



OPR Rail Development

Offsets Strategy

Prepared for
Oakajee Port and Rail Pty Ltd

January 2011

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PREPARED FOR	Oakajee Port and Rail Pty Ltd
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1 Introduction

The following Offset Strategy outlines the approach and level of commitment of Oakajee Port and Rail Pty Ltd to mitigate significant residual impacts of its rail development project to key environmental assets in the mid-west of WA through the provision of appropriate offsets to provide long term environmental benefits to these assets.

1.1 PROJECT BACKGROUND

Oakajee Port and Rail Pty Ltd (OPR) plan to construct 530 km of rail formation and associated infrastructure with a 10 to 15 km spur line to Weld Range and a 20 km Mullewa spur line, through pastoral and freehold land in the northern mid-west region of WA (the Proposal). OPR seek to develop this Proposal on a commercial basis, to promote open access to all users of the port and rail infrastructure and in particular to service mining operations in the Mid-West, Gascoyne and Pilbara regions.

The Proposal was referred to the Environmental Protection Authority (EPA) for consideration under the *Environmental Protection Act 1986* (WA) (EP Act) who determined it would be formally assessed. A Public Environmental Review (PER) level of assessment was subsequently set and guidelines for its preparation released by the EPA. In parallel, OPR referred the Proposal to the Federal Government for a determination on whether it constituted a 'Controlled Action' under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). It was subsequently determined that the Proposal was a 'Controlled Action'. A PER document was prepared by OPR; this document describes the Proposal, its likely effects on the environment and management responses to addressing environmental impacts. The PER was released for public review and submissions have been received by the Office of the EPA and responded to by OPR. The Federal Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) has also commented on the PER.

A number of submissions indicated an expectation for further clarification on the level of OPR's commitment to mitigating the environmental impacts of the Proposal. OPR's ability to respond to these submissions has been aided by its advancement in refining the Proposal design. The PER described the rail as occurring within a 4 km wide study corridor within pastoral land areas and up to a 3.2 km study corridor within freehold land areas. This has since been refined down to an indicative alignment with a proposed disturbance width of 100 m. The designation of these disturbance widths has allowed OPR to be more definitive on the extent of impact anticipated and hence propose an appropriate level of mitigation required to address residual significant impacts.

1.2 KEY ENVIRONMENTAL ASSETS AFFECTED BY DEVELOPMENT

The majority of freehold land the rail alignment passes through has been historically cleared for agriculture and hence the Proposal has few potential ecological impacts. The Proposal is not able to avoid some areas of remnant vegetation. Such vegetation invariably has some regional significance either as it is representative of a vulnerable ecological community or supports habitat for federal and/or state listed threatened or otherwise conservation significant flora and fauna species.

In the pastoral region, the land is mostly uncleared but has been subject to threatening processes to varying degrees, such as long term grazing, drought, feral animal impacts, and weed infestation, which has affected habitat values. In this area, areas of good habitat for threatened species and existing or planned conservation reserves have significance as refuges for flora and fauna.

Following public submissions and further review, OPR has identified the following key environmental assets affected by the Proposal that may warrant consideration for further mitigation, including offsets:

- Vulnerable vegetation associations (being broad ecological community units (as mapped by Beard 1976; Beard and Burns 1976) that have been cleared to the extent that less than 30% of their original extent remains)
- Federal and State listed threatened and Priority flora populations
- Federal and State listed threatened and Priority fauna species/species habitat.

1.2.1 Endangered and Vulnerable vegetation associations

The Proposal requires the clearing of some areas of remnant vegetation in the freehold land. Most vegetation associations in the freehold land have been largely historically cleared and hence less than 30% of their original extent remains in the region (Table 1). These vegetation associations are those as mapped by Beard (1976) in the Murchison region at a scale of 1:1,000,00 and by Beard & Burns (1976) in Geraldton area at a finer scale of 1:250,000. *EPA Position Statement No. 2 - Environmental Protection Of Native Vegetation In Western Australia Clearing Of Native Vegetation (EPA 2000)*¹ indicates that the “threshold level” below which species loss appears to accelerate exponentially at an ecosystem level is regarded as being at a level of 30% of the pre-clearing extent of the vegetation type (a level of 10% of the original extent is regarded as being a level representing “endangered”).

Table 1 Beard vegetation associations with high degree of endemism within the Study Area with <30% of their pre-European extent remaining in IBRA region (adapted from OPR 2010 – PER)

UNIT CODE	PRE-EUROPEAN EXTENT IN WA (HA)	PRE-EUROPEAN EXTENT IN IBRA REGION (HA)	CURRENT EXTENT REMAINING IN THE IBRA REGION	% OF ORIGINAL EXTENT REMAINING IN THE IBRA REGION
a33Sc*	3,478	1,749	370	21.1
e6Mr a19Si*	184,571	184,571	31,410	17
e6Mr eaSi*	97,368	96,821	7,470	8
mhSc*	51,880	51,880	14,221	27
x2SZc*	328,738	328,738	43,126	13
x3SZc*	580,547	507,874	52,364	10.3
x3SZc/acSc*	82,081	82,081	9,276	11

¹ EPA (2000) provides an indication of expectations when affecting vegetation of which less than 30% of its original extent remains. In such cases the EPA expects that alternative mechanisms for protecting biodiversity be examined including rehabilitation of disturbed areas and/or acquisition of areas containing remnant native vegetation. The EPA would like to see an overall environmental benefit as a result of the proposal, such as ensuring protection and management of higher quality remnant native vegetation in the general area (not necessarily on the same property).

1.2.2 Conservation reserves

The Proposal is in proximity to a number of existing and planned conservation reserves in the freehold and pastoral land traversed by the rail alignment.

In freehold land, the Proposal runs close to the boundaries of the Moresby Range Conservation Park and Urawa and Wokatherra Nature Reserves, as well as one unnamed nature reserve, under the management of the Department of Environment and Conservation (DEC). An additional Reserve 16200, which is vested in the Minister for Water Resources for the purposes of water supply and conservation of flora and fauna, is also intersected by the proposed alignment.

In the pastoral land, the Proposal will intersect three proposed conservation reserves, being the:

- former Woolgorong Pastoral Lease
- former Twin Peaks Pastoral Lease
- former Narloo Pastoral Lease.

1.2.3 Threatened and Priority flora

The PER identified three EPBC Act listed threatened flora species, 2 of which are Declared Rare Flora (DRF) under the *Wildlife Conservation Act 1950* (WA) (WC Act), in proximity of the Proposal. An additional 87 Priority (P) Flora listed by DEC for conservation have also been recorded within the study area centred on the proposed alignment.

Of these species, the following have been identified as being potentially affected by the Proposal and have been subject to detailed targeted surveys:

- *Caladenia hoffmanii* (Endangered (EPBC Act), Schedule 1/DRF (WC Act))
- *Eucalyptus blaxellii* (Endangered (EPBC Act), P4)
- *Chamelaucium* sp. Yalgoo (P1)
- *Eremophila* sp. Tallering (P1)
- *Goodenia lyrata* (P1)
- *Gunniopsis divisa* (P1)
- *Petrophile vana* (P1)
- *Ptilotus tetrandrus* (P1)
- *Eremophila arachnoids* subsp. Arachnoids (P3)
- *Homalocalyx echinulatus* (P3)
- *Tecticornia cymbiformis* (P3)
- *Thryptomene* sp. Moresby Range (P3)
- *Thryptomene* sp. Wandana (P3).

1.2.4 Threatened fauna habitat

The PER identified 21 conservation significant fauna that occur or are likely to occur in proximity of the Proposal. Of these, the following species have been identified during the PER process (including from project refinement and in responding to public submissions) as being potentially affected by the Proposal through known or potential habitat clearing and/or requiring particularly attention because of their conservation status:

- Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) – Endangered (EPBC Act), Schedule 1 (WC Act)
- Western Spiny-tailed Skink (*Egernia stokesii badia*) (Black form) – Endangered (EPBC Act), Schedule 1 (WC Act)

- Malleefowl (*Leipoa ocellata*) – Vulnerable (EPBC Act), Schedule 1 (WC Act)
- Slender-billed Thornbill (*Acanthiza iredalei iredalei*) – Vulnerable (EPBC Act)
- Yuna Broad-blazed slider (*Lerista yuna*) – Schedule 4 (WC Act)
- *Lerista eupoda* (no common name) – DEC listed Priority (P) 1 species
- Crested Bellbird (*Oreioeca gutturalis*) (southern subspecies) – DEC listed P4 species
- Rufous Fieldwren (*Calamanthus campestris*) (western subspecies) – DEC listed P4 species.

1.3 RATIONALE FOR ENVIRONMENTAL OFFSETS

OPR has identified a potential need to provide environmental offsets for significant residual environmental impacts remaining after on-site efforts to avoid, minimise and mitigate impacts have been applied. This need has been identified through the PER process, including in response to feedback and submissions from agencies such as DEC and DSEWPC.

1.4 RELEVANT POLICY AND GUIDANCE

1.4.1 Federal offsets policy

The Federal Government has provided advice on the use of environmental offsets in *Draft Policy Statement: Use of environmental offsets under the Environment Protection and Biodiversity Conservation Act 1999* (Department of Environment and Water Resources (DEWR), August 2007). The Federal Government defines environmental offsets as ‘actions taken outside a development site that compensate for the impacts of that development - including direct, indirect or consequential impacts’. Environmental offsets provide an opportunity to achieve long-term conservation outcomes whilst providing flexibility for proponents seeking to undertake development which will have environmental impacts (DEWR 2007). Actions that can be considered as environmental offsets are generally categorised into direct and indirect offsets.

Direct offsets are aimed at on-ground maintenance and improvement of habitat or landscape values. They may include:

- long-term protection of existing habitat – including through the acquisition and inclusion of land in the conservation estate, and covenanting arrangements on private land
- restoration or rehabilitation of existing degraded habitat
- re-establishing habitat (DEWR 2007).

Indirect offsets are the range of other actions that improve knowledge, understanding and management leading to improved conservation outcomes. They may include:

- implementation of recovery plan actions – including surveys
- contributions to relevant research or education programs
- removal of threatening processes
- contributions to appropriate trust funds or banking schemes that can deliver direct offsets through a consolidation of funds and investment in priority areas
- on-going management activities such as monitoring, maintenance, preparation and implementation of management plans etc (DEWR 2007).

Environmental offset principles to be applied when development an offsets proposal are described in the *Draft Environmental Offsets Policy* (Policy Statement 4.1 EPBC Act, DEWR 2007) (Table 1).

Table 2 Environmental offset principles for Matters of NES (DEWR 2007)

Environmental offsets should be targeted to the matter protected by the EPBC Act that is being impacted.
A flexible approach should be taken to the design and use of environmental offsets to achieve long-term and certain conservation outcomes which are cost effective for developers.
Environmental offsets should deliver a real conservation outcome.
Environmental offsets should be developed as a package of actions - which may include both direct and indirect offsets.
Environmental offsets should, as a minimum, be commensurate with the magnitude of the impacts of the development and ideally deliver outcomes that are 'like for like'.
Environmental offsets should be located within the same general area as the development activity.
Environmental offsets should be delivered in a timely manner and be long lasting.
Environmental offsets should be enforceable, monitored and audited.

1.4.2 State offsets policy and guidance

The EPA has advised on its policy regarding its expectations regarding the use of environmental offsets for proposals or schemes that impact on biodiversity in *Position Statement No. 9 Environmental Offsets* (EPA, 2006). *EPA Guidance Statement No. 19 Guidance for Environmental Offsets – Biodiversity* (EPA 2008) provides more specific advice than in the Position Statement, particularly in relation to the technical application of biodiversity offsets and the presentation of offsets packages to the EPA.

The Position Statement indicates that offsets:

- are a package of activities undertaken to counter adverse environmental impacts arising from a development
- are the 'last line of defence' and are considered after all steps have been taken to minimise impacts resulting from a development
- aim to ensure that any adverse impacts from development are counter-balanced by an environmental gain somewhere else
- should be used with a goal of achieving a net environmental benefit
- should only be used after all efforts to avoid and minimise environmental impact have been exhausted through consideration of alternative development strategies or using new technologies and 'best practice' processes and operations
- can work to ensure that development can occur not to the overall detriment of the environment.

An 'offsets package' may consist of a combination of restoring and rehabilitating land outside the area where the impact occurs (i.e. off-site) and securing land for conservation or enhancing its protection. To help ensure that offset activities are successful over the long term, supporting initiatives may be undertaken such as management activities (weed and feral animal control, fire control, monitoring and maintenance of the offset site), new research, education and other activities that have a proven environmental benefit. Together the combination of activities and supporting initiatives form an 'offsets package' that should deliver an overall net environmental benefit (EPA 2006).

Ideally, the environmental values of the offset site should be similar to those being impacted. This concept is often referred to as 'like for like' and considers the environment's distinctive values and characteristics. The offset site should be located in the same local vicinity as the area being impacted, so as to ensure the immediate environment receives the benefit. However, flexibility to determine the

best environmental outcome must be considered in selecting offset sites. For example, sometimes a better environmental outcome could be achieved at a broader rather than at a local scale (EPA 2006).

1.5 OBJECTIVES OF STRATEGY

The objectives of this strategy are to indicate OPR's commitment to provide an offsets package that:

- is targeted to the matters potentially significantly affected by the Proposal.
- is more than commensurate with the magnitude of the impacts of the development and delivers outcomes that are 'like for like or better'
- provides for an overall net environmental benefit from the Proposal
- can be delivered in a timely manner and be long lasting
- is able to be enforced, monitored and audited on adaption into conditions of approval.

2 Extent and significance of impacts

2.1 POTENTIAL IMPACTS PRIOR TO MITIGATION

The Offset Summary Table in Section 8, based on EPA Guidance Statement No. 19, and the following subsections describe the extent of impacts that would have arisen from the rail development as originally proposed prior to application of further avoidance, minimisation and mitigation measures.

2.1.1 Vegetation associations

The Proposal as described in the Environmental Scoping Document was based on a nominal 200 m disturbance corridor, including temporary access tracks and laydown areas for construction, as well as for permanent access track and rail formation, through the freehold land in which the endangered and vulnerable vegetation associations occur (Section 1.2.1). This would have resulted in 20.3 ha of endangered vegetation associations and 102.5 ha of vulnerable vegetation associations being directly impacted (Table 3).

Table 3 Area of endangered and vulnerable vegetation associations affected by Proposal before and after on-site measures to avoid, minimise and mitigate

BEARD VEGETATION ASSOCIATION	EXTENT OF IMPACT (ADVERSE IMPACTS) PRIOR TO APPLICATION OF MITIGATION	EXTENT OF RESIDUAL IMPACTS (ADVERSE IMPACTS REMAINING AFTER ALL MITIGATION ATTEMPTS EXHAUSTED)
Vegetation association <10% pre-european extent remaining		
e6Mr eaSi	20.3 ha	11.5 ha (8.8 ha reduction)
Total	20.3 ha	11.5 ha (8.8 ha reduction)
Vegetation association < 30% but > 10% pre-european extent remaining		
a33Sc	5.8 ha	3.6 ha (2.2 ha reduction)
e6Mr a19Si	18.6 ha	10.4 ha (8.2 ha reduction)
mhSc	39.6 ha	12.9 ha (26.7 ha reduction)
x2SZc	2.6 ha	1.1 ha (1.5 ha reduction)
x3SZc	27.0 ha	18.8 ha (8.2 ha reduction)
x3SZc/acSc	8.9 ha	7.4 ha (1.5 ha reduction)
Total	102.5 ha	54.2 ha (48.3 ha reduction)

2.1.2 Conservation reserves

In the freehold land, the original rail alignment and construction corridor for the Proposal referred to the EPA would have affected 3.2 ha of the Moresby Range Conservation Park and 5 ha of Reserve 16200 vested in the Minister for Water Resources (Section 1.2.2).

In the pastoral land, a 200 m disturbance corridor would have resulted in:

- Up to 260 ha of proposed Woolgorong conservation reserve being directly affected
- Up to 350 ha of proposed Twin Peaks conservation reserve being directly affected
- Up to 31 ha of proposed Narloo conservation reserve being directly affected.

2.1.3 Threatened and Priority flora

The original Proposal potentially would have affected two EPBC Act listed threatened species, one of which is also DRF under the WC Act, and approximately 19 Priority species (Table 4). This included up to 10 plants of *Caladenia hoffmanii* (EPBC Act listed Threatened and DRF species), which represented over 3.5% of the known population. Seven P1 plants, 50 P2 plants, at least 1789 P3 plants, and 191 P4 plants would have been disturbed for construction of the Proposal along the original alignment and with a 200 m construction corridor.

Table 4 Numbers of recorded significant flora likely to be disturbed by Proposal before and after on-site measures to avoid, minimise and mitigate

SIGNIFICANT FLORA SPECIES	EXTENT OF IMPACT (NUMBER OF PLANTS TO BE DISTURBED) PRIOR TO MITIGATION	EXTENT OF RESIDUAL IMPACTS (ADVERSE IMPACTS REMAINING AFTER ALL MITIGATION ATTEMPTS EXHAUSTED)
EPBC Act listed threatened/DRF species		
<i>Caladenia hoffmanii</i>	10 known plants (3.5% of total population).	Nil
<i>Eucalyptus blaxellii</i> *	2 known plants (0.1% of total population).	Nil
Priority flora species		
<i>Euphorbia sarcostemmoides</i> (P1)	1 known plant (0.3% of total population).	Nil
<i>Lepidosperma</i> sp. Moresby Range (P1)	3 known plants (1.7% of total population).	Nil
<i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94)	3 known plants (1.8% of known population).	Nil
<i>Leucopogon borealis</i> (P2)	50 known plants (12.0% of total population).	Nil
<i>Acacia speckii</i> (P3)	7 known plants (0.5% of total population).	3 known plants (0.2% of total population).
<i>Calytrix verruculosa</i> (P3)	22 known plants (2.0% of total population).	Nil
<i>Dodonaea amplisemina</i> (P3)	**	1 known plants (0.1% of total population).
<i>Eremophila arachnoids</i> subsp. <i>arachnoids</i> (P3)	12 known plants (4.5% of total population).	Nil
<i>Eremophila muelleriana</i> (P3)	12 known plants (2.0% of total population).	22 known plants (3.7% of total population).
<i>Gastrolobium rotundifolium</i> (P3)	1 known plant (0.3% of total population).	1 known plant (0.3% of total population).
<i>Grevillea stenostachya</i> (P3)	18 known plants (2.8% of total population).	18 known plants (2.8% of total population).
<i>Grevillea triloba</i> (P3)	790 known plants (5.2% of total population).	773 known plants (5.1% of total population).
<i>Hemigenia tysonii</i> (P3)	102 known plants (1.3% of total population).	101 known plants (1.3% of total population).
<i>Hemigenia virescens</i> (P3)	52 known plants (2.0% of total population).	51 known plants (2.0% of total population).
<i>Petrophile pauciflora</i> (P3)	3 known plants (0.7% of total population).	3 known plants (0.7% of total population).
<i>Prostanthera petrophila</i> (P3)	39 known plants (2.4% of total population).	39 known plants (2.4% of total population).

SIGNIFICANT FLORA SPECIES	EXTENT OF IMPACT (NUMBER OF PLANTS TO BE DISTURBED) PRIOR TO MITIGATION	EXTENT OF RESIDUAL IMPACTS (ADVERSE IMPACTS REMAINING AFTER ALL MITIGATION ATTEMPTS EXHAUSTED)
<i>Ptilotus beardii</i> (P3)	332 known plants (8.7% of total population).	269 known plants (7.1% of total population).
<i>Thryptomene</i> sp. Moresby Range (P3)	399 known plants on freehold land (21.8% of total population).	10 plants (1% of total population following new surveys)
<i>Thryptomene</i> sp. Wandana (P3)	**	20 plants in freehold land (2.7% of total population following new surveys)
<i>Diuris recurva</i> (P4)	10 known plants (1.4% of total population).	Nil
<i>Verticordia penicillaris</i> (P4)	179 known plants (3.4% of total population).	128 known plants (2.4% of total population).

* EPBC Act listed threatened species but not DRF – listed as DEC P4 species.

** Species not initially identified as being potentially affected by Proposal.

2.1.4 Threatened fauna

The PER identified the extent of potential impact to habitat for a number of threatened species affected by the Proposal. Prior to avoidance and minimisation strategies, it was originally estimated:

- Approximately 59 ha of potential foraging habitat for Carnaby’s Black Cockatoo would be disturbed based on an initial desktop assessment of vegetation communities in the project area.
- 3.2 ha of granite outcrops, which represent suitable habitat for the Western Spiny-tailed Skink (black form), and 364 ha of “broader” habitat for this species around these outcrops would be disturbed.
- Up to 68 ha of Malleefowl (although no Malleefowl nests/mounds are within area of impact).
- Up to 64 ha of vegetation within areas known to be inhabited by Slender-billed Thornbill.
- Habitat for Yuna Broad-blazed slider, *Lerista eupoda* (no common name), Crested Bellbird (*Oreioca gutturalis*) (southern subspecies), and Rufous Fieldwren (western subspecies).

2.2 MEASURES EMPLOYED TO AVOID IMPACT

During and following the PER document preparation, OPR has pursued options for reducing the area of impact through:

- realignment of rail around conservation reserves (e.g. Moresby Range Conservation Park)
- moving designated off-limit areas and diverting access tracks outside of significant vegetation and habitat
- locating proposed borrow areas, accommodation camps, turkeys nests etc to avoid all native vegetation through the freehold area and outside of conservation reserves in the pastoral area as much as practicable.

These measures have greatly decreased the disturbance impact in freehold land, where the endangered and vulnerable vegetation associations, some Priority flora, and Carnaby’s Black Cockatoo habitat occur.

2.3 MEASURES EMPLOYED TO MINIMISE IMPACT

OPR has further minimised the extent of potential direct impact primarily through reducing the proposed width of the construction corridor from 200 down to 100 m where it traverses:

- vegetated areas in the freehold area/land
- conservation reserves in the pastoral area/land
- conservation significant fauna habitat.

This reduction in working width has been able to be proposed as it involves short or limited lengths of the rail in which narrower working space will not detrimentally affect construction has further reduced the extent and significance of likely direct impacts. OPR intends to further minimise its footprint by implementing a clearing approval procedure that includes instructions to reduce the disturbance width for construction to less than 100 m through these sensitive areas identified above wherever practicable. Although OPR is confident this will be able to be delivered, it is not able to commit to an actual further reduced construction width because the detailed design of the rail formation is not at a stage that it is able to be any more definitive on the cut and fill requirements that influence footprint.

2.4 MEASURES PROPOSED TO FURTHER MITIGATE (RECTIFY/REDUCE) IMPACT

OPR proposes to rectify a portion of extent of impacts over time through rehabilitation of areas disturbed during construction but not required for operation or maintenance of the permanent infrastructure. The final operational disturbance width made up of the rail formation and maintenance access track is expected to be 50 to 80 m; therefore between 20 and 50 m of the construction width will be subject to revegetation through remnant vegetation areas disturbed during construction.

During and following construction, the rail corridor will be actively managed to ensure indirect impacts are kept well within the direct area of impact and to aid regeneration of vegetation. Such management will include invasive weed monitoring and control, erosion management, and mulga sheet flow impact monitoring and adaptive management.

2.5 EXTENT AND SIGNIFICANCE OF PREDICTED RESIDUAL IMPACT

2.5.1 Vegetation associations

The predicted extent of impact to endangered and vulnerable vegetation associations has been substantially reduced in particular by rerouting proposed access tracks and reducing the construction working width through remnant vegetation in the freehold land. The estimated area of impact to endangered vegetation association has been reduced from 20.3 to 11.5 ha while the total estimated area of impact for vulnerable vegetations has been more than halved from 102.5 to 50.6 ha (Table 3).

2.5.2 Conservation reserves

The design of the original rail has avoided the Urawa and Wokatherra Nature Reserves and subsequent realignment of the proposed rail east of Oakajee has now avoided the Moresby Range Conservation Park. In the freehold area, only Reserve 16200 will be affected but with a reduced area of impact of 2.5 ha from reducing the construction width to 100 m compared to 5 ha with a 200 m width.

In the pastoral area, the Narloo Conservation Reserve has been able to be avoided through minimising working widths and avoiding placement of borrow areas, accommodation camps, turkeys nests etc in conservation reserves. Such measures have also reduced the predicted impacts to the proposed Woolgorong and Twin Peaks conservation reserves to approximately 175 ha & 290 ha (compared to 260 and 350 ha) respectively.

2.5.3 Threatened and Priority flora

OPR has been able to significantly reduce its impact to listed Threatened/DRF and Priority flora. Following efforts to avoid and minimise no known locations of any EPBC Act listed species or DRF will be disturbed or any P1 or P2 species (Table 4)

The residual impact on priority flora has been reduced to a total of 1433 plants of 13 P3 species, and 128 plants of *Verticordia penicillaris* (P4) (Table 4). 920 of these plants are in freehold land, with most being affected by the rail alignment through the narrower and more constrained valleys of the Moresby Range and Chapman Valley. The remaining 513 plants are on pastoral land.

2.5.4 Threatened fauna

The reduction of construction widths (from 200 to 100 m) in the freehold land has greatly reduced the extent of disturbance in vegetation originally identified in freehold area as representing potential Carnaby's Black Cockatoo habitat. There has been additional vegetation in the footprint, including associated with the North-West Coastal Highway deviation component of the rail project, that has been identified as containing flora species from genera known to be used by Carnaby's Black Cockatoo for feeding meaning that the predicted potential extent of impact to has not decreased by a corresponding factor of half. Ecologia (2010c) and Eco Logical Australia (2010) has subsequently further assessed this vegetation and refined the delineation of potential foraging habitat. It is estimated that up to 23.4 ha of potentially suitable foraging habitat will be directly impacted by the rail development.

Conversely for the Western Spiny-tailed Skink (black form), the finalisation of alignment of the rail route has resulted in avoidance of all granite outcrops that represent suitable habitat for the species.

A reduction in construction widths from 200 to 100 m through suitable Malleefowl and Slender-billed Thornbill habitat has resulted in disturbance estimates of up to 33.9 ha and 32 ha for Malleefowl and Slender-billed Thornbill habitat respectively. There is also an expectation that this will be able to be reduced through working widths being reduced for selected sections of the rail during construction.

2.6 SIGNIFICANT RESIDUAL IMPACTS PROPOSED TO BE OFFSET

The following residual impacts have been determined by OPR, based on its own assessment and feedback from stakeholders, to be significant such that environmental offsets will be proposed:

- Clearing of up to 11.5 ha of endangered vegetation association e6Mr eaSi.
- Clearing of up to 54.2 ha of vulnerable vegetation associations, with particular attention to x3SZc x3SZc/acSc in which over half of this clearing occurs and which are close to having only 10% of their pre-European extent remaining (at which point an association becomes endangered).
- Clearing in Reserve 16200, Woolgorong and Twin Peaks conservation reserves.
- Clearing of potential Carnaby's Black Cockatoo habitat in the Chapman Valley area.

In addition, in seeking environmental offsets for the above mentioned assets OPR will also consider providing net environmental benefits for the following assets for which the impacts have been reduced or are otherwise such that the environmental impacts are unlikely to be significant:

- Priority flora (e.g. *Eremophila arachnoids* subsp. *arachnoids* (P3), *Thryptomene* sp. Moresby Range (P3), and *Ptilotus beardii* (P3).
- Malleefowl.
- Slender-billed Thornbill.

3 Type and level of offsets proposed

3.1 DIRECT OFFSETS

OPR is committed to providing direct offsets on a better than like for like basis for mitigating significant residual impacts. As such, OPR commits to providing high offset to impact ratios on a per area basis and to seek opportunities for direct offsets to provide or support additional conservation values to those affected by the Proposal.

The direct offsets proposed are as follows:

- Long term protection/conservation of environmental assets:
 - Acquisition one or more parcels of land containing at least 23 ha of vegetation representative of Beard vegetation association e6Mr eaSi (2 times the extent of proposed clearing from the Proposal) (Section 4). This land would be transferred to DEC tenure on satisfaction land is in appropriate state to be accepted.
 - Acquisition one or more parcels of land containing at least 108 ha of vegetation representative of two or more of the vulnerable vegetation associations affected by the Proposal (2 times the extent of proposed clearing from the Proposal) (Section 4). One of these vegetation associations must be x3SZc, of which only 10.3% remains of its pre-European extent with 18.8 ha being affected by the Proposal or and/or x3SZc/acSc, with 7.4 ha affected and of which 11% of its pre-European extent remains. This land would be transferred to DEC tenure on satisfaction land is in appropriate state to be accepted. Land supporting as many of the affected associations as possible will be prioritised however other factors such as Slender-billed Thornbill habitat may also be considered.
 - Acquisition of one or more additional parcels of land supporting remnant areas of vulnerable vegetation associations, Priority flora populations and Carnaby's Black Cockatoo habitat in the Moresby Range-Chapman Valley area (Section 5). If a suitable parcel of land is found, it will reduce the area of offset required to be secured elsewhere for the remaining vulnerable vegetation associations above. The acquisition of new conservation estate in the Moresby Range-Chapman Valley area will also directly offset impacts to Reserve 16200 in the freehold land.
 - Acquisition of a portion of pastoral land twice the size of the area within the proposed Woolgorong and Twin Peaks Conservation Reserves affected by the Proposal future transfer to DEC tenure (Section 6). Consideration will be given to acquiring land that supports Western Spiny-tailed Skink and Malleefowl habitat.
- Restoration or rehabilitation of existing degraded habitat and re-establishing habitat
 - Revegetation and supplementary planting program in future conservation tenure land in the Chapman Valley area for Carnaby's Black Cockatoo habitat enhancement and restoration. This may include works on lower slopes of valley for foraging habitat and along watercourses for future breeding habitat for Carnaby's Black Cockatoo.

3.2 INDIRECT / SUPPORTING OFFSETS

The following indirect or supporting offsets are proposed and/or are an integral component to ensure the objectives of the strategy are met:

- Implementation of recovery plan actions – including surveys
 - OPR will conduct genetic studies and a regional habitat assessment with supporting surveys for ground truthing to increase knowledge of the distribution and extent of Western Spiny-tailed Skink in the Western Murchison (Section 7)
- Contributions to relevant research or education programs
 - OPR will provide funding towards a research project on the food resource base of Carnaby's Black Cockatoo in the Geraldton Sandplains-Geraldton Hills subregion (Section 7)
 - OPR will undertake propagation and plant recruitment trials for Priority flora species as part of its land rehabilitation program, which will increase knowledge on the biology of these species.
- Removal of threatening processes
 - OPR will undertake works on land acquired for the purpose of conservation to address existing threatening process such as feral animals, grazing pressure, uncontrolled access, weed infestation, prior to handover to DEC (Section 4,5, and 6)
- On-going management activities
 - OPR will prepare Conservation Management Plans (CMPs) for the land acquired in the freehold land to address management of threatening processes, and describing any revegetation programs, and related monitoring. The CMPs would be implemented by OPR for two years or until that time DEC agree to accept land under their management (Section 4,5, and 6)

4 Offset Proposal 1 – Agricultural zone remnant vegetation conservation project

4.1 DESCRIPTION

Acquisition of land for conservation in the agricultural zone on Geraldton Sandplains between Geraldton and Mullewa.

4.1.1 Location

- Between Geraldton and Mullewa, WA

4.1.2 Number of parcels of land and size

- At least one and up to four parcels of land totalling at least 110 ha in size.

4.1.3 Environmental description

- Includes expansive and intact remnant area/s of:
 - remnant vegetation Eucalyptus spp. (mallee) and Acacia spp. scrub
 - Acacia - Casuarina spp. thicket
 - Various inland scrub heath vegetation types.

4.1.4 Existing threatening processes

- Grazing
- Uncontrolled access
- Feral animals
- Declared weed and environmental weed infestation
- Fire

4.2 RELEVANT ENVIRONMENTAL ASSETS

- Endangered vegetation associations (Beard vegetation association with < 10% of pre-European extent remaining)
- Vulnerable vegetation associations (Beard vegetation association with < 30% but > 10% of pre-European extent remaining)
- Priority flora

4.3 OBJECTIVES

- Protect in perpetuity remnant vegetation representative of endangered and vulnerable vegetation association on the Geraldton Sandplains that supports Priority flora.
- Remove and/or reduce threatening processes
- Implement management measures to improve condition of land for purpose of conservation and to minimise ongoing liabilities for future land manager (DEC).

4.4 MINIMUM REQUIREMENTS TO ACHIEVE OBJECTIVE

Land to be acquired must support, in total, at least:

- 23 ha of vegetation representative of Beard vegetation association e6Mr eaSi.
- Between 78 and 108 ha of two of more of the following Beard vegetation associations but at least including associations x3SZc and/or x3SZc/acSc (which are subject to largest extent of clearing from the Proposal and only just above the 10% threshold from being Endangered) :
 - a33Sc
 - e6Mr a19Si
 - x2SZc
 - x3SZc
 - x3SZc/acSc.
- Known populations of Priority 3 flora or lower present and/or supports similar habitat in which Priority flora species affected by the Proposal have been recorded
- No significant management liabilities that may jeopardise the perpetual conservation values (as defined in this section) of the land

In addition to these mandatory requirements, habitat for Slender-billed Thornbill habitat will be a secondary consideration when determining the appropriate land.

4.5 OPPORTUNITIES TO PROVIDE BETTER THAN LIKE FOR LIKE OFFSET

- Subject land much larger than the area affected by the Proposal
- Subject land also provides ecological linkage or 'stepping stone' function for threatened species
- Subject land has values for conservation significant species in addition to those affected by the Proposal
- Subject land also is adjacent to and will enhance an existing conservation reserve/area
- Priority flora in subject land have higher conservation status
- Higher number of Priority flora species and/or populations in subject land compared to those/that affected by Proposal

4.6 IMPLEMENTATION PLAN

On approval

- OPR to identify suitable land that is likely to or will possibly meet criteria in Section 4.4
- OPR to approach landowner/s and seek access to undertake any remaining field inspection/survey required to confirm land meets criteria in Section 4.4 above for purchase
- OPR to discuss and agree with DEC on suitability of site for future placement in DEC tenure on provision of Conservation Management Plan having been prepared and implemented by OPR
- OPR to make offer to purchase land
- OPR to prepare a CMP, on advice from DEC, for implementation for management of the land for at least two years (or sooner if agreed with DEC), addressing:
 - Weed control
 - Feral animal control
 - Bushfire prevention and management
 - Erosion control
 - Access management
 - Monitoring of effectiveness of management measures and of condition and health of habitat
 - Contingency and remedial actions.

Year 1 to 2

- OPR to implement CMP

Year 2

- OPR to confirm agreement from DEC for transfer of land for the purpose of conservation on the proviso that the land is provided in a suitable condition for low ongoing liabilities for management
- OPR to initiate transfer of land
- OPR to provide monitoring reports to DEC demonstrating that management measures have adequately addressed threatening processes
- OPR and DEC to conduct final site inspection together
- OPR and DEC to determine if there is a requirement for ongoing management assistance from OPR subsequent to transfer of land and if so, agree on the scope of that assistance
- OPR and DEC to finalise transfer of land on receipt of confirmation from DEC that land is in suitable state for acceptance for long term management.

NOTE: OPR will commit a maximum value of \$600,000 for the management of the offsets land/s subject to the Port and Rail development offsets packages (in addition to the budget allocated for habitat rehabilitation and/or restoration works). This value includes provision for the implementation of the CMP's as well as management of any ongoing environmental liabilities as agreed to by both parties at time of land transfer.

5 Offset Proposal 2 – Moresby Range/Chapman Valley habitat conservation and restoration project

5.1 DESCRIPTION

Acquisition of land for conservation and rehabilitation of habitat in agricultural land in the Chapman Valley and along the Moresby Ranges near Geraldton

5.1.1 Location

- Moresby Range and Chapman Valley

5.1.2 Number of parcels of land and size

- Up to two parcels of land totalling 140 ha

5.1.3 Environmental description

Intact areas of Eucalypt-Banksia spp. Woodland and areas of remnant vegetation with some cleared land covering a valley with low mallee woodland over shrubland/sedgeland and closed tall to mid shrubland over sedgeland on hills and upper slopes with remnant pockets of Acacia and Hakea on mid-slopes down to Eucalypt woodland along watercourse.

5.1.4 Existing threatening processes

- Grazing
- Uncontrolled access
- Feral animals
- Declared weed and environmental weed infestation
- Fire
- Edge effects from surrounding agricultural land and existing disturbance/degraded areas

5.2 RELEVANT ENVIRONMENTAL ASSETS

- Vulnerable vegetation associations (Beard vegetation association with < 30% but > 10% of pre-European extent remaining) in the Geraldton-Chapman Valley area e.g. mhSc
- Priority flora
- Threatened fauna (Potential Carnaby's Black Cockatoo foraging and breeding habitat)

5.3 OBJECTIVES

- Protect in perpetuity remnant vegetation representative of a vulnerable vegetation association in the Chapman Valley-Moresby Range region that supports Priority flora and potential Carnaby's Black Cockatoo foraging and breeding habitat

- Enhance habitat values for Carnaby's Black Cockatoo through restoration or rehabilitation of existing degraded habitat and re-establishment of habitat (along lower slopes of valley for foraging habitat and along watercourse for breeding habitat).
- Remove and/or reduce threatening processes
- Implement management measures to improve condition of land for purpose of conservation and to minimise ongoing liabilities for future land manager (DEC).

5.4 MINIMUM REQUIREMENTS TO ACHIEVE OBJECTIVE

Land to be acquired must support at least:

- Vegetation representative of a Beard vegetation association Beard vegetation association with < 30% but > 10% of pre-European extent remaining) in the Geraldton-Chapman Valley area affected by the Proposal
- Known populations of Priority 3 flora or better present and/or supports similar habitat in which Priority flora species affected by the Proposal have been recorded
- 135 ha of remnant vegetation that includes areas potentially suitable for Carnaby's Black Cockatoo foraging and breeding if found
- 5 ha of degraded habitat in which the landforms and soils in which flora species suitable for Carnaby's Black Cockatoo use can grow, for the purpose of revegetation
- No significant management liabilities that may jeopardise the perpetual conservation values (as defined in this section) of the land

5.5 OPPORTUNITIES TO PROVIDE BETTER THAN LIKE FOR LIKE OFFSET

- Subject land much larger than the area affected by the Proposal
- Subject land also provides ecological linkage or 'stepping stone' function for threatened species
- Subject land also is adjacent to and will enhance an existing conservation reserve/area
- Subject land has values for conservation significant species in addition to those affected by the Proposal
- Priority flora in subject land have higher conservation status
- Subject land supports vegetation representative of a Priority Ecological Community (PEC)
- Higher number of Priority flora species and/or populations in subject land compared to those/that affected by Proposal.

5.6 IMPLEMENTATION PLAN

On approval

- OPR to identify suitable land that is likely to or will possibly meet criteria in Section 5.4
- OPR to approach landowner/s and seek access to undertake any remaining field inspection/survey required to confirm land meets criteria in Section 5.4 above for purchase
- OPR to discuss and agree with DEC on suitability of site for future placement in DEC tenure on provision of Conservation Management Plan having been prepared and implemented by OPR
- OPR to make offer to purchase land
- OPR to prepare a CMP, on advice from DEC and with consideration for EPBC Act listed fauna habitat as applicable, for implementation for management of the land for at least two years (or sooner if agreed with DEC), addressing:
 - Carnaby's Black Cockatoo habitat revegetation program for a five hectare area
 - Weed control

- Feral animal control
- Bushfire prevention and management
- Erosion control
- Access management
- Completion criteria for revegetation program
- Monitoring of success of revegetation program, effectiveness of management measures and of condition and health of habitat
- Contingency and remedial actions.

Year 1 to 2

- OPR to implement CMP

Year 2

- OPR to confirm agreement from DEC for transfer of land for the purpose of conservation on the proviso that the land is provided in a suitable condition for low ongoing liabilities for management and that revegetation completion criteria have been or are likely to be met
- OPR to initiate transfer of land
- OPR to provide monitoring reports to DEC and DSEWPC demonstrating revegetation completion criteria have been or are likely to be met and that management measures have adequately addressed threatening processes
- OPR and DEC to conduct final site inspection together
- OPR and DEC to finalise transfer of land on receipt of confirmation from DEC that land is in suitable state for acceptance for long term management.

NOTE: OPR will commit a maximum value of \$600,000 for the management of the offsets land/s subject to the Port and Rail development offsets packages (in addition to the budget allocated for habitat rehabilitation and/or restoration works). This value includes provision for the implementation of the CMP's as well as management of any ongoing environmental liabilities as agreed to by both parties at time of land transfer.

6 Offset Proposal 3 – Pastoral land conservation project

6.1 DESCRIPTION

Acquisition of land for conservation in the Murchison-Western Murchison pastoral region.

6.1.1 Location

Pastoral Murchison-Western Murchison region north-east of Yalgoo

6.1.2 Size

At least 950 ha

6.1.3 Environmental description

Largely uncleared area of Plains covered by continuous or patches of low mulga woodlands with granite and gneiss hills/outcrops.

6.1.4 Existing threatening processes

- Grazing
- Uncontrolled stock access
- Feral animals
- Declared weed and environmental weed infestation
- Fire

6.2 RELEVANT ENVIRONMENTAL ASSETS

- Conservation reserves
- Priority flora
- Threatened fauna (suitable Malleefowl and Western Spiny-tailed skink habitat)

6.3 OBJECTIVES

- Mitigate direct impact to Woolgorong and Twin Peaks conservation reserves by acquiring land with similar or higher conservation values for addition to the conservation estate
- Protect in perpetuity habitat that supports Priority flora species affected by the Proposal
- Remove and/or reduce threatening processes
- Implement management measures to improve condition of land for purpose of conservation and to minimise ongoing liabilities for future land manager (DEC).

6.4 MINIMUM REQUIREMENTS TO ACHIEVE OBJECTIVE

Land to be acquired must at least:

- Be at least double in size to the area directly affected by the Proposal in the Woolgorong or Twin Peaks conservation reserves (465 ha is to be cleared in these reserves)

- Support land systems poorly represented in the current conservation reserve system, within bioregions intersected by the rail development in the pastoral region
- Known populations of Priority 3 flora or better present and/or supports similar habitat in which Priority flora species affected by the Proposal have been recorded
- No significant management liabilities that may jeopardise the perpetual conservation values (as defined in this section) of the land

6.5 OPPORTUNITIES TO PROVIDE BETTER THAN LIKE FOR LIKE OFFSET

- Subject land includes substantial area/length of riparian habitat, which regionally functions as an ecological corridor and habitat niche
- Subject land has values for conservation significant fauna species (Mallefowl and Western Spiny-tailed Skink habitat)
- Priority flora in subject land have higher conservation status
- Higher number of Priority flora species and/or populations in subject land compared to those/that affected by Proposal

6.6 IMPLEMENTATION PLAN

On approval

- OPR to identify suitable pastoral land that is likely to or will possibly meet criteria in Section 6.4
- OPR to approach landowner/s and seek access to undertake any remaining field inspection/survey required to confirm land meets criteria in Section 6.4 above for purchase
- OPR to discuss and agree with DEC on suitability of site for future placement in DEC tenure
- OPR to negotiate for Pastoral lease holder to surrender subject portion of pastoral land
- OPR to undertake or seek contractual agreement with pastoral lease holder to remove stock and erect fencing between portion of land to be surrendered and surrounding pastoral land.
- OPR to undertake inspection for declared weeds and or significant environmental weeds that DEC require to be controlled prior to handover of land

Year 1

- Fencing to be installed and weed control (if required) to be undertaken

Year 1-2 (depending on DEC satisfaction with condition of land for inclusion into conservation estate)

- OPR to confirm agreement from DEC for transfer of lease for the purpose of conservation on the proviso that the land is provided in a suitable condition for low ongoing liabilities for management
OPR to initiate transfer of land
- OPR and DEC to conduct final site inspection together
- OPR and DEC to determine if there is a requirement for ongoing management assistance from OPR subsequent to transfer of land and if so, agree on the scope of that assistance
- OPR and DEC to finalise transfer of land on receipt of confirmation from DEC that land is in suitable state for acceptance for long term management.

NOTE: OPR will commit a maximum value of \$600,000 for the management of the offsets land/s subject to the Port and Rail development offsets packages (in addition to the budget allocated for habitat rehabilitation and/or restoration works). This value includes provision for the implementation of the CMP's as well as management of any ongoing environmental liabilities as agreed to by both parties at time of land transfer.

7 Offset Proposal 4 – Regional threatened fauna studies

7.1 DESCRIPTION

- Research project into Carnaby's Black Cockatoo visitation behaviour and habitat requirements in the Geraldton Hills-Geraldton Sandplains IBRA sub-region
- Regional habitat modelling and mapping for Western Spiny-tailed Skink

7.2 RELEVANT ENVIRONMENTAL ASSETS

- Threatened fauna (Carnaby's Black Cockatoo and Western Spiny-tailed Skink)

7.3 OBJECTIVES

- To increase knowledge of threatened species through contributions to research
- Aid recovery plans for threatened species through further surveys

7.4 MINIMUM REQUIREMENTS TO ACHIEVE OBJECTIVE

- *Carnaby's Black Cockatoo research* – This research shall seek to accurately identify significant foraging habitat for Carnaby's Black Cockatoo in the Geraldton Sandplains-Geraldton Hills IBRA sub-region, and place in some context how important individual sites are to the continued survival of the birds. This will be undertaken by determining the food resource base in the Geraldton Sandplains-Geraldton Hills subregion and determining, as best as possible, whether those resources can support the existing cockatoo population (taking into account other competing fauna), and how any expected changes to the availability of food resources will impact on sustainability. OPR propose to initiate the research project upon approval of the OPR development project and it is expected the research project will be conducted over a 3 – 4 year period, which is typical timing for PhD research projects. OPR would provide \$50,000 of funding for the research project, with the expectation that this funding would be used to leverage additional research funding from other sources to undertake the research.
- *Western Spiny-tailed Skink genetic study* – There are two collected forms of the Skink, a black form known from granite outcrop habitats and a brown form known from vegetated/tree hollow habitats. There is a degree of geographical separation between core areas of range of these forms and there is currently uncertainty as to whether the black and brown forms are the same or different species. Tissue samples were collected from the specimens collected during field surveys along the proposed rail alignment. It is proposed to undertake DNA analysis using these tissue samples to determine genetic differences between the two forms. OPR would provide \$20,000 for a suitably qualified specialist to undertake the genetic study and expects this study to be undertaken and completed within the first 12 months after the OPR development project is approved.
- *Western Spiny-tailed Skink regional habitat study (option 1)* – This study will consist of using regional vegetation data, including aerial photography, soils, geology, topography, and vegetation

mapping, together with data collected in OPR's Western Spiny-tailed Skink (black form) surveys to date, to extrapolate and predict where such habitat occurs more broadly across the region. This may identify particularly important areas of habitat for the species and be used to provide an approximate estimate of the numbers of the black form of this species in the region. Some selected field surveys may be undertaken to support and ground-truth the habitat modelling; or

- *Western Spiny-tailed Skink foraging range assessment (option 2)* – This assessment would use radio or GPS tracking technology to monitor individual Western Spiny-tailed Skink movements in reference to granite outcrops known to provide skink habitat. Data derived from this assessment will be utilised when assessing buffer zones surrounding granite outcrops to minimise the likelihood direct impacts to individuals and will provide insight into the skink foraging behaviours.
- OPR would provide \$80,000 for a suitably qualified specialist to undertake the Skink habitat modelling and mapping, or foraging ranges study (described in the above two dot points). OPR expects this to be completed within 12 months after the OPR development project is approved (i.e. concurrently with the Skink genetic study). OPR intends to seek input from relevant staff from DEC and/or WAM in the undertaking of the Skink studies and identification of possible collaboration with these agencies.

7.5 IMPLEMENTATION PLAN

Carnaby's Black Cockatoo research

- On approval, OPR would prepare an Invitation for Expression of Interest, in consultation with DEC and/or WAM, for an academic institution to undertake the research or approach a specific institution to participate, proposed to be undertaken as a PhD project
- OPR would provide funding for the research project with the expectation that this funding would be used to leverage additional research funding from other sources to undertake the research.
- OPR would require annual progress reports and final papers to be provided, which would also be provided to DEC and DSEWPC.

Western Spiny-tailed Skink genetic study

- On approval, OPR would engage a suitably qualified specialist to undertake the Skink genetic study
- OPR would provide a copy of the report from this study to DEC and DSEWPAC.

Western Spiny-tailed Skink habitat (option 1) or foraging (option 2) study

- On approval, OPR would engage a suitable specialist to undertake one of the described studies.
- OPR would provide a copy of the reports from this study to DEC and DSEWPAC.

8 Conclusion and offset summary tables

Table 5 provides a summary of the mitigation undertaken and proposed and the offsets strategy for addressing environmental impacts to key environmental assets from the Proposal.

Figure 1 diagrammatically represents the combined OPR Terrestrial Port and Rail Developments offsets strategy.

OPR is confident that it has proposed a comprehensive offsets package that will address significant residual impacts of the rail development and result in an overall net environmental benefit from the Proposal.

Combined OPR Terrestrial Port & Rail Offsets Implementation Schedule

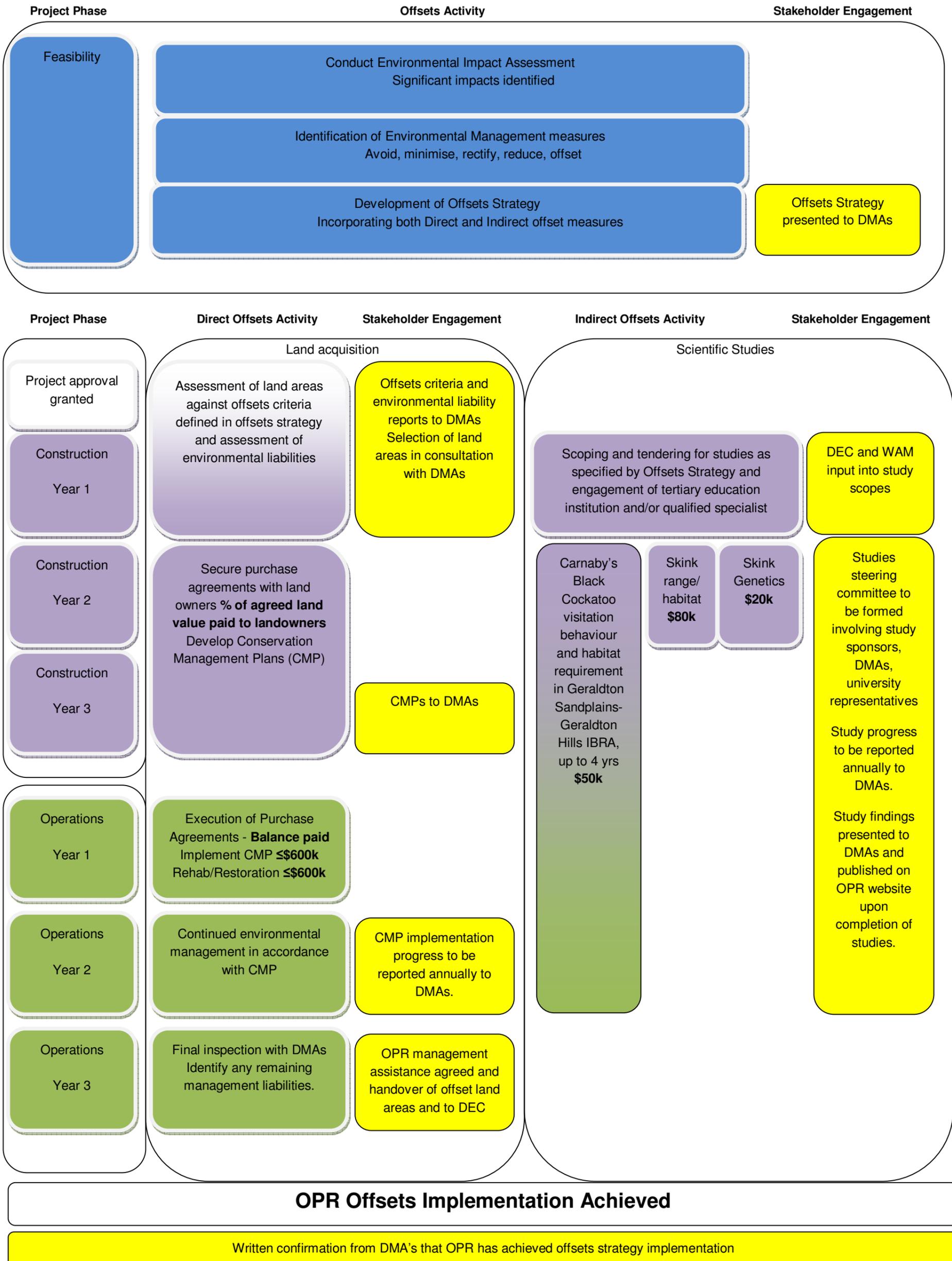


Figure 1 Flow chart showing the combined OPR Terrestrial Port and Rail Developments offsets implementation schedule

Table 5 Offset summary table for OPR rail development project

SECTION A: Administrative Information	
1. Proponent	Oakajee Port and Rail Pty Ltd (OPR)
2. Proposal name	OPR Rail Development
3. Summary of proposal	Development of 570 km rail to link the iron ore mines of the Mid-West to a port at Oakajee, approximately 24 km from Geraldton. Includes clearing and construction works for 530 km of rail formation and associated infrastructure within a 100 m wide construction corridor. In addition a 10 to 15 km spur line to Weld Range and a 20 km Mullewa spur line are proposed. Supporting infrastructure includes borrow areas, accommodation camps, access tracks etc.

SECTION B: Environmental assets				
Assets	Endangered and vulnerable vegetation associations	Existing and future conservation reserves	Significant flora	Significant fauna
Federal conservation status	None	None	Two EPBC Act listed Threatened species (both Endangered)	Four EPBC Act listed Threatened species
State conservation status	Endangered Vulnerable	Conservation reserves	Two Schedule 1/DRF (WC Act) species Six to eight Priority flora species	Three Schedule 1 (WC Act) species
State critical or High value	Endangered – critical value Vulnerable – high value	High value	Schedule 1 species – Critical value Priority flora – High value	Critical value
Description	<p>Endangered (Vegetation association < 10% pre-European extent remaining) e6Mr eaSi - <i>Eucalyptus</i> spp. (mallee) and <i>Acacia</i> spp. scrub with scattered <i>Eucalyptus loxophleba</i></p> <p>Vegetation association < 30% but > 10% pre-European extent remaining a33Sc - <i>Acacia rostelifera</i> thicket. e6Mr a19Si - <i>Acacia acuminata</i> scrub with scattered <i>Eucalyptus loxophleba</i>. mhSc – <i>Melaleuca - Hakea</i> spp. thicket. x2SZc - Scrub heath coastal association. x3SZc - Scrub heath inland association.</p>	1 x existing reserve (Reserve 16200) 4 x proposed reserves (Proposed Moresby Range Conservation Park, Woolgorong, Narloo and Twin Peaks Ex-Pastoral Leases)	EPBC Act listed threatened species <i>Caladenia hoffmanii</i> (also DRF) <i>Eucalyptus blaxellii</i> (also P4) 87 Priority flora species including: <i>Lepidosperma</i> sp. Moresby Range (P1) <i>Homalocalyx inerrabundus</i> (P2) <i>Leucopogon borealis</i> (P2) <i>Eremophila arachnoids</i> subsp. arachnoids (P3) <i>Serichonus gracilipes</i> (P3) <i>Thryptomene</i> sp. Moresby Range (P3) <i>Thryptomene</i> sp. Wandana (P3)	Known and potential habitat for: Carnaby's Black Cockatoo (<i>Calyptorhynchus latirostris</i>) – Endangered (EPBC Act), Schedule 1 (WC Act) Western Spiny-tailed Skink (<i>Egernia stokesii badia</i>) (Black form) – Endangered (EPBC Act), Schedule 1 (WC Act) Malleefowl (<i>Leipoa ocellata</i>) – Vulnerable (EPBC Act), Schedule 1 (WC Act) Slender-billed Thornbill (<i>Acanthiza</i>

SECTION B: Environmental assets				
	x3SZc/acSc – <i>Acacia-Casuarina</i> spp. thicket with scrub heath inland association.		<i>Eucalyptus ebbanoensis</i> subsp. <i>photina</i> (P4)	<i>iredalei iredalei</i>) – Vulnerable (EPBC Act)

SECTION C: Predicted extent of direct Impact to environmental assets														
	Endangered and vulnerable vegetation associations	Conservation reserve	Significant flora	Significant fauna										
Significant impacts (adverse impacts prior to application of mitigation)	Vegetation association <10% pre-European extent remaining e6Mr eaSi - 20.3 ha Vegetation association < 30% but > 10% pre-European extent remaining a33Sc – 5.8 ha e6Mr a19Si – 18.6 ha mhSc – 39.6 ha x2SZc – 2.6 ha x3SZc – 27.0 ha x3SZc/acSc – 8.9 ha	5 ha of current reserve (Reserve 16200). 3.2 ha of Proposed Moresby Range Conservation Park Up to 260 ha of proposed Woolgorong conservation reserve Up to 350 ha of proposed Twin Peaks conservation reserve Up to 31 ha of proposed Narloo conservation reserve	10 known plants of <i>Caladenia hoffmanii</i> (DRF) to be disturbed (3.5% of total population). 2 known plants of <i>Eucalyptus blaxellii</i> (EPBC Act listed and P4) to be disturbed (0.1% of total population). Impacts to Priority Flora species are listed below: <table border="1"> <tr> <td><i>Euphorbia sarcostemmoides</i> (P1)</td> <td>1 known plant (0.3% of total population).</td> </tr> <tr> <td><i>Lepidosperma</i> sp. Moresby Range (P1)</td> <td>3 known plants (1.7% of total population).</td> </tr> <tr> <td><i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94) (P1)</td> <td>3 known plants (1.8% of known population).</td> </tr> <tr> <td><i>Leucopogon borealis</i> (P2)</td> <td>50 known plants (12.0% of total population).</td> </tr> <tr> <td><i>Acacia speckii</i> (P3)</td> <td>7 known plants (0.5% of total population).</td> </tr> </table>	<i>Euphorbia sarcostemmoides</i> (P1)	1 known plant (0.3% of total population).	<i>Lepidosperma</i> sp. Moresby Range (P1)	3 known plants (1.7% of total population).	<i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94) (P1)	3 known plants (1.8% of known population).	<i>Leucopogon borealis</i> (P2)	50 known plants (12.0% of total population).	<i>Acacia speckii</i> (P3)	7 known plants (0.5% of total population).	Carnaby's Black Cockatoo - initially estimated stated that up to 58 ha based on initial assessment of vegetation communities in project area Western Spiny-tailed Skink - 3.2 ha of granite outcrops affected. Potential Malleefowl habitat - 68 ha but no mounds in footprint Potential Slender-billed Thornbill habitat - 64 ha
<i>Euphorbia sarcostemmoides</i> (P1)	1 known plant (0.3% of total population).													
<i>Lepidosperma</i> sp. Moresby Range (P1)	3 known plants (1.7% of total population).													
<i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94) (P1)	3 known plants (1.8% of known population).													
<i>Leucopogon borealis</i> (P2)	50 known plants (12.0% of total population).													
<i>Acacia speckii</i> (P3)	7 known plants (0.5% of total population).													

SECTION C: Predicted extent of direct Impact to environmental assets					
	Endangered and vulnerable vegetation associations	Conservation reserve	Significant flora		Significant fauna
			<i>Calytrix verruculosa</i> (P3)	22 known plants (2.0% of total population).	
			<i>Dodonaea amplisemina</i> (P3)	**	
			<i>Eremophila arachnoids</i> subsp. <i>arachnoids</i> (P3)	12 known plants (4.5% of total population).	
			<i>Eremophila muelleriana</i> (P3)	12 known plants (2.0% of total population).	
			<i>Gastrolobium rotundifolium</i> (P3)	1 known plant (0.3% of total population).	
			<i>Grevillea stenostachya</i> (P3)	18 known plants (2.8% of total population).	
			<i>Grevillea triloba</i> (P3)	790 known plants (5.2% of total population).	
			<i>Hemigenia tysonii</i> (P3)	102 known plants (1.3% of total population).	
			<i>Hemigenia virescens</i> (P3)	52 known plants (2.0% of total population).	
			<i>Petrophile pauciflora</i> (P3)	3 known plants (0.7% of total population).	
			<i>Prostanthera petrophila</i> (P3)	39 known plants (2.4% of total population).	

SECTION C: Predicted extent of direct Impact to environmental assets					
	Endangered and vulnerable vegetation associations	Conservation reserve	Significant flora		Significant fauna
			<i>Ptilotus beardii</i> (P3)	332 known plants (8.7% of total population).	
			<i>Thryptomene</i> sp. Moresby Range (P3)	399 known plants on freehold land (21.8% of total population).	
			<i>Thryptomene</i> sp. Wandana (P3)	**	
			<i>Diuris recurva</i> (P4)	10 known plants (1.4% of total population).	
			<i>Verticordia penicillaris</i> (P4)	179 known plants (3.4% of total population).	
Indirect	Within estimated area of direct impact	Within estimated area of direct impact	Within estimated area of direct impact	Within estimated area of direct impact	Within estimated area of direct impact

SECTION D: Mitigation measures					
	Endangered and vulnerable vegetation associations	Conservation reserves	Significant flora		Significant fauna
Avoid (avoiding the adverse environmental impact altogether)	<p>During and following the PER document preparation, OPR has pursued options for reducing the area of impact through:</p> <ul style="list-style-type: none"> • Realignment of rail around conservation reserves (e.g. Moresby Range Conservation Park) • Moving designated off-limit areas and diverting access tracks outside of significant vegetation and habitat • Locating proposed borrow areas, accommodation camps, turkeys nests etc to avoid all native vegetation through the freehold area and large number of Priority flora. Also located to avoid Western Spiny-tailed Skink habitat. <p>The Proposal Area was amended to exclude the proposed Moresby Range Conservation Park, resulting in the avoidance of a large area of vegetation association mhSc and large number of Priority flora, and the proposed Narloo conservation reserve were avoided.</p> <p>All DRF and EPBC Act listed flora species were avoided.</p>				

SECTION D: Mitigation measures				
	Endangered and vulnerable vegetation associations	Conservation reserves	Significant flora	Significant fauna
Minimise (limiting the degree or magnitude of the adverse impact)	<p>OPR has further minimised the extent of potential direct impact primarily through reducing the proposed width of the construction corridor from 200 down to 100 m:</p> <ul style="list-style-type: none"> • all vegetated areas in the freehold area/land • conservation reserves in the pastoral area/land • conservation significant fauna habitat (Malleefowl, Western Spiny-tailed Skink, Slender-billed Thornbill) <p>This reduction in working width has been able to be proposed as it involves short or limited lengths of the rail in which narrower working space will not detrimentally affect construction has further reduced the extent and significance of likely direct impacts. OPR intends to further minimise its footprint by implementing a clearing approval procedure that includes instructions to reduce the disturbance width for construction to less than 100 m through remnant vegetation in freehold land and in conservation reserves in the pastoral area wherever practicable. Although OPR is confident this will be able to be delivered, it is not able to commit to an actual further reduced construction width because the detailed design of the rail formation is not at a stage that it is able to be any more definitive on the cut and fill requirements that influence footprint.</p>			
Rectify (repairing, rehabilitating or restoring the impacted site as soon as possible)	<p>OPR proposes to rectify a portion of extent of impacts over time through rehabilitation of areas disturbed during construction but not required for operation or maintenance of the permanent infrastructure. The final operational disturbance width made up of the rail formation and maintenance access track is expected to be 50 to 80 m; therefore between 20 and 50 m of the construction width will be subject to revegetation through remnant vegetation areas disturbed during construction.</p> <p>During and following construction, the rail corridor will be actively managed to ensure indirect impacts are kept well within the direct area of impact and to aid regeneration of vegetation. Such management will include invasive weed monitoring and control, erosion management, and mulga sheet flow impact monitoring and adaptive management.</p>			
Reduce (gradually eliminating the adverse impact over time by preservation and maintenance operations during the life of the action)	<p>The operational corridor of 50-80 m is expected to be the minimum required for safe operation and therefore it is unlikely that the width will be able to be reduced over time.</p>			

SECTION E: Significant residual impacts (adverse impacts remaining after all mitigation attempts exhausted)				
	Endangered and vulnerable vegetation associations	Conservation reserves	Significant flora	Significant fauna
Direct	<p>Vegetation association <10% pre-European extent remaining</p> <p>11.5 ha of clearing of e6Mr eaSi (8.8 ha reduction)</p> <p>Vegetation association < 30% but > 10% pre-European extent remaining</p> <p>a33Sc – 3.6 ha (2.2 ha reduction)</p> <p>e6Mr a19Si – 10.4 ha (8.2 ha reduction)</p> <p>mhSc – 12.9 ha (23.5 ha reduction)</p> <p>x2SZc – 1.1 ha (1.5 ha reduction)</p> <p>x3SZc – 18.8 ha (8.2 ha reduction)</p> <p>x3SZc/acSc – 7.4 ha (1.5 ha reduction)</p>	<p>2.5 ha of current reserve (Reserve 16200).</p> <p>No impact to proposed Moresby Range Conservation Park</p> <p>No impact to proposed Narloo conservation reserve</p> <p>Approximately 175 ha & 290 ha of proposed Woolgorong and Twin Peaks conservation reserves respectively</p>	<p>No known locations of DRF to be disturbed.</p> <p>No P1 or P2 species to be disturbed.</p> <p>13 P3 species to be potentially disturbed:</p> <ul style="list-style-type: none"> • <i>Acacia speckii</i> (3 plants – 0.2% of total) • <i>Dodonaea amplisemina</i> (1 plant – 0.1% of total) • <i>Eremophila muelleriana</i> (22 plants – 3.7% of total) • <i>Gastrolobium rotundifolium</i> (1 plant – 0.3% of total) • <i>Grevillea stenostachya</i> (18 plants – 2.8% of total) • <i>Grevillea triloba</i> (788 plants – 5.2% of total) • <i>Hemigenia tysonii</i> (101 plants – 1.3% of total) • <i>Hemigenia virescens</i> (51 plants – 2.0% of total) • <i>Petrophile pauciflora</i> (3 plants – 0.7% of total) • <i>Prostanthera petrophila</i> (39 plants – 2.4% of total) • <i>Ptilotus beardii</i> (269 plants – 7.1% of total) • <i>Thryptomene</i> sp. Moresby Range (10 plants – 0.5% of total) • <i>Thryptomene</i> sp. Wandana (20 plants – 2.7% of total) <p>One P4 species to be disturbed:</p> <ul style="list-style-type: none"> • <i>Verticordia penicillaris</i> (128 plants – 2.4% of total) 	<p>Up to 16.0 ha in the footprint has been assessed as potentially suitable foraging habitat for Carnaby's Black Cockatoo and combined with the NW Coastal Highway impact of up to 7.4 ha of foraging habitat, the total impact of the rail will be up to 23.4 ha. No breeding trees recorded although suitable tree species present to develop hollows.</p> <p>Western Spiny-tailed Skink - No impacts to granite outcrops.</p> <p>Potential Malleefowl habitat - 33.9 ha</p> <p>Potential Slender-billed Thornbill habitat - 32 ha</p>
Indirect	Within estimated area of direct impact	Within estimated area of direct impact	Within estimated area of direct impact	Within estimated area of direct impact

SECTION F: Proposed offsets for significant residual impacts (activities that counterbalance an adverse residual environmental impact.)

	Endangered and vulnerable vegetation associations	Conservation reserves	Significant flora	Significant fauna
Direct	<p>Offset Proposal 1 – Agricultural zone remnant vegetation conservation project (Section 4), which must include:</p> <ul style="list-style-type: none"> • 23 ha of vegetation representative of Beard vegetation association e6Mr eaSi. • 108.4 ha of two of more of the vulnerable Beard vegetation associations affected by the Proposal but at least including associations x3SZc and/or x3SZc/acSc (which are subject to largest extent of clearing from the Proposal and only just above the 10% threshold from being Endangered). 	<p>Offset Proposal 1 – Agricultural zone remnant vegetation conservation project (Section 4) and Offset Proposal 2 – Moresby Range / Chapman Valley habitat conservation and restoration project (Section 5) provide direct offsets for impacts to Reserve 16200 in freehold land through acquisition of at least twice the area affected for transfer to the conservation estate</p>	<p>Offset Proposal 1 – Agricultural zone remnant vegetation conservation project (Section 4), Offset Proposal 2 – Moresby Range / Chapman Valley habitat conservation and restoration project (Section 5), and Offset Proposal 3 – Pastoral land conservation project (Section 6) are to include known populations of Priority 3 flora or lower present and/or supports similar habitat in which Priority flora species affected by the Proposal have been recorded.</p>	<p>Offset Proposal 2 – Moresby Range / Chapman Valley habitat conservation and restoration project (Section 5) includes the conservation of remnant habitat for Carnaby’s Black Cockatoo. Offset Proposal 3 – Pastoral land conservation project (Section 6) will consider habitat for Western Spiny-tailed Skink and Malleefowl as a secondary consideration when determining the appropriate land for acquisition.</p> <p>Offset Proposal 1 – Agricultural zone remnant vegetation conservation project (Section 4) will consider habitat for Slender-billed Thornbill habitat as a secondary consideration when determining the appropriate land for acquisition.</p>
	<p>Offset Proposal 2 – Moresby Range / Chapman Valley habitat conservation and restoration project (Section 5) must include vulnerable vegetation associations from the Geraldton-Chapman Valley area affected by the Proposal. Note, this may reduce the area of these associations required to be protected in Offset Proposal 1.</p>	<p>Offset Proposal 3 – Pastoral land conservation project (Section 6) provides direct offset for impacts to conservation reserves in pastoral land through acquisition of at least twice the area affected for transfer to the conservation estate.</p>		<p>Offset Proposal 2 also involves a Carnaby’s Black Cockatoo habitat rehabilitation program to increase the extent and value of habitat in the land acquired for conservation.</p>

SECTION F: Proposed offsets for significant residual impacts (activities that counterbalance an adverse residual environmental impact.)				
	Endangered and vulnerable vegetation associations	Conservation reserves	Significant flora	Significant fauna
Indirect/contributing	Offset Proposal 1 and 2 involve the removal or reduction of threatening processes and the implementation of management measures to improve the condition of the vegetation.	Offset Proposal 1, 2 and 3 the removal or reduction of threatening processes and the implementation of management measures to improve the condition of the land for purpose of conservation and to minimise ongoing liabilities for future land manager (DEC).	Offset Proposal 1, 2 and 3 the removal or reduction of threatening processes and the implementation of management measures to improve the condition of habitat for Priority flora species.	Offset Proposal 1, 2 and 3 the removal or reduction of threatening processes and the implementation of management measures to improve the condition of habitat for significant fauna species
			OPR will undertake propagation and plant recruitment trials for Priority flora species as part of its land rehabilitation program, which will increase knowledge on the biology of these species.	Offset Proposal 4 – Regional threatened fauna studies will provide indirect benefits to Carnaby's Black Cockatoo through increasing knowledge of these species through contributions to research. Offset Proposal 4 will also aid recovery plans for the Western Spiny-tailed Skink through further supporting surveys and genetic studies.

SECTION G: Spatial data relating to offset site/s				
	Endangered and vulnerable vegetation associations	Conservation reserves	Significant flora	Significant fauna
	Spatial data relating to candidate sites for each of the offset projects has been provided to the DEC and EPA			

SECTION H: Relevant data sources, technical information and consultation undertaken to establish suitability of offsets				
	Endangered and vulnerable vegetation associations	Conservation reserves	Significant flora	Significant fauna
	Beard (1976) Beard & Burns (1976) Ecologia (2010a, b)			

9 References

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