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ARROWSMITH NORTH SILICA SAND PROJECT

OFFSET STRATEGY

VRX SILICA LIMITED

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ACKNOWLEDGEMENT OF COUNTRY

Preston Consulting acknowledges the Traditional Owners of the lands on which it works, in particular the Whadjuk people of the Noongar Nation and the Yamatji people, the Traditional Custodians of the land on which the activity is proposed. Preston Consulting pays its respects to Elders past and present, to emerging community leaders and to all Aboriginal and Torres Strait Islander peoples.



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CONTENTS

1	INTRODUCTION.....	5
2	SCOPE AND PURPOSE.....	8
3	STAKEHOLDER CONSULTATION.....	9
4	PROPOSED OFFSETS.....	12
	4.1.1 Values and Quality of Offset Site.....	12
	4.1.2 Management of Offset Site.....	14
	4.1.3 Protection of Offset Site.....	14
	4.1.4 Justification of Offset Site.....	15
	4.1.5 Summary Table.....	15
5	ASSESSMENT OF THE PROPOSED OFFSETS.....	1
	5.1 Assessment - WA Environmental offset Guidelines.....	2
	5.1.1 WA Offsets Template.....	5
	5.1.2 Assessment against WA Offsets Calculator.....	10
	5.1.3 Assessment against Environmental Offsets Principles.....	12
	5.2 Assessment of Proposed Offsets – EPBC Act.....	13
	5.2.1 Commonwealth Environmental Offsets Guidelines.....	13
	5.2.2 Assessment Against EPBC Offsets Calculator.....	13
	5.2.3 Offset Principles.....	14
6	OBJECTIVES, TARGETS AND COMPLETION CRITERIA.....	16
7	MONITORING.....	17
8	FUNDING ARRANGEMENTS.....	19
9	MANAGEMENT, ROLES AND RESPONSIBILITIES.....	20
10	REVIEW AND REVISION.....	21
11	CONCLUSION.....	21
12	REFERENCES.....	22
13	ABBREVIATIONS.....	23

FIGURES

Figure 1: Regional setting of the Proposal.....	6
Figure 2: Development envelopes and indicative disturbance footprint.....	7
Figure 3: Offset Area and Carnaby’s Black Cockatoo foraging habitat.....	13



TABLES

Table 1: Summary of relevant stakeholder engagement.....	9
Table 2: Proposed terrestrial fauna offsets.....	1
Table 3: Assessment against residual impact significant model.....	3
Table 4: WA offsets policy template.....	6
Table 5: Criteria used in WA Offsets Calculator	10
Table 6: Assessment of the proposed offset against the six principles	12
Table 7: EPBC Act overarching principles applied in determining the suitability of offsets.....	15
Table 8: Objectives, targets and completion criteria.....	16
Table 9: Offset monitoring schedule	17
Table 10: Roles and responsibilities	20



1 INTRODUCTION

VRX Silica Limited (VRX) has applied for environmental approval under Section 38 of the *Environmental Protection Act 1986* (WA) (EP Act) to construct and operate the Arrowsmith North Silica Sand Project (the Proposal); a high-grade silica sand mines in the Geraldton Sandplain bioregion of WA. The Proposal is located approximately 270 kilometres (km) north of Perth and lies primarily within mining lease (M) 70/1389 held by Ventnor Mining Pty Ltd, a wholly-owned subsidiary of VRX. The regional location of the Proposal is shown in Figure 1.

The development envelopes outline the boundaries for the Proposal, where all ground disturbance and key proposal elements listed below are proposed to occur. A total disturbance limit of 353.8 hectares (ha) is proposed within a total development envelope area of 407.5 ha. Development envelopes and disturbance footprints for the access corridor and mine area are provided in Figure 2.

The Mine Development Envelope (same boundary as the Mine Disturbance Footprint) is located within VRX's mining lease (M70/1389) and covers an area of 347.3 ha. Up to 347.3 ha of native vegetation disturbance will be required within the Mine Development Envelope to develop the following:

- Mining areas;
- Mine Feed Plant;
- Processing Plant;
- Process water tanks;
- Vegetation direct transfer (VDT) initial stockpile area;
- Slurry and return water pipelines; and
- Ablutions area.

The Access Development Envelope covers an area of 60.4 ha. Up to 6.5 ha of native vegetation disturbance will be required within the Access Development Envelope (Figure 2) to develop the following:

- An access corridor approximately 5.5 km in length, running 800 m west then 4.7 km south from the southwest corner of the Mine Development Envelope to the Brand Highway;
- A groundwater bore that will supply water to the mine; and
- Water pipeline.



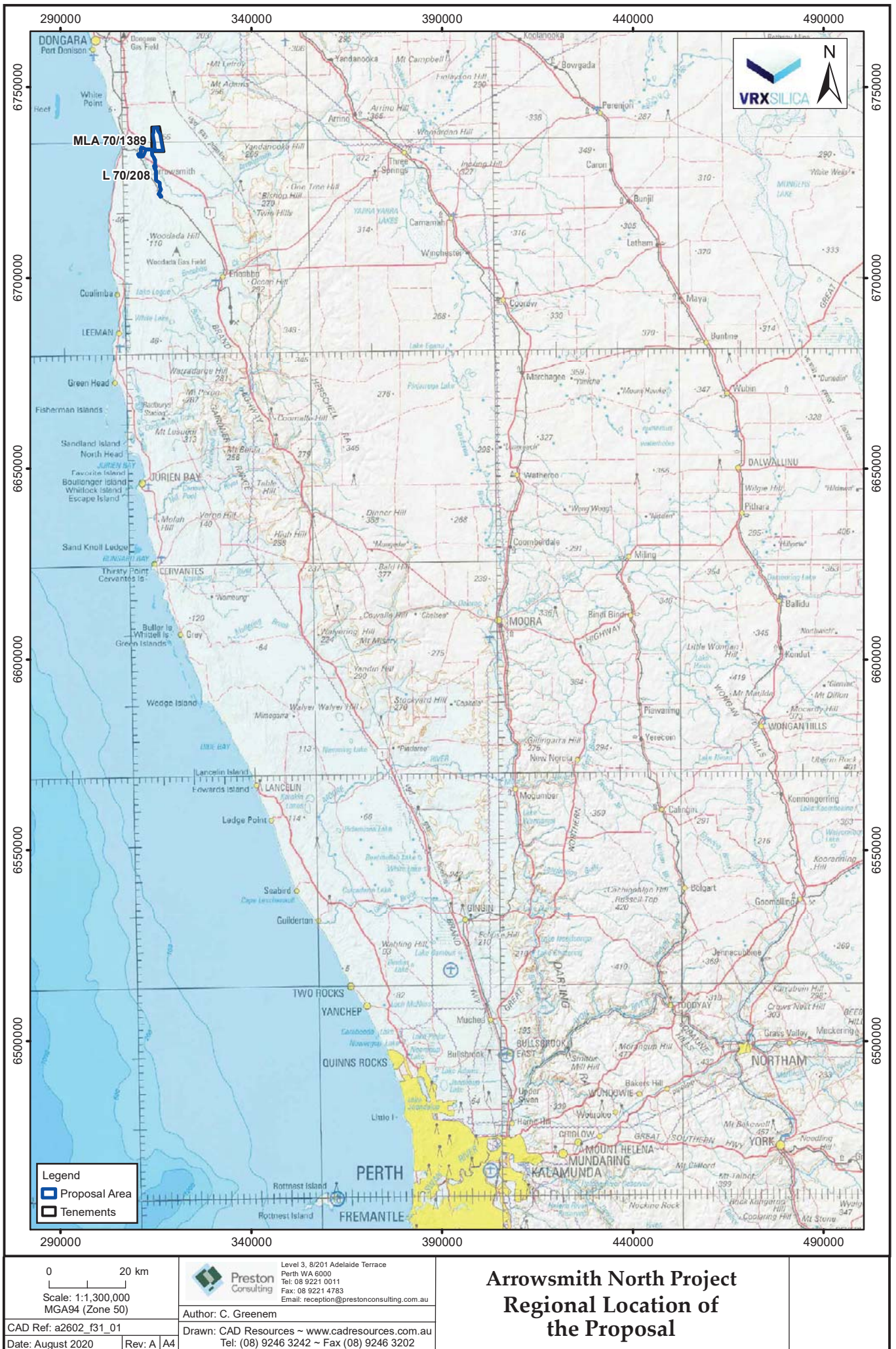


Figure 1: Regional setting of the Proposal

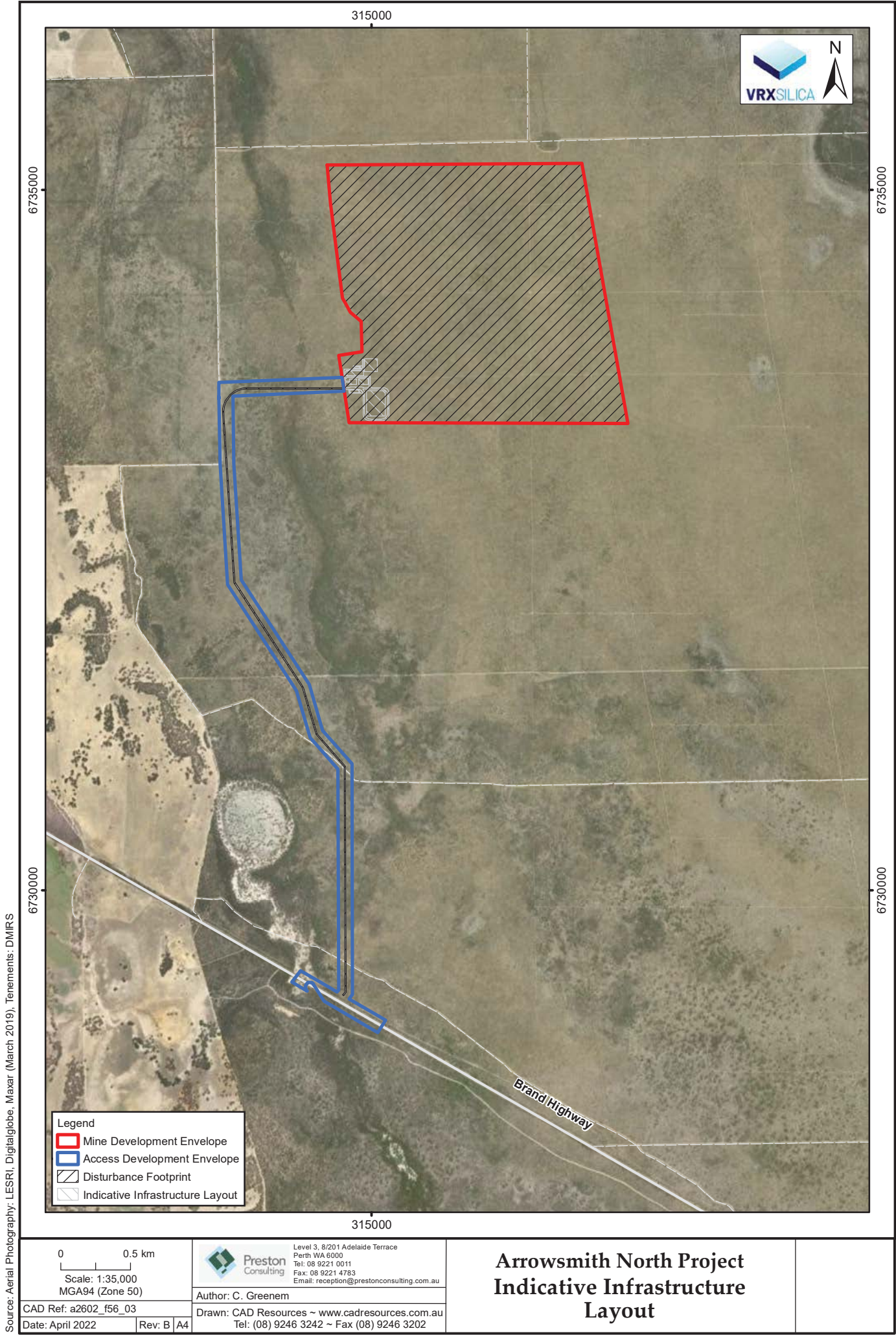


Figure 2: Development envelopes and indicative disturbance footprint

2 SCOPE AND PURPOSE

During their assessment of the Proposal, VRX considered the Proposal would have a significant residual impact on Carnaby's Cockatoo (*Zanda latirostris*), which is listed as Endangered under the *Biodiversity Conservation Act 2016* (WA; BC Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (Cth; EPBC Act). The Proposal will result in clearing of 353.8 ha of native vegetation representative of moderate to high value foraging Carnaby's Cockatoo foraging habitat. Of the proposed clearing, 14.5 ha will remain cleared for the life of the Proposal and 339.3 ha will be progressively rehabilitated using VDT and infill planting. VDT is described in detail in the Rehabilitation Strategy (Preston Consulting, 2022)

If the Proposal is approved, VRX predicts that an offset condition will be included in the Ministerial Statement (MS) and EPBC approval decision to counterbalance the significant residual impacts of the Proposal listed above. This Offset Strategy has been prepared in anticipation of this offset condition, in order to detail potential suitable offset measures to counterbalance the significant residual impacts of the Proposal. This Offset Strategy will remain in draft form until further detailed discussions are held with Environmental Protection Authority (EPA) Services, Department of Biodiversity, Conservation and Attractions (DBCA), Department of Mines, Industry Regulation and Safety (DMIRS) and the Department of Climate Change, Energy, the Environment and Water (DCCEEW), and it is revised as required for acceptance by EPA Services and DCCEEW.



3 STAKEHOLDER CONSULTATION

VRX has consulted with a range of relevant external stakeholders throughout the planning and construction phases of the Proposal. The core principle of the stakeholder engagement strategy is to identify relevant external stakeholders, and consult with them to identify their concerns, appropriate mitigation strategies and likely environmental outcomes. The outcomes of this stakeholder consultation relevant to this Offset Strategy are summarised in Table 1.

Table 1: Summary of relevant stakeholder engagement

Stakeholder	Date/s	Issues / Topics Raised	Proponent Response / Outcome
Government Stakeholders			
DCCEEW	17 July 2019 (phone conference meeting)	Present the Proposal. EPBC Act referral and approval processes for the Proposal.	EPBC Referral was submitted in parallel with the Section 38 Referral under the EP Act.
	2 November 2020 (email)	Email received from DCCEEW confirming that Proposal is a Controlled Action. This determination is based on the Proposal being likely to have a significant impact on the following MNES, including, but not limited to: <ul style="list-style-type: none"> • Carnaby's Black Cockatoo (<i>Zanda latirostris</i>); • Malleefowl (<i>Lieopa ocellata</i>); and • Sandplain Duck Orchid (<i>Paracaleana dixonii</i>). 	VRX proceeded with referral of the Proposal to the EPA under Section 38 of the EP Act.
	November 2022	DCCEEW provided comments on the draft Environmental Review Document (ERD) prepared for the Proposal	This Offset Strategy was developed to address several DCCEEW comments regarding offsets.
DBCA	1 July 2020	Present the Proposal. Potential offset options for reduction in Black Cockatoo foraging habitat.	VRX to liaise with DBCA through assessment process regarding suitable offset options.
DWER – EPA Services	1 August 2019 (meeting) 9 November 2019 (phone conference) 21 July 2020 (video conference)	Present the Proposal. Pre-referral meeting. Phone conference to discuss the Arrowsmith and Muchea Silica sand project requirements for water and EPA approvals. Update on Proposal referral timeframes.	Section 38 Referral and this SR prepared in accordance with EPA Services advice.
	28 August 2020 (email)	Submission of the Arrowsmith North Draft SR to DWER for review.	VRX to await DWERs comments on the SR.
	18 November 2020 (email)	DWER provided comments on the Supplementary Report (SR).	VRX to address comments and formally refer the Proposal to the EPA under Section 38 of the EP Act.



Stakeholder	Date/s	Issues / Topics Raised	Proponent Response / Outcome
DMIRS	2 August 2017, 26 November 2018, 22 March 2019, 13 February & 29 July 2020 (meetings)	Tenement requirements for the Proposal. Present the Proposal and discuss the requirements for EPA approvals.	VRX to keep DJTSI informed of progress. VRX to submit tenement applications as required. Mining Proposal and MCP to be submitted.
Community and Corporate Stakeholders			
Australian and New Zealand Environment and Conservation Council	August 2020 (email)	Proposal introduction and environmental considerations / issues. Information Pack provided. Offer for meeting or further information. Notification of plan to submit Section 38 Referral.	Consideration of issues in Proposal design. VRX to meet with stakeholder and / or provide additional information upon request.
Australian Nature Conservation Society / Australian Wildlife Conservancy	August 2020 (email)	Proposal introduction and environmental considerations / issues. Information Pack provided. Offer for meeting or further information. Notification of plan to submit Section 38 Referral.	Consideration of issues in Proposal design. VRX to meet with stakeholder and / or provide additional information upon request.
Birdlife WA	August 2020 (email)	Proposal introduction and environmental considerations / issues. Information Pack provided. Offer for meeting or further information. Notification of plan to submit Section 38 Referral.	Consideration of issues in Proposal design. VRX to meet with stakeholder and / or provide additional information upon request.
Birds Australia	August 2020 (email)	Proposal introduction and environmental considerations / issues. Information Pack provided. Offer for meeting or further information. Notification of plan to submit Section 38 Referral.	Consideration of issues in Proposal design. VRX to meet with stakeholder and / or provide additional information upon request.
Conservation Council of WA	August 2020 (email)	Proposal introduction and environmental considerations / issues. Information Pack provided. Offer for meeting or further information. Notification of plan to submit Section 38 Referral.	Consideration of issues in Proposal design. VRX to meet with stakeholder and / or provide additional information upon request.
Greening Australia	August 2020 (email)	Proposal introduction and environmental considerations / issues. Information Pack provided. Offer for meeting or further information. Notification of plan to submit Section 38 Referral.	Consideration of issues in Proposal design. VRX to meet with stakeholder and / or provide additional information upon request.



Stakeholder	Date/s	Issues / Topics Raised	Proponent Response / Outcome
Wildflower Society of WA	August 2020 (email)	<p>Proposal introduction and environmental considerations / issues.</p> <p>Information Pack provided.</p> <p>Offer for meeting or further information.</p> <p>Notification of plan to submit Section 38 Referral.</p>	<p>Consideration of issues in Proposal design.</p> <p>VRX to meet with stakeholder and / or provide additional information upon request.</p>



4 PROPOSED OFFSETS

To counterbalance the significant residual impacts of the Proposal, VRX proposes to designate a 1,367.1 ha portion of their Arrowsmith North Mining Lease (M 70/1389) for use as an Offset Area. The majority of the Offset Area lies to the north of the Mine Development Envelope and aligns with the boundary of M 70/1389, and specifically excludes the development envelopes; Figure 3). The Offset Area contains large areas of native vegetation in Excellent to Pristine condition that is representative moderate to high value Carnaby's Cockatoo foraging habitat.

4.1.1 VALUES AND QUALITY OF OFFSET SITE

Vegetation Condition

The condition of the vegetation within the Offset Area ranges from Pristine to Excellent, with the majority of the Offset Area considered Pristine (96.5 %) according to the Keighery (1994) scale. Some areas (3.5 %) on the western part of the Offset Area, near tracks, were downgraded to Excellent. Vegetation condition of the Offset Area is shown in Figure 3.

Foraging Value

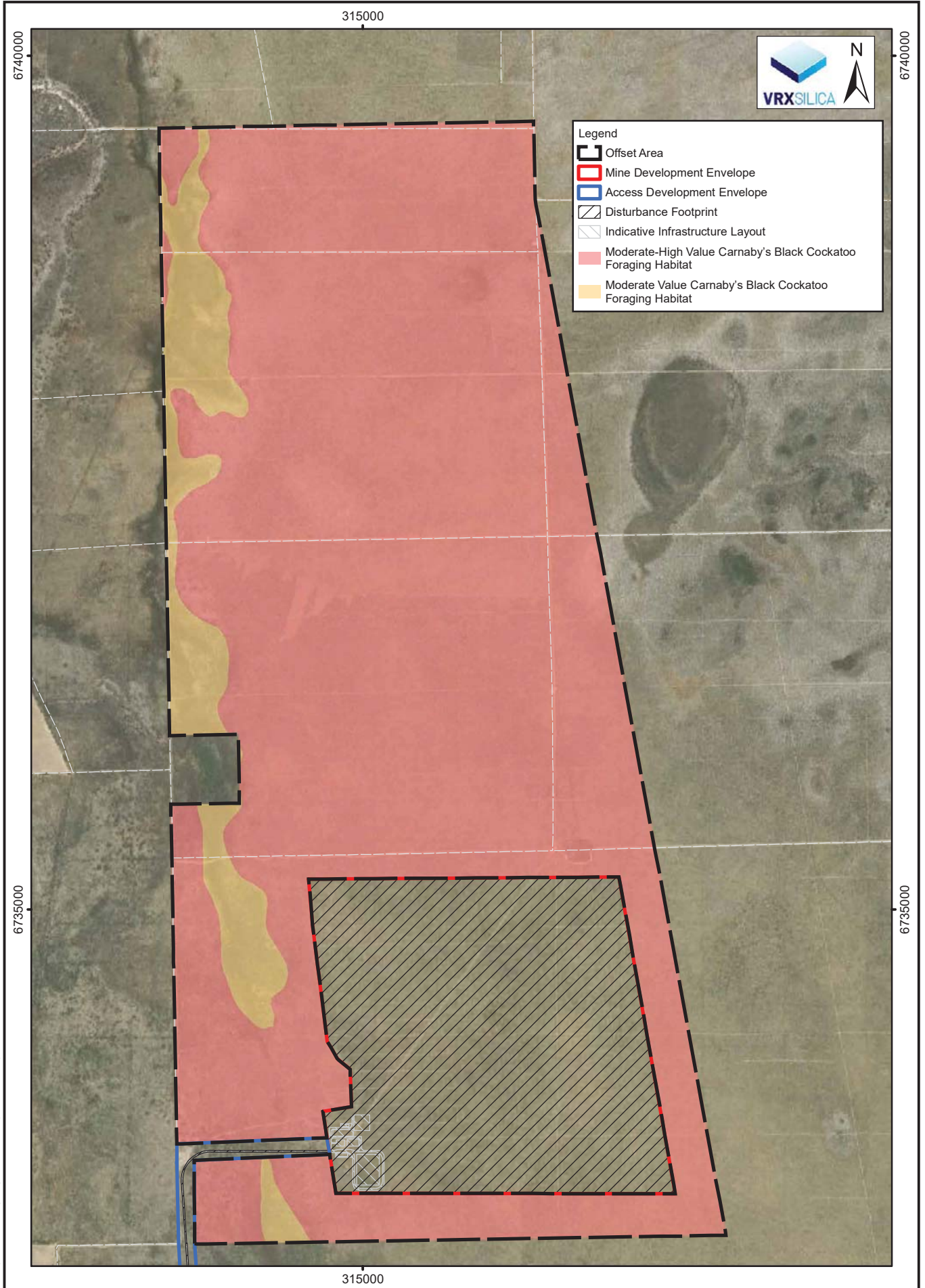
The Offset Area is comprised entirely of native vegetation that represents foraging habitat for Carnaby's Cockatoo. Bamford Consulting Ecologists (BCE) (2022) combined broad vegetation types, the soils or other substrates with which they are associated and the landform to define Vegetation Substrate Associations (VSAs).

VSAs in the Offset Area are:

1. Kwongan heath – Low, dense, proteaceous/myrtaceous shrubland on yellow and pale sands. This VSA contains several *Banksia* species that flower at different times of the year. In September 2019, *Banksia hookeriana* and *B. menziesii* were flowering prolifically, whereas in December 2021 *B. attenuata* was in flower. Occurs across majority of the project area and varies slightly with landscape position from high to low on stabilised dunes.
2. Dense Riparian thickets (and seasonal watercourse and swamps)– Dense thickets mostly of *Acacia blakelyi*, in some areas *Allocasuarina campestris*, growing on peaty-sand low in the landscape but extending onto slopes. These thickets are limited in the mining lease to a small drainage line in the west and south-west of the lease.
3. Open, low woodland of *Banksia* sp. With scattered *Eucalyptus todtiana* and *Xylomelum angustifolium* over shrubs on sand. Present in small patches in the mining lease but tends to merge with VSA 1.

The Offset Area is comprised of 1,152.2 ha of VSA1, 119.5 ha of VSA2 and 95.4 ha in VSA3. Both VSA1 and VSA3 (1,247.6 ha) are identified as Moderate to High value foraging habitat for Carnaby's Cockatoo, VSA2 is considered moderate value. The extent of Carnaby's Cockatoo foraging habitat within the Offset Area is shown in Figure 3.





Source: Aerial Photography: LESRI, Digitalglobe, Maxar (March 2019), Tenements: DMIRS

0 500 m
Scale: 1:30,000
MGA94 (Zone 50)
CAD Ref: a2602_f56_32
Date: July 2022

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Arrowsmith North Project Offset Area

Figure:

Figure 3: Offset Area and Carnaby's Black Cockatoo foraging habitat

4.1.2 MANAGEMENT OF OFFSET SITE

VRX proposed to protect and maintain Carnaby's Cockatoo foraging habitat as an offset for the residual impacts of the Proposal. Offsets include protection and maintenance activities to maintain (and potentially improve some areas) the condition of the native vegetation and reduce the threats to Carnaby's Cockatoos within the Offset Area. Protection and maintenance activities include but are not limited to:

1. Demarcation of the Offset Area;
2. Access restrictions into the area to minimise damage from off-road vehicles;
3. Erection of signs to identify the boundaries of the Offset Area;
4. Regular monitoring for signs of weed propagation, spread of dieback and changes in vegetation condition and foraging value;
5. Removal / treatment of weeds and treatment of dieback affected areas (if present);
6. Implementing the Dieback Management Plan (DMP);
7. Regular monitoring for signs of feral animals that may be predators or affect the quality of the low-lying habitat (including Fox, Cat, Dog, Pig);
8. Feral animal trapping and management with a particular focus on Foxes and Cats; and
9. Develop and implement a Ranger Program.

Implementation of the management mechanisms listed above is expected to protect the Offset Area from any impacts that may lower the foraging value to Carnaby's Cockatoo and ensure that extensive areas of moderate and moderate to high foraging value remains available to Carnaby's Cockatoos for a minimum of 30 years. The protection mechanisms listed above may have the added benefit of reducing predator numbers and improving the quality of foraging habitat.

4.1.3 PROTECTION OF OFFSET SITE

The proposed Offset Area lies entirely within M 70/1389 (excluding the area within the development envelopes), a lease held by VRX under the Mining Act. The area has been drilled and confirmed to contain large deposits of silica sand, with predictions of nearly 100 years of available silica sand at Arrowsmith North. Subject to approvals, VRX may gradually mine some of the area after the completion of this Proposal (i.e., from approximately Year 30 onwards). Prior to this occurring however, the area is available for use as a long-term preservation area (i.e., for at least 30 years) and it is likely that some areas could remain relatively untouched for nearly 100 years. For the purposes of this assessment a 30-year timeframe has been assumed.

The presence of silica sand in this portion of M 70/1389 means that VRX will have suitable justification to hold and renew the tenement for the life of the Proposal. Exploration for other minerals within the tenement has not returned any results, therefore silica sand is likely to remain as the only marketable product within the tenement.

VRX acknowledges that there may be minor disturbances associated with linear infrastructure (powerlines, roads, pipelines etc.) that could occur in the 30-year timeframe however this has been accounted for in the conservative offset calculations.



4.1.4 JUSTIFICATION OF OFFSET SITE

VRX are aware that the proposed offset is unique and differs from typical land acquisition offsets usually proposed for Carnaby's Cockatoo offsets. It was chosen given the unique scenario that the Proposal presents:

1. The Proposal clearing occurs at a very slow rate, meaning that clearing (and subsequent habitat loss) is not conducted all at once like many other mining operations;
2. Even if future mining is approved in this area, given the slow rate of mining the Offset Area is predicted to remain uncleared for a **minimum** of 30 years, with most of the area likely to remain uncleared for much longer based on future mine plans;
3. The foraging habitat within the Offset Area is habitat that likely will never be able to be added to conservation estate given the underlying silica sand resource (noting that silica sand is listed as a critical mineral (ATIC, 2022));
4. Given the known resource, the land would otherwise be at significant risk of disturbance during the life of the Proposal;
5. The land does not contain any other resources other than silica sand, therefore it is not at risk of being mined for another resource;
6. VRX's commitment to preserve and manage the Offset Area for at least 30 years provides a conservation outcome over an area that would not normally be protected or actively managed;
7. The Proposal is for 30 years of resource, therefore at the end of the life of the Proposal there will be almost 30 years of VDT rehabilitation that has occurred at the Proposal, and VRX (and Government) will have actual site-specific data on the success of the re-establishment of Carnaby's Cockatoo foraging species. This data will be critical in determining if mining can continue on the Mining Lease, i.e., if VDT is not shown to be highly successful then approval will be difficult to obtain. The success of the rehabilitation is therefore critical for VRX. If mining is to continue after the 30-year period (subject to separate approvals) there will be approximately 300 ha of established rehabilitated foraging habitat at the Proposal at that stage.

VRX considers that the proposed offset presents an opportunity to provide long-term protection and management of a large continuous area of moderate to high value Carnaby's Cockatoo foraging habitat that would otherwise be unlikely to be protected. This opportunity is likely to provide better outcomes for Carnaby's Cockatoo than the purchase of lower quality smaller isolated sites.

The proposed offset is a significant commitment by VRX as it will have the following implications:

- VRX will not be able to mine the Offset Area during the 30 year period;
- VRX will not be able to on-sell the Offset Area to another silica sand miner during the 30 year period; and
- VRX will be responsible for funding the ongoing management of the Offset Area for the entire 30-year period.

4.1.5 SUMMARY TABLE

Table 2 describes the measures proposed to offset the residual impacts to moderate to high value Carnaby's Cockatoo foraging habitat.



Table 2: Proposed terrestrial fauna offsets

Objective & intended outcome	Offset actions	Details	Success criteria	Governance / Responsibilities	Timing	Risks and contingency measures	Monitoring	Reporting
To counterbalance the significant residual impacts to 14.5 ha of Carnaby's Cockatoo foraging habitat for the life of the Proposal	Protect and maintain an estimated 1,247.6 ha of moderate to high and 119.5 ha of moderate value Carnaby's Cockatoo foraging habitat within the Offset Area	<p>14.5 ha of foraging habitat will be cleared for the life of the Proposal and rehabilitated at closure. It is expected that lessons learned from the mining and progressive rehabilitation will allow VRX to achieve effective rehabilitation (up to a value of 5/10) within 10 years using conventional methods (respreading topsoil and infill planting of select species).</p> <p>VRX is proposing to use a long-term land conservation offset to offset the significant residual impact to 14.5 ha of foraging habitat directly by protecting and maintaining moderate to high quality Carnaby's Cockatoo foraging habitat for the life of the Proposal.</p> <p>VRX will manage and pay costs for the maintenance and protection of the proposed offset commensurate with the protection mechanisms in Section 4.1.2 of the Environmental Review Document (ERD).</p> <p>The offset would adequately offset the foraging habitat impacts associated with the loss of availability of 14.5 ha of foraging habitat.</p>	<p>1,247.6 ha of moderate to high value (average value of at least 7/10) and 119.5 ha of moderate value (average value of 4/10) Carnaby's Cockatoo foraging habitat protected and maintained that would exceed the minimum offset criteria (DSEWPaC, 2012a; DWER, 2021b).</p> <p>Initial and ongoing management works are completed in accordance with Section 4.1.2 of the ERD.</p> <p>Carnaby's Cockatoo foraging habitat values are maintained.</p>	<p>VRX:</p> <ul style="list-style-type: none"> • Preservation of offset site • Funding of upfront and ongoing management costs for 30 years • Ultimate responsibility for the conservation of the environmental values of the offset site <p>Environment Manager:</p> <ul style="list-style-type: none"> • Overseeing the monitoring, management and reporting on the status of environmental values of the offset site <p>Site Manager:</p> <ul style="list-style-type: none"> • Onsite implementation of the Protection Mechanisms <p>Technical Officers:</p> <ul style="list-style-type: none"> • Carrying out routine monitoring and management of the Offset Area 	<p>Offset established and initial management costs provided within 12 months of implementation of the Proposal.</p> <p>Ongoing management provided for 30 years.</p>	<p>Dieback:</p> <ul style="list-style-type: none"> • Restriction of access • Education of contractors carrying out firebreak and fencing maintenance • Application of Phosphite to affected vegetation (or other methods in consultation with DBCA) <p>Weeds:</p> <ul style="list-style-type: none"> • Targeted control of high impact weed species that may be present or may become established • Weed hygiene controls during works <p>Feral animals:</p> <ul style="list-style-type: none"> • Monitor current use • Targeted control of high impact feral animal species if required <p>Unauthorised access (rubbish dumping, 4WD):</p> <ul style="list-style-type: none"> • Installation of fences where appropriate around the vegetation to 	<p>Annual monitoring to confirm foraging values are being protected.</p> <p>Annual monitoring of foraging use of the site by Carnaby's Cockatoo.</p> <p>Weed, dieback, boundary and firebreak monitoring / inspections every three months (i.e., weed infestations, feral animal use, fence lines, firebreaks, dieback)</p>	<p>Initial report of management actions completed prior to implementation.</p> <p>Annual report of management actions and monitoring results.</p>



Objective & intended outcome	Offset actions	Details	Success criteria	Governance / Responsibilities	Timing	Risks and contingency measures	Monitoring	Reporting
		<p>VRX intends to commission experienced contractors to complete the work with direction and advice from VRX ecological consultants.</p> <p>The Offset Area has been assessed against the total residual impact of the Proposal using the WA Environmental Offsets Calculator and the EPBC Act Offsets Calculator and exceeds the minimum offset criteria within the Department of Sustainability Environment, Water, Population and Communities (DSEWPaC) (2012a) and the Department of Water and Environmental Regulation (DWER) (2021b).</p>				restrict all off-road vehicle access.		
<p>To counterbalance the significant residual impacts of clearing and progressive VDT rehabilitation of 339.3 ha of moderate to high value Carnaby's Cockatoo.</p> <p>It is expected that this will result in a reduction in foraging value from 7 /10 to 5/10.</p>		<p>VRX expects to obtain significant knowledge of rehabilitation during the first years of the Proposal. This knowledge will be used to determine the most effective revegetation methods for Carnaby's Cockatoo foraging habitat.</p> <p>VRX has nominated a conservative revegetation value of 5/10 based on advice within BCE (2020c), which stated values between 2 and 6 could be achieved.</p> <p>Over the life of the Proposal 219.5 ha of foraging habitat will be rehabilitated via</p>		As above	As above	As above	As above	As above



Objective & intended outcome	Offset actions	Details	Success criteria	Governance / Responsibilities	Timing	Risks and contingency measures	Monitoring	Reporting
		<p>VDT. VDT will reinstate some foraging values but overall will reduce the foraging value to Carnaby's Cockatoo by 2 (7/10 to 5/10).</p> <p>VRX is proposing to use a long-term land conservation offset to offset the significant residual impact to 339.3 ha of foraging habitat directly by protecting and maintaining an estimated 1,247.6 ha of moderate to high and 119.5 ha of moderate quality Carnaby's Cockatoo foraging habitat for the life of the Proposal.</p> <p>VRX will manage and pay costs for the maintenance and protection of the proposed offset commensurate with the protection mechanisms in Section 4.1.2 of the ERD.</p> <p>The Offset Area has been assessed against the total residual impact of the Proposal using the WA Environmental Offsets Calculator and the EPBC Act Offsets Calculator and exceeds the minimum offset criteria within DSEWPaC (2012a) and DWER (2021b).</p>						



5 ASSESSMENT OF THE PROPOSED OFFSETS

The Proposal will affect habitat utilised by Threatened Fauna and therefore the significance of the residual impacts on these habitats was assessed to determine whether these impacts would be considered 'significant residual impacts'. Direct impacts on fauna are necessarily generally based on assessment of impacts to habitat. VRX considers that the proposed disturbance of moderate to high value Carnaby's Cockatoo foraging habitat is considered significant and will require offsets.

The Proposal will disturb and progressively rehabilitate up to 339.3 ha of native vegetation which represents moderate to high value Carnaby's Cockatoo foraging habitat. An initial 14.5 ha of similar foraging habitat will be cleared for permanent infrastructure. Foraging habitat under rehabilitation will initially have no foraging value and for the purposes of offsets can be considered 'unavailable' to Carnaby's Cockatoo for foraging. After ten years, foraging habitat subject to rehabilitation will become potential Carnaby's Cockatoo foraging habitat and can be considered 'available', but will be of a lower quality. VRX predicts that VDT can return the foraging value of native habitat to moderate (5 out of 10) value after ten years, a net reduction in foraging value from the pre-mining rating of 7 out of 10 (BCE, 2022).

Mining is proposed to occur at a steady rate with 120 ha proposed to be disturbed in the first ten years of operation, 120 ha in the second ten years of operation and 99.5 ha in the third ten years of operation. This means that the area of foraging habitat that is not available will gradually increase over the first ten years, peaking at a maximum of 134.5 ha before reaching a general equilibrium (after ten years the area of rehabilitation that begins to return foraging values will grow at the same rate as new clearing). As an example, at year 30, a total of 219.5 ha of moderate to high value (7 out of 10) Carnaby's Cockatoo habitat would have been mined and rehabilitated via VDT and infill planting (the remaining 134.5 ha will be unavailable). The WA Environmental Offsets Calculator (EPA, 2021b) calculates the significant residual impact of a Proposal by considering the significance of the impact to the target species and the benefit of any proposed rehabilitation. VRX will incorporate progressive rehabilitation and VDT (described above) which minimises the residual significant impact of the Proposal.

The residual significant impacts to Carnaby's Cockatoo have been calculated with the WA Environmental Offsets Calculator and can be summarised as:

1. Loss of up to 14.5 ha of moderate to high value Carnaby's Cockatoo foraging habitat for a period of 40 years (30 years operation plus ten years before rehabilitation is suitable for foraging by Carnaby's Cockatoo). This loss represents a total quantum of impact of 10.15 ha. The rehabilitation is assumed to reach a foraging value of 5 out of 10 after this ten year rehabilitation period. A rehabilitation credit of 2.88 ha is applied and the significant residual impact is calculated as 7.27 ha; and
2. Loss of 339.3 ha of moderate to high value Carnaby's Cockatoo foraging habitat for a period of ten years (based on a period of ten years before VDT rehabilitation is suitable for foraging by Carnaby's Cockatoo). This loss represents a total quantum of impact of 237.51 ha. The rehabilitation is assumed to reach a foraging value of 5 out of 10 after this ten year period. Foraging value may increase in subsequent years. A rehabilitation credit of 96.37 ha is applied and the significant residual impact is calculated as 141.14 ha.

The residual significant impact used in the EPBC Act calculator should be determined after application of the mitigation hierarchy but prior to the consideration of benefits from progressive



rehabilitation. Therefore, for the EPBC Act calculator, the residual significant impact to Carnaby's Cockatoo is the quantum of impact to foraging habitat as a result of the Proposal. The residual significant impact includes a loss of up to 353.8 ha of moderate to high value Carnaby's Cockatoo foraging habitat for the life of the Proposal.

Application of the WA Environmental Offsets Calculator to determine significant residual impacts of the Proposal and the suitability of the proposed offset are discussed further in Section 11.3 of the ERD. Application of the EPBC Act Offsets Calculator to determine the suitability of the proposed offsets are discussed further in Section 11.6.2 of the ERD.

5.1 ASSESSMENT - WA ENVIRONMENTAL OFFSET GUIDELINES

The WA Environmental Offsets Guidelines (EPA, 2014a) states:

“In general, significant residual impacts include those that affect rare and endangered plants and animals (such as declared rare flora and threatened species that are protected by statute), areas within the formal conservation reserve system, important environmental systems and species that are protected under international agreements (such as Ramsar listed wetlands) and areas that are already defined as being critically impacted in a cumulative context. Impacts may also be significant if, for example, they could cause plants or animals to become rare or endangered, or they affect vegetation which provides important ecological functions”.

VRX has assessed the residual impacts of the Proposal against the residual impact significance model provided in the WA Environmental Offsets Guidelines (EPA, 2014a). The findings of this assessment is provided in Table 3.



Table 3: Assessment against residual impact significant model

Relevant Part IV Environmental Factors	Vegetation and Flora						
					Terrestrial Fauna		
Part V Clearing Principles	c – Rare flora	d – TECs	e – Remnant vegetation	f – Wetlands and waterways	h – Conservation areas	a – High biological diversity	b – Habitat for fauna
Residual impact that is environmentally unacceptable and cannot be offset	No residual impacts are considered to meet this criteria						
Significant residual impacts that will require an offset – all significant residual impacts to species and ecosystems are protected by statute or where the cumulative impact is already at a critical level	No residual impacts are considered to meet this criteria: <ul style="list-style-type: none"> No Threatened Flora records are located within the survey areas Impacts to Priority Flora are not considered significant 	No residual impacts are considered to meet this criteria – no TECs were recorded within the development envelopes	No residual impacts are considered to meet this criteria	No residual impacts are considered to meet this criteria as no wetlands or waterways that are protected by statute lie within the development envelopes or would be indirectly impacted by the Proposal	No residual impacts are considered to meet this criteria as no conservation areas that are protected by statute lie within the development envelopes or would be indirectly impacted by the Proposal	No residual impacts are considered to meet this criteria. The Kwongan Heath vegetation is known to have high diversity however the residual impacts on these areas are not considered significant given the area of intact habitat that will remain outside the development envelopes.	Residual impacts to Carnaby's Cockatoo foraging habitat are considered likely to meet this criteria. The significant residual impact to Carnaby's Cockatoo include a loss of up to 353.8 ha of moderate to high value foraging habitat for the life of the Proposal. Indirect impacts include: <ul style="list-style-type: none"> Increased predation (low Kwongan Heath) or competition from introduced fauna Alterations to behaviour (including feeding characteristics) as a result of elevated dust, light or noise emissions Reduction in habitat health as a result of: <ul style="list-style-type: none"> Alterations to fire regimes Smothering of vegetation as a result of unintentional discharge of sand slurry from surface pipelines Establishment or spread of weed species / populations Hydrocarbon spills Introduction or spread of dieback
Significant residual impacts that may require an offset – any significant residual impacts to potentially threatened species and ecosystems, areas of high environmental value or where the cumulative impact may reach critical levels if not managed	No residual impacts are considered to meet this criteria – refer above	No residual impacts are considered to meet this criteria – refer above	No residual impacts are considered to meet this criteria – refer above	No residual impacts are considered to meet this criteria – refer above	No residual impacts are considered to meet this criteria – refer above	No residual impacts are considered to meet this criteria – refer above	No other residual impacts are considered to meet this criteria – refer above
Residual impacts that are not significant	No Threatened Flora listed under the EPBC Act or BC Act were recorded in the development envelopes. The Proposal will result in clearing of up to 14.5 ha of vegetation for the life of the	No other residual impacts are considered to meet this criteria – refer above	Clearing of up to 14.5 ha of remnant vegetation for the life of the Proposal and up to 339.3 ha of remnant vegetation clearing and progressive rehabilitation via VDT. All remaining vegetation have 65% or more of their pre-European	No other residual impacts are considered to meet this criteria – refer above	No other residual impacts are considered to meet this criteria – refer above	Clearing of up to 14.5 ha of Kwongan Heath vegetation for the life of the Proposal and up to 339.3 ha of vegetation clearing and progressive rehabilitation via VDT.	The Proposal will result in clearing of up to 14.5 ha of vegetation for the life of the Proposal and up to 339.3 ha of remnant vegetation clearing and progressive rehabilitation via VDT. This vegetation is representative of habitat for



Relevant Part IV Environmental Factors	Vegetation and Flora						
				Terrestrial Fauna			
Part V Clearing Principles	c – Rare flora	d – TECs	e – Remnant vegetation	f – Wetlands and waterways	h – Conservation areas	a – High biological diversity	b – Habitat for fauna
	<p>Proposal and up to 339.3 ha of remnant vegetation clearing and progressive rehabilitation via VDT. This vegetation is representative of habitat for threatened flora including:</p> <ul style="list-style-type: none"> • <i>Conostylis dielsii</i> subsp. <i>teres</i> (Endangered) • <i>Conostylis micrantha</i> (Endangered) • <i>Hemiandra gardneri</i> (Endangered) <p>Based on the individual assessments of these species in Section Error! Reference source not found. of the ERD the Proposal is unlikely to significantly impact these species.</p> <p>Seven Priority flora species were recorded within the development envelopes. Of these, four are predicted to have more than 5% of the recorded individuals within the disturbance footprint. Impacts to these species includes:</p> <ol style="list-style-type: none"> 1. 1,277 <i>Banksia elegans</i> (P4) individuals (37.6% of survey records); 2. 30 <i>Comesperma rhadinocarpum</i> (P3) individuals (50.85% of survey records); 3. 98 <i>Hemiandra sp. Eneabba</i> (H. Demarz 3687) (P3) individuals (42.4% of survey records); and 4. 167 <i>Schoenus sp. Eneabba</i> (F. Obbens & C. Godden 1154) (P2) individuals (35.67% of survey records). <p>Based on the individual assessments of these species in Section Error! Reference source not found. of the ERD the Proposal is unlikely to significantly impact the local or regional extent of this species.</p> <p>No significant residual impacts to significant flora are anticipated as a result of the Proposal and, as such, offsets are not proposed. Potential impacts to significant flora (Priority flora species) will be avoided and minimised through implementation of the Final Infrastructure Design Plan.</p>		<p>extent remaining and impacts will be less than 0.45% of any vegetation association therefore residual impacts from clearing are not significant.</p>			<p>The Kwongan Heath vegetation is known to have high diversity however the residual impacts on these areas are not considered significant given the area of intact habitat that will remain outside the development envelopes.</p>	<p>threatened fauna (other than Carnaby's Cockatoo) including:</p> <ul style="list-style-type: none"> • <i>Lieopa ocellata</i> (Vulnerable); and • <i>Apus pacificus</i> (Marine; Migratory). <p>Based on the individual assessments of these species in Section Error! Reference source not found. of the ERD the Proposal is unlikely to significantly impact these species.</p> <p>Fauna habitats in the Proposal area are well represented locally and regionally and do not support species that are considered restricted to the area.</p>



As described in Table 3, based on the findings of the Environmental Impact Assessment in the ERD, VRX considers that the Proposal's residual impacts to Carnaby's Cockatoo may be considered significant and require offsets.

The indirect impacts described in the ERD are deliberately conservative and it is unlikely that the full scale of indirect impacts would occur given the proposed management measures. Based on the above, VRX has committed to ongoing monitoring that will inform and ultimately verify the scale of these residual indirect impacts.

5.1.1 WA OFFSETS TEMPLATE

VRX has completed a WA Offsets Template as per the requirements of the WA Environmental Offsets Guideline (EPA, 2014b), provided in Table 4. Note that only the values that were deemed to require offsets are included (refer to the ERD for the complete list).



Existing Environment / Impact	Mitigation			Significant Residual Impact	Offset Calculation Methodology				
	Avoid and Minimise	Rehabilitation Type	Likely Rehabilitation Success		Type	Risk	Likely Offset Success	Time Lag	Offset Quantification
<p>General flora and vegetation – Up to 14.5 ha of native vegetation clearing and up to 339.3 ha of native vegetation rehabilitation via VDT Reduction in vegetation health due to indirect impacts</p>	<p>Avoid Development envelopes were revised to avoid:</p> <ul style="list-style-type: none"> Four of the 11 Priority Flora species recorded within the Survey Area (refer to Section Error! Reference source not found. of the ERD); and The north-south drainage line and associated riparian vegetation along the western boundary of the Study Area <p>Minimise</p> <ul style="list-style-type: none"> Implement industry best practice management measures for flora and vegetation Implement the Rehabilitation Strategy Implement preventive measures to minimise the risk and impact of hydrocarbon spills Comply with Water Quality Protection Guidelines and guidance notes 	<p>339.3 ha of progressive VDT rehabilitation 14.5 ha of traditional mine rehabilitation – vegetation to be rehabilitated with stripped topsoil and seeded with impacted species if required and suitable</p>	<p>Can the environmental values be rehabilitated / Evidence? Yes, the values are either predicted to be retained during the VDT process or can be included in direct seeding / planting with VDT rehabilitation areas.</p> <p>Operator experience in undertaking rehabilitation? VRX has commenced VDT trials and will use the information gained to train experienced operators to conduct the rehabilitation works. Given progressive rehabilitation is proposed this experience will improve further over the life of the Proposal.</p> <p>What is the type of vegetation being rehabilitated? Predominantly Kwongan heath defined by Beard (1976) as: Shrublands; scrub-heath with scattered <i>Banksia</i> spp., <i>Eucalyptus todtiana</i> and <i>Xylomelum angustifolium</i> on deep sandy flats in the Geraldton Sandplain Region</p> <p>Time lag? Up to two years for some species depending on rainfall events, up to ten years for some deeper rooted species to become fully established</p> <p>Credibility of the rehabilitation proposed (evidence of demonstrated success) Credible, VDT has been trialled and evidence of demonstrated success is provided in Mattiske (2019a). Site-specific VDT trials are also being conducted.</p>	No					
<p>Priority Flora – Disturbance of:</p> <ul style="list-style-type: none"> 1277 <i>Banksia elegans</i> (P4) individuals 30 <i>Comesperma rhadinocarpum</i> (P3) individuals 98 <i>Hemiandra</i> sp. Eneabba (H. Demarz 3687) (P3) individuals 11 known <i>Hypocalymma gardneri</i> (P3) individuals 1 known <i>Schoenus griffinianus</i> (P4) individuals 167 <i>Schoenus</i> sp. Eneabba (F. Obbens & C. Godden 1154) (P2) individuals 6 <i>Stawellia dimorphantha</i> (P4) individuals Other potential species that may be present 	<p>Avoid Development envelopes were revised to avoid:</p> <ul style="list-style-type: none"> 62.4 % of <i>Banksia elegans</i> (P4) individuals 49.15 % of <i>Comesperma rhadinocarpum</i> (P3) individuals 57.6 % of <i>Hemiandra</i> sp. Eneabba (H. Demarz 3687) (P3) individuals 64.3 % of <i>Schoenus</i> sp. Eneabba (F. Obbens & C. Godden 1154) (P2) individuals >95 % of <i>Hypocalymma gardneri</i> (P3), <i>Schoenus griffinianus</i> (P4) and <i>Stawellia dimorphantha</i> (P4) individuals <p>Minimise</p> <ul style="list-style-type: none"> Implement industry best practice management measures for flora and vegetation Conduct additional significant flora searches of final disturbance footprints Ensure impacts to Priority Flora within the Access and Development Envelope do not exceed those predicted in Section Error! Reference source not found. of the ERD Prepare and implement a Significant Flora Management Plan Implement the Rehabilitation Strategy 	<p>339.3 ha of progressive VDT rehabilitation 14.5 ha of traditional mine rehabilitation – vegetation to be rehabilitated with stripped topsoil and seeded with impacted species if required and suitable</p>	<p>Can the environmental values be rehabilitated / Evidence? Yes, the values are either predicted to be retained during the VDT process or can be included in direct seeding / planting with VDT rehabilitation areas.</p> <p>Operator experience in undertaking rehabilitation? VRX has commenced VDT trials and will use the information gained to train experienced operators to conduct the rehabilitation works. Given progressive rehabilitation is proposed this experience will improve further over the life of the Proposal.</p> <p>What is the type of vegetation being rehabilitated? Predominantly Kwongan heath defined by Beard (1976) as: Shrublands; scrub-heath with scattered <i>Banksia</i> spp., <i>Eucalyptus todtiana</i> and <i>Xylomelum angustifolium</i> on deep sandy flats in the Geraldton Sandplain Region.</p> <p>Time lag? Up to two years depending on rainfall events, up to ten years for <i>Banksia elegans</i> (P4) populations to become fully established</p> <p>Credibility of the rehabilitation proposed (evidence of demonstrated success) Credible, VDT has been trialled and evidence of demonstrated success is provided in Mattiske (2019a). Site-specific VDT trials are also being conducted.</p>	No					



Existing Environment / Impact	Mitigation			Significant Residual Impact	Offset Calculation Methodology				
	Avoid and Minimise	Rehabilitation Type	Likely Rehabilitation Success		Type	Risk	Likely Offset Success	Time Lag	Offset Quantification
	<ul style="list-style-type: none"> Implement preventive measures to minimise the risk and impact of hydrocarbon spills Comply with Water Quality Protection Guidelines and guidance notes 								
<p>Terrestrial vertebrate fauna species and habitat –</p> <p>Up to 14.5 ha of fauna habitat clearing to remain cleared for the life of the Proposal</p> <p>Up to 399.5 ha of habitat rehabilitation via VDT</p> <p>Potential death or injury of fauna from vehicle strike or entrapment</p> <p>Some indirect impacts to fauna habitat health and fauna behavioural impacts</p>	<p>Avoid</p> <p>VRX has conducted numerous ecological surveys and this information has been utilised to design the Proposal and its development envelope boundaries to avoid almost all of the constrained VSA2 (Dense riparian thickets).</p> <p>The Proposal utilises previously cleared areas where possible such as utilising existing tracks for access.</p> <p>Minimise</p> <ul style="list-style-type: none"> Implement industry best practice management measures for terrestrial fauna Implement the Rehabilitation Strategy Prepare and implement Fauna Habitat Management Plan (FHMP) Implement preventive measures to minimise the risk and impact of hydrocarbon spills Comply with Water Quality Protection Guidelines and guidance notes 	<p>339.3 ha of progressive VDT rehabilitation</p> <p>14.5 ha of traditional mine rehabilitation – vegetation to be rehabilitated with stripped topsoil and seeded with impacted species if required and suitable</p>	<p>Can the environmental values be rehabilitated / Evidence?</p> <p>Yes, the habitat values are either predicted to be retained during the VDT process or can be improved by direct seeding / planting within VDT rehabilitation areas</p> <p>Operator experience in undertaking rehabilitation?</p> <p>VRX has commenced VDT trials and will use the information gained to train experienced operators to conduct the rehabilitation works. Given progressive rehabilitation is proposed this experience will improve further over the life of the Proposal.</p> <p>What is the type of vegetation being rehabilitated?</p> <p>Predominantly Kwongan heath defined by Beard (1976) as: Shrublands; scrub-heath with scattered <i>Banksia</i> spp., <i>Eucalyptus tottiana</i> and <i>Xylomelum angustifolium</i> on deep sandy flats in the Geraldton Sandplain Region.</p> <p>Time lag?</p> <p>Up to two years depending on rainfall events</p> <p>Credibility of the rehabilitation proposed (evidence of demonstrated success)</p> <p>Credible, VDT has been trialled and evidence of demonstrated success is provided in Mattiske (2019a). Site-specific VDT trials are also being conducted.</p>	No					
<p>SRE Fauna –</p> <p>9 potential SRE fauna (including one Priority 1 SRE <i>Idiosoma kwongan</i>) have been recorded within the development envelopes.</p> <p>Up to 14.5 ha of fauna habitat clearing to remain cleared for the life of the Proposal</p> <p>Up to 339.5 ha of habitat rehabilitation via VDT</p> <p>Potential death or injury of fauna from vehicle strike or entrapment</p> <p>Some indirect impacts to fauna habitat health and fauna behavioural impacts</p>	<p>Avoid</p> <p>VRX has conducted numerous ecological surveys and this information has been utilised to design the Proposal and its development envelope boundaries to avoid almost all of the constrained VSA2 (Dense riparian thickets).</p> <p>The Proposal utilises previously cleared areas where possible such as utilising existing tracks for access.</p> <p>Minimise</p> <ul style="list-style-type: none"> Implement industry best practice management measures for terrestrial fauna Implement the Rehabilitation Strategy Ensure no confirmed SREs are restricted to the disturbance footprint. Implement preventive measures to minimise the risk and impact of hydrocarbon spills Comply with Water Quality Protection Guidelines and guidance notes 	<p>339.3 ha of progressive VDT rehabilitation</p> <p>14.5 ha of traditional mine rehabilitation – vegetation to be rehabilitated with stripped topsoil and seeded with impacted species if required and suitable</p>	<p>Can the environmental values be rehabilitated / Evidence?</p> <p>Yes, the habitat values are either predicted to be retained during the VDT process or can be improved by direct seeding / planting within VDT rehabilitation areas</p> <p>Operator experience in undertaking rehabilitation?</p> <p>VRX has commenced VDT trials and will use the information gained to train experienced operators to conduct the rehabilitation works. Given progressive rehabilitation is proposed this experience will improve further over the life of the Proposal.</p> <p>What is the type of vegetation being rehabilitated?</p> <p>Predominantly Kwongan heath defined by Beard (1976) as: Shrublands; scrub-heath with scattered <i>Banksia</i> spp., <i>Eucalyptus tottiana</i> and <i>Xylomelum angustifolium</i> on deep sandy flats in the Geraldton Sandplain Region.</p> <p>Time lag?</p> <p>Up to two years depending on rainfall events</p> <p>Credibility of the rehabilitation proposed (evidence of demonstrated success)</p> <p>Credible, VDT has been trialled and evidence of demonstrated success is provided in Mattiske (2019a). Site-specific VDT trials are also being conducted.</p>	No					
<p>Malleefowl and potential habitat –</p> <p>Up to 14.5 ha of fauna habitat clearing to remain cleared for the life of the Proposal</p>	<p>Avoid</p> <p>The Proposal also utilises previously cleared areas where possible, and utilising existing tracks for the western access corridor option.</p>	<p>339.3 ha of progressive VDT rehabilitation</p> <p>14.5 ha of traditional mine rehabilitation – vegetation to be rehabilitated with</p>	<p>Can the environmental values be rehabilitated / Evidence?</p> <p>Yes, the habitat values are either predicted to be retained during the VDT process or can be improved by direct seeding / planting within VDT rehabilitation areas</p>	No					



Existing Environment / Impact	Mitigation			Significant Residual Impact	Offset Calculation Methodology				
	Avoid and Minimise	Rehabilitation Type	Likely Rehabilitation Success		Type	Risk	Likely Offset Success	Time Lag	Offset Quantification
<p>Up to 339.3 ha of habitat rehabilitation via VDT</p> <p>Potential death or injury from vehicle strike or entrapment</p> <p>Some indirect impacts to habitat health and behavioural impacts</p>	<p>Minimise</p> <ul style="list-style-type: none"> Implement industry best practice management measures for terrestrial fauna Implement the Rehabilitation Strategy Prepare and implement FHMP Conduct pre-clearance Malleefowl mound searches Implement preventive measures to minimise the risk and impact of hydrocarbon spills Comply with Water Quality Protection Guidelines and guidance notes 	<p>stripped topsoil and seeded with impacted species if required and suitable</p>	<p>Operator experience in undertaking rehabilitation?</p> <p>VRX has commenced VDT trials and will use the information gained to train experienced operators to conduct the rehabilitation works. Given progressive rehabilitation is proposed this experience will improve further over the life of the Proposal.</p> <p>What is the type of vegetation being rehabilitated?</p> <p>Predominantly Kwongan heath defined by Beard (1976) as: Shrublands; scrub-heath with scattered <i>Banksia</i> spp., <i>Eucalyptus todtiana</i> and <i>Xylomelum angustifolium</i> on deep sandy flats in the Geraldton Sandplain Region</p> <p>Time lag?</p> <p>Up to two years depending on rainfall events for most species, up to ten years for deeper-rooted species</p> <p>Credibility of the rehabilitation proposed (evidence of demonstrated success)</p> <p>Credible, VDT has been trialled and evidence of demonstrated success is provided in Mattiske (2019a). Site-specific VDT trials are also being conducted. Nevertheless, infill planting is expected to be required.</p>						
<p>Carnaby's Cockatoo foraging habitat –</p> <p>Up to 14.5 ha of medium to high value foraging habitat clearing to remain cleared for the life of the Proposal</p> <p>Disturbance and progressive VDT rehabilitation of up to 339.3 ha of moderate to high value foraging habitat</p> <p>Some indirect impacts to habitat health and behavioural impacts</p>	<p>Avoid</p> <p>The Proposal also utilises previously cleared areas where possible, and utilising existing tracks for the western access corridor option.</p> <p>Minimise</p> <ul style="list-style-type: none"> Implement industry best practice management measures for terrestrial fauna Implement the Rehabilitation Strategy Prepare and implement FHMP Implement preventive measures to minimise the risk and impact of hydrocarbon spills Comply with Water Quality Protection Guidelines and guidance notes 	<p>339.3 ha of progressive VDT rehabilitation</p> <p>14.5 ha of traditional mine rehabilitation – vegetation to be rehabilitated with stripped topsoil and seeded with impacted species if required and suitable</p>	<p>Can the environmental values be rehabilitated / Evidence?</p> <p>Yes, the foraging habitat values are predicted to be rehabilitated by direct seeding / planting within VDT rehabilitation areas</p> <p>Operator experience in undertaking rehabilitation?</p> <p>VRX has commenced VDT trials and will use the information gained to train experienced operators to conduct the rehabilitation works. Given progressive rehabilitation is proposed this experience will improve further over the life of the Proposal.</p> <p>What is the type of vegetation being rehabilitated?</p> <p>Predominantly Kwongan heath defined by Beard (1976) as: Shrublands; scrub-heath with scattered <i>Banksia</i> spp., <i>Eucalyptus todtiana</i> and <i>Xylomelum angustifolium</i> on deep sandy flats in the Geraldton Sandplain Region</p> <p>Time lag?</p> <p>Up to ten years for deeper-rooted foraging species</p> <p>Credibility of the rehabilitation proposed (evidence of demonstrated success)</p> <p>Some limitations have been noted with Banksia revegetation conducted in mine rehabilitation to-date. VDT has been trialled and evidence of demonstrated success is provided in Mattiske (2019a). Site-specific VDT trials are also being</p>	Yes	Protection and maintenance of an estimated 1,247.6 ha of moderate to high value (minimum average value of 7 out of 10) Carnaby's Cockatoo habitat	Low – VRX has identified sufficient foraging habitat within M 70/1398 suitable as an offset.	<p><u>Can the values be defined and measured?</u></p> <p>Yes – value to species can be measured</p> <p><u>Operator experience/Evidence?</u></p> <p>VRX will manage the land or will utilise an experienced land management contractor</p> <p><u>What is the type of vegetation being revegetated?</u></p> <p>None – VRX is protecting and maintaining existing Kwongan heath.</p>	Protects and maintains critical habitat upon agreement – no time delay	<p>Offset would ensure protection and maintenance of moderate and moderate to high value foraging habitat, which based on the WA Offset Calculator (DWER, 2021b) is considered to be suitable to offset the foraging habitat impacts associated with the long term impact to 14.5 ha and availability of 120 ha of foraging habitat.</p> <p>This is considered adequate by DCCEEW and satisfies the minimum 90% offset criteria within DSEWPac (2012a).</p>



Existing Environment / Impact	Mitigation			Significant Residual Impact	Offset Calculation Methodology				
	Avoid and Minimise	Rehabilitation Type	Likely Rehabilitation Success		Type	Risk	Likely Offset Success	Time Lag	Offset Quantification
			conducted. Nevertheless, infill planting is expected to be required.		Protection and maintenance of an estimated 119.5 ha of moderate value (minimum average value of 7 out of 10) Carnaby's Cockatoo habitat	Low - VRX has identified sufficient foraging habitat within M 70/1398 suitable as an offset.	<p><u>Can the values be defined and measured?</u> Yes - value to species can be measured</p> <p><u>Operator experience/Evidence?</u> VRX will manage the land or will utilise an experienced land management contractor</p> <p><u>What is the type of vegetation being revegetated?</u> None - VRX is protecting and maintaining existing Kwongan heath.</p>	Protects and maintains critical habitat upon agreement - no time delay	Offset would ensure protection and maintenance of moderate to high value foraging habitat, which based on the WA Offset Calculator (DWER, 2021b) is considered to be suitable to offset the reduction in value of foraging habitat associated with 219.5 ha of rehabilitation via VDT. This is considered adequate by DCCEEW and satisfies the minimum 90 % offset criteria within DSEWPac (2012a)



5.1.2 ASSESSMENT AGAINST WA OFFSETS CALCULATOR

VRX proposes to offset the significant residual impact of the Proposal on Carnaby’s Cockatoo foraging habitat by protecting and maintaining suitable areas of moderate to high and moderate value foraging habitat within the Offset Area (Figure 3).

The Offset Area is comprised of 119.5 ha of moderate and 1,247.6 ha of moderate to high value Carnaby’s Cockatoo foraging habitat, VRX proposes to protect and maintain the entire Offset Area to satisfy the offset requirements detailed above, with the exception of any minor disturbances that may be required in the future for infrastructure such as powerlines, roads and pipelines (noting none are currently planned). These minor disturbances have been accounted for in the calculations.

The WA Offsets Calculator (DWER, 2021b) has been used to quantify the area of foraging habitat required to be protected to offset the significant residual impact of the Proposal. The proposed offset has been evaluated to ensure it meets the minimum requirements of the Calculator. The assessment was run in two separate calculations:

1. **Offset 14.5 ha of clearing of foraging habitat for the life of the Proposal.** The value of the cleared foraging habitat is 7/10 therefore the total quantum of impact is 10.15 ha. The calculation includes rehabilitation of the cleared land by respreading topsoil and direct seeding at mine closure. Rehabilitation was calculated to provide a credit of 2.88 ha, therefore the significant residual impact of this clearing is 7.27 ha. A minimum of 24.42 ha of moderate to high value habitat is required to offset this significant residual impact; and
2. **Offset 339.3 ha of clearing and progressive VDT rehabilitation.** The value of this cleared habitat is 7/10 therefore the total quantum of impact is 237.51 ha. Rehabilitation via VDT and infill planting was calculated to provide a credit of 96.37 ha, therefore the significant residual impact of this clearing is 141.14 ha. A minimum of 473.98 ha of moderate to high value habitat is required to offset the significant residual impact.

The values used in the calculator, and the justification for the value is provided in Table 5.

Table 5: Criteria used in WA Offsets Calculator

Criteria	Value used	Justification / Rationale
Quality of impacted area	Moderate to High Value (7/10) for Carnaby’s Cockatoo foraging habitat	The Proposal will require clearing of native vegetation that represents Moderate to high value Carnaby’s Cockatoo habitat as described by BCE (2022).
Quality of rehabilitation site	0/10	Site would have recently been cleared to implement the Proposal
Future quality of rehabilitation site without rehabilitation	1/10	It is possible for the site to regrow naturally to some extent – however it is not expected to provide any significant foraging value in the near-medium term.
Future quality of rehabilitation site with rehabilitation	5/10	As described by BCE (2020). VRX acknowledges that rehabilitation of Carnaby’s Cockatoo foraging habitat is difficult however VRX proposes to undertake rehabilitation by VDT and infill planting. VDT has been identified as being the best rehabilitation method for the Proposal (discussed further in Section Error! Reference source not found. of the ERD). The Proposal has a 30 year mine life, progressive implementation of rehabilitation will provide VRX with opportunities to refine the VDT and infill planting



Criteria	Value used	Justification / Rationale
		methodology. For these reasons it is expected that rehabilitation of the Proposal will be successful, nevertheless VRX has chosen to take a conservative approach and predicts a value lower than the maximum provided in BCE (2020).
Time until ecological benefit	10 years	Vegetation is expected to represent foraging habitat 10 years after rehabilitation works are completed (BCE, 2020).
Confidence in rehabilitation result	80%	VRX has given this a high confidence as the target quality is relatively low (i.e., 80% confidence of achieving only 5/10). VDT trials have been conducted and an assessment of the VDT methodology in the context of the Proposal has been provided (Mattiske, 2019a, 2020a). A rehabilitation management plan has been prepared by VRX and will be updated as new site specific information on rehabilitation and VDT learned.
Quality of Offset Area	Moderate to High Value (7/10) Carnaby's Cockatoo foraging habitat	As described by BCE (2022).
Future quality of offset site without offset	6/10	VRX has assumed that no development will occur within the area and the reduction in value presented here is the result of incidental anthropogenic activities. If development was to occur, the future quality would be significantly less.
Future quality of offset site with offset	7/10	Active, on ground protection of the proposed offset site will maintain the value of native vegetation.
Time until ecological benefit	1 year	VRX is the sole lease holder of the proposed offset site and is able to protect the area from development immediately. 1 year is the lowest value available, but VRX intends to protect and maintain the offset from the commencement date of the Proposal.
Confidence in offset result	90%	Predicted changes in quality are conservative therefore confidence is relatively high
Duration of offset	20 years	20 years is the highest value available. VRX proposes to preserve and maintain the offset site for a minimum of 30 years
Time until offset site secured	0 year	VRX is the sole lease holder and intends to protect and maintain the offset from the commencement date of the Proposal
Risk of future loss of the offset site if offset was not in place	80%	20 year timeframe was used as per the duration of the offset listed above. The offset site overlies a significant mineral resource therefore there is a high likelihood that it would be developed if protection for an offset is not implemented.
Risk of future loss of the offset site if offset is in place	40%	20 year timeframe was used as per the duration of the offset listed above. The offset site will be protected from development therefore future loss is avoided. VRX acknowledges that this offset type is not the equivalent of a conservation covenant and therefore a conservative estimate of 40% risk of future loss has been applied.

Based on the calculations, VRX is required to offset the significant residual impact with a minimum of 498.4 ha of moderate to high value Carnaby's Cockatoo foraging habitat. The proposed Offset Area contains a total of 1,367.1 ha of foraging habitat (comprised of 119.5 ha of moderate and 1,247.6 ha of moderate to high value habitat). The proposed offset is deemed suitable to offset the significant residual impact of the Proposal on Carnaby's Cockatoo foraging habitat as, at a minimum, the moderate to high component exceeds the minimum required offset by 749.2 ha (approximately 2.5 times the required Offset Area).



VRX acknowledges that there may be minor disturbances within the Offset Area associated with linear infrastructure (powerlines, roads, pipelines etc.) that could occur in the 30-year timeframe however this has been accounted for in the offset calculations, with the available area significantly exceeding the minimum requirement.

5.1.3 ASSESSMENT AGAINST ENVIRONMENTAL OFFSETS PRINCIPLES

In WA, government decision making processes in relation to the use of environmental offsets are underpinned by six principles. These are set out in the Environmental Offsets Policy (EPA, 2011). The Proposal and proposed offset has been assessed against each of these principles, provided in Table 6.

Table 6: Assessment of the proposed offset against the six principles

No.	Principle	Assessment outcome
1	Environmental offsets will only be considered after avoidance and mitigation options have been pursued.	VRX has applied the mitigation hierarchy by identifying measures to avoid, minimise and rehabilitate. VRX's main action to meet this policy's requirements was site selection and design, which avoided development in areas of native vegetation with potential Carnaby's Black-Cockatoo breeding sites, and reduce the development envelope to the smallest size possible.
2	Environmental offsets are not appropriate for all projects.	It is acknowledged that offsets are not appropriate for all projects. As the Proposal will result in significant residual impacts due to impact on a threatened / protected fauna species, an offset is considered to be appropriate.
3	Environmental offsets will be cost-effective, as well as relevant and proportionate to the significance of the environmental value being impacted.	The proposed offsets have been designed to be cost-effective by targeting the initial retention and conservation of existing remnant vegetation, in close proximity to the Proposal, meaning that much of the same equipment and personnel could be used for management. Potential Carnaby's Black Cockatoo foraging habitat is proposed to be cleared during the implementation of the Proposal. The proposed Offset Area contains correlating Carnaby's Black Cockatoo foraging habitat values that represent those that will be lost during the implementation of the Proposal. The use of the proposed offsets for the Proposal is considered to be relevant and proportionate to the significance of the environmental value being impacted.
4	Environmental offsets will be based on sound environmental information and knowledge.	The proposed offsets are aligned with the Carnaby's Black Cockatoo Recovery Plan (DpaW, 2013a). The protection and maintenance of the Offset Area will ensure its protection from development, and that it is managed to maintain its natural values for 30 years.
5	Environmental offsets will be applied within a framework of adaptive management.	The proposed Offset Area will provide significant opportunities within the framework of adaptive management. It can potentially be used as a trial or pilot site for new approaches to threat reduction. In consultation with DBCA or other land management specialists, VRX will review the management mechanisms (Section 4.1.2 of the ERD) to ensure best practice management techniques are applied. Offsets have been designed to be adaptive, VRX will undertake regular monitoring and reporting to assess the performance of protection mechanisms and identify areas for improvement. This allows information and knowledge captured during operation to be used in an adaptive manner for ongoing maintenance and protection.
6	Environmental offsets will be focused on longer term strategic outcomes.	VRX acknowledges that the proposed offset does not offset native vegetation in perpetuity however, the offset dose align with the long-term strategy within the Carnaby's Black Cockatoo Recovery Plan (DpaW, 2013a). The proposed offsets have been designed to offset the impacts of the Proposal from the outset. It focuses on protection and enhancement of important habitat through management. Management actions have been developed to align with the recovery actions of the recovery plan, generally these include: <ul style="list-style-type: none"> • Prevent clearing and permanent habitat loss;



No.	Principle	Assessment outcome
		<ul style="list-style-type: none"> • Feral animal monitoring and control; • Management of fire regimes, salinity, weeds and dieback; and • Promote regeneration. <p>The protection and maintenance of the Offset Area will ensure its protection from development, and that it is managed to maintain its natural values for at least 30 years. It is expected that the foraging value of vegetation disturbed during mining will recover (to a lesser quality pending further evidence of rehabilitation outcomes) during the 30 year period.</p> <p>At the cessation of the 30 year protection period the land may be subject to development (subject to approvals at that time). Without protection, the proposed offset could be subject to development at any time.</p>

5.2 ASSESSMENT OF PROPOSED OFFSETS – EPBC ACT

The Commonwealth Minister for the Environment determined that the Proposal (EPBC 2020/8788) is a controlled action under the EPBC Act as it is likely to have a significant impact on one or more MNES. It was determined that the proposed action is likely to have a significant impact on the following matters protected by the EPBC Act:

- Carnaby’s Cockatoo (*Zanda latirostris*) – Endangered;
- Malleefowl (*Leipoa ocellata*) – Vulnerable; and
- Sandplain Duck Orchid (*Paracaleana dixonii*) – Endangered.

The Proposal is being assessed as an ‘accredited assessment’ under Part IV of the EP Act. Section 87 of the EPBC Act makes provisions for the EPA to undertake this accredited assessment of the potential impacts to MNES on behalf of DCCEEW.

5.2.1 COMMONWEALTH ENVIRONMENTAL OFFSETS GUIDELINES

Offsets are defined as measures that compensate for the residual adverse impacts of an action on the environment. Where appropriate, offsets are considered during the assessment phase of an EIA under the EPBC Act.

The EPBC Act Environmental Offsets Policy (DSEWPaC, 2012) states:

“The term ‘environmental offsets’ refers to measures that compensate for the residual adverse impacts of an action on the environment. Offsets provide environmental benefits to counterbalance the impacts that remain after avoidance and mitigation measures. These remaining, unavoidable impacts are termed ‘residual impacts’. For assessments under the EPBC Act, offsets are only required if residual impacts are significant.

Offsets can help to achieve long-term environmental outcomes for matters protected under the EPBC Act, while providing flexibility for proponents seeking to undertake an action that will have residual impacts on those protected matters.”

5.2.2 ASSESSMENT AGAINST EPBC OFFSETS CALCULATOR

VRX proposes to offset the residual significant impact of the Proposal on Carnaby’s Cockatoo foraging habitat by protecting and maintaining moderate to high and moderate value foraging habitat within the Offset Area (Figure 3).



The Commonwealth and WA Governments have similar offset calculators that allow a general assessment of the suitability of offsets in counterbalancing the residual impacts of a proposal. The calculators consider factors such as:

- The quality of the impacted area and offset sites (with and without the offset being applied);
- The likelihood that the offset sites will be disturbed (with and without the offset being applied);
- The size of the Offset Areas; and
- The likely change in quality with and without an offset.

The residual significant impact used in the EPBC Act Offsets Calculator includes 358.3 ha of Carnaby's Cockatoo habitat (i.e., the quantum of impact before consideration of benefits from progressive rehabilitation). Other values used in the calculator, and the justification for the value, is provided in Table 5.

The proposed offset site has been assessed against the EPBC Offsets Calculator (DSEWPaC (2012a)). The assessment was run in two separate calculations to determine the contribution of the proposed offset towards counterbalancing the residual impact of the Proposal. The calculations considered the:

1. **Offset value of the 119.5 ha moderate Carnaby's Cockatoo foraging habitat.** An offset of 119.5 ha of moderate value Carnaby's Cockatoo foraging habitat was suitable to offset 6.33% of the residual impact; and
2. **Offset value of 1,247.6 ha of moderate to high value Carnaby's Cockatoo foraging habitat.** An offset of 1,247.6 ha of moderate to high value foraging habitat is suitable to offset 108.96% of the residual impact.

Using the EPBC Act calculator, the offset sites contain sufficient areas of Carnaby's Cockatoo foraging habitat to adequately offset the total residual significant impact of the Proposal i.e., exceeds the minimum 90% offset criteria in DSEWPaC (2012a). VRX notes that, unlike the WA Offsets Calculator, the EPBC Act calculator does not account for rehabilitation of the Proposal when determining residual impacts (i.e. it assumes foraging habitat would be cleared forever). Furthermore, the calculator assumes that all clearing will be conducted immediately and remain cleared permanently. Given the entire Proposal will be progressively rehabilitated with portions expecting to reach a moderate foraging value within ten years this rehabilitation is considered to significantly reduce the residual impacts such that the proposed offset far exceeds the minimum offset requirements.

VRX acknowledges that there may be minor disturbances within the Offset Area associated with linear infrastructure (powerlines, roads, pipelines etc.) that could occur in the 30-year timeframe, however this has been accounted for in the offset calculations, with the available area significantly exceeding the minimum requirement.

In this instance, the EPBC Act offsets calculator is considered to be very conservative and the proposed offset sites are suitable to offset the residual significant impact of the Proposal on Carnaby's Cockatoo foraging habitat.

5.2.3 OFFSET PRINCIPLES

Table 7 provides the overarching principles that are applied in determining the suitability of offsets. In assessing the suitability of an offset, government decision-making will be informed by



scientifically robust information and incorporate the precautionary principle in the absence of scientific certainty and conducted in a consistent and transparent manner.

Table 7: EPBC Act overarching principles applied in determining the suitability of offsets

No.	Principle	Offset suitability
1	Offsets must deliver an overall conservation outcome that improves or maintains the viability of the protected matter	<p>The protection of Carnaby’s Black Cockatoo foraging habitat is a direct offset for the impacts of the Proposal. Implementation of Management and Protection mechanisms will ensure that the Offset Area will remain viable for the use as foraging habitat for Carnaby’s Cockatoo for a minimum of 30 years.</p> <p>The proposed offset includes monitoring of the Offset Site to determine the change in foraging value over time. Monitoring information will provide VRX with a better understanding of the impacts that weeds, dieback and feral animals will have on forging habitat. This information will be used to inform the protection and maintenance measures for the Offset Area which are likely to result in an improvement to the viability of the foraging habitat.</p>
2	Offsets must be built around direct offsets but may include other compensatory measures	The proposed offsets are direct offsets.
3	Offsets must be in proportion to the level of statutory protection that applies to the protected matter	VRX acknowledges the level of statutory protection that apply to the protected matter. This was considered when assessing the significance of the residual impacts. The scale of the proposed offsets takes into account these considerations.
4	Offsets must be of a size and scale proportionate to the residual impacts on the protected matter	The proposed offsets are significant in size and scale, proportionate to the predicted residual impacts.
5	Offsets must effectively account for and manage the risks of the offset not succeeding	The risk of the proposed offsets not succeeding is low. Proposed offsets include the protection and maintenance of existing native vegetation. VRX has commissioned extensive surveys of the Offset Area. Maintenance measures specific to the proposed offset have been determined based on the assessment of potential impacts to foraging habitat.
6	Offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs	The proposed offsets are in addition to that which is already required, determined by law or planning regulations, or agreed to under other schemes or programs. The offset site is not protected as conservation estate by any current legislation.
7	Offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable	<p>The proposed offset targets a portion of existing native vegetation representative of Carnaby’s Cockatoo foraging habitat. VRX has already secured tenure over this area and has a vested interest in maintaining tenure for a timeframe that exceeds the life of the Proposal (i.e., more than 30 years). Implementation of the offset can commence at any time following the approval date.</p> <p>The proposed offset is considered to be effective, scientifically robust and reasonable.</p>
8	Offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced	<p>VRX will be responsible for the protection and maintenance of the proposed offset. VRX has a corporate governance statement that sets out the main corporate governance policies and practices. Under this statement, VRX has an environmental policy to ensure the integrity of the environment for all employees, contractors and external stakeholders associated with operations.</p> <p>On approval of the ERD VRX will prepare and submit, for approval, an offset proposal that provides further details on the proposed offsets. An offset management plan will be provided for the offset proposed. The offset management plan will include requirements to monitor and report (annually) the outcomes of the offset.</p>



6 OBJECTIVES, TARGETS AND COMPLETION CRITERIA

Table 8 sets out the objectives, targets and completion criteria for the proposed offsets.

Table 8: Objectives, targets and completion criteria

Objective	Target	Completion Criteria
<p>To counterbalance the significant residual impacts to 14.5 ha of Carnaby's Cockatoo foraging habitat for the life of the Proposal</p>	<p>Protect and maintain an estimated 1,247.6 ha of moderate to high and 119.5 ha of moderate value Carnaby's Cockatoo foraging habitat within the Offset Area</p>	<p>1,247.6 ha of moderate to high value (average value of at least 7/10) and 119.5 ha of moderate value (average value of 4/10) Carnaby's Cockatoo foraging habitat protected and maintained that would exceed the minimum offset criteria (DSEWPaC, 2012a; DWER, 2021b).</p> <p>Initial and ongoing management works are completed in accordance with Section 4.1.2 of the ERD.</p> <p>Carnaby's Cockatoo foraging habitat values are maintained.</p>
<p>To counterbalance the significant residual impacts of clearing and progressive VDT rehabilitation of 339.3 ha of moderate to high value Carnaby's Cockatoo.</p> <p>It is expected that this will result in a reduction in foraging value from 7 /10 to 5/10.</p>		



7 MONITORING

Routine monitoring is necessary to ensure the proposed offsets are effective in counterbalancing the significant residual impacts on the environmental values. Table 9 provides a framework for the monitoring required, however final monitoring requirements and timings will be determined during agreements with the Conservation and Parks Commission / DBCA or other relevant parties.

Table 9: Offset monitoring schedule

Offset	Monitoring	Timing
Protection of 1,367.1 ha of native vegetation representative of Carnaby's Cockatoo foraging habitat within the Arrowsmith North Mining Lease (M70/1389) for the life of the Proposal.	Offset Area vegetation health monitoring	Every 6 months for the first 3 years from the commencement of operations, then annually
	Weed infestation, including: <ul style="list-style-type: none"> • Area of impact • Species list • Location of weed infestation 	Every 6 months for the first 3 years from the commencement of operations, then annually
	Evidence of access by public or introduced fauna	Annually
	Evidence of unauthorised disturbance (access etc.)	Annually
	Evidence of fire	Annually
	Evidence of spread of dieback infestations	Annually

VRX notes that rehabilitation is considered an offset when assessing EPBC Act offsets, The following section provides information about rehabilitation monitoring, sourced from the Rehabilitation Strategy (Preston Consulting, 2022).

Progressive rehabilitation using VDT and infill planting of select species is included as part of the Proposal. Rehabilitation has been considered in determining the residual significant impact of the Proposal (see Section 5). As part of rehabilitation, VRX is committed to undertaking routine monitoring to ensure rehabilitation of those sites is effective and meets the outcomes proposed in the Rehabilitation Strategy. Rehabilitation monitoring will be completed in the field to measure the rehabilitation outcomes. Completion criteria set the framework for this monitoring, but monitoring is also important to establish a continuous improvement feedback loop for rehabilitation. The monitoring proposed focuses on two key goals:

1. Providing feedback on rehabilitation performance as soon as possible in the rehabilitation process to:
 - a. Enable early evaluation of the outcomes of methodology variations;
 - b. Provide information from which decisions can be made about the need for interventions to improve the outcome; and
2. Provide evidence of progress toward and eventual attainment of completion criteria to enable relinquishment of responsibility for the tenements.

The monitoring therefore has three key timeframes where data is essential:

1. The first spring after the VDT process, when plants are re-sprouting and seeds are germinating. This is the time to determine whether any interventions (such as weed control, supplementary seeding or infill tree planting) may be required to meet the ten



- year criteria. Interventions become more difficult to implement as the rehabilitation progresses, requiring this early identification of potential failures;
2. Notionally at regular intervals, such as years 2, 5 and 10 to provide information on how the rehabilitation is progressing; and
 3. After ten or more years, when plants have had the opportunity to grow and establish, to demonstrate that the rehabilitation is attaining the required attributes to be self-sustaining and not require any additional management.

Monitoring will ultimately be compared to a series of reference plots selected in areas that will not be disturbed, in equivalent soils and landform positions, and with equivalent vegetation types. These reference plots are expected to be monitored annually over the life of the Proposal. In the first spring and autumn, the monitoring is planned to include a combination of functional groups, densities and percentage cover, together with selected species counts and densities/numbers in randomly generated spots. This approach is designed to give an immediate indication of the success of germination and establishment, the two key processes that dictate the starting point for the revegetation of the area. This data will be used to not only provide immediate feedback regarding the outcomes of the methodology and seasonal conditions and threats, but will enable the need for any interventions to be identified. For years 2, 5 and 10, the monitoring approach will be to determine how the established species are growing, cover, weeds or other problems, and any recruitment. Some of the completion criteria monitoring will take the form of auditing rather than monitoring. This approach enables a record of completion of key steps in the mine closure process.



8 FUNDING ARRANGEMENTS

VRX will provide funding for the following:

- Annual rent fees for Mining Lease (M 70/1389) to ensure it remains under VRX's control;
- Establishment and maintenance of demarcation for the Offset Area;
- Installation of access restriction infrastructure (as required);
- Erection of signs to identify the boundaries of the Offset Area;
- Monitoring associated with the maintenance of the Offset Area and rehabilitated areas;
- Maintenance of the site including:
 - Removal/treatment of weeds;
 - Treatment of dieback affected areas (application of phosphite or similar fungicide as required);
 - Feral animal trapping and management;
- Development and implementation of a ranger program;
- Establishing fire breaks as required;
- Revegetation of previously disturbed vegetation via VDT and infill planting; and
- Administration costs associated with establishment and maintenance of the Offset Area.



9 MANAGEMENT, ROLES AND RESPONSIBILITIES

VRX will be wholly responsible for the implementation of the proposed offset. As part of the offset, VRX will develop and implement a ranger program (planned to be in collaboration with the Traditional Owners) which will be afforded responsibilities relating to monitoring and maintenance (to be determined in consultation with ranger group). VRX will also seek guidance from relevant authorities including DCCEEW, DMIRS, DBCA and DWER to further refine the management actions and objectives.

Table 10 identifies the key roles and responsibilities for the implementation of offsets.

Table 10: Roles and responsibilities

Role	Responsibility
VRX (corporate)	Development and implementation of the Offset Strategy, funding of offset works and preserving the native vegetation within the Offset Area.
Ranger Program (to be developed)	Implementing and involvement in the development of management and monitoring actions for the Offset Area
VRX Environment Manager	Overseeing the monitoring, management and reporting on the status of the proposed offset and rehabilitation under VRX's management.
VRX Site Manager	Onsite compliance with the Offset Strategy
Technical Officers	Carrying out routine monitoring and management



10 REVIEW AND REVISION

This Offset Strategy is to be reviewed at least every five years, or more frequently under the following circumstances:

- Following a significant environmental incident that threatens the success of the proposed offsets;
- When there is a need to improve performance in an area of environmental conservation;
- When there are changes to activities that are being managed under this Offset Strategy; or
- When there are new activities that should be managed under this Offset Strategy.

The review is to assess whether the Offset Strategy is achieving its objectives and the requirements of approval conditions. The review is to consider environmental monitoring records, response actions taken and the results of any internal and external audits. During the review process, the reasons for varying the Offset Strategy are to be documented. The review may be initiated by any party that has a management responsibility for the implementation of the offsets or at the request of a Government agency that has an interest in the Offset Strategy (in particular DCCEEW, DBCA, DWER and DMIRS).

11 CONCLUSION

VRX has assessed the impacts of the Proposal against the Residual Impact Significance Model (EPA, 2014a) and has determined that the Proposal is likely to result in a significant residual impact to several environmental values.

If approved, VRX predicts that offset conditions will be included in the Ministerial Statement to counterbalance the significant residual impacts of the Proposal. This draft Offset Strategy provides additional detail regarding the offsets proposed by VRX for the Proposal, however these offsets may change pending further discussions with DCCEEW, EPA Services, DBCA, DMIRS and other relevant stakeholders. It is therefore anticipated that a final detailed version of this Offset Strategy will be a pre-implementation condition in the Ministerial Statement and EPBC Act decision (upon approval).

The suitability of the proposed offsets have been assessed against the six offset principles set out in the Environmental Offsets Policy (Government of WA, 2011) and the WA Offsets Template, and EPBC Act guidelines, principles and the offsets calculator. Based on this assessment the proposed offsets are considered to be relevant and proportionate to the significance of the environmental value being impacted.



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13 ABBREVIATIONS

Term	Meaning
4WD	Four-wheel drive
BC Act	<i>Biodiversity Conservation act 2016 (WA)</i>
BCE	Bamford Consulting Ecologists
DAWE	Department of Agriculture, Water and the Environment
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DMIRS	Department of Mines, Industry Regulation and Safety
DMP	Dieback Management Plan
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
DWER	Department of Water and Environmental Regulation
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
EPA	Environmental Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>
ERD	Environmental Review Document
FHMP	Fauna Habitat Management Plan
ha	Hectare
km	Kilometre
m	metre
M	Mining lease
MS	Ministerial Statement
P	Priority
Proposal	Arrowsmith North Silica Sand Project
SR	Supplementary Report
VDT	Vegetation Direct Transfer
VRX	VRX Silica Limited
WA	Western Australia

