

environmental management



Woodlinks Village

Offset Management Plan

246-326 Collingwood Drive, Collingwood Park
Canberra Estates Consortium No 36 Pty Ltd [ABN: 90 156 442 312]
EPBC Ref: 2013/6866
SHG Ref: 7189
September 2014



Declaration of Accuracy

In making this declaration, I am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the regulations. This offence is punishable on conviction by imprisonment for not more than 1 year, a fine not more than 60 penalty units, or both. An extract of section 491 of the EPBC Act is attached.

Signed:

Full Name: Murray Saunders

Organisation: Saunders Havill Group

Date: 24.09.2014

491 Providing false or misleading information to authorised officer etc.

- (1) A person is guilty of an offence if the person:
 - (a) provides information or a document to another person (the *recipient*); and
 - (b) knows the recipient is:
 - (i) an authorised officer; or
 - (ii) the Minister; or
 - (iii) an employee or officer in the Department; or
 - (iv) a commissioner;
performing a duty or carrying out a function under this Act or the regulations; and
 - (c) knows the information or document is false or misleading in a material particular.
- (2) The offence is punishable on conviction by imprisonment for a term not more than 1 year, a fine not more than 60 penalty units, or both.

Note: Subsection 4B(3) of the *Crimes Act 1914* lets a court fine a body corporate up to 5 times the maximum amount the court could fine a person under this subsection.



Document Control

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Reports and/or Plans by Others

Reports and/or plans by others may be included within this Offset Management Plan to support the document.



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I. Executive Summary

The Woodlinks Village project site was deemed a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on the 14th of June 2013 due to potential impacts on the vulnerably listed Koala. The project gained subsequent approval on the 4th of March 2014 after being assessed by Preliminary Documentation. This Offset Management Plan has been developed in response to Condition 4 of the EPBC Act approval package and outlines the immediate, mid-term and long-term offset goals for the project.

Woodlinks Village is a residential master planned development with ancillary retail and commercial uses, located in Collingwood Park, South East Queensland. While a number of management plans will be in place to avoid and mitigate impacts to Koalas, impacts to Koalas that must be offset as per Condition 4 include:

- The loss of 25.9 hectares of habitat critical to the survival of the Koala; and
- Injury and mortality to Koalas.

This Offset Management Plan has the purpose of providing high level guidance for the creation and implementation of offset mechanisms. The primary offset mechanisms include:

- Rehabilitation and reinstatement of 27 hectares of vegetation along Goodna Creek. This includes areas adjacent to the development on the western side of Goodna Creek and areas within Harry Ratnam Park, located on the eastern side of Goodna Creek.
- Construction of access facilities (road) to the Koala Harvest Plantation in Harry Ratnam Park, which will facilitate access to this foliage plantation for the Ipswich Koala Protection Society.

The successful implementation of these offset mechanisms will create a self-sustaining, continuous corridor of high quality Koala habitat, facilitating Koala dispersal between habitat patches within the local landscape. This will help to achieve **Ipswich City Council's** vision to create a locally significant conservation corridor along Goodna Creek.

I.I. Conditions of Approval Reference Table

Condition	OMP Reference	Comments
Condition 4: The approval holder must prepare an Offset Management Plan to address significant residual impacts to Koalas as a result of the action.		
a) Impacts to Koalas that must be offset include: i. The loss of 25.9 hectares of habitat critical to the survival of the Koala, and ii. Injury and mortality of Koalas.	N/A	This <u>Offset Management Plan</u> provides guidance on how both the loss of 25.9 hectares of habitat critical to the survival of the Koala and potential injury and mortality will be offset.
b) The Offset Management Plan must include, but not be limited to:		
i. A detailed description of all affected	Section 3	Section 3 provides a description of the habitat values on site and the



Condition	OMP Reference	Comments
values and the extent and likely timing of the impact/s on each;		impacts from the action. It also discusses mitigation measures and residual impacts that require offsetting.
ii. The offset delivery mechanism(s) comprising land offsets and management, and maintenance of Koala population offset within the 'Goodna Creek Corridor' as shown in Attachment 1;	Section 4.4	Section 4.4 provides a detailed description of key delivery mechanisms of the offset. This includes rehabilitation of Goodna Creek and providing access to the Koala Harvest Plantation.
iii. Detailed descriptions of how enhanced conservation outcomes for the affected Koalas will be achieved in accordance with the EPBC Act Offsets Policy;	Section 4.5	The requirements and objectives of the EPBC Act Offsets Policy are described in Section 4.5. This is accompanied by a description of how the proposed offset meets the desired objectives.
iv. Contribution of funding to the management and maintenance of the Offset Management Plan;	Section 5.2	Section 5.2 describes the role of Canberra Estates Consortium No 36 as the primary contributor to funding.
v. Timeframes and key milestones for implementation of offsets including, but not limited to, beginning to implement the offset plan prior to commencement of the action;	Section 5.1	Timeframes and milestones, as well as the responsible person/ entity are described in a schedule in Section 5.1.
vi. Discussion of the risks and uncertainties associated with proposed offsets;	Section 6	Section 6 provides a detailed analysis of the risks and uncertainties relating to restoration ecology. Measures to minimise these risks are also proposed.
vii. Mechanisms for monitoring and reporting of offset milestones and outcomes, including timing and frequency of monitoring and reporting;	Section 5.3	Section 5.3 describes monitoring and reporting mechanisms
viii. Corrective actions and contingency measures to be implemented (including the timing of implementation of these) where monitoring of the offset area/s under the offset plan shows that offset strategies are not effectively	Section 5.4	Adaptive management techniques are described in Section 5.4 which will identify corrective actions and contingency measures.



Condition	OMP Reference	Comments
achieving a net benefit or key milestones are not being or are unlikely to be met; and		
ix. Include textual descriptions and maps clearly defining the locations and boundaries of offset areas. These must be accompanied by a Shapefile.	Plan 1 and Section 4. Shapefile has accompanied the report.	Plan 1 shows the offset area. Section 4 provides a detailed description of the offset site.
c) The Offset Management Plan must be developed in consultation with the Department and other relevant stakeholders, including but not limited to, the Ipswich City Council and the Ipswich Koala Protection Society.	Section 2.4	This Offset Management Plan has been developed in consultation with identified stakeholders.
d) The approval holder must give consideration to how offsets will contribute to programs or incentives that align with the broader strategies and programs for the conservation and protection of Koalas.	Section 4.1, Figure 4.	The contextual conservation object of both Ipswich City Council and the Ipswich Koala Protection Society is listed in Section 4.1. This is accompanied by Figure 4 which shows the strategic zoning of the offset area as a conservation corridor under the Ipswich Planning Scheme.
e) The Offset Management Plan must be submitted to the Minister for approval no less than three months prior to its intended implementation. Once approved the Offset Management Plan must be implemented.	N/A	The action will not commence until the OMP and KMP have been approved. It is anticipated that construction will commence in late 2014/ early 2015.
f) The Offset Management Plan must be implemented prior to the commencement of the action, or as otherwise directed in writing by the Minister.	N/A	This <u>Offset Management Plan</u> will be implemented prior to the commencement of the action.



2. Introduction

The *Environmental Management Division* of **Saunders Havill Group** was engaged by **Canberra Estates Consortium No 36** to prepare an Offset Management Plan for Woodlinks Village, located at 246-326 Collingwood Drive, Collingwood Park. The development proposal can be described as a master planned residential development with ancillary commercial and retail purposes with a designated open space/ conservation area.

Woodlinks Village was referred under the *Environment Protection and Biodiversity Conservation Act* (EPBC Act) on the 16th of May 2013 and subsequently declared a “controlled action” pursuant to section 18 and 18A (listed threatened species and communities) (EPBC Act reference 2013/6866). The trigger for the controlling provision was due to potential impacts on the Koala (*Phascolarctos cinereus*), which is listed as Vulnerable under the EPBC Act. Under the **Department of the Environment’s** Preliminary Documentation requirements, an offset proposal to compensate for the impacts on 25.9 hectares of *habitat critical to the survival of the koala* was prepared in consultation with **Ipswich City Council** and the **Ipswich Koala Protection Society** (IKPS). The offset proposal included the rehabilitation and reinstatement of 27 hectares of degraded vegetation along Goodna Creek, and the creation of access facilities to the Harry Ratnam Park Koala Foliage Harvest Plantation.

The project was approved on the 4th of March 2014, subject to twelve conditions. Condition 4 of the approval provides that ‘*the approval holder must prepare an Offset Management Plan to address significant residual impacts to Koalas as a result of the action.*’ As such, this Offset Management Plan has been developed to satisfy the requirements of Condition 4 of the EPBC Act approval and to guide the implementation and management of offset activities. As per the requirements of the approval, this Offset Management Plan will include:

- A detailed description of all affected values and the expected timing of these impacts;
- The offset delivery mechanisms;
- A description of how the conservation outcomes of the *EPBC Act Environmental Offsets Policy* will be achieved and enhanced;
- Management mechanisms, including timeframes, funding, maintenance, monitoring/ reporting and corrective actions; and
- Identification of the risks and uncertainties associated with the offset.

Overarching Objective:

The successful implementation of proposed offset mechanisms will create a self-sustaining, continuous corridor of high quality Koala habitat, facilitating Koala dispersal between habitat patches within the local landscape. This will help to achieve **Ipswich City Council’s** vision to create a locally significant conservation corridor along Goodna Creek.



2.1. Key Site Details

Address	246-326 Collingwood Drive, Collingwood Park
RPD	Lot 1 on SP266990
Area	77.97 hectares
Approval Summary	<p>The site retains a Preliminary Approval overriding the Ipswich City Council Planning Scheme for the establishment of the Corymbia Woods Master Plan, allowing for:</p> <ul style="list-style-type: none"> -1966 total dwellings (site density of 25.3/ha) - 6.1 ha Urban Centre which, along with dwellings, includes the following possible uses: <ul style="list-style-type: none"> ▪ Business uses/ professional offices ▪ Fast food ▪ Retail ▪ Cafes ▪ Medical centre
Tenure	Freehold
Local Government Area	Ipswich City Council
Action Commencement Date	Late 2014/ Early 2015

2.2. Site Context

Contextually, Woodlinks Village is located three kilometres north-west of Redbank Plains and is bounded by residential housing to the north, rural allotments and Redbank Plains Road to the south and Goodna Creek to the east. The surrounding suburbs of Redbank Plains and Collingwood Park are highly urbanised and contain a mixture of residential housing, commercial properties and industrial land uses. Refer to **Figure 1** for the site context and **Figure 2** for the site aerial.



Legend

 Woodlinks Village Project Area

Figure 1 Site Context

File ref. 7189 E Figure 1 - Site Context A

Date 01.07.14

Project Woodlinks Village

0 0.5 1 2 km
 Scale (A4): 1:45,000 [GDA 1994 MGA Z56]



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Legend

 Woodlinks Village Project Area

Figure 2 Site Aerial

File ref. 7189 E Figure 2 - Site Aerial C

Date 01.07.14

Project Woodlinks Village

0 50 100 200 300 m
 Scale (A4): 1:8,000 [GDA 1994 MGA Z56]



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2.3. Project Scope and Activities

Woodlinks Village is to be developed in accordance with the flexible Preliminary Approval outcomes set out in the Corymbia Woods Master Plan and the Development Permit issued by **Ipswich City Council** in September 2008. While the Preliminary Approval refers to 'Corymbia Woods,' the project name has since been changed to 'Woodlinks Village.'

The project can be described as a residential master planned development with ancillary local shopping, business and retail uses. The primary statistics include:

Site Area:	=	77hectares
Development Footprint as zoned	=	52 hectares
Area of Open Space (Various Forms)	=	15 hectares
Total number of approved dwellings	=	1966 (includes units)
Action Commencement Date	=	Late 2014/ Early 2015



The types of residential dwellings proposed include:

- Apartment houses
- Cottage allotments
- Side yards allotments
- Traditional house lots (400-600m²)

The primary layout feature of the development proposal is a clear delineation between 'residential' areas and 'conservation' areas, as shown in the adjacent image. This will achieve conservation outcomes by discouraging Koalas, and other fauna species, into urban areas where they are more susceptible to injury and mortality caused by vehicle strike and dog attack.

Instead, the conservation area designated on both sides of Goodna Creek will provide safe habitat opportunities for fauna and will contribute to the creation of a continuous ecological corridor, connecting habitat areas to the north and south of the site.



2.4. Stakeholder Consultation

Woodlinks Village has undergone three community consultation phases which has allowed for the identification and resolution of planning and development issues.

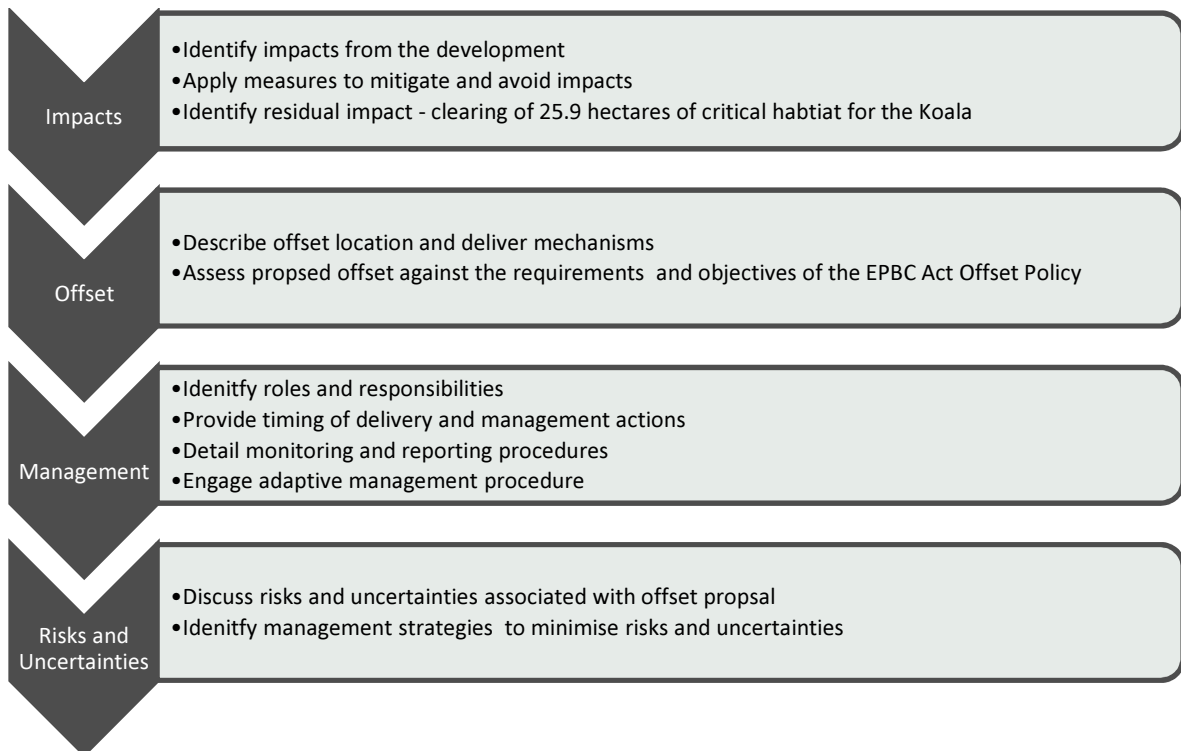
Stakeholder consultation has been made available through:

1. The Collingwood Drive Design Forum- held over three days in 2007 in Ipswich, with attendees from the general community, **Ipswich City Council**, State Government and project team representatives (refer to image opposite).
2. Ongoing consultation with the **Ipswich Koala Protection Society (IKPS)** to identify offset areas and outcomes and to assist in developing the Woodlink Koala Management Plan.
3. Publication of referral documentation for public comment during the assessment stage of the project as required by the EPBC Act.



This Offset Management Plan has been developed in direct consultation with the **Department of the Environment, IKPS** and **Ipswich City Council**.

2.5. Offset Management Plan Objectives





3. Habitat Description and Likely Impacts

The subject site has been extensively surveyed since 2005, with more contemporary surveys focusing on potential EPBC Act issues, particularly the Koala. The range of ecological surveys conducted, which have spanned over nine years, has provided a detailed understanding of the ecological values that are present across the site. The following provides a description of the values which are likely to be affected as a result of construction activities.

3.1. Flora Values

The site currently supports a number of different vegetation communities identified under Regulated Vegetation mapping, as shown in **Figure 3** (Regional Ecosystem Map):

RE12.9-10.17 (Least Concern)

Open forest to woodland complex generally with a variety of stringybarks, grey gums, ironbarks and in some areas spotted gum. Canopy trees include *Eucalyptus siderophloia*, *E. propinqua* or *E. major*, *E. acmenoides* or *E. portuensis*, *E. carnea* and/or *E. microcorys* and/or *Corymbia citriodora* subsp. *variegata*. Other species that may be present locally include *Corymbia intermedia*, *C. trachyphloia*, *Eucalyptus tereticornis*, *E. biturbinata*, *E. moluccana*, *E. longirostrata*, *E. fibrosa* subsp. *fibrosa* and *Angophora leiocarpa*. *Lophostemon confertus* or Whipstick *Lophostemon confertus* often present in gullies and as a sub canopy or understorey tree. Mixed understorey of grasses, shrubs and ferns. Hills and ranges of Cainozoic and Mesozoic sediments.

RE12.9-10.19 (Least Concern)

Eucalyptus fibrosa subsp. *fibrosa* woodland +/- *Corymbia citriodora* subsp. *variegata*, *E. acmenoides* or *E. portuensis*, *Angophora leiocarpa*, *E. major*. Understorey often sparse. Localised occurrences of *Eucalyptus sideroxylon*. Occurs on Cainozoic and Mesozoic sediments.

RE12.9-10.3 (Of Concern)

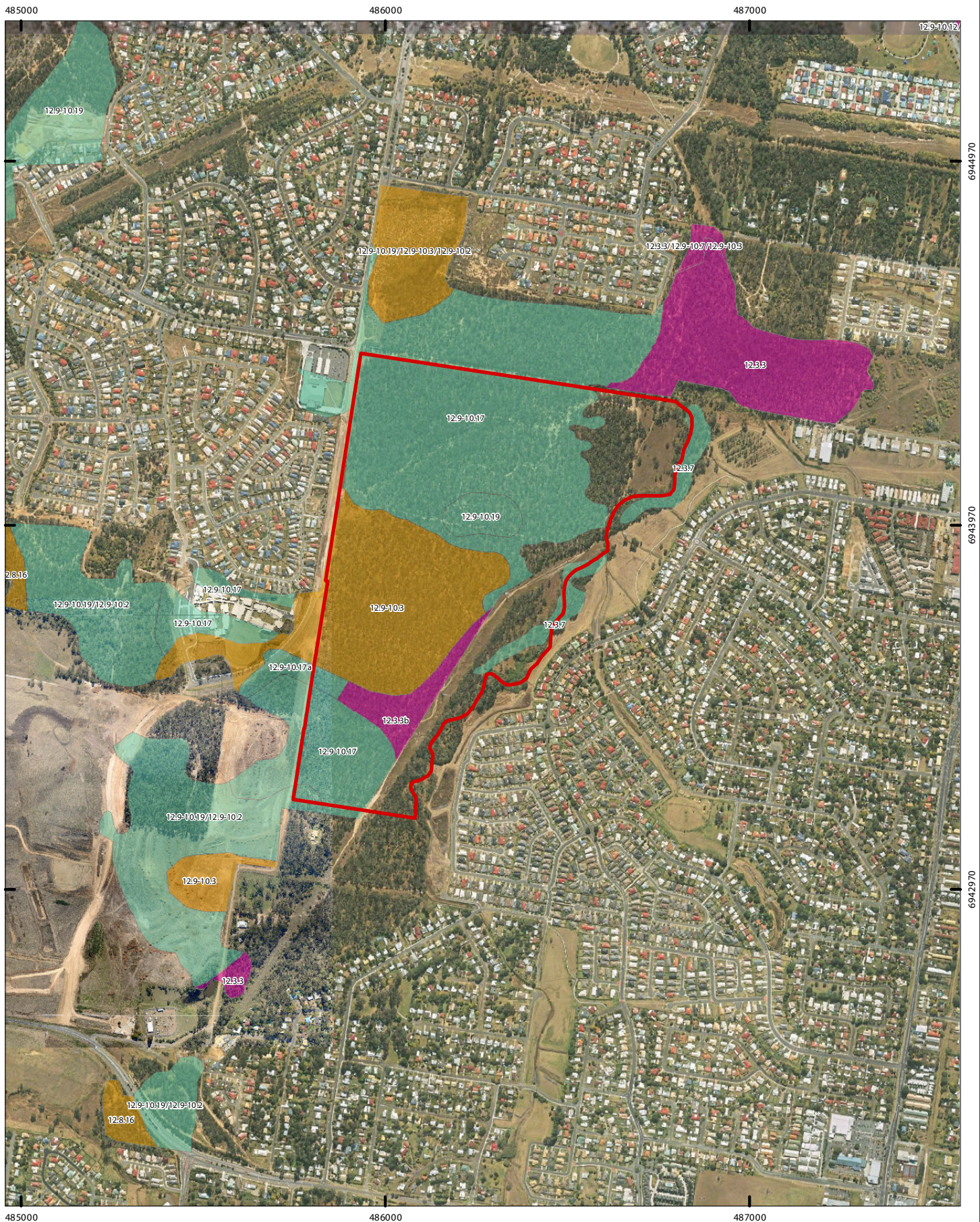
Eucalyptus moluccana +/- *Corymbia citriodora* subsp. *variegata* open forest. Other species include *Eucalyptus siderophloia* or *E. crebra*, *E. tereticornis*. Understorey generally sparse but can become shrubby in absence of fire. Occurs on Cainozoic and Mesozoic sediments, especially shales. Prefers lower slopes.

RE12.3.3 (Endangered)

Eucalyptus tereticornis woodland. *Eucalyptus crebra* and *E. moluccana* are sometimes present and may be relatively abundant in places, especially on edges of plains and higher level alluvium. Other species that may be present as scattered individuals or clumps include *Angophora subvelutina* or *A. floribunda*, *Corymbia clarksoniana*, *C. intermedia*, *C. tessellaris*, *Lophostemon suaveolens* and *E. melanophloia*. Occurs on Quaternary alluvial plains, terraces and fans where rainfall is usually less than 1000mm/y.

Field surveys confirmed the occurrence of these Regional Ecosystems and found that the majority of the site was dominated by eucalypt and corymbia species. Generally, a larger number of *Eucalyptus tereticornis* (Forest Red Gum), *Eucalyptus seeana* (Narrow-leaved Red Gum) and *Eucalyptus moluccana* (Gum Topped Box) were identified towards the eastern property boundary along Goodna Creek and a greater number of *Corymbia citriodora* (Spotted Gum) and *Eucalyptus crebra* (Narrow Leaf Ironbark) were dominant along ridgelines with less fertile soils.

The alluvial plain of Goodna Creek was assessed as highly disturbed as a result of historic land clearing, slashing and weed invasion. Most areas surveyed were devoid of a shrub layer however there was a consistent density in coverage of native canopy trees. The site contained forty-three (43) weed species, which included *Lantana camara* (lantana), *Opuntia* (prickly pear), *Ipomoea cairica* (mile-a-minute) and *Celtis sinensis* (Chinese elm). Goodna Creek is identified as an ecological corridor within the **Ipswich Planning Scheme**.



Legend

- Woodlinks Village Project Area
- Regional Ecosystem v6.1
 - Remnant vegetation containing Endangered REs
 - Remnant vegetation containing Of Concern REs
 - Remnant vegetation that is a Least Concern RE

Figure 3 Regional Ecosystem v6.1

File ref. 7189 E Figure 3 - RE C
Date 01.07.14
Project Woodlinks Village

0 100 200 400 600 m
 Scale (A4): 1:14,000 [GDA 1994 MGA Z56]



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3.2. Koala Habitat

Approximately 35.2 hectares of vegetation on-site was assessed as achieving the definition of *habitat critical to survival of the Koala*. As there were no referral guidelines for the Koala released at the time of assessment, this interpretation was formulated against the *Interim Koala Referral Advice for Proponents* (2012).

Ecological experts from **BAAM** who completed studies across the site in 2008 and 2013 as a lead into the EPBC Act referral surveyed the site and surrounding areas and concluded in their letter dated the 27th of September 2013 that:

Although the subject site supports areas of highly suitable habitat, as assessed by the dominance of primary food trees, repeated surveys of the site indicate that koala usage of this resource is very low. It is expected that the condition of the soil profile, together with environmental factors, are such that the food trees do not provide the necessary foliar nutrients or moisture required to sustain a koala.

Fauna surveys across the site did not result in the identification of other EPBC Act listed species or ecological communities, however evidence of low level Koala usage in the form of scats was found. The site was assessed as supporting 1-2 individual Koalas. It is noted that Koala densities in the Collingwood Park area are relatively low, with most individual restricted to 'Riffle Range,' a state reserve located to the north of the site, connected to the site by Goodna Creek.

3.3. Impact Summary

The development of Woodlinks Village will result in the following ecological impacts on MNES:

- a) Removal and fragmentation of 52 hectares of vegetation, which includes 25.9 hectares of *habitat critical to the survival of the koala*;
- b) Decrease in availability of habitat for Koalas and other fauna species in the local area;
- c) Risk of injury or mortality to Koalas
- d) Changes to site topography through earthworks;
- e) Change to site hydrology introduced through hardstand and additional hard and soft drainage structure;
- f) Expansion of housing;
- g) Increase in vehicle use on access roads to service new housing; and
- h) Increase in domestic animals through the local area.

Table 1: Risk Assessment

Impact	Likelihood	Consequence	Risk Rating
Construction Phase			
Loss of habitat	Almost certain (A)	Minor (2)	High
Loss of 25.9 hectares of critical habitat	Almost certain (A)	Minor (2)	High
Injury and mortality due to vegetation clearing	Unlikely (D)	Major (4)	High
Injury and death due to	Unlikely (D)	Major (4)	High



Impact	Likelihood	Consequence	Risk Rating
increased vehicle usage			
Species displacement into other habitat areas	Possible (C)	Minor (2)	Moderate
Impacts on breeding	Unlikely (D)	Moderate (3)	Moderate
Operational Phase			
Loss of habitat	Almost certain (A)	Minor (2)	High
Injury and death from dogs	Possible (C)	Major (4)	Extreme
Injury and death from cars	Possible (C)	Major (4)	Extreme
Barriers to dispersal	Possible (C)	Minor (2)	Moderate
Dispersal of koalas into residential areas	Possible (C)	Moderate (3)	High

As identified from the risk assessment above, management measures will focus on avoiding and mitigating impacts caused by:

- Loss of habitat
- Risk of injury and death caused by:
 - Vegetation clearing
 - Dog attack
 - Vehicle strike
- Dispersal into residential areas

3.4. Avoidance and Mitigation

Following the Mitigation Hierarchy set out within the *EPBC Act Biodiversity Offsets Policy*, measures to avoid and mitigate impacts have been developed to reduce the quantity of residual impacts on MNES that require offsetting. Post the “Controlled Action Determination,” consultation with the **IKPS** and **Ipswich City Council** has led to the incorporation of two (2) primary factors into the project to help avoid and mitigate development impacts on Koalas during the operational stage of the project. These include:

1. Minor Alterations to the Plan of Development
2. Preparation of a Woodlink Koala Management Plan

In addition, a number of management plans will be imposed to ensure impacts from construction are minimised, particularly in relation to preventing injury and mortality to Koalas and other species during construction.



3.4.1 Alterations to the Plan of Development

The original Development Permit and proposal issued to the **Department of the Environment** for referral was based on the 2008 Corymbia Woods Master Plan. Amongst a range of leading urban design outcomes, the open space network included a number of lineal tree protection zones connecting internal local recreation parks with the rehabilitated Goodna Creek area set aside for environmental protection. While improving the walkability of the estate and linkage of the parkland, this outcome resulted in the substantial fragmentation of existing vegetated areas and could potentially have the effect of drawing fauna up from the Goodna Creek corridor into high density residential areas where vehicles and dogs would be more prevalent. Post an on-site workshop with **Ipswich City Council** officers, it also became clear that many of these lineal opens pace areas will be heavily effected by earthworks and new infrastructure alignments.

Similarly, a more detailed review of Council's Planning and Development (PD) online database shows the approved footprint of surrounding developments and new roads which completely eliminate the potential connectivity of site vegetation to the west of the project area (refer to **Figure 4**).

In response to these concerns, the preference was for a minor redesign which clearly demarcated areas of the site to be developed and areas to be retained and enhanced for the environment, reducing the integration of the two uses. The new proposal now infills much of the internal linear open space system with development footprint, with limited direct connectivity between internal recreation open space and the Goodna Creek Corridor. The trade-off for this outcome is the commitment to undertake major replanting works to the eastern side of Goodna Creek in the existing Council owned Harry Ratnam Park. This is discussed further in **Section 4**.

Figure 4: Contextual Development Footprint





3.4.2 Woodlink Koala Management Plan

A number of potential and necessary koala and other fauna controls and management measures were discussed through the additional consultation with Council and the **IKPS**. To embed all of these controls and measures in a single management document, the Woodlink Koala Management Plan has been prepared and will be lodged in addition to this Offset Management Plan. The Management Plan includes details on:

1. The existing broad ecological values of the site
2. The environmental and development context of the Collingwood Park area
3. Outlines the various components of the proposal
4. Lists out Vegetation Controls for the Control of Clearing Works
5. Details the Fauna Management Protocols during and post construction
6. Lists a range of proposed operational management measures (dogs, vehicles)
7. Outlines the works proposed to be completed on and off site along Goodna Creek

The Woodlink Koala Management Plan has been prepared for approval to form an overarching commitment to wildlife management and the Goodna Creek Corridor enhancement for the life of the project.

Some of the more specific management considerations in the management plan include:

1. Road Design and Vehicle Controls

Vehicle strikes are a major contributor to injuries and fatalities in Koalas and so it has been recognised that measures need to be in place to safeguard Koalas from vehicle related injuries. The new Woodlinks Village development proposal no longer introduces a network of complex open space linkages intertwined within the internal road network, with the environmental focus of the project limited to the Goodna Creek Corridor. The project proposes a low speed residential scale esplanade road along the edge of the corridor separating the new housing from the corridor area. By law, the maximum speed for this road is 50km per hour, however enquires have been made to **Ipswich City Council** and **Queensland Department of Transport and Main Roads** to further reduce this zone to 40km per hour.

With the road travelling adjacent to and not across the corridor, traffic calming, awareness signage and the specific landscape design of the road verge will all contribute towards slowing cars and maximising driver visibility of moving fauna. The streetscape and adjoining houses will be planted out with non-Koala tree native species to reduce any encouragement for Koalas and other native fauna to venture away from the Goonda Creek corridor.

The external road upgrades of Collingwood Drive and the Future Eagle Street have been designed and implemented by **Ipswich City Council**, with Woodlink having no control over these major infrastructure items. Representations have been made to **Ipswich City Council** to incorporate a fauna culvert in the Eagle Street upgrade allowing for the continued connectivity of this site and retained habitats along the creek to the north.

2. Dog Controls – Goodna Creek Corridor

To minimise the risk of injury to Koalas by dog attacks, controls will be in place requiring all dogs to be on a leash and/or prohibited from the Goodna Creek Corridor. Dog off-leash facilities will be provided within the local parks scattered throughout the estate to offset this on lead control along Goodna Creek. These requirements will be signed throughout the estate and particularly along the entry and exit points to the Goodna Creek open space. The design of the Goodna Creek Corridor is primarily rehabilitation works with no major recreation facilities or



open turf areas which would attract dog use. **Ipswich City Council** operates an existing animal control local law which requires all dogs to be registered.

3. Education and Awareness

Education and awareness signage along the Goodna Creek pedestrian link and esplanade road will be installed, detailing the importance of the corridor, its potential use by koalas and how residents can support this use. This signage will be developed in conjunction with **IKPS**.

The Woodlink Village lifestyle guideline documentation will be issued to each new resident and is designed to help promote a range of ecological sustainable living principles. The guideline will be used to directly educate and raise awareness of a large audience towards the management of the Goodna Creek Corridor. Topics included within the education documents include:

- Appropriate plant selection on allotments
- Inappropriate planting species (known local or declared weed species)
- Management of house hold scale run-off
- Protection of native animals and the types of native animals residents could expect to see within Goodna Creek
- Understanding stormwater devices
- Appropriate management of domestic animals
- Location of dog on-leash and off-leash areas
- Key local and state phone numbers to contact if distressed or orphaned fauna is located.

Through raising awareness, the lifestyle guidelines will help new residents take direct ownership of the local streetscapes and the existing vegetated and recently rehabilitated portions of the Goodna Creek Open Space.

In addition to these specific restrictions and awareness requirements, many of the previously discussed management plans will incorporate ongoing monitoring and reporting on the function of the corridor open space system.

4. Urban Infrastructure

The need to ensure Koalas remain within the Goodna Creek Corridor and avoid entering the adjoining residential areas is a paramount concern. During the 30th October 2013 meeting with **Department of the Environment** representatives, discussions centred around the potential use of colorbond fencing within the allotments adjoining domestic animals internally and preventing koalas from accessing these areas. The [Woodlinks Village Koala Management Plan](#) provides details on measures which can be used to retain Koalas within the Goodna Creek Corridor and to restrain them from entering adjoining residential areas. Some of the options considered include:

- Considerations for fauna exclusion fencing (via combination of retaining and fencing) to the periphery of the Goodna Creek Corridor. The goal would be to provide a one way access barrier which enables animals to enter the corridor but not exit where it interfaces with the new residential development areas.
- The inclusion of fauna friendly or exclusion fencing in specific locations throughout the estate where deemed to provide a functional outcome in the protection of koalas
- A non-koala tree landscape mix to be used in estate landscaping. Ensure street and park trees while being planted out with non-invasive native trees don't specifically include any primary or secondary Koala food trees. The goal of this approach is to minimise the attraction for Koalas to exit the corridor area.



3.4.3 Additional Management Measures

To manage these impacts, a number of procedures will be implemented prior to and during vegetation clearing works and construction. This includes the implementation of a Vegetation Clearing and Management Plan (VC&MP) and use of a registered Fauna Spotter Catcher recommended by **IKPS** to protect wildlife from the impacts of clearing. In addition, to ensure the highest level of environmental management is incorporated into the project, the RSPCA/ ESU of WW Draft Code for Fauna Spotting will be adopted to ensure that fair, reasonable and appropriate measures are undertaken to minimise the adverse impacts on wildlife.

3.5. Risks of Injury and Morality to Koalas

Given the extensive management measures to be imposed throughout the construction and operational phases of Woodlinks Village, it is unlikely that injury or mortality to Koalas will occur. However, should an incident occur during the construction of Woodlinks Village that results in injury to Koalas, the animal's full rehabilitation costs will be covered by the proponent.

3.6. Residual Impacts on MNES

While incorporating a number of measures to avoid and mitigate impacts on the Koala, the proposal results in the direct removal or fragmentation of 25.9 hectares of *habitat critical to the survival of the Koala*. This residual impact is to be offset in accordance with Condition 4 of the EPBC Act Approval through the rehabilitation and reinstatement of a portion of Goodna Creek adjacent to the development site, as well as through the construction of access facilities to the Koala Foliage Harvest Plantation located on Harry Ratnam Park for the **Ipswich Koala Protection Society**.



4. Offset Design

4.1. Background

The rehabilitation of a 27 hectare area along Goodna Creek has been identified as the most effective and efficient offset opportunity to compensate for the residual impacts on Koala habitat as a result of the development of Woodlinks Village. This offset area is depicted in **Plan 1**. Its selection as an offset area came after extensive consultation with **Ipswich City Council** and the **Ipswich Koala Protection Society**, who both identified its rehabilitation as the preferred conservation outcome for the local area. The Goodna Creek ecological corridor has been strategically designated within the Ipswich Planning Scheme to retain and enhance linkages between areas of remnant vegetation within Collingwood Park and Redbank (refer to **Figure 5**). The Goodna Creek corridor will play an important role in maintaining connectivity between protected vegetation areas such as the “Riffle Range” (State reserve) to the north and to other habitat areas along Six Mile Creek and the Brisbane River.

The proposed offset area includes 16 hectares along the western side of Goodna Creek, adjacent to Woodlinks Village, and 11 hectares to the east of the Creek in Harry Ratnam Park (refer to **Plan 1**). Not only will rehabilitation works allow for the creation of a continuous corridor along Goodna Creek, but it will facilitate **IKPS’s** access to Koala leaf collection areas in Harry Ratnam Park. This particular portion of Goodna Creek has been chosen for rehabilitation as it is heavily degraded and provides an important opportunity to increase Koala habitat and connectivity opportunities in the local area. Once the rehabilitation works are complete, the offset area will be transferred to Council ownership to ensure its continued protection and maintenance.

4.2. Location

Contextually, the offset area is located to the east of the Woodlinks Village development site, flanking both sides of Goodna Creek (refer to **Plan 1**). The offset area totals approximately 27 hectares, which is made up of:

- a) 16 hectares of land within the Woodlinks Village project area boundaries; and
- b) 11 hectares of land within Harry Ratnam Park, which is owned by **Ipswich City Council**.

Under the Ipswich Planning Scheme, a large proportion of the Goodna Creek Corridor offset area is protected from development through its ‘recreation’ zoning (refer to **Figure 5** and **Plan 2**). This corridor adjoins the Brisbane River and Six Mile Creek, both located to the north of the site. This corridor also adjoins a State Reserve known as ‘Riffle Range,’ located approximately two kilometres north along Goodna Creek. The recreational zoning ensures that incompatible development and land uses that impede the ability of Goodna Creek to act as an ecological corridor do not occur. The location of the offset area has been identified in recognition of Ipswich City Council’s long term vision for Goodna Creek to act as a primary ecological corridor within the landscape.

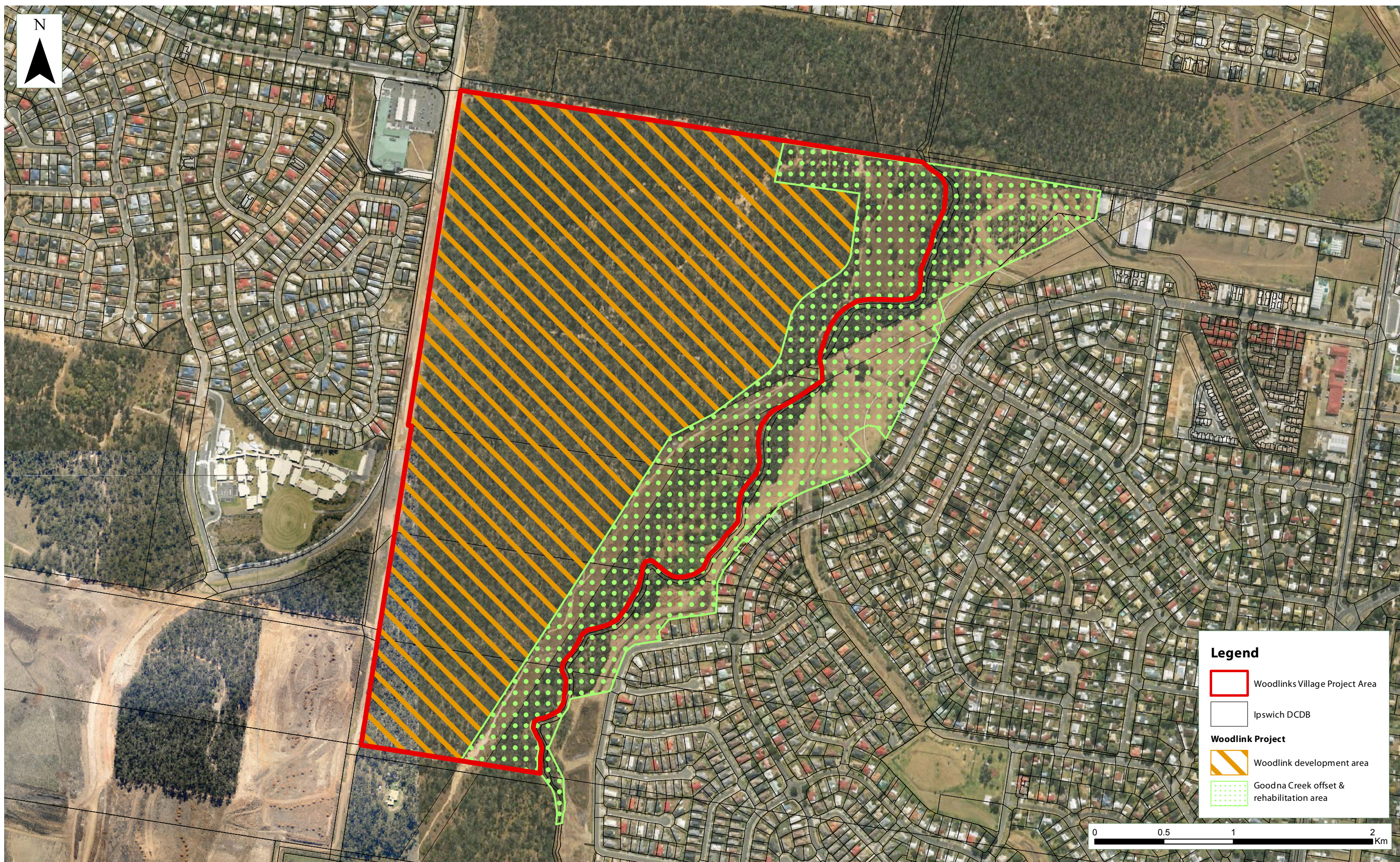
The offset area is contained within parts of the following allotments:

Woodlinks Village Project Area





- Lot 1 on SP266990
- A/RP116226 (easement)

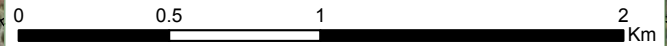
Harry Ratnam Park:

- Lot 5 on RP221982
- Lot 519 on SL10400
- Lot 901 on SP198179



Legend

-  Woodlinks Village Project Area
-  Ipswich DCDB
- Woodlink Project**
-  Woodlink development area
-  Goodna Creek offset & rehabilitation area



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Quality Management Systems
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ISO 14001
Environmental Management Systems
QMS

ISSUES:

Issue	Date	Description	Drawn	Checked
C	24.09.2013	Lodgement	TC	MS

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CONFIRM ALL DIMENSIONS ON SITE PRIOR TO CONSTRUCTION AND DO NOT SCALE FROM THE DRAWING. ALL DIMENSIONS ARE IN METRES. ANY DISCREPANCIES SHOULD BE CLARIFIED IN WRITING WITH SAUNDERS HAVILL GROUP PRIOR TO THE COMMENCEMENT OF WORK.
PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON SITE, THE RELEVANT AUTHORITY SHOULD BE CONTACTED FOR FURTHER UNDER-GROUND SERVICES AND DETAIL LOCATIONS OF ALL SERVICES.

Woodlinks Village

Goodna Creek Offset & Rehabilitation Area

Date 24.09.13
Scale 1:25,000 @ A3
Data Information:
Universal Transverse Mercator
GDA 1994 MGA Zone 56
Client Canberra Estates Consortium No 36 Pty Ltd
Project Woodlinks Village
Address/RPD Collingwood Drive, Collingwood Park
Source DCBD (DNRM, 2013), Aerial (QLD Globe, 2013)
RE & HVR (EHP, 2013)

Plan 1

SHG File
7189 E 01 Offset Proposal B

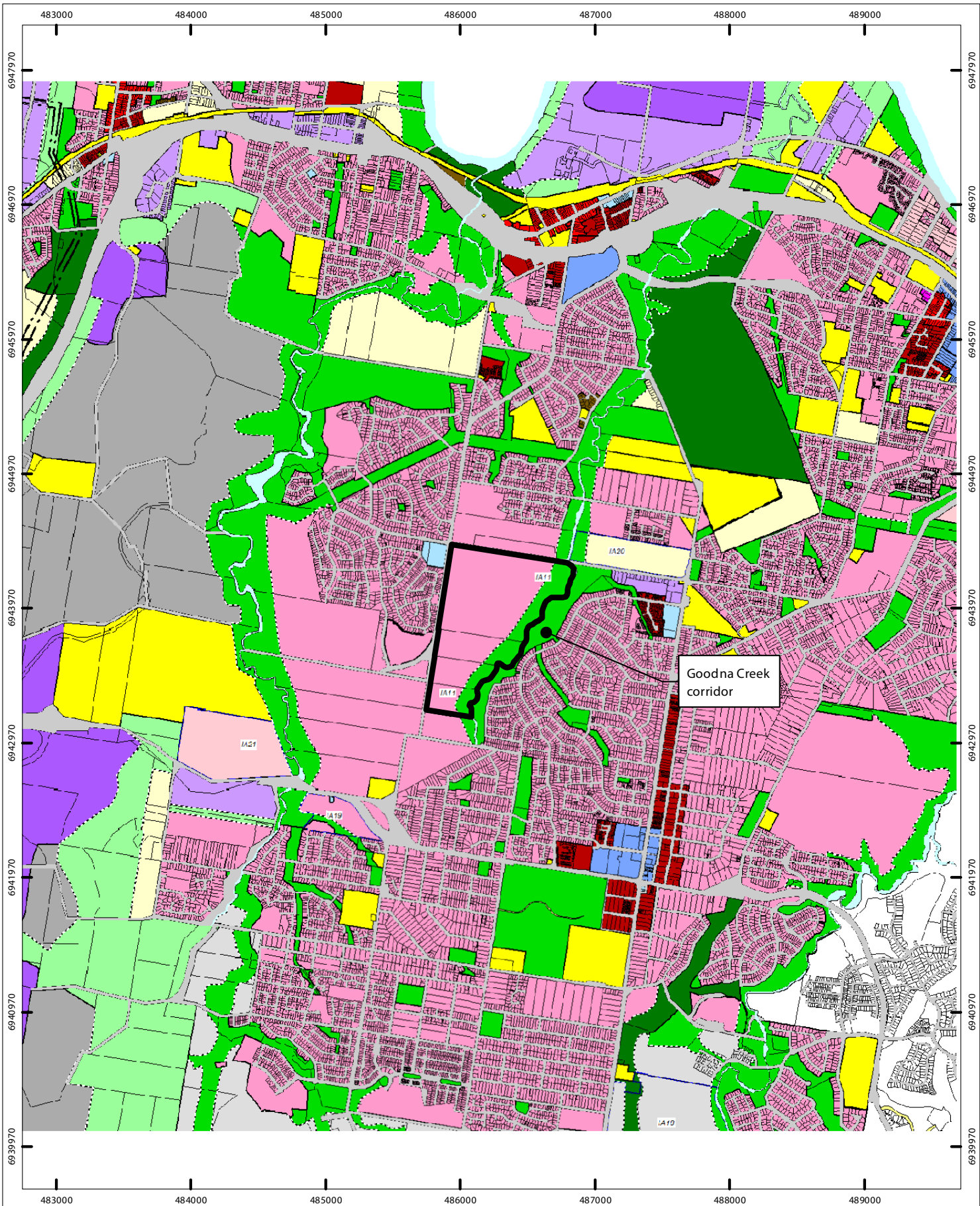


Figure 5 Ipswich City Council Planning Scheme Zoning

File ref. 7189 E Figure 5 - Ipswich City Council Zoning A

Date 1/07/2014

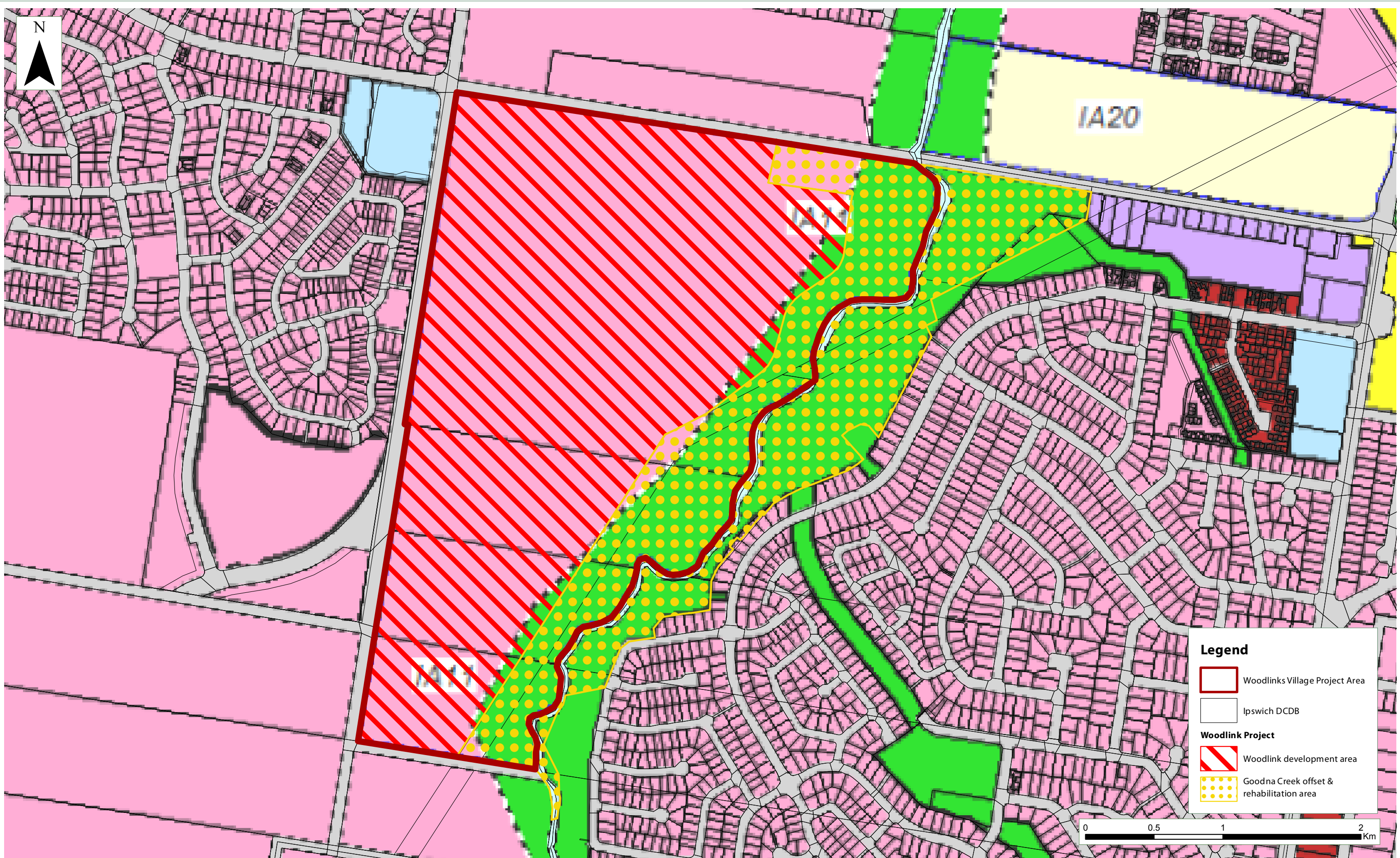
Project Woodlinks Village

0 250 500 1,000 1,500 m
 Scale (A4): 1:37,203 [GDA 1994 MGA Z56]



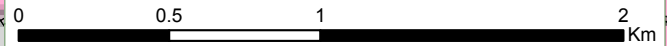
Urban Areas

- | | | | |
|--|--|--------------------------------|---------------------------------------|
| BI Business Incubator | BRS Bundamba Racecourse Stables Area | LC Local Retail and Commercial | LDC Limited Development (Constrained) |
| CHL Character Housing (Low Density - Sub Area) | CHM Character Housing (Mixed Density - Sub Area) | LLR Large Lot Residential | MC Major Centres |
| CMU Character Areas - Mixed Use | CON Conservation | REC Recreation | RL Residential Low Density |
| FU Future Urban | LB Local Business and Industry | RM Residential Medium Density | SA Special Opportunity |
| LBB Local Business and Industry Buffer | LBIA Local Business and Industry Investigation | SU Special Uses | |



Legend

-  Woodlinks Village Project Area
-  Ipswich DCDB
- Woodlink Project**
-  Woodlink development area
-  Goodna Creek offset & rehabilitation area



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Woodlinks Village

Goodna Creek Offset & Rehabilitation Area - Ipswich City Council Zoning

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ISSUES:

Issue	Date	Description	Drawn	Checked
C	24.09.2013	Lodgement	TC	MS

Date 24.09.13
Scale 1:25,000 @ A3
Data Information:
Universal Transverse Mercator
GDA 1994 MGA Zone 56
Client Canberra Estates Consortium No 36 Pty Ltd
Project Woodlinks Village
Address/RPD Collingwood Drive, Collingwood Park
Source DCBD (DNRM, 2013), Aerial (QLD Globe, 2013)
RE & HVR (EHP, 2013)

Plan 1

<BOL>SHG File </BOL>
7189 E 02 Zoning & Offset Proposal A



4.3. Offset Site- Basic Description

In its current state, the vegetation alongside Goodna Creek is heavily degraded as a result of previous land clearing and weed invasion. Only small patches of vegetation within the 27 hectare offset site are mapped as remnant vegetation, with the remaining portions retaining mostly disturbed regrowth vegetation or cleared pastoral paddocks. The alluvial plain of Goodna Creek is dominated by *Lantana camara* (lantana), *Ipomoea cairica* (mile-a-minute) and *Celtis sinensis* (Chinese Elm). No consistent coverage of vegetation aligns the creek and the dense infestations of weeds limits the creeks ability to support native fauna due to dispersal impediments and lack of suitable habitat, particularly for Koalas.

The north-east portion of the offset area located in Harry Ratnam Park contains a Koala tree foliage area for local conservation groups to collect eucalyptus leaves to feed Koalas in their care. While a number of plantation trees exist in this area, they are almost completely inaccessible, with recent attempts resulting in car boggings.

Photos:





4.4. Delivery Mechanisms

4.4.1 Rehabilitation Works- Goodna Creek

The area either side of Goodna Creek has always been strategically zoned for ecological enhancement and open space within the Ipswich Planning Scheme, representing a lineal corridor dedicated in a series of fragments up and downstream from the project. The corridor portion within the Woodlinks Village project is heavily degraded and requires substantial weed management and replanting.



To offset for the loss of vegetation within the development area, major replanting works will occur across 16 hectares adjacent to Woodlinks Village and Goodna Creek. An additional 11 hectares have been negotiated with Council within their existing land holdings on the eastern side of Goodna Creek known as Harry Ratnam Park. These works provide an additional 11 hectares of current open grass land adjoining Goodna Creek to be replanted with native species. Two detailed Weed Management and Rehabilitation Plan Series have been prepared as technical documents to show the precise commitment works within this corridor, attached in **Appendix A & B**. The core works proposed on these documents include:

a) **Weed Management**

Weed management will comprise a major part of the site works within the corridor area and will provide a basis of aiding natural regeneration within the riparian corridor. Where significant disturbance occurs, infill tubestock planting will be utilised to aid stabilisation and native vegetation succession. Weed removal will be undertaken in three stages: primary weed removal stage, secondary or follow-up weeding and maintenance weeding phase. This, along with monitoring, will provide effective weed management within rehabilitation areas.

b) **Revegetation**

Post weed-removal, rehabilitation areas will undergo revegetation to varying degrees, depending on the level of disturbance. It involves the cultivation and planting of native species and maintenance in the form of watering, continued weed removal, erosion control and ongoing management. The Rehabilitation Management Plan provides details on the types of plant species which will be used in particular rehabilitation areas. The



rehabilitation areas have been divided into four separate categories, each with varying degrees of rehabilitation:

i. **Zone 1- Existing Vegetation Area (Natural Regeneration)**

This area is predominantly free of weeds and disturbance from the development will be kept to a minimum. Minimal weed removal will occur, allowing for natural regeneration of this area.



ii. Zone 2- Mass Koala Regeneration Area (Reconstruction)

Due to previous land uses and clearing, these areas will be reconstructed through the removal of invasive species and the replanting of native vegetation such as koala habitat trees, native shrubs and ground covers.

iii. Zone 3- Koala Infill Revegetation Area (Assisted Natural Regeneration/ Reconstruction)

Zone 3 occurs along the fringes of easement areas which have been previously cleared for construction and electrical infrastructure. These areas have been identified as partially disturbed and will require partial assisted natural regeneration and reconstruction approaches.

iv. Zone 4- Powerline Revegetation Area (Reconstruction)

There is currently an electrical easement traversing the site which is highly disturbed due to clearing and slashing over many years. This area is generally covered in pastoral grasses with minor regrowth occurrences. This area will be rehabilitated with small trees, shrubs and groundcovers and access tracks will be stabilised with rock and mulch.

v. Zone 5- Rehabilitation and Stormwater Shared Use Area

Zone 5 is restricted to parts of Harry Ratnam Park and includes areas to be planted with species tolerant to frequent inundation.

4.4.2 Koala Foliage Harvest Plantation

Within Harry Ratnam Park, **Ipswich City Council** has provided an existing 1.5 hectare Koala tree foliage harvest facility for use by the **Ipswich Koala Protection Society**. Discussions with **Ipswich Koala Protection Society** have revealed that this facility is not currently used as no traversable vehicle access has been provided, with previous attempts resulting in major vehicle boggings. As part of the replanting of Harry Ratnam Park, legitimate access facilities will be provided for the **Ipswich Koala Protection Society**.



Picture: Koala Foliage Harvest Plantation on Harry Ratnam Park



4.5. Offset Requirements (EPBC Act Offsets Policy Objectives)

Condition 4 of the EPBC Act approval requires the preparation of an Offset Management Plan to address significant residual impacts to Koalas, in accordance with the *EPBC Act Biodiversity Offset Policy*. The extent of impacts on the Koala which require offsetting under the EPBC Act approval include:

- a) The loss of 25.9 hectares of habitat critical to the survival of the Koala; and
- b) Injury and mortality to Koalas.

The main **objective** of the offset is to:

To create a self-sustaining system that provides habitat critical to the survival of the Koala while creating a locally significant corridor connecting habitat areas along Goodna Creek.

It is anticipated that this objective will be achieved through its fulfilment of the performance requirements set out in the *EPBC Act Environmental Offset Policy*, as demonstrated in **Table 2**.

Table 2: EPBC Act Offset Policy Requirements

Policy Requirement	✓/x	Strategy
Suitable offsets must deliver and overall conservation outcome that improves or maintains the viability of the protected matter.	✓	<p>The development of Woodlinks Village will result in the unavoidable removal or fragmentation of 25.9 hectares of habitat critical to the survival of the Koala. As this will reduce the availability of habitat for Koalas in the local area, the offset has been designed to rehabilitate 27 hectares of degraded vegetation along Goodna Creek to improve its ecological value to Koalas and other local fauna species. This is considered to improve or maintain the value (that being, Koala habitat), which is being lost as a result of the development. In addition, the rehabilitation of Goodna Creek will improve connectivity between Riffle Range, an area known to support local koalas located to the north, and areas further south of the site.</p> <p>The offset will improve or maintain Koala habitat.</p>
Suitable offsets must be built around direct offsets but may include compensatory measures.	✓	<p>As discussed above, the offset includes the direct rehabilitation and restoration of 27 hectares along Goodna Creek. The Offsets Calculator shows that this will achieve a 100.39% direct offset of residual impacts, going beyond the 90% minimum. The offset area will be secured under the protection of Ipswich City Council.</p> <p>The offset is built on direct offsets.</p>



Policy Requirement	✓/x	Strategy
Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter.	✓	<p>Assessment against the EPBC Act Offsets Assessment Guide utilised the International Union for Conservation of Nature data to determine the probability of annual extinction for different categories of threatened species. As the Koala is listed as Vulnerable, the annual probability of extinction used was 0.2%. This measurement was used within the Offset Calculator, ensuring that the level of statutory protection that applies to the protected matter was taken into account.</p> <p>The level of statutory protection was taken into account.</p>
Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter.	✓	<p>An offset area of 27 hectares was calculated to provide a 100.39% direct offset to compensate for the impacts on Koala habitat. As such, this area is considered to be appropriate and proportionate to the residual impacts identified above.</p> <p>The offset is proportionate to the impact.</p>
Suitable offsets must effectively account for and manage the risks of the offset not succeeding.	✓	<p>A 90% confidence in the quantified averted loss is considered appropriate as it is highly likely that the already degraded corridor would continue to loss value, should the rehabilitation not occur. The corridor is fragmented, limiting its ability to achieve its desired purpose, and its lack of mature native vegetation makes it susceptible to weed invasion and erosion impacts. Should the rehabilitation occur, a continuous corridor will be created and its resilience to disturbance and undesired impacts will improve.</p> <p>Risks have been appropriately considered and managed.</p>
Suitable offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs.	✓	<p>The rehabilitation of Goodna Creek will be implemented as a requirement by the <i>EPBC Act Offsets Policy</i>. It is to be done in addition to other planning requirements.</p> <p>The offset is additional to what is already required.</p>
Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable.	✓	<p>A number of management strategies will be in place to ensure that the offset achieves these desired outcomes:</p> <p><u>Efficient and Effective</u></p> <ul style="list-style-type: none"> - Funds being put directly to the rehabilitation - Rehabilitation plan has already been developed,



Policy Requirement	✓/x	Strategy
		<p>providing a clear direction on required actions</p> <ul style="list-style-type: none"> - Efficiency is encapsulated in the fact that land has already been acquired- rather than having to buy up additional land to provide an offset, the proponent has been able to use 16 hectares of degraded land within the ownership boundaries of Woodlinks Village and 11 hectares of Council owned land to the east. This allows more funding to be available to effectively rehabilitate the site, rather than used to buy land. - The design of the offset has focused on recreating Koala habitat- replanting works will focus on ensuring there is a high mix of primary and secondary Koala food trees to ensure the rehabilitation is efficiently and effectively recreating the habitat lost as a result of the development. <p><u>Timely</u></p> <p>To reduce time-lag between the loss of vegetation and the establishment of offset vegetation, rehabilitation works are scheduled to commence with the first action on-site. It is noted that clearing is to occur in 6 or more stages and span the life of the project (6-8 years). It is expected that the initial weed removal and replanting works should be completed/ established within 18 months of the initial commencement of works, leaving the vegetation to regenerate and grow throughout the lifespan of the project.</p> <p><u>Transparent</u></p> <p>As per the requirements of the EPBC Act approval, the most up-to-date version of this Offset Management Plan will be available online for view by the public. In addition, monitoring and reporting will be made available to the Department of the Environment on request.</p> <p><u>Scientifically Robust</u></p> <p>The rehabilitation program has been designed in collaboration between qualified landscape architects, ecologists and environmental managers with experience in vegetation rehabilitation within South East Queensland. It is this experience that ensures the rehabilitation program will successfully achieve short and long term outcomes to appropriately compensate for the loss of Koala habitat.</p> <p>The aim of rehabilitation works will be to establish an ecosystem</p>



Policy Requirement	✓/x	Strategy
		<p>with the physical structure and function of woodland dominated by primary and secondary Koala food trees.</p> <p>Reasonable The offset design has been based upon achieving conservation outcomes for the local Ipswich area. By considering Ipswich City Council’s Planning Scheme, it was clear that Council had the intention of creating a conservation corridor along Goodna Creek. It was reasonable, in the context of offsetting impacts in Ipswich, to create a conservation outcome that services the Ipswich locality.</p> <p>The offset is efficient, effective, timely, transparent, scientifically robust and reasonable.</p>
<p>Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.</p>	<p>✓</p>	<p>Monitoring of the rehabilitation and regeneration works will be undertaken by contractors consistently throughout the offset establishment phase, which will allow for transparency in monitoring. Monitoring will be based upon objective criteria which will determine whether rehabilitation works are meeting weed removal and rejuvenation success thresholds. Should offset works fail to meet objectives, corrective actions will be undertaken to identify why the rehabilitation works hadn’t achieved desired objectives and new strategies will be designed and implemented.</p> <p>The offset will have a transparent governance arrangement.</p>



5. Offset Management

5.1. Management Actions- Timing of Delivery

Rehabilitation works along Goodna Creek will commence with the first stage of development and is programed to be completed within the first three years. This will allow for the establishment of the offset area in a faster time frame compared to the rate of vegetation removal, which is expected to span across eight years. After the completion of works, the proponent will maintain the offset area until is it ready for hand over and dedicated to **Ipswich City Council**. **Table 3 and 4** provide an indicative schedule of work items and maintenance sequencing for works:

Table 3: Indicative Timing Schedule/ Responsible Person or Entity

Milestone	Timeframe									
	Prior to Commencement		Pre-start	Commencement of Action – Offset Establishment (18 months)						>18 Months post commencement
	6 months prior to commencement	3 months prior to commencement		Construction Period (3 months- Winter)	Establishment Period (3 months- Spring)	Ongoing Maintenance (3 months- Summer)	Ongoing Maintenance (3 months- Autumn)	Ongoing Maintenance (3 months- Winter)	Ongoing Maintenance (3 months- Spring)	
Offset Management Plan Design	Saunders Havill Group									
Stakeholder Consultation	Saunders Havill Group		Saunders Havill Group							
Submission to the Minister for Approval		Submission by Saunders Havill Group to Kate Paull (Department of the Environment)								
Pre-Start Meeting			Council officers, Les Milne, Murray Saunders, development contracts, fauna spotter catcher							
Fauna Management			Fauna Spotter/Catcher	Fauna Spotter/Catcher	Fauna Spotter/Catcher	Fauna Spotter/Catcher	Fauna Spotter/Catcher	Fauna Spotter/Catcher	Fauna Spotter/Catcher	Fauna Spotter/Catcher
Environmental Training (all site contractors)			Site contractors	Site contractors	Site contractors	Site contractors	Site contractors	Site contractors	Site contractors	Site contractors
Rehabilitation & regeneration of Goodna Creek	Weed Management		Contractors	Contractors	Contractors	Contractors	Contractors	Contractors	Contractors	Contractors
	Soil Preparation			Contractors						
	Mulching			Contractors					Contractors	
	Initial Planting and Watering			Contractors						



Milestone	Timeframe										
	Prior to Commencement		Pre-start	Commencement of Action – Offset Establishment (18 months)						>18 Months post commencement	
	6 months prior to commencement	3 months prior to commencement		Construction Period (3 months- Winter)	Establishment Period (3 months- Spring)	Ongoing Maintenance (3 months- Summer)	Ongoing Maintenance (3 months- Autumn)	Ongoing Maintenance (3 months- Winter)	Ongoing Maintenance (3 months- Spring)		
Replacement of Failed Plants					Contractors	Contractors				Contractors	
Formative Pruning								Contractors			
Monitoring					Contractors	Contractors	Contractors	Contractors	Contractors	Contractors	
Reporting					Contractors	Contractors	Contractors	Contractors	Contractors		
Construction of Access Facilities to Koala Foliage Harvest Plantation (Harry Ratnam Park)					Contractors						
Review of Offset Management Plan/ Audit								Saunders Havill Group			
Handover of Offset Land to Council											Proponent/ Council



Table 4: Rehabilitation Works Indicative Schedule

WEEK	Winter			Spring			Summer			Autumn			Winter			Spring		
	Construction Period (3 months)			Establishment Period (3 months)			Ongoing Maintenance			Ongoing Maintenance			Ongoing Maintenance			Ongoing Maintenance		
	Month 1	Month 2	Month 3	Month 1	Month 2	Month 3	Month 1	Month 2	Month 3	Month 1	Month 2	Month 3	Month 1	Month 2	Month 3	Month 1	Month 2	Month 3
WEEK 1	Pre-start meeting with Council, Contractor and Superintendent	Weed management- "knockdown spray"	Mulch spreading and Jute-mat installation	Watering and monitoring and reporting (throughout establishment)	Watering and monitoring and reporting (throughout establishment)	Watering and monitoring and reporting (throughout establishment)	Monitoring and reporting (watering to replacement plants only)	Monitoring and reporting	Monitoring and reporting	Monitoring (watering to replacement plants only)		Monitoring and reporting			Monitoring and reporting	Mulch- top up depths to 100mm and replace/ repair Jute matting as required	Monitoring (watering to replacement plants only)	Monitoring (watering to replacement plants only)
WEEK 2	Initial weed management works- wood weed removal/ "knockdown spray"	Soil preparation and cultivation	Natural regeneration, plant staking for identification	Weed management- "knockdown spray" in mulched areas	Weed management- "knockdown spray" reapply to woody weeds	Weed management- "knockdown spray" in mulched areas	Weed management-rotation "knockdown spray" in mulched areas	Weed management-rotation "knockdown spray" in mulched areas	Weed management-rotation "knockdown spray" in mulched areas	Weed management-rotation "knockdown spray" in mulched areas		Weed management-rotation "knockdown spray" in mulched areas			Weed management-rotation "knockdown spray" in mulched areas	Natural regeneration plants- weed management	Weed management-rotation "knockdown spray" in mulched areas	Weed management-rotation "knockdown spray" in mulched areas
WEEK 3	Weed management works- removed by hand	Soil preparation and modification	Planting and watering	Natural regeneration plants- weed management	Replacement of failed plants	Replacement of failed plants	Natural regeneration plants- weed management	Natural regeneration plants- weed management	Replacement of failed plants	Natural regeneration plants- weed management		Trees formative pruning				Replacement of failed plants	Replacement of failed plants	Natural regeneration plants- weed management
WEEK 4	Weed management-slashing of maintenance plants	Mulch-stockpiled on site	Planting and watering	Weed management-slashing of maintenance access paths	Weed management-slashing of maintenance access paths	Weed management-slashing of maintenance access paths	Weed management-slashing of maintenance access paths	Weed management-slashing of maintenance access paths	Weed management-slashing of maintenance access paths	Weed management-slashing of maintenance access paths		Weed management-slashing of maintenance access paths			Weed management-slashing of maintenance access paths	Replacement of failed plants	Weed management-slashing of maintenance access paths	Weed management-slashing of maintenance access paths

** Note: assumes planting at end of Winter to allow for establishment and maintenance over two growing seasons

Key:

Weed Management	Planting Works	Watering, Monitoring and Reporting	Soil Preparation and Mulching
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5.2. Funding

All upfront costs associated with the weed management and revegetation of Goodna Creek will be the responsibility of the proponent (**Canberra Estates Consortium No. 36**). The detailed rehabilitation plans submitted with the Preliminary Documentation Submission will be lodged with Council as operational works drawings to obtain final works approvals. As part of this approval process council will set timeframes and criteria for the works to be considered complete, on establishment and on and off maintenance. Council will require a bond for the works to enable the project to advance ahead of the completion of the rehabilitation works. Under current Council policy the bond is calculated as 1.5 times the tendered cost of the works including full maintenance. In recent revegetation projects completed on Ironpot Creek, Council conditioned a 2 years establishment period followed by a 3 year maintenance period before the works would be accepted under Council ownership (5 years from practical completion). If at any stage the success of the weed management and revegetation works do not achieve the criteria for on and off maintenance then the works remain the responsibility of the developer. Council retain the value of the works (at 1.5 times) until they are satisfied with the level of success. If the developer was to fail to undertake the works then Council under law must use the bond to complete the works.

As indicated in a meeting with the Department on the 30th of October 2013, **Canberra Estates Consortium No 36** is committed to providing ongoing funding for weed management and rehabilitation during and beyond the life of the project. This may be arranged in the future either with the Council or through direct funding of local community environmental organisations. Returning the grass land areas to remnant status will ultimately take 20 years, however the revegetation is likely to be self-sustaining and functional between 7-9 years, during which time the proponent is committed to weed management and rehabilitation of the offset site.

In the long term, beyond the life of the project, the offset area will be made up of a combination of recently dedicated and existing Council parklands. The entire offset area will be transferred to **Ipswich City Council as part of their larger** conservation land holdings and will be managed through budget revenue created through the expanded Collingwood Park rates base.

5.3. Monitoring and Reporting Procedures

The objective on this Offset Management Plan is to maintain or enhance the Koala habitat values lost as a result of the development within the Goodna Creek rehabilitation area. As such, monitoring and reporting of the offset site will need to be undertaken to determine if this objective has been or is going to be achieved. This will include both short term and long term criteria to measure success. To offset the impacts from the development, Goodna Creek is to be rehabilitated through weed removal and the replanting of native species. Monitoring the weed management and revegetation works allows for:

- A review of the pre-established performance indicators for measuring the success of the weed removal and control;
- Ensure level of protection for existing identified native vegetation inclusive of that which has naturally regenerated;
- Review the rate of spread or contraction of weed infestation within the control program;
- Monitor the rate of assisted regeneration and revegetation of desirable native species promoted in areas where weeds have been removed; and



- Identification of new weed threats or other factors which may be affecting areas designated for rehabilitation.

5.3.1 Benchmarks

The weed management and rehabilitation works aims to improve the flora and fauna value along the Creek corridor through weed removal and promoting native species growth. The following breakdown of works as well as on and off maintenance milestones is proposed:

a) Existing Vegetation Areas:

- On maintenance requirements:
 - Primary weed removal completed
 - Secondary weed removal completed
 - Minimum 50% weed removal from existing vegetation
- Off maintenance requirements:
 - 10% or less weeds present on site
 - Any additional revegetation required has 80% success rate

b) Revegetation Areas

- On maintenance requirements:
 - All required planting completed
 - Evidence of ongoing weed management
 - Maximum of 10% plant failures at time of inspection
- Off maintenance requirements:
 - Maximum 20% plant failures
 - Plants established and generally free of weeds

5.3.2 Monitoring Timeframes

As per the schedule provided in **Table 4**, initial monitoring and reporting of weed removal and revegetation/regeneration works will be undertaken monthly within the initial 18 months. This will measure whether weed removal and regeneration targets are met.

Once the rehabilitated areas have been established, monitoring will continue every up until final changeover to Council ownership. The purpose of this monitoring will be to identify:

- Whether weed invasion has been controlled
- Whether the number of individuals within the vegetation community is being sustained or increased by natural recruitment
- Whether adequate levels of biodiversity (genetic variation) are maintained through generations of flora.
- Occurrence and utilisation by native fauna to assess ecosystem restoration.

5.3.3 Reporting

Throughout the monitoring of rehabilitation works, results will be recorded as part of a progress report and be made available via the **Saunders Havill Group** and **Village Building Company** websites within 10 business days of the monitoring event. This will allow for an assessment of whether the rehabilitation works are achieving set objectives and targets and will trigger corrective actions should results fall short of targets.



5.4. Adaptive Management

This Offset Management Plan will adopt an adaptive management approach to allow for reassessment and re-evaluation of offset management measures and techniques. Through the practical implementation of this Offset Management Plan, monitoring and reporting processes and document review procedures will allow for the identification of knowledge and procedural gaps and will facilitate an evaluation of successes and failures. This process will also allow for the identification of necessary corrective actions which have not been contemplated in the initial design of the offset proposal.

5.4.1 Contingency Measures

The following potential risks to the successful implementation of Goodna Creek have been identified:

- Failure of successful regeneration of juvenile/ planted specimens
- Failure of weed management
- Failure to create a self-sustaining ecosystem

Should the initial weed removal and revegetation works fail to achieve the objectives for the offset area, monitoring and reporting procedures will facilitate the identification of the cause of failure, whether that be due to flooding, drought, poor soil quality, inadequacy of weed removal techniques, impacts from human disturbance or other causative events. Once the causative event of failure is identified, corrective actions can be imposed to implement new procedures, techniques or management measures.

Potential contingency measures include:

- Use of different plant species or using higher ratios of successful species;
- Implementation of more aggressive weed removal and management techniques;
- Utilising a variety of water sources during drought, including irrigation;
- Replanting where damage has occurred as a result of unexpected events such as flooding and fire;
- Erection of fences or signs where failure has occurred as a result of human disturbance; and
- Maximising surface roughness to slow runoff, which reduces erosion and provides more time for plants to absorb water.

As noted previously, the proponent has provided a dedication to the ongoing funding of rehabilitation works until a self-sustaining ecosystem has been created. In addition, rehabilitation works must be established to an acceptable standard before Council will take on ownership and management of the corridor. The process of accepting the completed works requires regular monitoring and acceptance by Council that objectives have been achieved. Council will retain a monetary bond from the proponent to mitigate the risk of non-compliance. The purpose of the bond is so that Council have the means to complete rehabilitation works with bond money should the proponent fail to do so. However, the onus to rehabilitate the Goodna Creek Corridor lies on the proponent and must be achieved in order to comply with Commonwealth and Local Government approval conditions.

5.5. Protection Mechanisms

As stated above, once rehabilitated, the offset area will be dedicated to Council for the long term management and protection of the conservation corridor. This will involve the dedication of land into Council ownership to facilitate the long term protection of the offset land in accordance with the recreational zoning of Goodna Creek.



6. Risks and Uncertainties

The use of biodiversity offsets provides an opportunity to balance development and conservation outcomes in order to achieve sustainable development by compensating for development impacts on the environment. In particular, the *EPBC Act Biodiversity Offset Policy* requires ‘not net loss’ or ‘net gain’ of Matters of National Environmental Significance (MNES) compensated under the offset regime. By imposing an obligation on proponents to achieve ‘no net loss’ or ‘net gain’ via a minimum 90% direct offset, the theoretical application of the policy will ensure that the MNES values lost as a result of development will be adequately compensated through offset activities. This approach is considered to halt the rate of biodiversity loss for MNES and in some circumstances, provides an opportunity to exceed the ‘no net loss’ requirement.

In order to offset the impacts on Koalas caused by the loss of 25.9 hectares of *habitat critical to the survival of the Koala*, this Offset Management Plan aims to guide the rehabilitation and regeneration of 27 hectares of degraded vegetation along Goodna Creek in order to create new habitat areas for Koalas, as well as to improve connectivity between habitat patches in the local landscape. **Table 5** explores some of the theoretical and practical risks and uncertainties that have been identified in relation to this offsets proposal. This is accompanied by a number of management strategies that will seek to avoid or minimise the identified risks and uncertainties.

Table 5: Offset Risks/ Uncertainties and Management Strategies

Risk/ Uncertainty	Management Strategy
<p>Currency: Have the ecological values present on the development and offset sites been adequately identified and captured to determine losses and gains?</p>	<p>The <i>EPBC Act Biodiversity Offset Policy</i> seeks to address this problem by considering a wide range of values to accurately measure values lost and to be replaced. This has allowed the offset proposal to be measured against a number of metrics, including:</p> <ul style="list-style-type: none"> ▪ The quality of habitat as a measure of conditions, context and species stocking rate; ▪ The time over which loss is averted ▪ The time until the ecological benefit; ▪ The risk of loss; and ▪ Confidence in results. <p>The use of a wide range of metrics has allowed for a more comprehensive and robust assessment of lost and gained ecological values.</p>
<p>Equivalence: Will the offset restore the functionality of habitat that has been lost?</p>	<p>While there are questions relating the whether the offset will actually recreate the quality of critical habitat lost as a result of the development, the functionality of the habitat within the development footprint is expected to diminish drastically in the future as a result of the expansion of development surrounding the site. Even if the habitat was retained, the influx in surrounding development will remove connectivity between the site and surrounding habitat areas, particularly given the degraded state of</p>



Risk/ Uncertainty	Management Strategy
	<p>the Goodna Creek corridor. Rather, the rehabilitation of Goodna Creek will see the continuation of a local ecological corridor linking vegetation to the north and south of the site and will cater for safe Koala movement opportunities in the area while also providing an extra 27 hectares of valued habitat. In the long term, the rehabilitation of Goodna Creek is expected to provide greater value to Koalas within the landscape than if the offset was not provided and vegetation on site was fragmented from surrounding habitat areas.</p> <p>Case Study 1, described below, provides an example of a situation where Koala habitat has been recreated which is successfully utilised by Koalas. The rehabilitated vegetation contained a higher diversity and density of Koala habitat trees than undisturbed habitat and was used by Koalas as part of their main home range. It is anticipated that by replanting a mix of primary and secondary Koala habitat trees along Goodna Creek (in accordance with the rehabilitation plans in Appendix A), the proposed offset will recover the functions lost as a result of the development.</p> <p>The issue of equivalence has been a focus in the design of the offset program. Under the EPBC Act assessment, it was identified that the development would impact on <i>habitat critical to the survival of the Koala</i>. Therefore, it has been paramount that the offset creates new habitat which will achieve the <i>critical habitat</i> threshold in the future. As such, the offset site will be rehabilitated with native species known to be primary and secondary Koala food trees.</p>
<p>Time lag: How do you minimise time lag between losses and gains?</p>	<p>To avoid time-lag issues between the removal of habitat and the restoration of Goodna Creek, rehabilitation works will commence with the first action on-site. It is noted that clearing is to occur in 6 or more stages and span the life of the project (6-8 years). It is expected that the initial weed removal and replanting works should be completed/ established within 18 months of the initial commencement of works, leaving the vegetation to regenerate and grow throughout the lifespan of the project.</p>
<p>Direct vs Indirect Offsets:</p>	<p>In accordance with the EPBC Act Offset Policy, the proposed offset will achieve a 100.39% direct offset, satisfying both the minimum 90% direct offset requirement and 'no net loss' requirement.</p>
<p>Measuring ecological outcomes: How do you measure success and failure?</p>	<p>The purpose of the offset is to ensure there is 'no net loss' of <i>habitat critical to the survival of the species</i>. Success will be measured by the</p>



Risk/ Uncertainty	Management Strategy
	<p>restoration of Koala habitat, the recreation of an ecological corridor and the use of vegetation within the offset site by local native fauna species, including Koalas and other mammals, birds, reptiles and amphibians. The purpose of the offset was to compensate for lost Koala habitat and to rehabilitate Goodna Creek so that it could become a continuous lineal corridor. Success will be measured by how successfully the offset achieves these objectives.</p>
<p>Uncertainty: How do you manage uncertainty to ensure lost values are realised in the offset?</p>	<p>Within the scientific community there is still uncertainty surrounding how effective restoration programs are, given the relative youth of the discipline.</p> <p>During the assessment against the <i>EPBC Act Offset Policy</i>, a 90% confidence in success of the offset was identified. In other words, there is a 90% confidence that the rehabilitation of Goodna Creek will restore the habitat values which will be lost as a result of the development of Woodlinks Village. Restoration actions will relate directly to weed removal and replanting native vegetation, particularly eucalyptus species which are known to be favoured koala food trees. As the offset area is located within an identified ecological corridor under the Ipswich Planning Scheme, it will be subject to ongoing protection, as well as improvement in values as other areas along the corridor are rehabilitated. This will also contribute to creating a continuous corridor from 'Riffle Range' through to areas to the south of the site.</p> <p><u>Restoration Success</u></p> <p>The project will result in the removal of 25.9 hectares of <i>habitat critical to the survival of the Koala</i>, which is categorised given its high density of primary Koala food trees. Eucalypt species are known favoured Koala food trees, with <i>Corymbia</i> and <i>Lopostemon</i> species also supporting Koalas within areas containing Eucalypts. Rehabilitation of creek corridors has been successful within other areas of South-East Queensland, with weed removal and revegetation resulting in increased ecological values along ecological corridors. Appropriate rehabilitation techniques, such as those described in the Rehabilitation Management Plan in Appendix A will be used to ensure the restoration of habitat along Goodna Creek is successful.</p> <p><u>Utilisation by Koalas</u></p> <p>Case Study 1, provided below, provides an example of a study undertaken to compare the usage of vegetation within a</p>



Risk/ Uncertainty	Management Strategy
	<p>rehabilitation site and within undisturbed habitat by Koalas on Stradbroke Island. The results showed that Koalas utilised areas subject to rehabilitation just as much as undisturbed areas and that the rehabilitated vegetation supported healthy, reproductive Koalas. In addition, species diversity and density was higher within rehabilitation areas. In terms of recreating Koala habitat, this venture has successfully created habitat comparable to habitat within undisturbed areas.</p> <p>This study provides support for high confidence that should the recreation of habitat along Goodna Creek be successful, Koalas will benefit from it equally compared to undisturbed habitat.</p>

Case Study I- Koala Usage of a Rehabilitated Mine Site

Reference: Cristescu, R, Banks, P, Carrick, F and Frere, C 2013, 'Potential 'Ecological Traps' for Restored Landscapes: Koalas *Phascolarctos cinereus* Re-Occupy a Rehabilitated Mine Site', *PLOS One*, vol. 8, no. 11, pp.e80469-e80481.

This study compared Koala usage between a rehabilitated mine site and an undisturbed habitat bushland area. While the first hypothesis was that rehabilitated areas could become ecological sinks (failures in terms of supporting wildlife), the observations throughout the study refuted this. No evidence was found to suggest recreated koala habitat was of a lower quality to undisturbed koala habitat (indicators being species richness and density and predator densities) and no evidence was found to suggest that koalas in rehabilitated areas were of a lower density, in a poorer condition or had lower rates of reproduction to koalas in undisturbed areas. The study found that radio-tracked koalas spent equivalent time in undisturbed and rehabilitated habitats and included a wide age range of healthy, reproductive koalas. Rather than rehabilitated areas acting as sinks, the study found that the subject koalas actually used rehabilitated areas as a substantial part of their home ranges. In addition, rehabilitated areas were found to contain a higher tree density and species richness and similar canopy cover (for habitats rehabilitated before 1997) which in turn provided high koala food tree densities with shorter travel distances between them.



Appendix A

Onsite Rehabilitation Plans

Woodlink Estate - Rehabilitation Plan Series I - Onsite Works

Weed Management and Rehabilitation Works

SITE LAYOUT: 1:3000 @ A1



WOODLINK ESTATE- WEED MANAGEMENT & REHABILITATION WORKS

(EPBC PRELIMINARY DOCUMENTATION SUBMISSION)

As part of the original development permit for the Woodlink Project (as known as "Corymbia Woods") a large linear open space dedication was proposed between the development zone and the Goodna Creek channel. The requirement to provide this open space area lined up with long term zonings of the Ipswich City Council Planning Scheme and is consistent with up and downstream development approvals and housing construction patterns. As part of the old Corymbia Woods proposal the layout included a number of narrow open space strips which linked internal recreation open space with Goodna Creek. Since the Controlled Action Determination made by the Department of Sustainability, Environment, Water Populations and Communities (SEWPAC) on the 14 of June 2013 further consultation has been held with Ipswich City Council and the Ipswich Koala Protection Society. This included a joint on-site inspection with a number of Council experts representing various disciplines (planning, environment, engineering, open space).

Post these consultations events a number of minor changes have been made to the design which reflect less integration of the proposed urban and environmental areas and more focus on Goodna Creek as a long term ecological corridor. Part of the negotiations for the on lot clearing was the commitment to undertake substantial replanting on existing Council owned land on the eastern Edge of Goodna Creek in Harry Ratnam Park. Council have agreed to make approximately 11 hectares of this land available for this replanting use which enables the Woodlink project to commit to reinstating a large portion of the corridor.

In addition the specific works required within the replanting areas has been brought forward by way of detailed rehabilitation plans. Rehabilitation Plan Series 1 outlines extensive weed management and revegetation works to occur on the application site. When works are completed in this zone it will be dedicated to Council and from part of the local area environment network.

DRAWING SCHEDULE

Dwg No.	Drawing Title	Issue	Date
6777 L 01	Cover Sheet	C	23-09-14
6777 L 02	Site Based Rehabilitation Plan Weed Management- Sheet 1	C	23-09-14
6777 L 03	Site Based Rehabilitation Plan Weed Management- Sheet 2	C	23-09-14
6777 L 04	Site Based Rehabilitation Plan Weed Management Notes	C	23-09-14
6777 L 05	Site Based Rehabilitation Plan Weed Treatment & Removal Strategy	C	23-09-14
6777 L 06	Site Based Rehabilitation Plan Weed Treatment & Removal Strategy	C	23-09-14
6777 L 07	Site Based Rehabilitation Plan Weed Treatment & Removal Strategy	C	23-09-14
6777 L 08	Site Based Rehabilitation Plan Rehabilitation Notes	C	23-09-14
6777 L 09	Site Based Rehabilitation Plan Rehabilitation - Sheet 1	C	23-09-14
6777 L 10	Site Based Rehabilitation Plan Rehabilitation - Sheet 2	C	23-09-14
6777 L 11	Site Based Rehabilitation Plan Rehabilitation - Plant Schedules	C	23-09-14

AMENDMENTS (C)

amendments:

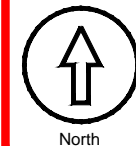
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B	23/09/13	SEWPAC Lodgement	
C	23/09/14	DoE Lodgement	

Date 23-09-14
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 Cover Sheet

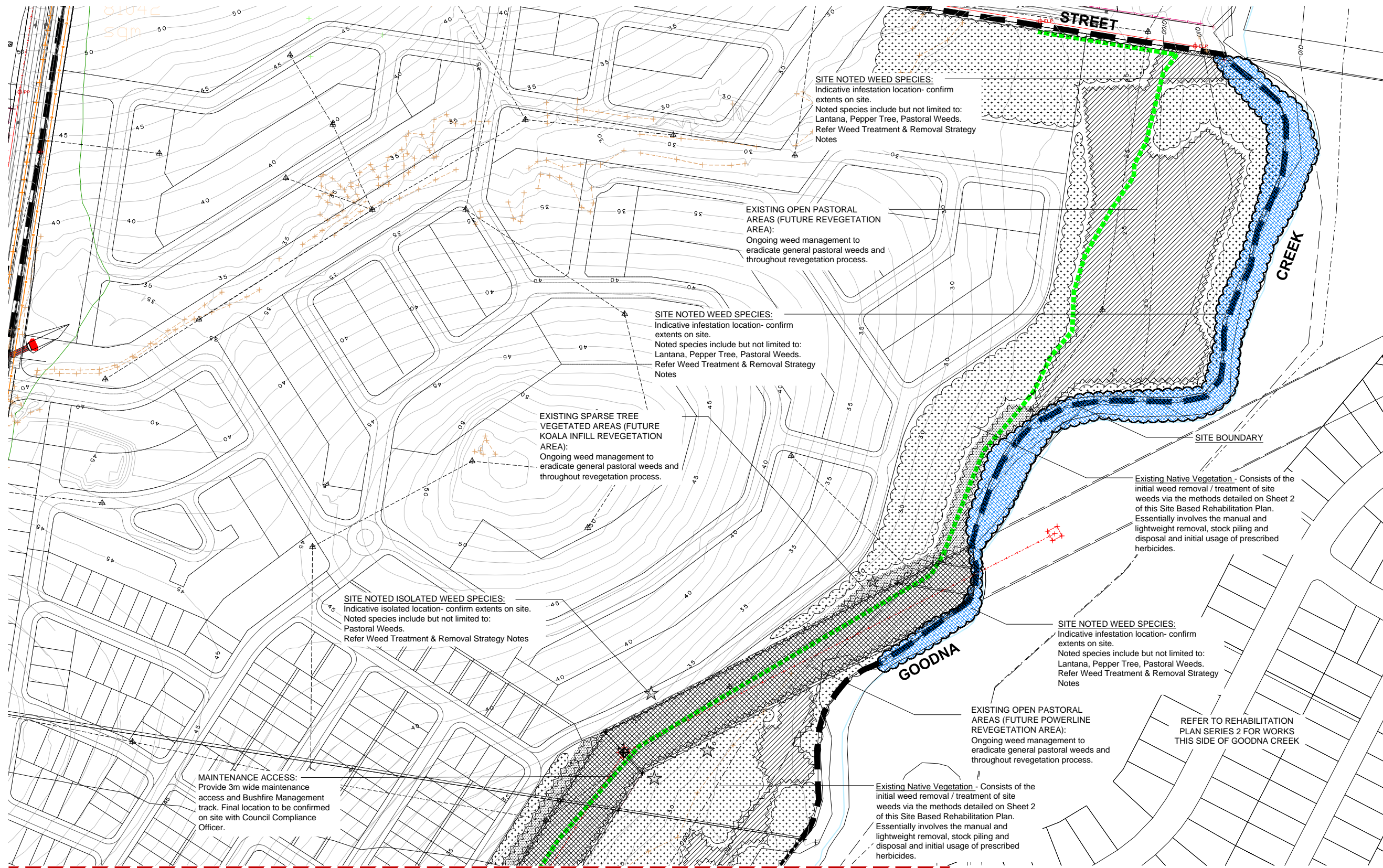
Drawn by. RM Project Woodlink Estate
 Checked by. MS Client Canberra Estate Consortium No. 36

LODGEMENT DRAFT



Woodlink Estate - Rehabilitation Plan Series I - Onsite Works

Site Based Rehabilitation - Weed Management



LEGEND

- EXISTING VEGETATION:**
Full weed management throughout involving manual and lightweight removal, stock piling and disposal and initial usage of prescribed herbicides.
- EXISTING OPEN PASTORAL AREAS (FUTURE REVEGETATION AREA):**
Ongoing weed management to eradicate general pastoral weeds and throughout revegetation process.
- EXISTING SPARSE TREE VEGETATED AREAS (FUTURE KOALA INFILL REVEGETATION AREA):**
Ongoing weed management to eradicate general pastoral weeds and throughout revegetation process.
- EXISTING OPEN PASTORAL AREAS (FUTURE POWERLINE REVEGETATION AREA):**
Ongoing weed management to eradicate general pastoral weeds and throughout revegetation process.
- INDICATIVE WEED INFESTATION AREA:**
Refer to notes
- INDICATIVE INDIVIDUAL WEED LOCATIONS:**
Refer to notes
- SITE BOUNDARY**
- MAINTENANCE ACCESS TRAIL:**
Existing track through site. Stabilize with rock and mulch as required.

NOTES

- NOTE 1: Indicative dominant weed locations are noted in approximate locations from site observations and do not represent all weeds on site.
- NOTE 2: All works in accordance with Ipswich City Council Landscape Development Manual.
- NOTE 3: Where plans refer to engineering drawings, refer to plans provided by HDR/DKS CONSULTING ENGINEERS.

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Scale 1:1500 - Lengths are in Metres.

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C	23/09/14	DoE Lodgement	

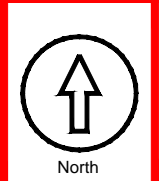
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Plan of
Site Based Rehabilitation Plan
Weed Management- Sheet 1

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LODGEMENT DRAFT



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Dwg No. 6777 L 02 C

Woodlink Estate - Rehabilitation Plan Series I - Onsite Works

Site Based Rehabilitation - Weed Management

JOIN LINE: REFER DWG 6777 L 02



LEGEND

- EXISTING VEGETATION:**
Full weed management throughout involving manual and lightweight removal, stock piling and disposal and initial usage of prescribed herbicides.
- EXISTING OPEN PASTORAL AREAS (FUTURE REVEGETATION AREA):**
Ongoing weed management to eradicate general pastoral weeds and throughout revegetation process.
- EXISTING SPARSE TREE VEGETATED AREAS (FUTURE KOALA INFILL REVEGETATION AREA):**
Ongoing weed management to eradicate general pastoral weeds and throughout revegetation process.
- EXISTING OPEN PASTORAL AREAS (FUTURE POWERLINE REVEGETATION AREA):**
Ongoing weed management to eradicate general pastoral weeds and throughout revegetation process.
- INDICATIVE WEED INFESTATION AREA:**
Refer to notes
- INDICATIVE INDIVIDUAL WEED LOCATIONS:**
Refer to notes
- SITE BOUNDARY**
- MAINTENANCE ACCESS TRAIL:**
Existing track through site. Stabilize with rock and mulch as required.

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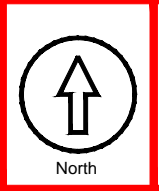
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B	23/09/13	SEWPAC Lodgement	
C	23/09/14	DoE Lodgement	

Date 23-09-14
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Plan of
Site Based Rehabilitation Plan
Weed Management- Sheet 2

Drawn by. RM Project Woodlink Estate
Checked by. MS Client Canberra Estate Consortium No. 36

**LODGEMENT
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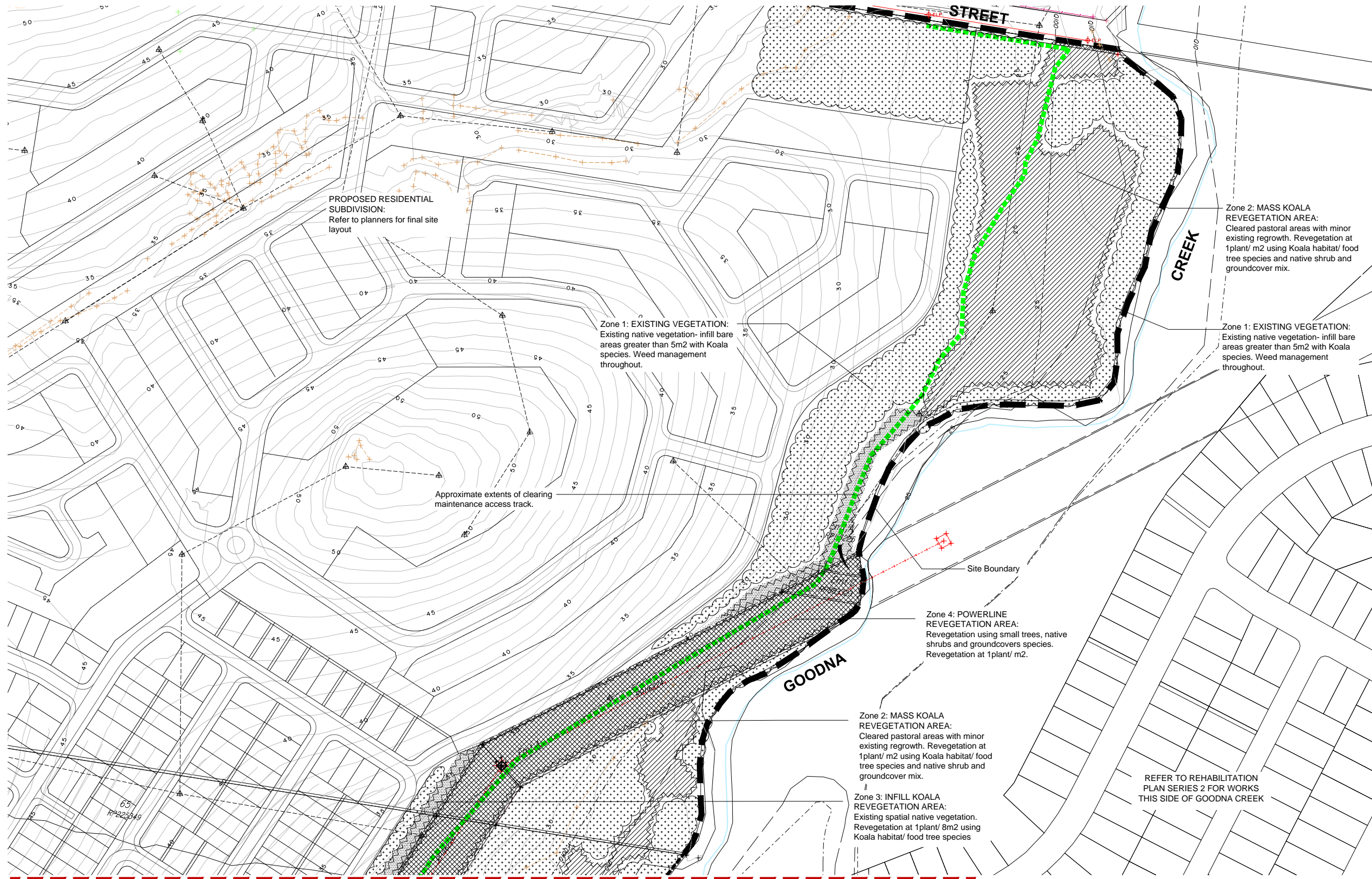


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





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Woodlink Estate - Rehabilitation Plan Series I - Onsite Works

Site Based Rehabilitation - Rehabilitation



LEGEND

-  Zone 1: EXISTING VEGETATION: Existing native vegetation- infill bare areas greater than 5m2 with Koala species. Weed management throughout.
-  Zone 2: MASS KOALA REVEGETATION AREA: Cleared pastoral areas with minor existing regrowth. Revegetation at 1plant/ m2 using Koala habitat/ food tree species and native shrub and groundcover mix.
-  Zone 3: INFILL KOALA REVEGETATION AREA: Existing spatial native vegetation adjacent to power line corridor. Revegetation at 1plant/ 8m2 using Koala habitat/ food tree species
-  Zone 4: POWERLINE REVEGETATION AREA: Revegetation using small trees, native shrubs and groundcovers species. Revegetation at 1plant/ m2.
-  SITE BOUNDARY
-  MAINTENANCE ACCESS TRAIL: Existing track through site. Stabilize with rock and mulch as required.

Any disturbed area as a result of civil earthworks to be blanket mulched to a minimum depth of 100mm to suppress weed growth and revegetated.

Where batters steeper than 1:3 exist Jute mat is proposed to stabilise and provide protection against erosion and scouring.

Species densities planted at minimum 1 plant per square metre with species selected from preclear mapping.

All disturbed/ bare areas to be blanket mulched to a minimum depth of 100mm to suppress weed growth and revegetated.

Where batters steeper than 1:3 exist Jute mat is proposed to stabilise and provide protection against erosion and scouring.

All disturbed/ bare areas to be blanket mulched to a minimum depth of 100mm to suppress weed growth and revegetated.

All disturbed/ bare areas to be blanket mulched to a minimum depth of 100mm to suppress weed growth and revegetated.

NOTE 1: All works in accordance with Ipswich City Council Landscape Development Manual.
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JOIN LINE: REFER DWG 6777 L 10

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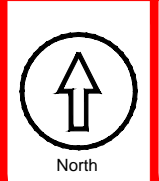
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B	23/09/13	SEWPAC Lodgement
C	23/09/14	DoE Lodgement

Date 23-09-14
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Plan of
Site Based Rehabilitation Plan
Sheet 1

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Checked by.	MS	Client	Canberra Estate Consortium No. 36

LODGEMENT DRAFT



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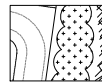
Woodlink Estate - Rehabilitation Plan Series I - Onsite Works

Site Based Rehabilitation - Rehabilitation

JOIN LINE: REFER DWG 6777 L 09



LEGEND



Zone 1: EXISTING VEGETATION:
Existing native vegetation- infill bare areas greater than 5m2 with Koala species. Weed management throughout.

Any disturbed area as a result of civil earthworks to be blanket mulched to a minimum depth of 100mm to suppress weed growth and revegetated.

Where batters steeper than 1:3 exist Jute mat is proposed to stabilise and provide protection against erosion and scouring.

Species densities planted at minimum 1 plant per square metre with species selected from preclear mapping.



Zone 2: MASS KOALA REVEGETATION AREA:
Cleared pastoral areas with minor existing regrowth. Revegetation at 1plant/ m2 using Koala habitat/ food tree species and native shrub and groundcover mix.

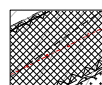
All disturbed/ bare areas to be blanket mulched to a minimum depth of 100mm to suppress weed growth and revegetated.

Where batters steeper than 1:3 exist Jute mat is proposed to stabilise and provide protection against erosion and scouring.



Zone 3: INFILL KOALA REVEGETATION AREA:
Existing spatial native vegetation adjacent to power line corridor. Revegetation at 1plant/ 8m2 using Koala habitat/ food tree species

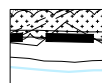
All disturbed/ bare areas to be blanket mulched to a minimum depth of 100mm to suppress weed growth and revegetated.



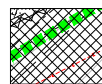
Zone 4: POWERLINE REVEGETATION AREA:
Revegetation using small trees, native shrubs and groundcovers species. Revegetation at 1plant/ m2.

Existing pastoral cover to be slashed and sprayed out prior to cultivation and revegetation works.

All disturbed/ bare areas to be blanket mulched to a minimum depth of 100mm to suppress weed growth and revegetated.



SITE BOUNDARY



MAINTENANCE ACCESS TRAIL:
Existing track through site. Stabilize with rock and mulch as required.

NOTE 1: All works in accordance with Ipswich City Council Landscape Development Manual.

NOTE 2: Where plans refer to engineering drawings, refer to plans provided by HDR/DKS CONSULTING ENGINEERS.

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Issue	Date	Details	Approved
A	28/08/13	Client Comment	
B	23/09/13	SEWPAC Lodgement	
C	23/09/14	DoE Lodgement	

Plan of
Site Based Rehabilitation Plan
 Sheet 2

Date	23-09-14	Drawn by.	RM	Project	Woodlink Estate
Scale	1:1500@A1	Checked by.	MS	Client	Canberra Estate Consortium No. 36

LODGEMENT DRAFT



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 Dwg No. 6777 L 10 C



Appendix B

Offsite Rehabilitation Plans

Harry Ratnam Park - Rehabilitation Plan Series 2 - External Works

Weed Management and Rehabilitation Works

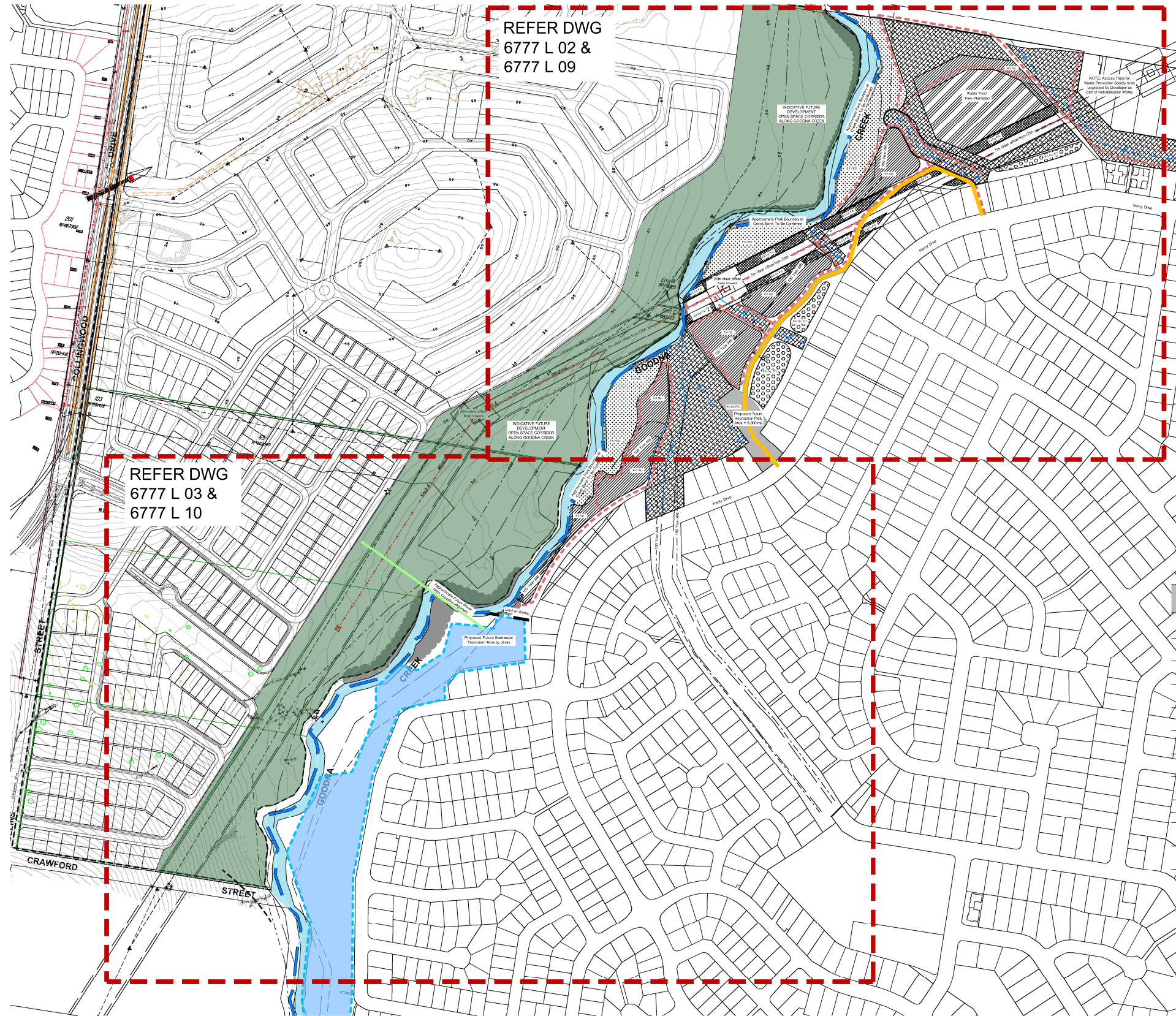
HARRY RATNAM PARK - WEED MANAGEMENT & REHABILITATION - EXTERNAL WORKS

(EPBC PRELIMINARY DOCUMENTATION SUBMISSION)

As part of the original development permit for the Woodlink Project (as known as "Corymbia Woods") a large linear open space dedication was proposed between the development zone and the Goodna Creek channel. The requirement to provide this open space area lined up with long term zonings of the Ipswich City Council Planning Scheme and is consistent with up and downstream development approvals and housing construction patterns. As part of the old Corymbia Woods proposal the layout included a number of narrow open space strips which linked internal recreation open space with Goodna Creek. Since the Controlled Action Determination made by the Department of Sustainability, Environment, Water Populations and Communities (SEWPac) on the 14 of June 2013 further consultation has been held with Ipswich City Council and the Ipswich Koala Protection Society. This included a joint on-site inspection with a number of Council experts representing various disciplines (planning, environment, engineering, open space).

Post these consultations events a number of minor changes have been made to the design which reflect less integration of the proposed urban and environmental areas and more focus on Goodna Creek as a long term ecological corridor. Part of the negotiations for the on lot clearing was the commitment to undertake substantial replanting on existing Council owned land on the eastern Edge of Goodna Creek in Harry Ratnam Park. Council have agreed to make approximately 11 hectares of this land available for this replanting use which enables the Woodlink project to commit to reinstating a large portion of the corridor.

In addition the specific works required within the replanting areas has been brought forward by way of detailed rehabilitation plans. Rehabilitation Plan Series 2 specifies works proposed offsite within the existing Harry Ratnam Park.



DRAWING SCHEDULE

Dwg No.	Drawing Title	Issue	Date
6777 L ER 01	Cover Sheet	C	24-09-14
6777 L ER 02	Site Based Rehabilitation Plan Weed Management- Sheet 1	C	24-09-14
6777 L ER 03	Site Based Rehabilitation Plan Weed Management- Sheet 2	C	24-09-14
6777 L ER 04	Site Based Rehabilitation Plan Weed Management Notes	C	24-09-14
6777 L ER 05	Site Based Rehabilitation Plan Weed Treatment & Removal Strategy	C	24-09-14
6777 L ER 06	Site Based Rehabilitation Plan Weed Treatment & Removal Strategy	C	24-09-14
6777 L ER 07	Site Based Rehabilitation Plan Weed Treatment & Removal Strategy	C	24-09-14
6777 L ER 08	Site Based Rehabilitation Plan Rehabilitation Notes	C	24-09-14
6777 L ER 09	Site Based Rehabilitation Plan Rehabilitation - Sheet 1	C	24-09-14
6777 L ER 10	Site Based Rehabilitation Plan Rehabilitation - Sheet 2	C	24-09-14
6777 L ER 11	Site Based Rehabilitation Plan Rehabilitation - Plant Schedules	C	24-09-14

SEWPAC LODGEMENT (C)

amendments:

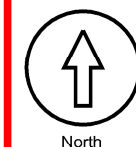
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A	18/09/13	Client Comment	
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C	23/09/14	DoE Lodgement	

Date 24-09-13
Scale N.T.S

Plan of Cover Sheet

Drawn by. RM Project Woodlink Estate
 Checked by. MS Client Canberra Estate Consortium No. 36

LODGEMENT DRAFT

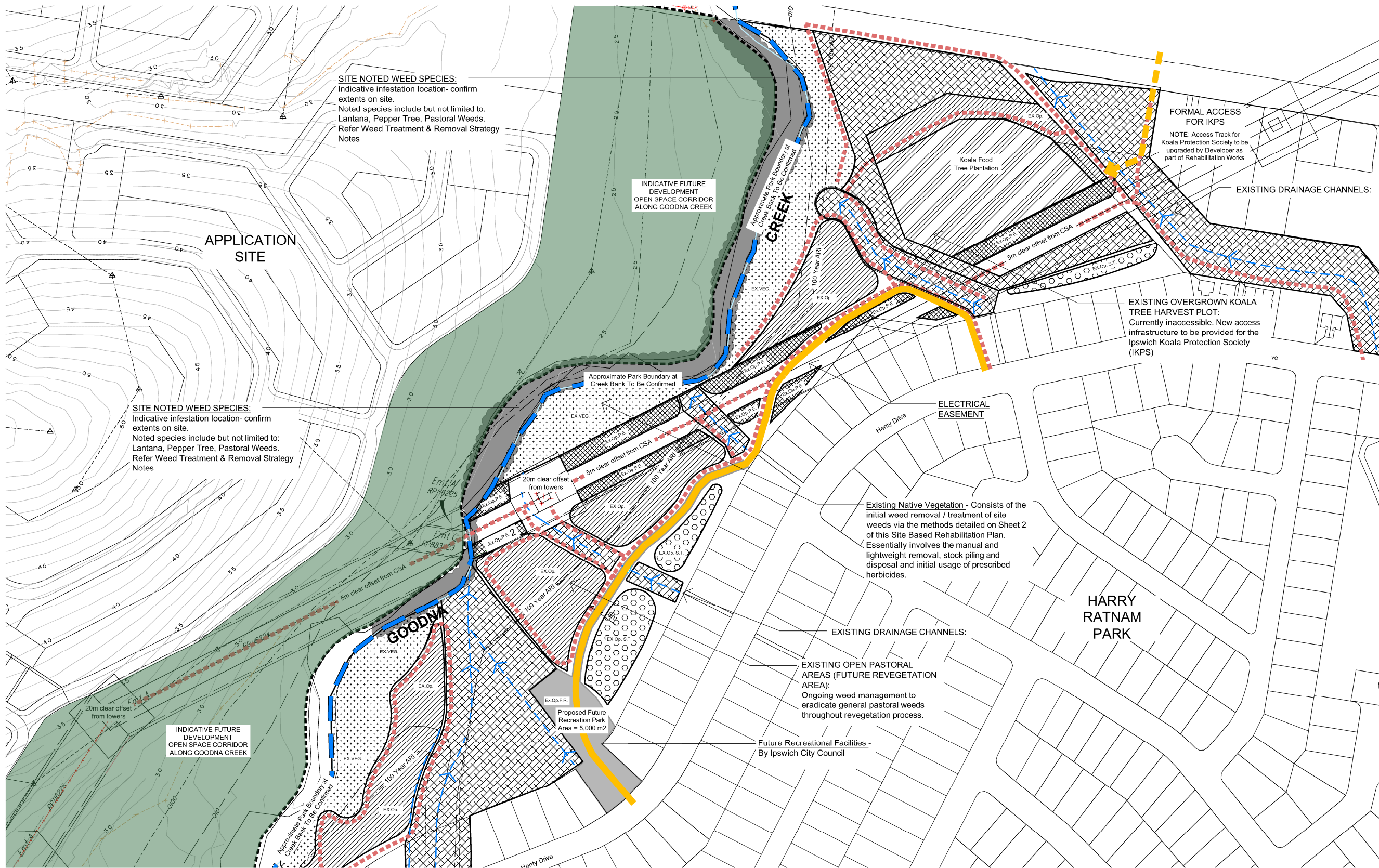


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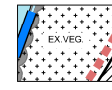
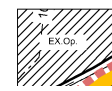

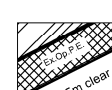
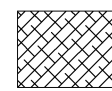

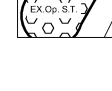
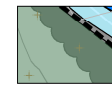


Dwg No. 6777 L ER 01 C

Harry Ratnam Park - Rehabilitation Plan Series 2 - External Works

Offset Rehabilitation - Weed Management



LEGEND

-  **EXISTING VEGETATION:**
Full weed management throughout involving manual and lightweight removal, stock piling and disposal and initial usage of prescribed herbicides.
-  **EXISTING OPEN PASTORAL AREAS (FUTURE REVEGETATION AREA):**
Ongoing weed management to eradicate general pastoral weeds and throughout revegetation process.
-  **EXISTING OVERGROWN KOALA TREE FOLIAGE PLANTATION:**
Currently inaccessible. New access infrastructure to be provided by developer for the Ipswich Koala Protection Society (IKPS)
-  **EXISTING ELECTRICAL EASEMENT:**
Ongoing weed management to eradicate general pastoral weeds throughout revegetation process.
-  **STORMWATER & REHABILITATION SHARED USE AREAS:**
Areas to be planted with plant species tolerant of frequent inundation in conjunction with stormwater detention and bio-retention basins implementation. Details to be confirmed with Ipswich City Council for construction.
-  **EXISTING OPEN SINGLE TREE PLANTING IN SLASHED GRASS:**
Areas adjacent to houses to be planted with tree species in mulched groups with maintained grassed understorey.
-  **INDICATIVE WEED INFESTATION AREA:**
Refer to notes
-  **FUTURE WORKS & RECREATIONAL FACILITIES LOCATIONS:**
By ICC
-  **TOP OF BANKS**
-  **EXISTING DRAINAGE CHANNELS:**

NOTES

NOTE 1: Indicative dominant weed locations are noted in approximate locations from site observations and do not represent all weeds on site.
 NOTE 2: All works in accordance with Ipswich City Council Landscape Development Manual.
 NOTE 3: Where plans refer to engineering drawings, refer to plans provided by HDR CONSULTING ENGINEERS.

JOIN LINE: REFER DWG 6777 L ER 03

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Scale 1:1500 - Lengths are in Metres.

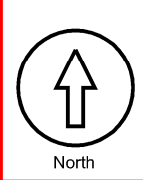
Issue	Date	Details	Approved
A	18/09/13	Client Comment	
B	24/09/13	SEWPAC Lodgement	
C	23/09/14	DoE Lodgement	

Date Sep -13
 Scale 1:1500@A1

Plan of
External Rehabilitation Plan
Weed Management- Sheet 1

Drawn by. RM Project Woodlink Estate
 Checked by. MS Client Canberra Estate Consortium No. 36

LODGEMENT DRAFT

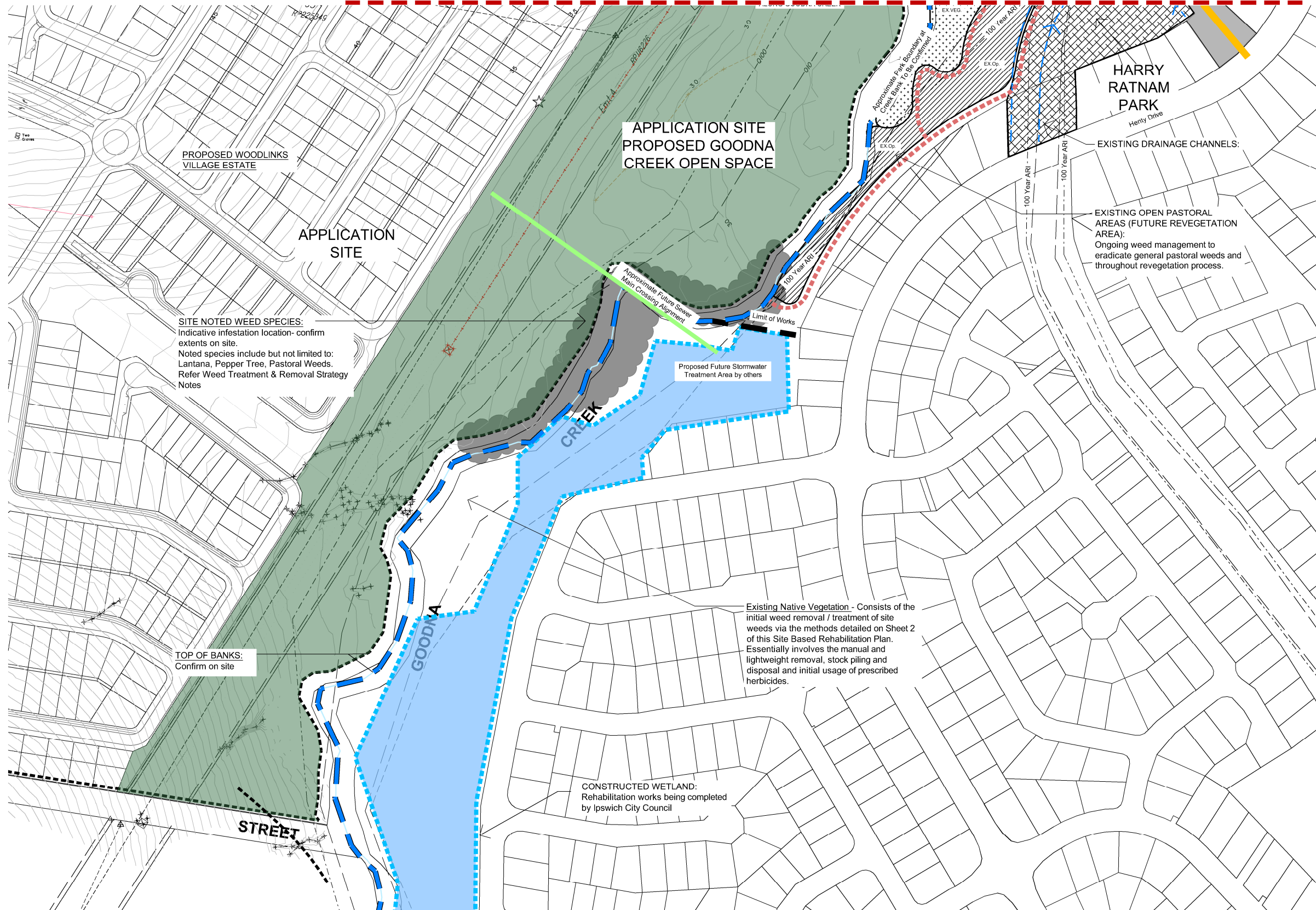


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 Dwg No. 6777 L ER 02 C

Harry Ratnam Park - Rehabilitation Plan Series 2 - External Works

External Rehabilitation - Weed Management

JOIN LINE: REFER DWG 6777 L 02



LEGEND

- EXISTING VEGETATION:**
Full weed management throughout involving manual and lightweight removal, stock piling and disposal and initial usage of prescribed herbicides.
- EXISTING OPEN PASTORAL AREAS (FUTURE REVEGETATION AREA):**
Ongoing weed management to eradicate general pastoral weeds and throughout revegetation process.
- EXISTING OVERGROWN KOALA TREE FOLIAGE PLANTATION:**
Currently inaccessible. New access infrastructure to be provided by developer for the Ipswich Koala Protection Society (IKPS)
- EXISTING ELECTRICAL EASEMENT:**
Ongoing weed management to eradicate general pastoral weeds throughout revegetation process.
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- EXISTING OPEN SINGLE TREE PLANTING IN SLASHED GRASS:**
Areas adjacent to houses to be planted with tree species in mulched groups with maintained grassed understorey.
- INDICATIVE WEED INFESTATION AREA:**
Refer to notes
- FUTURE WORKS & RECREATIONAL FACILITIES LOCATIONS:**
By ICC
- TOP OF BANKS**
- EXISTING DRAINAGE CHANNELS:**

NOTES

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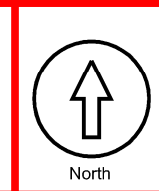
amendments:

Date Sep 13
 Scale 1:1500@A1

Plan of
External Rehabilitation Plan
Weed Management- Sheet 2

Drawn by. RM	Project Woodlink Estate
Checked by. MS	Client Canberra Estate Consortium No. 36

LODGEMENT DRAFT

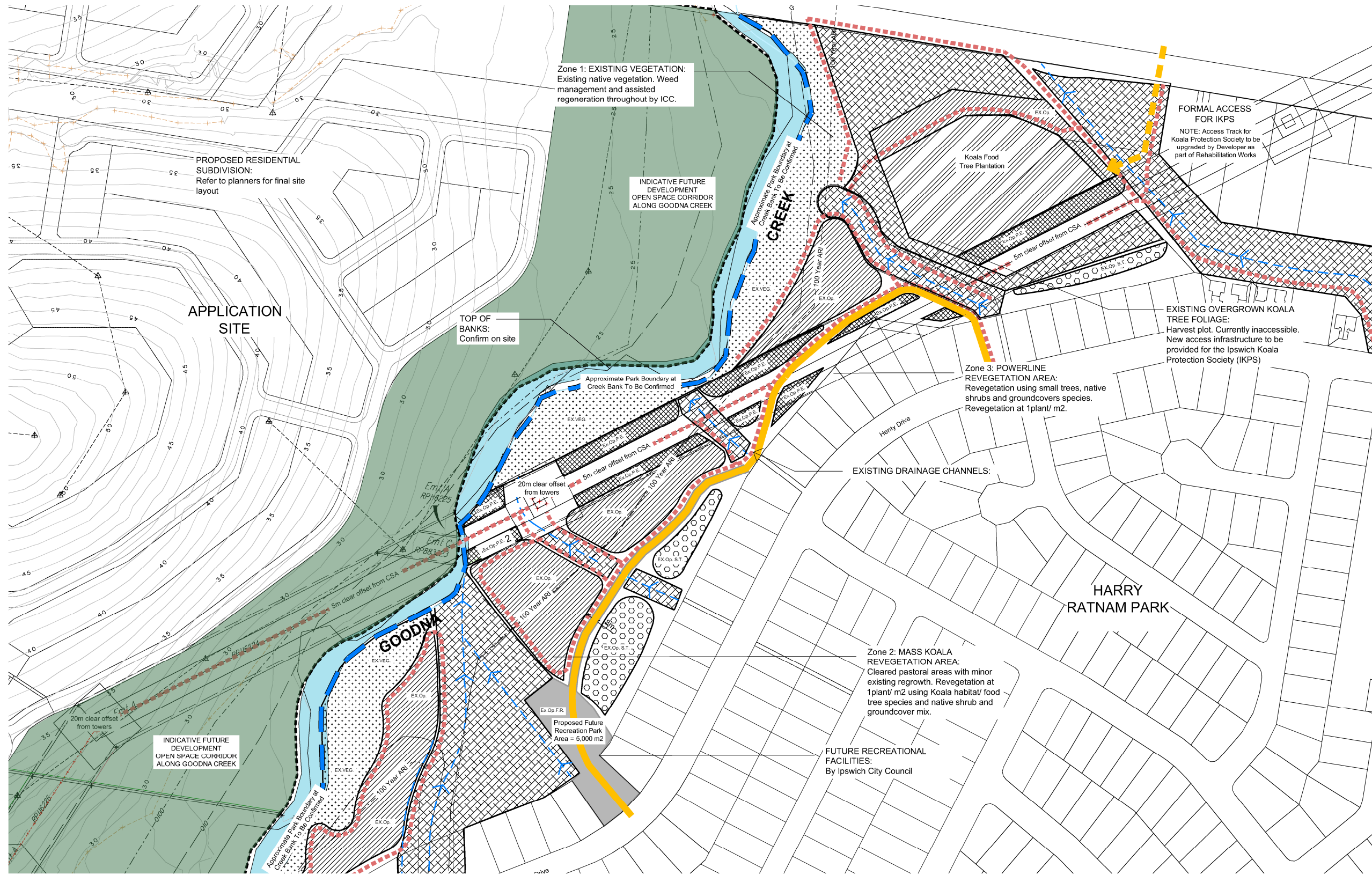


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Dwg No. 6777 L ER 03 C

Harry Ratnam Park - Rehabilitation Plan Series 2 - External Works

External Rehabilitation



LEGEND

-  Zone 1: EXISTING VEGETATION: Existing native vegetation. Weed management and assisted regeneration throughout by Ipswich City Council.
 -  Zone 2: MASS KOALA REVEGETATION AREA: Cleared pastoral areas with minor existing regrowth. Revegetation at 1plant/ m2 using Koala habitat/ food tree species and native shrub and groundcover mix.
 -  Zone 3: POWERLINE REVEGETATION AREA: Revegetation using small trees, native shrubs and groundcovers species. Revegetation at 1plant/ m2.
 -  TOP OF BANKS
- All disturbed/ bare areas to be blanket mulched to a minimum depth of 100mm to suppress weed growth and revegetated.
- Where batters steeper than 1:3 exist Jute mat is proposed to stabilise and provide protection against erosion and scouring.
- Existing pastoral cover to be slashed and sprayed out prior to cultivation and revegetation works.
- All disturbed/ bare areas to be blanket mulched to a minimum depth of 100mm to suppress weed growth and revegetated.

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JOIN LINE: REFER DWG 6777 L 10

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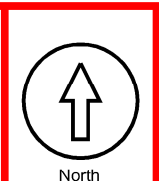
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A	18/09/13	Client Comment	
B	24/09/13	SEWPAC Lodgement	
C	23/09/14	DoE Lodgement	

Date 24-09-13
 Scale 1:1500@A1

Plan of
External Rehabilitation Plan
 Sheet 1

Drawn by.	RM	Project	Woodlink Estate
Checked by.	MS	Client	Canberra Estate Consortium No. 36

LODGEMENT DRAFT

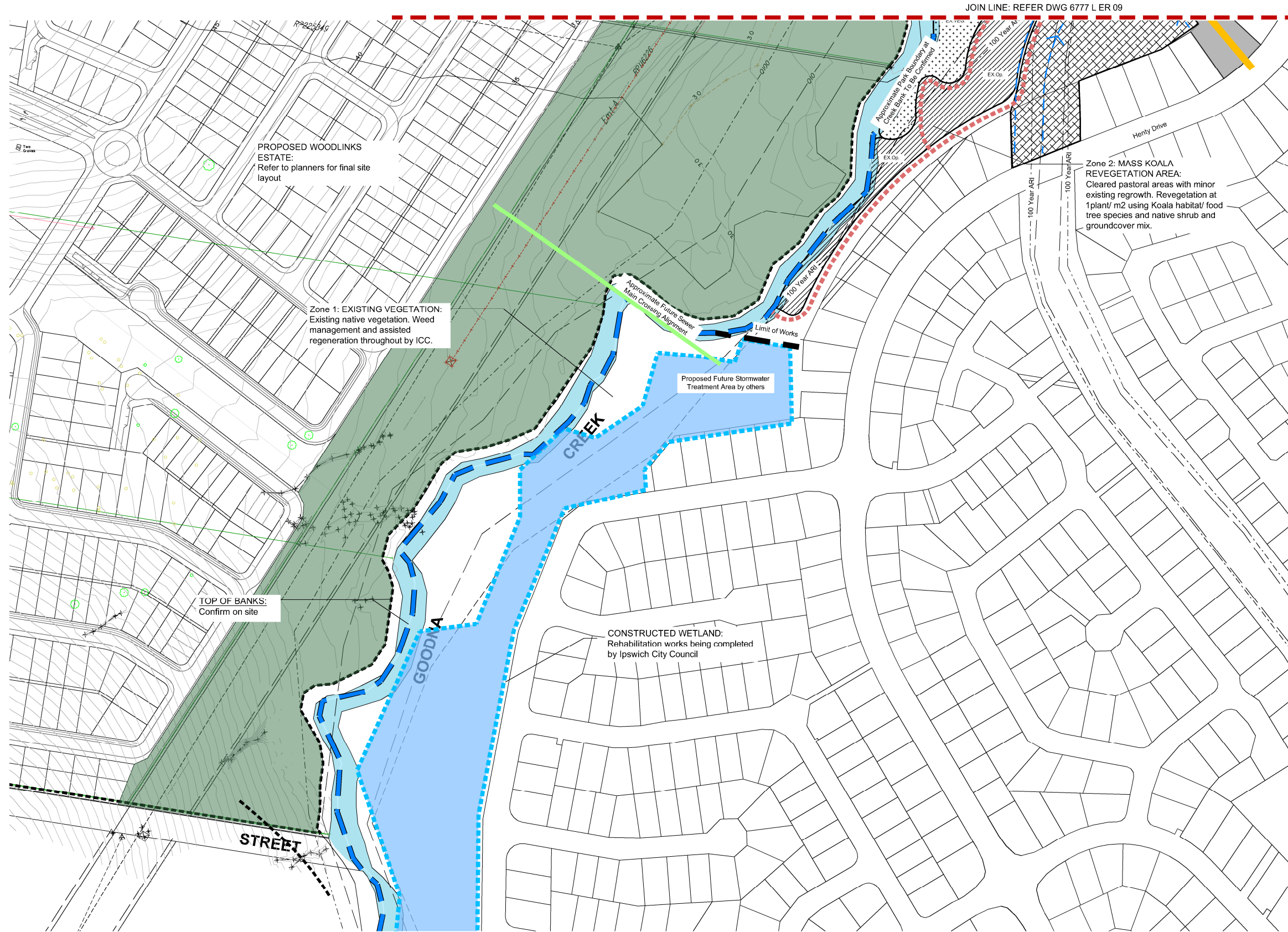


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Dwg No. 6777 L ER 09 C

Harry Ratnam Park - Rehabilitation Plan Series 2 - External Works

External Rehabilitation



LEGEND

- Zone 1: EXISTING VEGETATION: Existing native vegetation. Weed management and assisted regeneration throughout by Ipswich City Council.
- Zone 2: MASS KOALA REVEGETATION AREA: Cleared pastoral areas with minor existing regrowth. Revegetation at 1plant/ m2 using Koala habitat/ food tree species and native shrub and groundcover mix.

All disturbed/ bare areas to be blanket mulched to a minimum depth of 100mm to suppress weed growth and revegetated.

Where batters steeper than 1:3 exist Jute mat is proposed to stabilise and provide protection against erosion and scouring.
- Zone 3: POWERLINE REVEGETATION AREA: Revegetation using small trees, native shrubs and groundcovers species. Revegetation at 1plant/ m2.

Existing pastoral cover to be slashed and sprayed out prior to cultivation and revegetation works.

All disturbed/ bare areas to be blanket mulched to a minimum depth of 100mm to suppress weed growth and revegetated.
- TOP OF BANKS

NOTE 1: All works in accordance with Ipswich City Council Landscape Development Manual.
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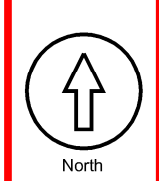
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Issue	Date	Details	Approved
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B	24/09/13	SEWPAC Lodgement	
C	23/09/14	DoE Lodgement	

Plan of External Rehabilitation Plan Sheet 2

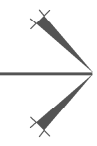
Date	24-09-13	Drawn by.	RM	Project	Woodlink Estate
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LODGEMENT DRAFT



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Harry Ratnam Park - Rehabilitation Plan Series 2 - External Works



External Rehabilitation - Rehabilitation Schedules

REHABILITATION SCHEDULES

ZONE 1 - EXISTING VEGETATION: GENERAL REVEGETATION (IF AREAS DISTURBED FOLLOWING WEED MANAGEMENT OR EXISTING BARE AREAS)

Species to be planted in random grid matrix pattern					
FORM (Position in Community)	Botanical Name	Common Name	Size	Qty	
Canopy Layer	CORYMBIA citriodora	"Lemon scented Gum"	Tube	-	
	CORYMBIA intermedia	"Pink Bloodwood"	Tube	-	
	CORYMBIA tessellaris	"Moreton Bay ash"	Tube	-	
	EUCALYPTUS acmenoides	"Queensland White Mahogany"	Tube	-	
	EUCALYPTUS crebra	"Narrow leaved Ironbark"	Tube	-	
	EUCALYPTUS moluccana	"Gum Top Gum"	Tube	-	
	EUCALYPTUS portuensis	"Bloodwood"	Tube	-	
	EUCALYPTUS robusta	"Swamp Maohogany"	Tube	-	
	EUCALYPTUS siderophloia	"Grey Ironbark"	Tube	-	
	EUCALYPTUS tereticornis	"Queensland Blue Gum"	Tube	-	
LOPHOSTEMON suaveolens	"Swamp Box"	Tube	-		
SUB TOTAL				0	
Shrub Layer	BABINGTONIA similis	"Twiggy Myrtle"	Tube	-	
	BACKHOUSIA myrtifolia	"Backhousia"	Tube	-	
	BANKSIA robur	"Swamp Banksia"	Tube	-	
	BANKSIA spinulosa	"Hairpin Banksia"	Tube	-	
	CRYPTOCARYA triplinervis	"Three-veined Cryptocarya"	Tube	-	
	JACKSONIA scoparia	"Dogwood"	Tube	-	
	LEPTOSPERMUM polygalifolium	"Wild May"	Tube	-	
	PITOSPORUM undulatum	"Sweet Pittosporum"	Tube	-	
	SUB TOTAL				0
	Ground Layer	BOTHRIOCHLOA sp.	"Beardgrass"	Tube	-
CAREX brunnea		"Greater Brown Sedge"	Tube	-	
CYMBOPOGON refractus		"Barbwire Grass"	Tube	-	
CYPERUS spp.		"Sedges"	Tube	-	
DIANELLA caerulea		"Flax Lilly"	Tube	-	
DIANELLA caerulea var caerulea		"Dianella"	Tube	-	
IMPERATA cylindrica		"Blady Grass"	Tube	-	
LOMANDRA longifolia		"Spiny-headed mat-rush"	Tube	-	
THEMEDA triandra		"Kangaroo Grass"	Tube	-	
SUB TOTAL				0	
TOTAL				0	

ZONE 1 - EXISTING VEGETATION: CREEK CHANNEL/ BATTERS REVEGETATION SPECIES SCHEDULE (IF AREAS DISTURBED FOLLOWING WEED MANAGEMENT)

NOTE: Species selected within the Water Sensitive Urban Design Guidelines. Quantities are based on 3 plants per square metre. If batters greater than 1:3 install in Jutemat Thickmat to manufacturer's recommendations

Species to be planted in random grid matrix pattern					
FORM (Position in Community)	Botanical Name	Common Name	Size	Qty	
Ground Layer	CAREX appressa	"Tall Sedge"	Tube	-	
	LOMANDRA hystrix	"Lomandra"	Tube	-	
	CYPERUS difformis	"Rice Sedge"	Tube	-	
	CYPERUS polystachyos	"Common Sedge"	Tube	-	
	SOLEPSIS nodosa	"Knobby Club Rush"	Tube	-	
	JUNCUS usitatus	"Common Rush"	Tube	-	
	PERSICARIA decipens	"Slender Knotweed"	Tube	-	
	PHILYDRUM lanuginosum	"Woolly Frogmouth"	Tube	-	
	SCHOENOPLECTUS validus	"River Clubrush"	Tube	-	
	SUB TOTAL				0
	TOTAL				0

NOTE: Zone 1- Existing Vegetated Areas currently maintained and undergoing weed management and infill revegetation by ICC.

ZONE 2 - KOALA REVEGETATION AREA (79,670M2)

Species to be planted in random grid matrix pattern					
FORM (Position in Community)	Botanical Name	Common Name	Size	Qty	
Canopy Layer	ACACIA complanata	"Flat-stemmed Wattle"	Tube	885	
	ACACIA concurrens	"Black Wattle"	Tube	885	
	ACACIA disparima	"Hickory Wattle"	Tube	885	
	ACACIA fimbriata	"Brisbane Wattle"	Tube	885	
	ALPHITONIA excelsa	"Red Ash"	Tube	885	
	ANGOPHORA woodsiana	"Roughbark Apple"	Tube	885	
	ANGOPHORA leiocarpa	"Smooth-barked Apple"	Tube	885	
	CORYMBIA citriodora	"Lemon scented Gum"	Tube	885	
	CORYMBIA intermedia	"Pink Bloodwood"	Tube	885	
	CORYMBIA tessellaris	"Moreton Bay ash"	Tube	885	
	EUCALYPTUS acmenoides	"Queensland White Mahogany"	Tube	885	
	EUCALYPTUS crebra	"Narrow leaved Ironbark"	Tube	885	
	EUCALYPTUS moluccana	"Gum Top Gum"	Tube	885	
	EUCALYPTUS portuensis	"Bloodwood"	Tube	885	
	EUCALYPTUS robusta	"Swamp Maohogany"	Tube	885	
	EUCALYPTUS siderophloia	"Grey Ironbark"	Tube	885	
	EUCALYPTUS tereticornis	"Queensland Blue Gum"	Tube	885	
	LOPHOSTEMON suaveolens	"Swamp Box"	Tube	885	
	SUB TOTAL				15930
	Shrub Layer	BABINGTONIA similis	"Twiggy Myrtle"	Tube	1838
BACKHOUSIA myrtifolia		"Backhousia"	Tube	1838	
BANKSIA robur		"Swamp Banksia"	Tube	1838	
BANKSIA spinulosa		"Hairpin Banksia"	Tube	1838	
CALLICARPA pedunculata		"Callicarpa"	Tube	1838	
CASSINIA subtropica		"Cough bush"	Tube	1838	
CRYPTOCARYA triplinervis		"Three-veined Cryptocarya"	Tube	1838	
JACKSONIA scoparia		"Dogwood"	Tube	1838	
LEPTOSPERMUM polygalifolium		"Wild May"	Tube	1838	
NEOLITSEA dealbata		"White Bolly Gum"	Tube	1838	
PILIDIOSTIGMA glabrum		"Plum Myrtle"	Tube	1838	
PITOSPORUM undulatum		"Sweet Pittosporum"	Tube	1838	
RHODOMYRTUS psidioides		"Native Guava"	Tube	1838	
SUB TOTAL				23894	
Ground Layer		BOTHRIOCHLOA sp.	"Beardgrass"	Tube	3320
		CAREX brunnea	"Greater Brown Sedge"	Tube	3320
		CAREX maculata	"Carex"	Tube	3320
	CYMBOPOGON refractus	"Barbwire Grass"	Tube	3320	
	CYPERUS spp.	"Sedges"	Tube	3320	
	DIANELLA caerulea	"Flax Lilly"	Tube	3320	
	DIANELLA caerulea var caerulea	"Dianella"	Tube	3320	
	GEITONOPLESIMUM cymosum	"Scrambling Lilly"	Tube	3320	
	JUNCUS usitatus	"Common Rush"	Tube	3320	
	IMPERATA cylindrica	"Blady Grass"	Tube	3320	
	LOMANDRA longifolia	"Spiny-headed mat-rush"	Tube	3350	
	THEMEDA triandra	"Kangaroo Grass"	Tube	3350	
	SUB TOTAL				39900
TOTAL				79724	

ZONE 3 - ELECTRICAL EASEMENT REVEGETATION AREA (26,600M2)

Species to be planted in random grid matrix pattern					
FORM (Position in Community)	Botanical Name	Common Name	Size	Qty	
Shrub Layer	BANKSIA robur	"Swamp Banksia"	Tube	665	
	BANKSIA spinulosa	"Hairpin Banksia"	Tube	665	
	CALLICARPA pedunculata	"Callicarpa"	Tube	665	
	CASSINIA subtropica	"Daviesia"	Tube	665	
	CRYPTOCARYA triplinervis	"Three-veined Cryptocarya"	Tube	665	
	DAVIESIA arborea	"Daviesia"	Tube	665	
	DAVIESIA ulcifolia	"Bitter Pea"	Tube	665	
	DODONAEA triquetra	"Common Hop Bush"	Tube	665	
	HOVEA acutifolia	"Pointed Leaf Hovea"	Tube	665	
	INDIGOFERA australis	"Austral Indigo"	Tube	665	
	JACKSONIA scoparia	"Dogwood"	Tube	665	
	LEPTOSPERMUM polygalifolium	"Tea tree"	Tube	665	
	NOTELAEA longifolia	"Long-leaved Mock Olive"	Tube	665	
	NOTELAEA ovata	"A Mock Olive"	Tube	665	
	PULTENAEA villosa	"Hairy Bush Pea"	Tube	665	
	SENNA artemisioides	"Feathery senna"	Tube	665	
	SUB TOTAL				10640
	Ground Layer	CAREX brunnea	"Greater Brown Sedge"	Tube	1450
		CAREX maculata	"Carex"	Tube	1450
		CYMBOPOGON refractus	"Barbwire Grass"	Tube	1450
CYPERUS spp.		"Sedges"	Tube	1450	
DIANELLA brevipedunculata		"Short-flowered Flax Lilly"	Tube	1450	
DIANELLA caerulea		"Flax Lilly"	Tube	1450	
DIANELLA caerulea var caerulea		"Dianella"	Tube	1450	
JUNCUS usitatus		"Common Rush"	Tube	1450	
LOMANDRA filiformis		"Wattle mat-rush"	Tube	1460	
LOMANDRA laxa		"A mat-rush"	Tube	1450	
THEMEDA triandra	"Kangaroo Grass"	Tube	1450		
SUB TOTAL				15960	
TOTAL (1plant/m2)				26600	

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 ■ surveying ■ town planning ■ urban design ■ environmental management ■ landscape architecture

amendments:			
Issue	Date	Details	Approved
A	18/09/13	Client Comment	
B	24/09/13	SEWPAC Lodgement	
C	23/09/14	DoE Lodgement	

Plan of External Rehabilitation Plan Rehabilitation Schedules	
Date 24-09-13	Drawn by. RM Project Woodlink Estate
Scale 1:1500@A1	Checked by. MS Client Canberra Estate Consortium No. 36

LODGE MENT DRAFT

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