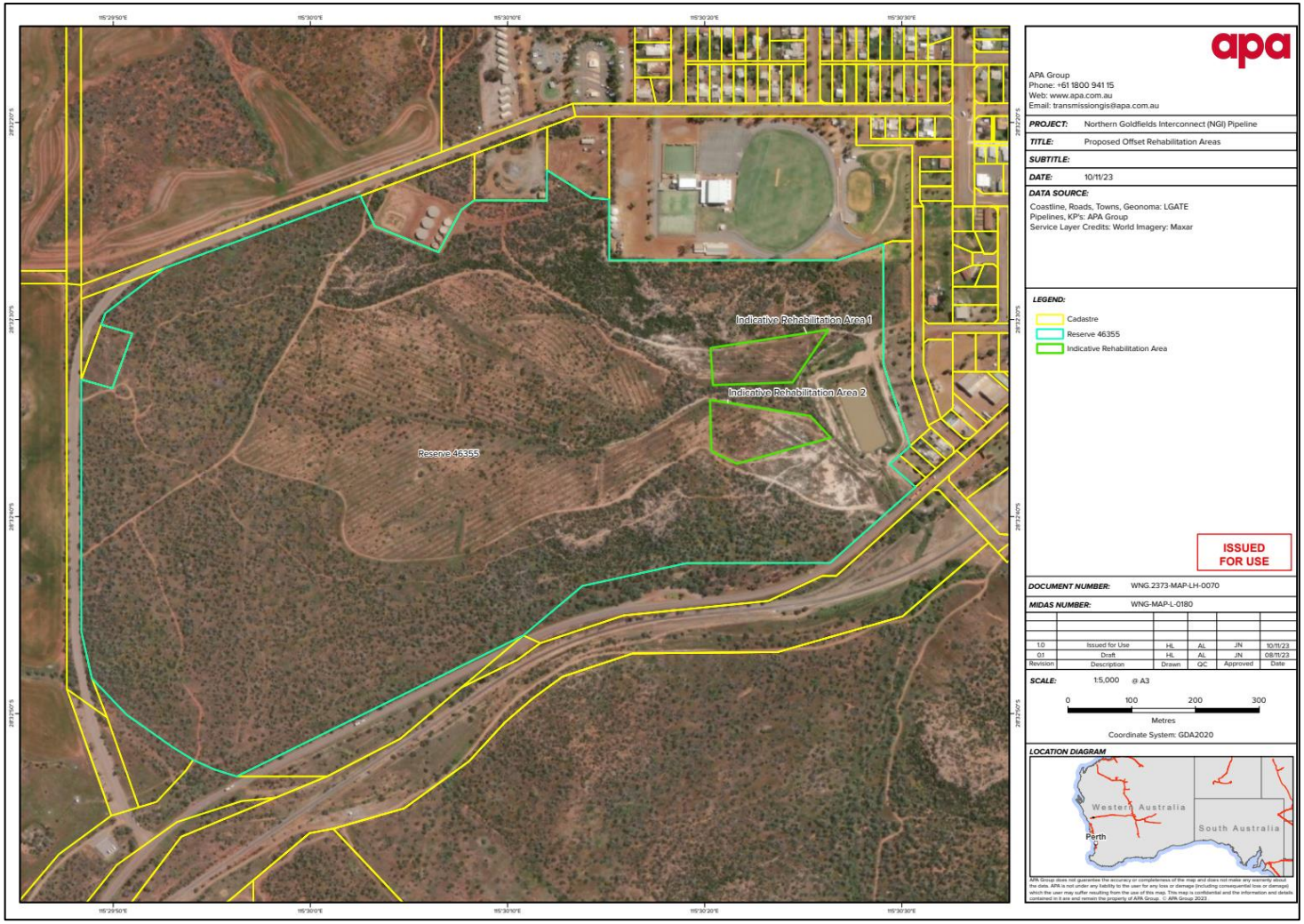

Figure B-6-3 Short-listed areas for revegetation activities within Reserve 46355

Acacia tetragonophylla (karara)

Solanum lasiophyllum

Hakea recuve subsp. *arida* (Protaceae – 'Needle bush')

Senna artemaisioides (Silver Cassia) or potentially *Senna glutinosa*

Figure B-4 Species photographed during informal site visit.