



INO Angas Securities Ltd

Fernhill Central West Biobank

BioBanking Assessment

February 2014

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- Appendix A – BioBanking Credit Report
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1. Introduction

1.1 Overview

GHD Pty Ltd (GHD) has been engaged by INO Angas Securities Ltd. to provide a BioBanking Assessment of the proposed 'Fernhill Central West' biobank to support an application for a biobanking agreement (see Figure 1). The purpose of the assessment is to determine the biodiversity credit value of the ecosystems and habitats at the Fernhill Central West biobank using the BioBanking Assessment Methodology (BBAM).

This report provides an overview of the Biodiversity Banking and Offsets Scheme (BioBanking), the application of the BBAM, the results of the site assessment, the calculation of biodiversity credits and proposed management actions for the site.

1.2 BioBanking

BioBanking was established by the New South Wales (NSW) Department of Environment, Climate Change and Water (DECCW) (now the Office of Environment and Heritage (OEH)) as a method to address the loss of biodiversity and threatened species. The scheme attempts to create a market framework for the conservation of biodiversity values and the offsetting of development impacts. The scheme is currently voluntary.

BioBanking is established under Part 7A of the *NSW Threatened Species Conservation Act 1995* (TSC Act), which was enabled by the *Threatened Species Conservation Amendment (Biodiversity Banking) Bill 2006*. The *Threatened Species Conservation (Biodiversity Banking) Regulation 2008* provides additional rules for specific aspects of the scheme that are important for its operation.

To establish credits for a biobank site a landholder must commit to enhancing and protecting biodiversity values over time. A biobanking agreement is entered into and registered on the title of the land, binding both the current and future landholders to maintaining biodiversity through the completion of a range of management actions on the site. Each biobank site may generate a number of different ecosystem credits and any of these credits may be sold separately or as a group.

The BBAM sets out how biodiversity values will be assessed, establishes rules for calculating the number and class of credits, and determines the trading rules that will apply. The methodology includes a software package known as the BioBanking Credit Calculator (the credit calculator) which processes site survey and assessment data. The credit calculator specifies the type and extent of surveys required for a BioBanking assessment and then processes survey data to calculate the number and type of biodiversity credits that are either required at a development site or will be generated at a biobank site.

The BioBanking Trust Fund ensures that landowners have the money needed to carry out the management actions required each year and provides a financial incentive to landowners to carry out those actions. The scheme is administered by OEH and ensures accountability and compliance through legislation, regular reporting requirements and financial measures.

1.3 Scope of Assessment

The scope of this BioBanking assessment report is to:

- Outline the methods used in the BioBanking assessment

- Describe the existing environment of the Fernhill Central West biobank, including the results of site surveys
- Present the data used to perform the BioBanking assessment for the site
- Calculate the number and type of biodiversity credits that will be generated when a biobanking agreement is obtained for the site using Version 2.0 of the BioBanking credit calculator (the 'credit calculator')
- Provide an overview of the management actions and monitoring program that would be required in perpetuity under a biobanking agreement, such that a net improvement in biodiversity over time is achieved.

The BioBanking assessment and credit calculations were performed by Ben Harrington (Accredited BioBanking Assessor number 0073).

This report should be read in conjunction with the Management Actions Plan (MAP) for the Fernhill Central West biobank.

1.4 Glossary of Terms

Biobank site	Land that is designated by a biobanking agreement to be a biobank site.
Biobanking agreement	An agreement entered into between the landowner and the Minister under Part 7A of the TSC Act for establishing a biobank site.
BioBanking Assessment Methodology (the methodology; BBAM)	The rules of the BioBanking Scheme established under the TSC Act that determine credits created, credits required and the circumstances that improve or maintain biodiversity values.
BioBanking Scheme (BioBanking; the scheme)	The biodiversity banking and offsets scheme established under Part 7A of the TSC Act.
Biobanking statement	Specifies the number and class of credits to be retired for a particular development. A biobanking statement can only be issued in circumstances that improve or maintain biodiversity values.
Biobanking Trust Fund	The Trust Fund established under Part 7A of the TSC Act to hold funds from the sale of credits.
Biodiversity credit	Registered biodiversity credits are created for management actions that have been carried out or are proposed to be carried out, in accordance with the biobanking agreement.
Biodiversity offset	Actions that are put in place to counterbalance (offset) an impact on biodiversity values.
Biodiversity values	The composition, structure and function of ecosystems including threatened species, populations and ecological communities, and their habitats.
Development site	Land that is designated by a biobanking statement to be a development site.

Ecosystem credit	A credit that relates to a vegetation type and the threatened species that are reliably predicted by that vegetation type (as a habitat surrogate).
Fernhill Central West biobank (the biobank)	The land that is the subject of this BioBanking assessment, as described in Section 3.1.1 of this report and as shown on Figure 1..
Landscape value	The portion of the BioBanking credit calculations that relates to the biodiversity value of the site and surrounding area at the landscape scale i.e. patch size, connectivity.
Management action	Means an action or proposed action in respect of which a biodiversity credit may be created.
Site value	The portion of the BioBanking credit calculations that relates to the biodiversity value of the site itself i.e. the extent and condition of vegetation and habitat resources..
Species credit	A credit that relates to an individual threatened species whose occurrence at a given site cannot be reliably predicted based on habitat surrogates. Threatened species that require species credits are identified in the Threatened Species Profile Database.



1:8,000 (at A3)

0 40 80 160 240 320

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

LEGEND

- ① Boundary Points
- Fernhill Central West biobank site boundary
- Lot boundary*

GHD

INO Angas Securities Ltd
Fernhill Central West Biobank
BioBanking Assessment

Job Number 22-16689
Revision A
Date 20 Jan 2014

2. Methods

2.1 Approach

Biodiversity credits were calculated at the biobank site according to the methodology presented in the DECC (2009) *BioBanking Assessment Methodology and Credit Calculator Operational Manual* and the *Draft Operational Manual for using the BioBanking Credit Calculator v2.0* (OEH 2011). The credit calculator is the software version of the methodology. Data is entered into the credit calculator based on information collected in the desktop assessment, site surveys and from using GIS mapping software.

The methodology establishes two classes of biodiversity credits that may be created:

- Ecosystem credits – these are created or required for all impacts on biodiversity values including threatened species that can be reliably predicted by habitat surrogates
- Species credits – these are created or required for impacts on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates. Threatened species that require species credits are identified in the Threatened Species Profile Database (OEH, 2013b).

This BioBanking assessment has been prepared to support an application for a biobanking agreement for the Fernhill Central West biobank as follows:

- Geographic information system (GIS) assessment to map the biobank site and calculate the landscape value
- Field survey of the biobank site, including the BioBanking plot/transect methodology to calculate the site value
- Credit calculations using the credit calculator V.2.0 to determine the ecosystems credits that will be generated when a biobanking agreement is obtained for the site and it is formally set aside and managed for conservation.

The credit calculator produces a number of reports, including the threatened species predicted to occur, survey effort required at the site and the biodiversity credit profile which are appended to this BioBanking assessment.

The purpose of this BioBanking assessment is to assess the number of credits that may be created by conserving the vegetation on site in perpetuity under a biobanking agreement.

2.2 Desktop Assessment

2.2.1 Literature and Database Review

The following resources were reviewed to describe the existing environment of the biobank site and to obtain the necessary data to perform BioBanking credit calculations:

- DECC (2008a) *NSW (Mitchell) Landscapes Version 3 (2008)*
- DECC (2008b) *Descriptions for NSW (Mitchell) Landscapes*
- OEH (2013a) *Vegetation Types Database*
- OEH (2013b) *Threatened Species Profile Database*
- DECCW (2010) *NSW Interim Vegetation Extent* remote sensing imagery
- Aerial photographs and satellite imagery of the study area

- NPWS (2002) *Native Vegetation of the Cumberland Plain, Western Sydney*
- GHD (2013a) *Fernhill East Biobank BioBanking Assessment*
- GHD (2013b) *Fernhill Eastern Precinct Ecological Assessment*.
- GHD (2012) *Preliminary Ecology Assessment and 7-part test to support the Development Application (DA) for the proposed Athletic Endurance course (Tough Mudder) at Fernhill NSW*
- EcoLogical Australia (2010) *Owston Estate (Fernhill) Ecological Assessment of Proposed Rezoning*.

2.2.2 Geographical Information System (GIS) Analysis

GIS analysis is an integral part of the BBAM. GIS was used to plot the biobank site on a high resolution aerial photo base and to map vegetation types and biodiversity values across the site. GIS analysis was used to calculate the extent of native vegetation to be managed within the biobank site, which was entered into the credit calculator.

GIS analysis was used to accurately determine the Catchment Management Authority (CMA), CMA Sub-region and Mitchell Landscape of the site.

Additional GIS analysis was used to plot the assessment circles surrounding the site in which landscape scores are calculated. Native vegetation cover, extent and connectivity were assessed using aerial photography and DECCW (2010) *NSW Interim Vegetation Extent* remote sensing imagery. Air photo interpretation was used to identify and record distinct vegetation patches, determine the broad condition state of vegetation types and the location and extent of vegetated habitat corridors. DECCW (2010) remote sensing imagery was used to estimate foliage projective cover in the landscape assessment circles. The assessment circles and GIS area calculations were used to enter information about landscape value and to determine the change in Landscape Value score by assessing the impact of the biobank on native vegetation cover and connectivity as well as the size of adjacent remnant area.

2.3 Site Survey

2.3.1 Survey effort

Staged field surveys of the biobank site were conducted with reference to the BBAM. Surveys involved broad vegetation surveys and vegetation mapping, along with opportunistic fauna and threatened flora surveys, followed by BioBanking plot-transect surveys and additional opportunistic fauna and threatened flora surveys. GHD have also completed a number of site surveys over the broader Fernhill Estate (GHD, 2013a, 2013b; EcoLogical, 2010) that have contributed to the understanding of the existing environment for this assessment.

Survey effort that has directly contributed to this BioBanking assessment is summarised in Table 1 and described below.

Table 1 Survey effort

Stage	Date	Survey Technique
'Tough Mudder' DA preliminary survey (GHD, 2012)	11 December 2012	Broad-scale vegetation survey, vegetation mapping, opportunistic fauna and threatened flora observations.
Fernhill East biobank ecosystem survey	28-30 May, 6 - 7 June and 10 July 2013	Fine-scale vegetation survey and vegetation mapping, habitat assessments, opportunistic fauna observations.
Fernhill Central West biobank ecosystem survey	18, 19, 25 and 26 September and 11 and 12 December 2013	Fine-scale vegetation survey and vegetation mapping, 37 20 m x 50 m BioBanking plot / transects, random meander searches for threatened plants, habitat assessments, opportunistic fauna observations.

The broad scale vegetation mapping for the Fernhill Estate was ground-truthed in the field via systematic walked transects across the biobank site and by walking the boundary of vegetation communities. Field ecologists checked mapped vegetation polygons with a hand-held Trimble GPS unit loaded with aerial photography and draft vegetation mapping. Necessary adjustments were made by hand on aerial photographs of the site and by capturing waypoints at vegetation type boundaries. The site was divided into relatively homogenous or discrete vegetation zones for assessment. Each zone represented a distinct vegetation type according to the OEH (2013a) Vegetation Types Database and broad condition state. A total of nine vegetation zones were identified at the site as shown on Figure 2.

Opportunistic observations of fauna and threatened plants were recorded throughout the survey. The locations of any threatened species identified within the site were captured with a handheld GPS.

Plot and transect surveys were conducted on site in accordance with the BBAM to obtain data for the calculation of ecosystem credits. The site value was determined by assessing 10 site condition attributes against benchmark values. Benchmarks are quantitative measures of the range of variability in condition in vegetation with relatively little evidence of alteration, disturbance or modification by humans since European settlement (DECC, 2009). Species were identified according to the nomenclature of the Royal Botanic Gardens and Domain Trust (2013). Cover abundance data was also collected for each species within the 20 metre x 20 metre portion of each plot/transect.

Plots were distributed between vegetation zones according to the minimum number of plots required by the DECC (2009) methodology. A total of 24 plots were sampled within the biobank site as shown on Figure 2.

One vegetation zone is a freshwater wetland. For health and safety and logistical reasons plot/transects were placed near the edges of this vegetation zone and the central transect was not walked. Instead the edge of the plot was walked and the central transect was sampled via observation from up to 10 metres away depending on the depth of water and stability of the substrate. This approach was adopted in consultation with OEH (Seidel, J., OEH, *pers. comm.*) and given the characteristics of the vegetation is likely to have provided a reasonably accurate sample. Specifically, the majority of the vegetation zone does not contain overstorey or midstorey vegetation cover that would require sampling from below and the groundcover vegetation is structurally simple and dominated by Tall Spike Rush (*Eleocharis sphacelata*).

Opportunistic and incidental observations of fauna species were recorded at all times during field surveys. Casual fauna observations were made in suitable areas of habitat throughout the course of the flora survey and while incidentally traversing the site. This included visual inspection of nests, creeklines, overhangs and woody debris, active searches for small fauna and opportunistic observation of scats, tracks, burrows or other traces.

All observations of threatened fauna or suspected evidence of threatened fauna were recorded along with a waypoint captured with a hand-held GPS.

2.4 BioBanking Assessment

The BioBanking credit calculations were performed by Ben Harrington (assessor accreditation number 0073) using credit calculator Version 2.0. Field survey results, BBAM assessments, GIS calculations and this assessment report have been peer reviewed by accredited assessors (see Table 2). The credit calculations have been submitted to OEH and the biodiversity credit report is included as Appendix A.

2.5 Staff Qualifications

This report, including all BioBanking credit calculations, was prepared by Ben Harrington based on field surveys conducted by GHD ecologists. The assessment was peer reviewed by Jeremy Pepper and Dan Williams. Staff qualifications are presented in Table 2.

Table 2 Staff qualifications

Name	Position / Project Role	Qualifications	Relevant Experience
Ben Harrington	Senior Ecologist / desktop assessment, site surveys, credit calculations and reporting	BSc, MSc (Physical Geography) BioBanking Assessor Accreditation ¹	10+ years
Rowena Hamer	Graduate Ecologist / site surveys, desktop assessments	BSc Hons (Ecology)	3+ years
Nicole Hansen	Graduate Ecologist / site surveys, desktop assessments	BSc, MPhil (Biological Sciences)	4 + years
Jeremy Pepper	Principal Ecologist / Technical review	BSc (Hons), Cert III Bush. Regen, Cert II Hort. (Arboriculture). BioBanking Assessor Accreditation ¹	17 years
Daniel Williams	Principal Ecologist / Peer review, management actions, consultation and planning	B. App. Sc. BioBanking Assessor Accreditation ¹	13+ years

¹ Refer to OEH (2013c) list of accredited assessors.

3. Existing Environment

3.1 Site Context

3.1.1 Location and Land Uses

The proposed biobank is located at Mulgoa within the Penrith Local Government Area (LGA) as shown on Figure 1. The biobank comprises Part Lot 10, DP 615085. It is bounded to the north by the Blue Mountains National Park and to the northeast by the Fernhill East biobank site. It is bounded to the east, west, south and south-west by rural residential land within the Fernhill Estate and other adjoining properties. The biobank site is approximately 1 km to the east of the Nepean River and lies on the northern edge of the village of Mulgoa and approximately 10 km south of Penrith town centre.

The biobank falls within the Hawkesbury Nepean Catchment Management Authority (CMA), and within the Sydney Basin Bioregion.

The biobank is currently zoned E2 Environmental Conservation under the *Penrith City Council Local Environment Plan 2010*. The site contains predominantly native vegetation and is currently used for low density cattle grazing activities. There are some areas of native vegetation from which grazing is excluded by existing fences.

The eastern portion of Lot 10, DP 615085 is excluded from the biobank site as it has been included in the adjoining Fernhill East biobank site or will continue to be used for agriculture, equestrian activities and events within the Fernhill Estate. These lands have been excluded from the Fernhill Central West biobank, and no calculations relating to credit generation have been undertaken in this area.

The remainder of Lot 10, DP615085 would form the Fernhill Central West biobank, covering 147.3 hectares (ha) of land. The Fernhill Central West biobank site boundary is shown on Figure 1, including point locations that delineate the boundary where it does not match cadastral Lot boundaries. The area to be set aside for the biobank was the focus of the field surveys.

Historical land uses within the biobank site appear to have included grazing, livestock keeping and timber getting. Areas within the site that have been disturbed include partially cleared grazing country, an informal rubbish tip and those areas adjacent to fence lines and gates, farm dams and existing access tracks and roads throughout the site.

3.1.2 Climate

The site has a relatively mild climate, typical of western Sydney. Based on data from the Orchard Hills Treatment Works weather station (number 067084), the site has a mean annual rainfall of 803 mm, mean daily maximum temperature of 23.4°C and a mean daily minimum temperature of 11.6°C. The site does experience regular extremes in temperature, with average ranges of a mean daily minimum temperature of 5.3°C to mean daily maximum temperature of 17.2°C in July, through to a mean daily minimum temperature of 15.5°C to mean daily maximum temperature of 28.5°C in December (BOM, 2013).

3.1.3 Hydrology

Drainage lines and water bodies in the study area are shown on Figure 2. An un-named drainage line flows through from west to east through the southern portion of the biobank site before heading northwards along its eastern boundary and then flowing east out of the site. This drainage line is a tributary of Mulgoa Creek, which in turn drains to the Nepean River. The upper reaches of this drainage line have been leveed to produce 'Top Dam', which is around 2.51 ha

in area. The biobank is dissected by a number of smaller unnamed first and second order drainage lines. Many of the drainage lines and water bodies contained water at the time of the site visits, and supported varying degrees of instream and riparian vegetation.

3.1.4 Landscape Context

The western portion of the site falls within the Kurrajong Fault Scarp Mitchell Landscape and the eastern portion within the Cumberland Plain Mitchell Landscape (DECC, 2008a). The majority of the site falls within the Kurrajong Fault Scarp and so this is the Mitchell landscape that was entered in the BioBanking credit calculations for the biobank.

The Kurrajong Fault Scarp Mitchell Landscape is approximately 100 to 250 m above sea level (ASL) and comprises dissected and broken slopes on Triassic Quartz sandstone and shale across the Lapstone monocline and Kurrajong fault scarp. It features abundant rock outcrop with pockets of yellow-brown sand and occasional yellow texture-contrast soils. Vegetation is typically an open forest with a shrubby understorey. Canopy species include Turpentine (*Syncarpia glomulifera*), Red Bloodwood (*Corymbia gummifera*), Smooth-barked Apple (*Angophora costata*), Sydney Peppermint (*Eucalyptus piperita*) and Grey Gum (*Eucalyptus punctata*) (DECC 2008b).

The Cumberland Plain Mitchell Landscape is approximately 30 – 120 m ASL, and comprises 'low rolling hills and valleys in a rain shadow area between the Blue Mountains and the coast' (DECC 2008), with vegetation characterised by woodlands and open forest of Grey Box (*Eucalyptus moluccana*), Forest Red Gum (*Eucalyptus tereticornis*), Narrow-leaved Ironbark (*Eucalyptus crebra*), Thin-leaved Stringybark (*Eucalyptus eugenioides*), Cabbage Gum (*Eucalyptus amplifolia*) and Broad-leaved Apple (*Angophora subvelutina*). Grassy to shrubby understorey often dominated by Australian Boxthorn (*Bursaria spinosa*), poorly drained valley floors, often salt affected with Swamp Oak (*Casuarina glauca*) and paperbarks (*Melaleuca* spp.) (DECC 2008b).

The geology of Cumberland Plain consists of Triassic shales and lithic sandstones, with a small number of volcanic vent intrusions. Tertiary river gravels and sands (Hawkesbury-Nepean Terrace Gravels landscape) partially cover much of the landscape, in addition to Quaternary alluvium along the main watercourses (DECC 2008b).

The geomorphology, soils and vegetation observed by GHD ecologists at the site reflects its transitional position between the Cumberland Plain and sandstone landscapes of the Lapstone monocline and lower Blue Mountains (see Section 3.2.1). Based on site inspection and review by OEH regional staff the 'Lapstone Slopes' is considered a more appropriate Mitchell landscape (Steenbeeke, G. OEH pers. comm.). The BBAM requires that where the description of an adjacent Mitchell Landscape more accurately reflects the landscape in which the proposal occurs then that Mitchell Landscape should be entered (DECC, 2009).

The Lapstone Slopes comprises the frontal slope of the Blue Mountains formed by folding and faulting of Triassic quartz sandstone and shale with a veneer of Tertiary river gravels and is southern extension of the Kurrajong Fault Scarp landscape. Larger streams cut through the structural ridge in deep gorges, but smaller streams have accumulated organic sands in swamps and lagoons on the western side of the flexure (DECC 2008b). General elevation 50 to 300m, local relief 180m, steep dip slopes on the eastern face and benched faulted slopes on the west. It features extensive rock outcrop, thin sandy soils with gravel and occasional white or yellow clay subsoils and pockets of deep sand in some streams. Vegetation includes Red Bloodwood (*Corymbia gummifera*), Yellow Bloodwood (*Corymbia eximia*), Gey Gum (*Eucalyptus punctata*) and Forest Oak (*Allocasuarina torulosa*) with a diverse shrubby understorey (DECC 2008b).

According to the Soil Landscapes of the Penrith 1:100 000 Sheet the site is part of the Luddenham soil landscape (Bannerman and Hazelton, 1990). This soil landscape is described by Bannerman and Hazelton (1990) as: undulating to rolling low hills often associated with Minchinbury Sandstone. Local relief is 50-80m and slopes 5-20%. There are narrow ridges, hillcrests and valleys. The soils are shallow (<100cm) dark podzolic soils or massive earthy clays on crests; moderately deep (70 - 150cm) red podzolic soils on upper slopes; moderately deep (<150cm) yellow podzolic soils and prairie soils on lower slopes and drainage lines. The main geomorphic feature within the Fernhill Central West biobank is a low hill which dominates the centre of the site. This is associated with sandstone derived soils and vegetation in contrast to the shale derived soils and vegetation on lower ground in the eastern portion of the Fernhill Estate. A deep, incised drainage line dissects this hill from east to west revealing outcropping sandstone. The eastern portion of the Fernhill Central West Biobank contains shale-sandstone transition soils and vegetation at the interface between sandstone and Wianamatta Shale. The southwestern portion of the site also features transitional soils, presumably derived from a Shale cap that would have overlain the central hill. The northwest portion of the biobank site features soils and vegetation that are transitional between sandstone and gravelly Tertiary alluvium substrates.

3.2 Vegetation and Habitat Resources

3.2.1 Overview

Field surveys confirmed the presence and distribution of seven NSW vegetation types within the biobank. Stands of these vegetation types include near-intact vegetation in 'moderate/good – high' condition, partially cleared vegetation in 'moderate/good – poor' condition and extensively modified regrowth in 'low' condition (according to the BBAM, DECC, 2008). Accordingly ten vegetation types and broad condition classes were identified and mapped in the biobank shown on Figure 2, summarised in Table 3 and described below. The site contains two landscape assessment circles and so this vegetation has been further split to yield 14 vegetation zones as described in Section 4.4.

Two of the vegetation types within the biobank comprise local occurrences of threatened ecological communities (TECs) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and/or TSC Act (see Table 3 and Section 3.3.3).

The distribution of vegetation types in the biobank is closely tied to soil type, underlying geology and geomorphic position. A low hill dominates the central portion of the biobank site. This central portion features a broad ridge, upper slopes and dissected gullies on lithic sandstone substrate. Ridges and upper slopes support Red Bloodwood - Grey Gum woodland (HN564). HN564 transitions into Turpentine - Smooth-barked Apple moist shrubby forest (HN606) in sheltered lower slopes and gullies reflecting a moister microclimate and probably also accumulation of richer soil from upslope. Steeper sided sections of these gullies, with more sheltered aspects, contain Grey Myrtle dry rainforest (HN538).

The north-west facing slope of the central hill feature Red Bloodwood - scribbly gum heathy woodland (HN566) associated with a drier, more exposed microclimate and possibly also a transition to Tertiary gravel-derived soils. The far north-western portion appears to be an alluvial terrace with Tertiary gravel-derived soils supporting Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland (HN542). This vegetation zone is an occurrence of Castlereagh Scribbly Gum Woodland, which is listed as a vulnerable ecological community (VEC) under the TSC Act and EPBC Act.

The eastern portion of the biobank site features mid-slopes with shale-influenced soils above lithic sandstone substrate. Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest (HN556) occupies the majority of this area. This vegetation type is an occurrence of

Shale/Sandstone Transition Forest, which is listed as an endangered ecological community (EEC) under the TSC Act and EPBC Act. These areas of HN556 feature a shrubby understorey, reflecting higher sandstone influence. The south-western portion of the biobank site also supports HN556, but on gentler slopes and flats. These areas feature a grassy understorey, probably reflecting higher shale influence. Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest in the south west has been partially cleared and grazed and occurs as a matrix of moderate/good- high and moderate/good - poor condition patches. These patches were defined based on overstorey cover and the extent of exotic plant cover in the understorey. There is a 0.69 ha patch of low condition vegetation in the south of the site associated with a disused tip. Based on adjoining vegetation and remnant over storey and mid storey species this area would formerly have supported Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest.

There are occasional patches of noxious weeds such as Lantana (*Lantana camara*) and Blackberry (*Rubus fruticosus* spp. agg.). These weeds are most prevalent: on sheltered slopes and drainage lines; in moderate/good – poor condition vegetation in the west; and where the biobank adjoins an electricity easement in the east. The patch of low condition vegetation is infested with noxious and environmental weeds. The majority of the biobank has very little exotic vegetation cover and features only very occasional wind borne exotic herbs.

Much of the site has been grazed, and canopy vegetation is likely to have been at least partially cleared or thinned historically. Canopy vegetation has since re-established across the majority of the biobank. There are mature hollow-bearing trees in moderate densities throughout the biobank.

There are a number of small, informal, dirt tracks that have been included in surrounding vegetation types because they do not comprise a gap in over storey vegetation and they contain partial cover of native understorey vegetation.

Table 3 Vegetation types within the Fernhill Central West biobank

Vegetation Type (OEH, 2013a)	Veg Type ID	Condition	Area within Biobank Site (ha)	Conservation Significance
Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest	HN556	Moderate/good - high	37.3	EEC listed on TSC Act and EPBC Act (Shale Sandstone Transitional Forest)
Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest	HN556	Moderate/good - poor	4.1	EEC listed on TSC Act and EPBC Act (Shale Sandstone Transitional Forest)
Turpentine - Smooth-barked Apple moist shrubby forest	HN606	Moderate/good - high	5.0	
Red Bloodwood - Grey Gum woodland	HN564	Moderate/good - high	86.7	
Red Bloodwood - Grey Gum woodland	HN564	Moderate/good - poor	1.3	
Red Bloodwood - Grey Gum woodland	HN564	Low	1.5	
Grey Myrtle dry rainforest	HN538	Moderate/good	1.7	
Red Bloodwood - scribbly gum heathy woodland	HN566	Moderate/good - high	5.0	
Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland	HN542	Moderate/good - high	2.0	VEC listed on TSC Act (Castlereagh Scribbly Gum Woodland)
Coastal freshwater wetland	HN630	Moderate/good	2.7	
		Total area	147.3	

3.2.2 Vegetation Types

The structure, species composition and condition of each of the vegetation types and condition classes within the biobank are described below. Species lists are provided in Appendix B. Plot/transect data is also provided in Appendix B along with benchmark values for each vegetation type.

Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest (high condition)

This vegetation type is a moderate/good - high condition form of the NSW vegetation type 'Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest' (HN556, OEH, 2013a), which is consistent with 'Shale Sandstone Transition Forest (low sandstone influence) and Shale Sandstone Transition Forest (high sandstone influence)' in the NPWS (2002)

vegetation mapping and classification of the Cumberland Plain. It comprises an occurrence of a EEC listed on TSC Act and EPBC Act (Shale/Sandstone Transition Forest).

Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest occurs on mid and lower slopes in the eastern and south-western portions of the biobank. It has an open forest structure with a canopy ranging up to approximately 25 m in height, dominated by Narrow-leaved Ironbark (*Eucalyptus crebra*), Broad-leaved Ironbark (*E. fibrosa*), Grey Gum (*E. punctata*), Narrow-leaved Stringybark (*E. eugenioides*) and Yellow Bloodwood (*Corymbia eximia*). There is moderately dense mid-storey containing Box-leaved Wattle (*Acacia buxifolia*), Thin-leaved Geebung (*Persoonia linearis*), Dwarf Cherry (*Exocarpos strictus*) and scattered patches of Lantana. The groundcover is dominated by grasses and herbs at lower elevations in the south-western portions of the biobank and by shrubs in the centre and east. Patches with shrubbier understorey probably reflect higher sandstone influence. Shrub species include Prickly Shaggy Pea (*Podolobium ilicifolium*), Large-leaf Hop-bush (*Dodonaea triquetra*), and Gorse Bitter Pea (*Daviesia ulicifolia*). Native grasses include Purple Wiregrass (*Aristida ramosa*), Bushy Hedgehog-grass (*Echinopogon caespitosus*), Two-colour Panic (*Panicum simile*) and Wiry Panic (*Entolasia stricta*). Characteristic herb and forbs include Burr-daisy (*Calotis dentex*), Many Flowered Mat Rush (*Lomandra multiflora*), *Glycine clandestina*, and *Phyllanthus hirtellus*.

Exotic species are occasionally present within the community and include noxious and environmental weeds such as Lantana, Cobbler's Pegs (*Bidens pilosa*) and Whiskey Grass (*Andropogon virginicus*).

BioBanking habitat attribute data from plot/transects and confirms that this vegetation is largely intact and in good condition, with benchmark values for native plant species richness and vegetation cover, at least one hollow bearing tree and some fallen logs in each plot sampled. Grass cover was very high, probably reflecting the wet summer and autumn through 2013. Exotic plant cover varied from nil to slight infestation (0 to 7% cover). There were moderate to high densities of leaf litter present throughout this vegetation type. All canopy species present in the vegetation type were observed regenerating.

This vegetation type has moderate potential for achieving gains in biodiversity values through management within a biobank site. Improvements in biodiversity value could be obtained through continuing development of vegetation structure and habitat resources, removal of exotic plants, exclusion of grazing and associated impacts and management of pest fauna.

Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest (poor condition)

This vegetation type is a moderate/good – poor condition form of the NSW vegetation type 'Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest' (HN556, OEH, 2013a). It comprises an occurrence of the Shale/Sandstone Transition Forest.

Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest occurs in partially cleared flats in the western portion of the biobank.

This vegetation type has an open woodland or derived grassland structure with occasional remnant trees approximately 25 m in height, including Narrow-leaved Ironbark, Narrow-leaved Stringybark and Grey Gum. There is a sparse, patchy mid-storey containing Box-leaved Wattle, Black Wattle (*Acacia decurrens*), Parramatta wattle (*A. parramattensis*) Pine-leaved Geebung and scattered patches of Lantana.

The groundcover is dominated by grasses. Native grasses include Purple Wiregrass, Bushy Hedgehog-grass, Weeping Meadow Grass and Bordered Panic. Up to 50% of the groundcover consists of exotic grasses, especially Whiskey Grass (*Andropogon virginicus*) and *Briza subaristata*. There is a moderate diversity and cover of native herbs and forbs including Rock

Fern (*Cheilanthes sieberi* subsp. *sieberi*), *Juncus usitatis*, *Glycine tabacina*, Rough Saw-sedge (*Gahnia aspera*) and Indian Pennywort.

Exotic species are widespread and abundant within this vegetation type including extensive cover of Whiskey Grass, *Briza subaristata* and exotic pasture species and localised infestation with Lantana and African Lovegrass (*Eragrostis curvula*). Other weed species include Common Chickweed (*Stellaria media*), Fireweed (*Senecio madagascariensis*) and Purpletop (*Verbena bonariensis*).

BioBanking habitat attribute data confirms that this vegetation is in moderate/good - poor condition. It does not qualify as 'low' because the average native overstorey cover is greater than 25% of benchmark and/or greater than 50% of the groundcover vegetation is native. This type features moderate native plant species richness, over storey and mid storey cover and occasional hollow bearing trees and fallen logs. Native grass and other understory species cover varied from benchmark levels to very low, depending on the degree of infestation by exotic grasses. Exotic plant cover varied from moderate (54%) to severe infestation (92% cover). There were moderate to high densities of leaf litter present throughout this vegetation type. Around 80% of canopy species present in the vegetation type were observed regenerating.

This vegetation type has good potential for achieving gains in biodiversity values through management within a biobank site. Improvements in biodiversity value could be obtained through continuing development of vegetation structure and habitat resources, treatment of weed infestations, ongoing removal of exotic plants and associated impacts and management of pest fauna. Whiskey Grass is the most abundant exotic plant species in this vegetation type and it is likely to be managed relatively easily through shading once the native over storey and mid storey plantings become established.

Turpentine - Smooth-barked Apple moist shrubby forest

This vegetation type is a moderate/good condition form of the NSW vegetation type 'Turpentine - Smooth-barked Apple moist shrubby forest' (HN606, OEH, 2013a) which is consistent with 'Western Sandstone Gully Forest' in the NPWS (2002) vegetation mapping and classification of the Cumberland Plain.

Turpentine - Smooth-barked Apple moist shrubby forest occurs in broader, more exposed portions of gullies through the south and east of the biobank. It has an open forest structure with a canopy ranging up to approximately 25 m in height, dominated by Sydney Red Gum (*Angophora costata*), Grey Gum and Turpentine (*Syncarpia glomulifera*). There is an open mid-storey of Thin-leaved Geebung, Blueberry Ash (*Elaeocarpus reticulatus*) and Forest Oak (*Allocasuarina torulosa*) and occasional dense patches of Kanooka (*Tristanopsis laurina*) and Grey Myrtle (*Backhousia myrtifolia*). The groundcover is diverse and structurally complex and includes: shrubs such as Large-leaf Hop-bush, Prickly Shaggy Pea (*Podolobium ilicifolium*) and Rough Fruit Pittosporum (*Pittosporum revolutum*); grasses such as Weeping Meadow Grass and *Oplismenus imbecilis*; sedges such as Variable Sword-sedge (*Lepidosperma laterale*) and *Schoenus melanostachys*; forbs such as *Plectranthus parviflorus*, *Dianella caerulea* var. *producta* and *Lomandra* species; and ferns such as Rainbow Fern (*Calochlaena dubia*) and Necklace Fern (*Asplenium flabellifolium*). Climbers and scramblers are abundant, including Sweet Morinda (*Morinda jasminoides*), Dusky Coral Pea (*Kennedia rubicunda*) and Wombat Berry (*Eustrephus latifolius*). There are also many lithophytic species (i.e. growing on rocks) including the ferns and herbs mentioned above, mosses and lichens and Sydney Rock Orchid (*Dendrobium speciosum*) and Dog Orchid (*Liparis reflexa*).

Exotic species are only very occasionally present within the majority of this vegetation type. Exotic plants include occasional isolated Lantana and windborne environmental weeds such as

Fleabane (*Conyza bonariensis*), Paspalum (*Paspalum dilatatum*) and *Setaria* species. At the far eastern edges of patches of this vegetation type, where it adjoins a cleared electricity easement, there is locally severe infestation with Lantana, Small-leaved Privet (*Ligustrum sinensis*), Arum Lily (*Zantedeschia aethiopica*) and Crofton Weed (*Ageratina adenophora*). The degree of weed infestation in this area may also be influenced by nutrient rich runoff from adjoining horse paddocks and house blocks.

BioBanking plot/transect data confirms that this vegetation is intact and in good condition, with benchmark values for native plant species richness and vegetation cover, hollow-bearing trees and fallen logs. There are good quantities of leaf litter and rock outcrops with associated habitat resources such as rock fragments, overhangs and fissures. There is aquatic and riparian habitat within this vegetation type. All canopy species present in the vegetation type were observed regenerating.

This vegetation type has moderate potential for achieving gains in biodiversity values through management within a biobank site. Improvements in biodiversity value could be obtained through continuing development of vegetation structure and habitat resources, bush regeneration and management of pest fauna.

Red Bloodwood - Grey Gum woodland (high condition)

This vegetation type is a moderate/good-high condition form of the NSW vegetation type 'Red Bloodwood - Grey Gum woodland' (HN564; OEH, 2013a). HN564 is transitional between 'Western Sandstone Gully Forest' and 'Sandstone Ridgetop Woodland' in the NPWS (2002) vegetation mapping and classification of the Cumberland Plain. Red Bloodwood - Grey Gum woodland occurs on ridges, upper and mid-slopes in the central portions of the biobank, as a large continuous patch.

It has an open forest structure with a shrub – grass understorey. There is an open canopy ranging up to approximately 20 m in height, with a diverse range of tree species including Red Bloodwood (*Corymbia gummifera*), Grey Gum, Turpentine, Brown Stringybark (*Eucalyptus oblonga*), Sydney Red Gum and Thin-leaved Stringybark (*Eucalyptus eugenioides*). There is a characteristic, dense mid-storey of species such as Forest Oak (*Allocasuarina torulosa*), Woody Pear (*Xylomelum pyrifolium*), Thin-leaved Geebung, Slender Tea-tree (*Leptospermum trinervium*) and Flax-leaved Wattle (*Acacia linifolia*).

As with other sandstone vegetation types at the site the groundcover is diverse and structurally complex. Native groundcover species include: shrubs such as Prickly Shaggy Pea, Mountain Devil (*Lambertia formosa*), Spiny Bossiaea (*Bossiaea obcordata*), *Monotoca scoparia* and Prickly Moses (*Acacia ulicifolia*); grasses such as Bottle Washers (*Enneapogon avenaceus*) and Brown's Lovegrass (*Eragrostis brownii*); *Xanthorrhoea media*; sedges such as Variable Sword-sedge; herbs such as *Dianella caerulea* var. *producta*, Slender Violet-bush (*Hybanthus monopetalus*), *Calochilus paludosus* and *Lomandra* species; and ferns such as Lacy Wedge Fern (*Lindsaea microphylla*). There is a diverse range of climbers and scramblers including *Glycine* species, False Sarsaparilla (*Hardenbergia violacea*) and *Comosperma volubile*.

Exotic species are only occasionally present within the community and are limited to occasional patches of Lantana and wind borne environmental weeds such as Dandelion (*Taraxacum officinale*), Fireweed and Lamb's Tongues (*Plantago lanceolata*).

BioBanking habitat attribute data from plot/transects (see Appendix B) confirms that this vegetation is largely intact and in good condition, with benchmark values for native plant species richness and most native vegetation strata. Native mid storey and shrub cover are below benchmark in some plots and grass cover is very high throughout, potentially reflecting fire history. There are very high numbers of hollow bearing trees (two to six per plot) and fallen logs. Exotic plant cover was negligible. There were good quantities of leaf litter present throughout

this vegetation type. All canopy species present in the vegetation type were observed regenerating.

This vegetation type has moderate potential for achieving gains in biodiversity values through management within a biobank site. Improvements in biodiversity value could be obtained through continuing development of vegetation structure (especially shrub and mid story cover) and habitat resources, monitoring and bush regeneration as required, exclusion of grazing and associated impacts and management of pest fauna.

Red Bloodwood - Grey Gum woodland (poor condition)

This vegetation type is a moderate/good – poor condition form of the NSW vegetation type 'Red Bloodwood - Grey Gum woodland' (HN564; OEH, 2013a).

Poor condition Red Bloodwood - Grey Gum woodland occurs in partially cleared flats in the north western portion of the biobank where it was discriminated from adjoining moderate/good - high condition vegetation based on lower canopy cover and from low condition vegetation based on greater than 50% native plant cover in the understorey.

This vegetation type has an open woodland or derived grassland structure with occasional remnant trees approximately 25 m in height, including Narrow-leaved Stringybark and Grey Gum. There is a sparse, patchy mid-storey containing Box-leaved Wattle, Parramatta wattle, Pine-leaved Geebung and scattered patches of Lantana.

The groundcover is dominated by grasses. Native grasses include Purple Wiregrass, Bushy Hedgehog-grass, Weeping Meadow Grass and Bordered Panic. Around 25-50% of the groundcover consists of exotic grasses, especially Whiskey Grass and *Briza subaristata*. There is a moderate diversity and cover of native herbs and forbs.

BioBanking habitat attribute data confirms that this vegetation is in moderate/good - poor condition. It does not qualify as 'low' because the average native overstorey cover is greater than 25% of benchmark and/or greater than 50% of the groundcover vegetation is native. This type features moderate native plant species richness, over storey and mid storey cover and occasional fallen logs. Native grass and other understrey species cover varied from benchmark levels to very low, depending on the degree of infestation by exotic grasses. Exotic plant cover is moderate (38% in the plot sampled). There were moderate to high densities of leaf litter present throughout this vegetation type. Around 50% of canopy species present in the vegetation type were observed regenerating.

Red Bloodwood - Grey Gum woodland (low condition)

This vegetation type is a low condition form of the NSW vegetation type 'Red Bloodwood - Grey Gum woodland' (HN564; OEH, 2013a).

Low condition Red Bloodwood - Grey Gum woodland occurs in the vicinity of a former rubbish tip in the south of the site. It also occurs in partially cleared flats in the western portion of the biobank where it was discriminated from adjoining moderate/good - poor condition vegetation based on lower canopy cover and greater than 50% exotic plant cover in the understorey.

It has a derived grassland or herbland structure with occasional remanant trees such as Grey Gum, Narrow-leaved Ironbark or Sydney Red Gum (*Angophora costata*). There is a patchy, locally dense mid-storey containing Box-leaved Wattle, Black Wattle and Lantana. The groundcover is dominated by exotic grasses and herbs with occasional patches of exotic shrubs or scramblers and extensive areas of bare earth and rubbish. There are small areas of leaf litter or predominantly native understorey. Native understorey species include Flax Lily (*Dianella caerulea* var. *producta*), Indian Weed (*Sigisbeckia orientalis*), Purple Wiregrass, Wiry Panic, Narrow Plantain (*Plantago gaudichaudii*) and Bordered Panic.

Exotic species dominate this vegetation type, including localised very severe infestation with Lantana, Cobblers Pegs, Madeira Vine (*Anredera cordifolia*), Panic Veldtgrass (*Ehrharta erecta*) and African Lovegrass. There is a highly diverse range of other weed species including Common Chickweed, Blackberry Nightshade (*Solanum nigrum*) and Nursery Flick Weed (*Cardamine hirsuta*).

BioBanking habitat attribute data confirms that this vegetation is in low condition native with average overstorey cover well below 25% of the lower limit of benchmark levels and less than 50% of the groundcover vegetation is native. This vegetation type has below benchmark values for native plant species richness and cover though occasional hollow bearing trees and fallen logs. Exotic plant cover is generally very high (up to 92% cover) and there are also areas of bare earth and rubbish. Around 50% of canopy species present in the vegetation type were observed regenerating.

This vegetation type has good potential for achieving gains in biodiversity values within a biobank site, though would require specific and intensive management actions (see the management actions figure in the MAP). Initially this vegetation type would require removal of rubbish and treatment of weed infestations, potentially including excavation of topsoil in the most severely affected areas or where there are highly invasive species such as Madeira Vine. Ecological burns may be a useful tool for restoring native vegetation cover and reducing weed biomass once all non-organic rubbish has been removed. Supplementary planting would be performed in this vegetation type to help establish canopy and mid storey vegetation. Further improvements in biodiversity value could be obtained through continuing development of vegetation structure and habitat resources, ongoing removal of exotic plants and management of pest fauna.

Red Bloodwood - scribbly gum heathy woodland

This vegetation type is a moderate/good condition form of the NSW vegetation type 'Red Bloodwood - Grey Gum woodland' (HN564; OEH, 2013a). HN564 is consistent with 'Sandstone Ridgetop Woodland' in the NPWS (2002) vegetation mapping and classification of the Cumberland Plain. Red Bloodwood - Grey Gum woodland occurs on ridges, upper and mid-slopes in the north western portion of the biobank, as a large continuous patch.

It has a woodland structure with a shrub – grass understorey. In some areas frequent or hot fire appears to have modified the vegetation structure and it is relatively open and grassy. The canopy is up to approximately 10 m in height with a diverse range of tree species including Thin-leaved Scribbly gum (*Eucalyptus racemosa*), Hard-leaved Scribbly Gum (*E. sclerophylla*), Narrow-leaved Apple (*Angophora bakeri*), Yellow Bloodwood, Red Bloodwood and Brown Stringybark. There is a characteristic mid-storey of species such as Thin-leaved Geebung, Slender Tea-tree and Flax-leaved Wattle (*Acacia linifolia*). This mid storey is absent in some fire affected areas as described above.

As with other sandstone vegetation communities at the site the groundcover is diverse and structurally complex. Native groundcover species include: shrubs such as Mountain Devil, *Monotoca scoparia*, Grey Spider Flower (*Grevillea sphacelata*), Pink Spider Flower (*G. sericea*) and Showy Wedge Pea (*Gompholobium grandiflorum*); grasses such as Kangaroo Grass (*Themeda australis*), Wiry Panic and wallaby grasses (*Rhytidosperra* spp.); sedges such as Variable Sword-sedge and Curly Wig (*Caustis flexuosa*); herbs such as Slender Violet-bush, *Mitrasacme polymorpha*, terrestrial orchids and *Lomandra* species; and ferns such as Lacy Wedge Fern. There is a diverse range of climbers and scramblers including *Glycine* species and Netted Shaggy Pea (*Podolobium scandens*).

Exotic species are only very occasionally present within the community and are limited to occasional wind borne environmental weeds such as Dandelion and Lamb's Tongues.

BioBanking habitat attribute data from plot/transects (see Appendix B) confirms that this vegetation is largely intact and in good condition, with benchmark values for native plant species richness and most native vegetation strata. Native mid storey cover is below benchmark in some plots and grass cover is very high throughout, potentially reflecting fire history. There are very high numbers of hollow bearing trees (two to six per plot). The length of fallen logs is slightly below benchmark. Exotic plant cover was negligible. There were good quantities of leaf litter present throughout this vegetation type. All canopy species present in the vegetation type were observed regenerating.

This vegetation type has moderate potential for achieving gains in biodiversity values through management within a biobank site. Improvements in biodiversity value could be obtained through continuing development of vegetation structure and habitat resources, monitoring and bush regeneration as required, exclusion of grazing and associated impacts and management of pest fauna.

Grey Myrtle dry rainforest

This vegetation type is a moderate/good condition form of the NSW vegetation type 'Grey Myrtle dry rainforest' (HN538, OEH, 2013a), which is consistent with 'Western Sydney Dry Rainforest' in the NPWS (2002) vegetation mapping and classification of the Cumberland Plain. It comprises an occurrence of an EEC listed on the TSC Act (Western Sydney Dry Rainforest). It is not consistent with the similar CEEC listed on EPBC Act (Western Sydney Dry Rainforest and Moist Woodland on Shale) because of the dominance of Rusty Fig (*Ficus rubiginosa*) and Grey Myrtle (*Backhousia myrtifolia*).

Grey Myrtle dry rainforest occurs in deep, sheltered portions of gullies that run through the south and east of the biobank site. It has a closed forest structure with a canopy ranging up to approximately 20 m in height, dominated by Rusty Fig, Grey Myrtle, Kanooka (*Tristaniopsis laurina*) and Lilly Pilly (*Acmena smithii*). There is a diverse open mid-storey of small trees such as Cheese Tree (*Glochidion ferdinandii*) and Large Mock-olive (*Notelaea longifolia*).

The groundcover is dominated by ferns and mosses along with a patchy, variable mix of shrubs, grasses, sedges and forbs. Characteristic fern species include Prickly Rasp Fern (*Doodia aspera*), Necklace Fern (*Asplenium flabellifolium*), Common Maidenhair (*Adiantum aethiopicum*) and Giant Maidenhair (*A. formosum*). Shrub species include Rough-fruited Pittosporum and *Breynia oblongifolia*. Native grasses include Basket Grass (*Oplismenus imbecillis*) and Weeping Meadow Grass. Herbs, sedges and forbs include Pastel Flower (*Pseuderanthemum variabile*), Variable Sword-sedge, *Schoenus melanostachys* and *Stellaria flacida*. Climbers and scramblers are abundant, including Sweet Morinda and Wombat Berry.

Exotic species are occasionally present within this vegetation type. Exotic plants include occasional patches of Lantana and other environmental weeds such as Small-leaved Privet (*Ligustrum sinense*).

BioBanking plot/transect data confirms that this vegetation is intact and in good condition, with benchmark values for native plant species richness, vegetation cover and hollow-bearing trees. Length of fallen logs was below benchmark in the plot sampled though there were substantial amounts of woody debris at other locations up and down stream. There are good quantities of leaf litter and rock outcrops with associated habitat resources such as rock fragments, overhangs and fissures. There is aquatic and riparian habitat within this vegetation type. All canopy species present in the vegetation type were observed regenerating.

This vegetation type has moderate potential for achieving gains in biodiversity values through management within a biobank site. Improvements in biodiversity value could be obtained through continuing development of vegetation structure and habitat resources, monitoring and bush regeneration as required and management of pest fauna.

Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland

This vegetation type is a moderate/good condition form of the NSW vegetation type 'Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland' (HN542; OEH, 2013a). HN542 is consistent with 'Castlereagh Scribbly Gum Woodland' in the NPWS (2002) vegetation mapping and classification of the Cumberland Plain. Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland occurs on lower slopes in the north western corner of the biobank site.

It has an open woodland structure with a shrub – grass understorey. There is an open canopy ranging up to approximately 10 m in height, dominated by Hard-leaved Scribbly Gum, Narrow-leaved Apple and Yellow Bloodwood.

There is a dense mid storey of tall shrubs such as Finger Hakea (*Hakea dactyloides*), Tantoon (*Leptospermum polygalifolium*), Slender Tea-tree and Lance-leaved Geebung. The ground cover is dense, diverse and structurally complex. Ground cover vegetation includes: shrubs such as Hairpin Banksia (*Banksia spinulosa*), Fern-leaved Banksia (*Banksia oblongifolia*), Heathy Mirbelia (*Mirbelia rubiifolia*) and Pinnate Wedge Pea (*Gompholobium pinnatum*); sedges such as *Lepyrodia scariosa*, *L. anarthria* and Curly Wig (*Caustis flexuosa*); herbs such as Poverty Raspwort (*Gonocarpus tetragynus*), Grass Triggerplant (*Stylidium graminifolium*) and Silky Purple-Flag (*Patersonia sericea*); and scramblers such as *Glycine microphylla* and *Cassytha glabella*.

Exotic species are only occasionally present within the community and are limited to Whiskey Grass along the edge of vegetated patches and wind borne environmental weeds such as Dandelion and Fireweed.

BioBanking habitat attribute data from plot/transects (see Appendix B) confirms that this vegetation is largely intact and in good condition, with benchmark values for native plant species richness and native vegetation cover and good quantities of hollow bearing trees and fallen logs. Exotic plant cover is negligible within plots though some weed infestation was observed around the edges of patches elsewhere in the site. There are good quantities of leaf litter present throughout this vegetation type. All canopy species present in the vegetation zone were observed regenerating.

This vegetation type has moderate potential for achieving gains in biodiversity values through management within a biobank site. Improvements in biodiversity value could be obtained through continuing development of vegetation structure and habitat resources, monitoring and bush regeneration as required, exclusion of grazing and associated impacts and management of pest fauna.

Coastal freshwater wetland

This vegetation type is a moderate/good condition form of the NSW vegetation type 'Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin', abbreviated in this report to 'Coastal freshwater wetland' (HN630; OEH, 2013a). The Coastal freshwater wetland is associated with the dammed upper reaches of a drainage line in the southwest of the site, known locally as 'Top Dam'. This vegetation type does not comprise an occurrence of an EEC because it is clearly an artificial feature. Nonetheless it has considerable habitat value in its current form and so there would be no justification for attempting to restore it to a forest vegetation type. Therefore for the purposes of Biobanking calculations it has been treated as the vegetation type closest to its current state rather than the vegetation type that is likely to have occurred prior to disturbance. This approach is supported by OEH (Seidel, J., OEH, pers. comm.).

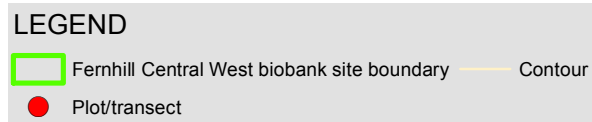
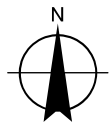
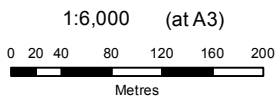
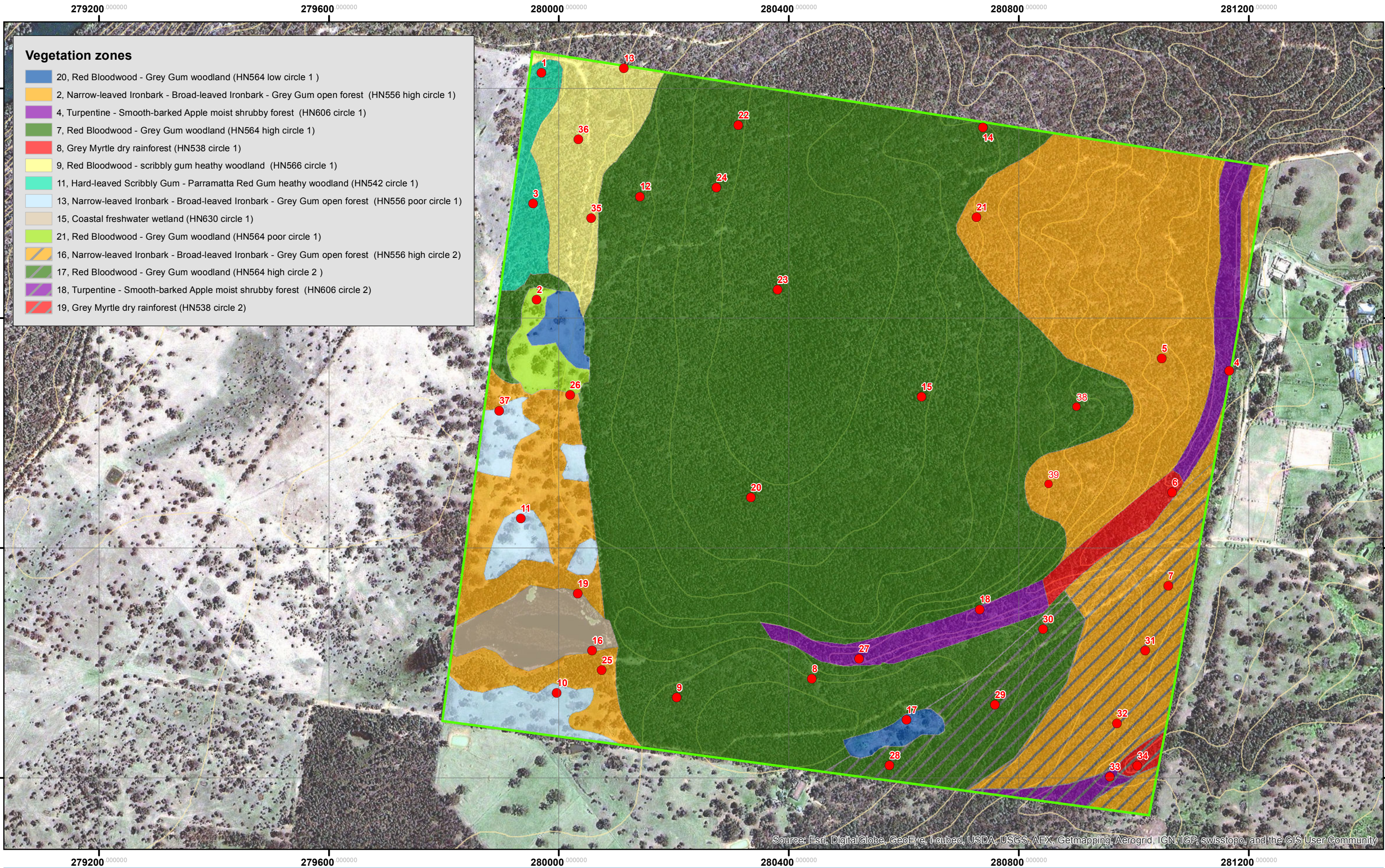
It has a closed wetland structure with a narrow fringe of Flax-leaved Paperbark (*Melaleuca linariifolia*) up to seven metres in height around its margins. The wetland is dominated by Tall Spike Rush (*Eleocharis sphacelata*). Other species include: the sedges *Chorizandra cymbaria*

and *Lepyrodia anarthria*; aquatic herbs such as *Triglochin microtuberosa*; emergent herbs such as Frogsmouth (*Philydrum lanuginosum*); and herbs of wetland margins such as *Goodenia paniculata*, *Drosera spatulata* and Indian Pennywort.

No exotic species were observed in this community.

BioBanking habitat attribute data from plot/transects (see Appendix B) confirms that this vegetation is largely intact and in good condition, with benchmark values for native plant species richness and native 'other' cover (i.e. rushes and sedges). Exotic plant cover was negligible. This vegetation type comprises wetland and aquatic habitat.

This vegetation type has moderate potential for achieving gains in biodiversity values through management within a biobank site. Improvements in biodiversity value could be obtained through continuing development of vegetation structure and habitat resources, removal of exotic plants, exclusion of grazing and associated impacts and management of pest fauna.



INO Angas Securities Ltd
Fernhill Central West Biobank
BioBanking Assessment

Job Number	22-16689
Revision	B
Date	21 Feb 2014

Vegetation Zones

Figure 2

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Data Source: NSW LPMA; Elevation contours 2012; Google Earth: Aerial Imagery. Created by: rphamer

3.2.1 Habitat resources

There are small, second order drainage lines running through the southern and eastern portions of the biobank. These streams feature near-intact geomorphology and good instream and riparian vegetation. There is moderate to severe weed infestation in the downstream, eastern portions of the drainage lines where they adjoin cleared agricultural land, but no significant evidence of degradation by livestock or poor water quality. The drainage line contains pools of surface water up to 30 cm deep, gravel riffles, waterfalls and stone pavements. It is bedrock confined, with moderate to steep slope and gravel or sand substrate. This type of drainage line would provide habitat for native fish and aquatic invertebrates and breeding habitat for a number of stream breeding frogs, including the Leaf-green Tree Frog (*Litoria phyllochroa*), Eastern Dwarf Tree Frog (*Litoria fallax*) and the threatened Red-crowned Toadlet (*Pseudophryne australis*), which have all been recorded on site. It may also provide habitat for threatened frogs such as Littlejohn's Tree Frog (*Litoria littlejohnii*).

There are a number of smaller drainage lines which are also bedrock confined on sandstone substrate and likely to be intermittent with scattered semi-permanent pools of water.

There are a number of small dams and flooded depressions within the biobank containing a variety of native wetland plants. As described above there is a 2.5 hectare freshwater wetland in the western portion of the biobank which contains extensive reed beds.

The biobank features gullies which are incised into lithic sandstone and associated cliff lines, caves, overhangs and fissures. These would comprise roosting habitat and potential also breeding habitat for cave-roosting microbats such as the Large-eared Pied-bat (*Chalinolobus dwyeri*). There are also significant cave and cliff formations in the extensive Blue Mountains National Park, which lies immediately to the north of the site.

The BioBanking assessment of habitat resources at the biobank site was completed with reference to the above observations and is presented in Appendix B.

3.2.2 Noxious and environmental weeds

The *Noxious Weeds Act 1993* provides for the declaration of noxious weeds in local government areas. Landowners and occupiers must control noxious weeds according to the control category specified in the Act. Public authorities must control noxious weeds according to the control category to the extent necessary to prevent their spread to adjoining land.

The biobank contains at least four species declared as noxious weeds in the Penrith LGA, as shown in Table 4. These noxious species occur in low densities in forest throughout the study area and as moderate infestations along drainage lines and where the biobank adjoins cleared paddocks dominated by exotic plant species. Surface water and nutrient flows may also be contributing to the observed weed infestation in the eastern portion of the site. As described above there is a former tip that is severely infested by weeds.

Wetlands and water bodies in the study area appear to be free of noxious aquatic weeds such as Alligator weed (*Alternanthera philoxeroides*) and Water Hyacinth (*Eichhornia crassipes*).

Table 4 Declared noxious weeds recorded during the field survey

Scientific Name	Common Name	Control category	Legal Requirements
<i>Lantana camara</i> *	Lantana	4	The growth of the plant must be managed in a manner that reduces its numbers, spread and incidence and continuously inhibits its reproduction
<i>Ligustrum lucidum</i> *	Privet (Broad-leaf)	4	The growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its flowering and reproduction
<i>Ligustrum sinense</i> *	Privet (Narrow-leaf/Chinese)	4	The growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its flowering and reproduction
<i>Rubus fruticosus</i> aggregate species	Blackberry	4	The growth of the plant must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction and the plant must not be sold propagated or knowingly distributed

3.3 Conservation Significance

3.3.1 Threatened Flora Species

No threatened flora species were observed at the biobank, though survey effort to date has not included systematic searches for threatened plants.

Based on the desktop assessment there is habitat for at least four threatened flora species and one threatened flora population at the biobank site:

- Camden White Gum (*Eucalyptus benthamii*) (vulnerable, TSC Act; vulnerable, EPBC Act) has been recorded in the locality (OEH, 2013e) and may be present near drainage lines in a range of forest types in the biobank.
- *Dillwynia tenuifolia* (vulnerable; TSC Act) has been recorded within Western Sydney Dry Rainforest in the Mulgoa Nature Reserve (DECC, 2009) and may be present in Shale/Sandstone Transition Forest in the biobank.
- Juniper-leaved Grevillea (*Grevillea juniperina* subsp. *juniperina*) (vulnerable, TSC Act; vulnerable, EPBC Act) has been recorded in the western portion of the Fernhill Estate (EcoLogical, 2010; GHD, 2012) and may be present in Shale/Sandstone Transition Forest in the biobank.
- *Micromyrtus minutiflora* (endangered, TSC Act; vulnerable, EPBC Act) has been recorded in the western portion of the Fernhill Estate (EcoLogical, 2010; GHD, 2012) and may be Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland or Shale/Sandstone Transition Forest in the biobank.

- *Marsdenia viridiflora* R. Br. subsp. *viridiflora* population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas (endangered population, TSC Act) may be present in shale woodlands or dry rainforest in the biobank.

Of these species Juniper-leaved Grevillea and *Micromyrtus minutiflora* have been recorded in the immediate vicinity of the biobank site, within the western portion of the Fernhill Estate.

The survey effort to date has not included targeted threatened flora surveys because the purpose of this assessment was to calculate ecosystem credits and obtain a biobanking agreement as soon as practicable. Targeted, seasonal surveys for threatened plants would have delayed this process. The BBAM allows for modifications to biobanking agreements to allow generation of species credits based on supplementary survey results and so targeted, seasonal surveys for threatened plants may be conducted as part of a future modification.

3.3.2 Threatened Fauna Species

A total of four threatened fauna species have been recorded on or near the biobank during recent GHD field surveys:

- Red-crowned Toadlet (*Pseudophryne australis*) which is listed as a vulnerable species under the TSC Act.
- Varied Sittella (*Daphoenositta chrysoptera*) which is listed as a vulnerable species under the TSC Act.
- Glossy Black-cockatoo (*Calyptorhynchus lathamii*) which is listed as a vulnerable species under the TSC Act.
- Cumberland Plain Land Snail (*Meridolum corneovirens*) which is listed as an endangered species under the TSC Act.

Red-crowned Toadlets were heard calling in two drainage lines through the southern portion of the Fernhill Central West biobank. There is breeding habitat for the species along the whole length of these two larger drainage lines and extensive areas of additional habitat associated with small intermittent tributaries and soaks within their catchments. The Red-crowned Toadlet is a species credit-type species however targeted surveys and mapping of species polygons was not a part of the methodology for this assessment. Supplementary surveys and calculation of Red-crowned Toadlet species credits would be included in a modification to the biobanking agreement at a later date.

Varied Sittellas were recorded within Grey Box - Forest Red Gum grassy woodland and Forest Red Gum - Rough-barked Apple grassy woodland in the eastern portion of the Fernhill Estate. The Varied Sittella would forage and probably also breed locally in native grassy woodland and forest vegetation in the Fernhill Central West biobank and throughout the locality. There are a total of 18 records of the Varied Sittella within the locality (OEH 2013e). This species would occur within all vegetation zones in the Fernhill Central West biobank.

The Glossy Black-cockatoo was recorded flying over the biobank and characteristic chewed *Allocasuarina* cones were observed at several locations. The Glossy Black-cockatoo would forage and probably also breed locally in native forest vegetation types in the Fernhill estate and throughout the locality. It would occur within all vegetation zones in the Fernhill Central West biobank with the Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest in high condition and Red Bloodwood - Grey Gum woodland featuring the greatest concentrations of the species' preferred foraging habitat with *Allocasuarina*.

The Varied Sittella and Glossy-black Cockatoo are both ecosystem credit-type threatened species and so do not require any specific consideration in this assessment.

A total of 28 live Cumberland Plain Land Snail individuals or shells have been recorded in the Fernhill East biobank (GHD, 2013). The local population of the Cumberland Plain Land Snail occurs in relatively extensive patches of Cumberland Plain Woodland in the locality, including elsewhere in the Fernhill estate (EcoLogical, 2010), in the vicinity of numerous BioNet records to the east of Mulgoa road (OEH, 2013e) and in Mulgoa Nature reserve (DECC, 2008b). There is no suitable shale woodland habitat for the Cumberland Plain Land Snail in the Fernhill Central West biobank.

There is potential for a number of threatened fauna species to occur within the biobank, given the presence of suitable habitat and previous records within the locality. The survey effort to date has not included targeted surveys because the purpose of this assessment was to calculate ecosystem credits. Targeted, seasonal surveys for threatened fauna may be conducted as part of a future modification to the biobanking agreement.

3.3.3 Threatened Ecological Communities

Two of the vegetation types within the biobank comprise local occurrences of TECs listed under the TSC Act:

- Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest in high condition, poor and low condition, which comprise local occurrences of Shale/Sandstone Transition Forest (EEC).
- Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland which comprises a local occurrence of Castlereagh Scribbly Gum Forest (VEC).

Shale/Sandstone Transition Forest is also listed as an EEC under EPBC Act.

A number of additional TECs are predicted to occur within the site, based on topography and geographic location (OEH, 2013e). Based on results of field surveys and vegetation mapping the TECs present are restricted to those listed above.

4. BioBanking Credit Calculations

4.1 Approach

The BioBanking credit calculations were performed by Ben Harrington (assessor accreditation number 0073) using credit calculator Version 2.0. The credit calculations have been submitted to OEH and the biodiversity credit report is included as Appendix A.

The data and assumptions used to perform the BioBanking credit calculations are summarised below.

4.2 Biobank Location

The biobank site is located in the 'Hawkesbury Nepean' CMA region; the 'Cumberland' CMA sub-region; and the 'Lapstone Slopes' is considered the most appropriate Mitchell landscape for the assessment (Steenbeeke, G. OEH pers. comm.).

4.3 Biobank Landscape Value

The landscape assessment for the biobank is shown Figure 3 and summarised in Table 5. The approach to the landscape assessment is described below.

The BBAM uses 100 hectare and 1,000 hectare assessment circles to estimate the extent and connectivity of native vegetation and habitat surrounding the site. Two landscape assessment circles are required because the biobank site occurs across two CMA sub-regions: assessment circle 1, in the Wollemi CMA sub-region in the central and western portion of the site; and assessment circle 2 in the Cumberland CMA sub-region in the south eastern portion of the site (see **Error! Reference source not found.**). Vegetation cover and connectivity was estimated based on the current situation and after the management of the site using GIS measurement of foliage projective cover within the assessment circles. The assessment circles were placed so as to capture the greatest change in vegetation cover as a result of the management of the biobank. The percentage change in native vegetation cover was estimated by adding the area of cleared land within the biobank site to the area of native vegetation within the assessment circles to obtain the vegetation cover after establishment of the biobank. Patch size and connectivity were assessed using GIS and air photo interpretation of native vegetation cover within the assessment circles and adjoining areas of native vegetation.

Impacts on connectivity are calculated by entering the 'primary link' for each assessment circle, which is the vegetated link that will experience the greatest change in connectivity as a result of the biobank. The primary links for the Fernhill East biobank are shown on Figure 3.

The primary link for assessment circle 1 is in the central portion of the site. At this location the biobank site is part of an extensive patch of native vegetation that is connected to the Blue Mountains National Park to the north and west. The biobank site is connected via vegetated corridors greater than 500 m wide in all directions. Therefore the primary link for assessment circle 1 is greater than 500 m both before and after the establishment of the biobank. Based on site surveys the over-storey, mid storey and groundcover vegetation within the primary link is in good condition and is at benchmark values both before and after establishment of the biobank (refer plot/transects 1, 14, 5 and 9 in Appendix B which reflect benchmark conditions across the entire vegetated corridor).

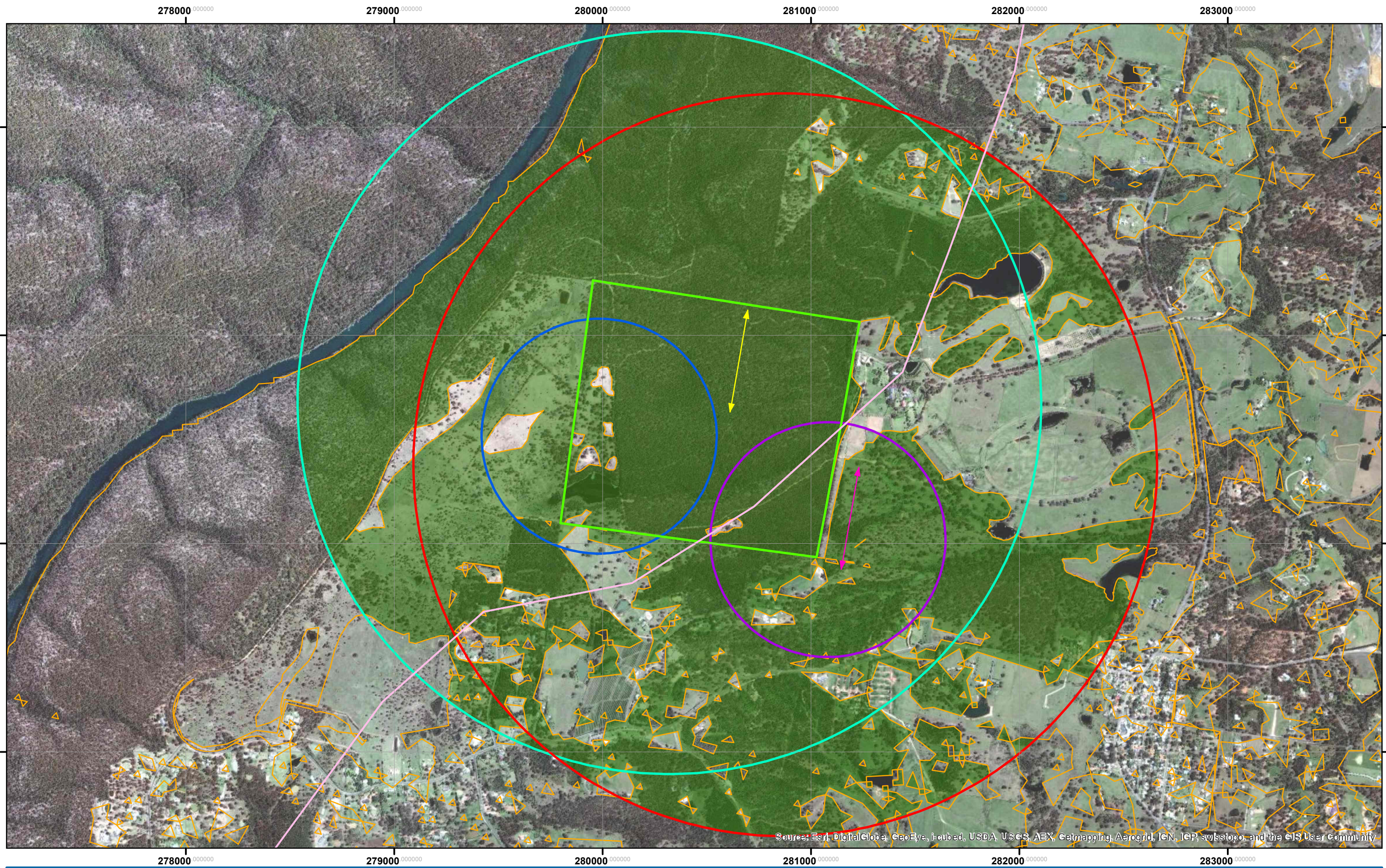
The primary link for assessment circle 2 is to the east of the site. Vegetated corridors passing through assessment circle 2 extend to the south and south east of the site. There are narrow sections of these vegetated corridors however all are bypassed by an extensive patch of vegetation to the south east. Therefore the primary link for assessment circle 1 is greater than

500 m both before and after the establishment of the biobank. Based on site surveys conducted for the Fernhill East biobank (GHD, 2013) the over-storey vegetation within the primary link is in good condition and is at benchmark values both before and after establishment of the biobank. Vegetation within the primary link features mid storey and groundcover vegetation in moderate condition with below benchmark values for shrub cover and around 20% exotic plant cover (GHD, 2013). Averaged across the full width of the primary link the condition is >25% of benchmark values. Mid storey and groundcover vegetation is likely to mature and regenerate and reach benchmark values with establishment of the biobank.

Table 5 Landscape assessment values summary

Landscape Attribute	Assessment Circle 1		Assessment Circle 2	
	Before Biobank	After Biobank	Before Biobank	After Biobank
CMA sub-region	Wollemi		Cumberland	
% Native vegetation cover in 1000 ha assessment circle	71-80% (768 ha)	71-80% (771 ha)	71-80% (761 ha)	71-80% (762 ha)
% Native vegetation cover in 100 ha assessment circle	91-100% (92 ha)	91-100% (94.5 ha)	91-100% (92 ha)	91-100% (93 ha)
Connectivity value width	> 500 m	> 500 m	> 500 m	> 500 m
Connectivity value over-storey condition	PFC at BM	PFC at BM	PFC at BM	PFC at BM
Connectivity value mid-storey or groundcover condition	PFC of mid-storey/ ground cover at BM	PFC of mid-storey/ ground cover at BM	PFC of mid-storey/ ground cover >25% of lower BM	PFC of mid-storey/ ground cover at BM

*PFC = percentage foliage cover; BM = benchmark values for the attribute (OEH, 2013d).



Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

1:16,500 (at A3)

0 62.5 125 250 375 500 625

Metres

N

LEGEND

- Fernhill Central West biobank site boundary
- CMA sub-region boundary
- Adjacent remnant area (>501ha)
- Native vegetation
- Circle 1: 100ha landscape assessment circle
- Circle 1: 1000ha landscape assessment circle
- Circle 2: 1000ha landscape assessment circle
- Circle 2: 100ha landscape assessment circle
- Circle 1: Primary link >500m before and after biobank
- Circle 2: Primary link >500m before and after biobank

INO Angas Securities Ltd
Fernhill Central West Biobank
BioBanking Assessment

Job Number 22-16689
Revision A
Date 20 Jan 2014

Landscape Assessment

Figure 3

4.4 Biobank Site Value

One vegetation zone and threatened species sub zone was created for each native vegetation type and broad condition state in each assessment circle at the site. The area of each zone was calculated using GIS. Vegetation zones and threatened species sub zones within the Fernhill Central West biobank are summarised below in Table 6. Please note that the vegetation zone ID numbers are non-sequential because vegetation zones were mapped with consistent vegetation zone IDs across the entire Fernhill Estate but only a proportion of the total number of vegetation zones are present in the Fernhill Central West biobank.

Zone 20 is in low condition and so has an adjacent remnant area of zero. All of the other vegetation zones within the Fernhill Central West biobank contain native vegetation in moderate/good condition and are connected. These vegetated areas are connected to an extensive area of native vegetation in the Fernhill Estate and Blue Mountains National Park to the west. The area of contiguous treed vegetation connected to the Fernhill Central West biobank was calculated with GIS and is greater than the maximum value for adjacent remnant area in the BBAM of 500 ha, so for all these vegetation zones the adjacent remnant area was entered as 501 hectares. Patch size, including low condition vegetation is equal to the maximum area within the BBAM of 501 ha for all vegetation zones.

Site value data was collected using the BioBanking plot/transect methodology and was entered for each plot/transect field in each vegetation zone.

Table 6 Vegetation zones

Zone ID	Threatened Species Sub Zone	Vegetation Zone	Assessment Circle	Veg Type ID	Condition	Area (ha)*	Adjacent remnant area (ha)	Patch size... (ha)	EEC	Plot / transects Required	Plot / transects Completed
2	2	Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest (HN556 high circle 1)	1	HN556	Moderate/good - high	27.8	501	501	Yes (Shale Sandstone Transitional Forest)	4	5, 21, 25, 26, 29
13	13	Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest (HN556 poor circle 1)	1	HN556	Moderate/good - poor	4.1	501	501	Yes (Shale Sandstone Transitional Forest)	2	10, 11, 37
4	4	Turpentine - Smooth-barked Apple moist shrubby forest (HN606 circle 1)	1	HN606	Moderate/good - high	4.3	501	501	No	3	4, 18, 27
7	7	Red Bloodwood - Grey Gum woodland (HN564 high circle 1)	1	HN564	Moderate/good - high	81.4	501	501	No	5	8, 9, 12, 14, 15, 20, 22, 23, 24, 28
20	20	Red Bloodwood - Grey Gum woodland (HN564 low circle 1)	1	HN564	Low	1.5	0	501	No	1	17
21	21	Red Bloodwood - Grey Gum woodland (HN564 poor circle 1)	1	HN564	Moderate/good - poor	1.3	501	501	No	1	2
8	8	Grey Myrtle dry rainforest (HN538 circle 1)	1	HN538	Moderate/good	1.3	501	501	No	1	6
9	9	Red Bloodwood - scribbly gum heathy woodland (HN566)	1	HN566	Moderate/good - high	5.0	501	501	No	3	13, 35, 36

Zone ID	Threatened Species Sub Zone	Vegetation Zone	Assessment Circle	Veg Type ID	Condition	Area (ha)*	Adjacent remnant area (ha)	Patch size... (ha)	EEC	Plot / transects Required	Plot / transects Completed
		circle 1)									
11	11	Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland (HN542 circle 1)	1	HN542	Moderate/good - high	2.0	501	501	No	2	1, 3
15	15	Coastal freshwater wetland (HN630 circle 1)	1	HN630	Moderate/good	2.7	501	501	No	2	16, 19
16	16	Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest (HN556 high circle 2)	2	HN556	Moderate/good - high	9.5	501	501	Yes (Shale Sandstone Transitional Forest)	3	7, 31, 32
17	17	Red Bloodwood - Grey Gum woodland (HN564 high circle 2)	2	HN566	Moderate/good - high	5.3	501	501		3	28, 29, 30
18	18	Turpentine - Smooth-barked Apple moist shrubby forest (HN606 circle 2)	2	HN606	Moderate/good	0.7	501	501		1	33
19	19	Grey Myrtle dry rainforest (HN538 circle 2)	2	HN538	Moderate/good	0.4	501	501		1	34

* A number of 'slivers' that were the result of splitting mapped vegetation zones between CMA sub-regions were merged with adjacent polygons.

Change in site biodiversity values through the conservation and management of a biobank site is the basis for calculation of biodiversity credits that would be generated. Conservation of vegetation within a biobank increases the site value by a default amount based on expected improvements in the condition of vegetation and habitat resources. There are certain circumstances where portions of a biobank are managed such that a greater than expected increase in site value is obtained. This may include intense, targeted management activities such as tree planting. One management zone was created for each vegetation zone (Table 7). Figure 4 shows the location of the management zones. Supplementary planting is proposed in management zone MZ20b (Red Bloodwood - Grey Gum woodland in low condition in tip). This zone has been cleared and used as a tip and so supplementary planting of canopy and mid storey species is proposed. Supplementary planting would assist with vegetation regeneration and establishment of fauna habitat resources. Establishing canopy and mid storey vegetation can also assist with recruitment of native understorey species and suppression of weeds.

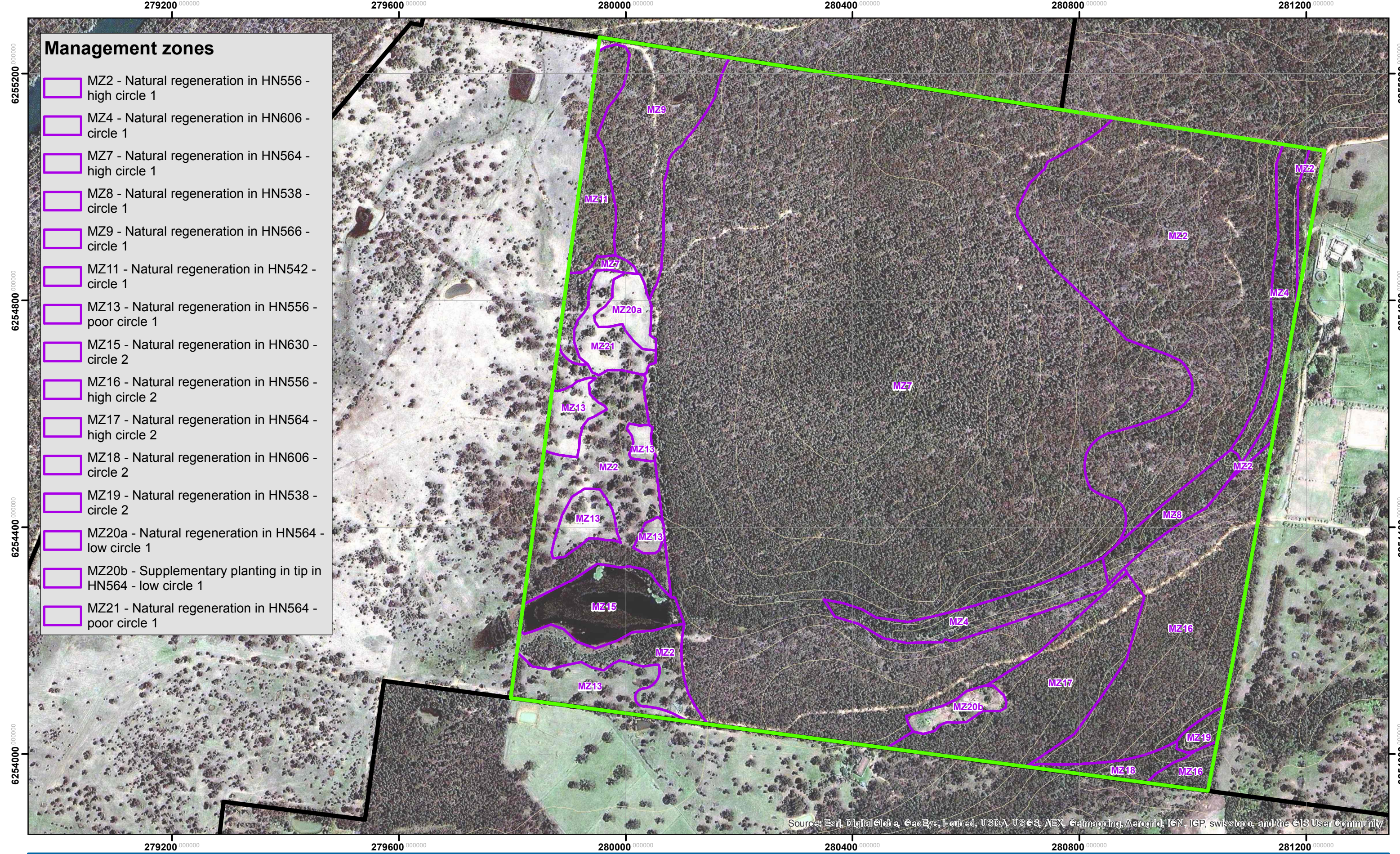
No further specific, targeted management actions would be performed in any other zones. Accordingly, the default increase in site value was entered for all other management zones.

Table 7 Management zones

Zone ID	Vegetation Zone ID	Veg Type ID	Management Zone	Area (ha)*	Management / Site Attribute Scores
MZ2	2	HN556	Natural regeneration in Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest (high)	27.8	Default increase in all management scores.
MZ13	13	HN556	Natural regeneration in Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest (poor)	4.1	Default increase in all management scores.
MZ4	4	HN606	Natural regeneration in Turpentine - Smooth-barked Apple moist shrubby forest	4.3	Default increase in all management scores.
MZ7	7	HN564	Natural regeneration in Red Bloodwood - Grey Gum woodland	81.4	Default increase in all management scores.
MZ20A	20	HN564	Natural regeneration in Red Bloodwood - Grey Gum woodland (low)	0.8	Default increase in all management scores.
MZ20B	20	HN564	Supplementary planting in Red Bloodwood - Grey Gum woodland (low in tip)	0.7	Supplementary planting. Additional half point increase in over storey cover and mid storey cover / Default increase in all other management scores.
MZ21	21	HN564	Natural regeneration in Red Bloodwood - Grey Gum woodland (poor)	1.3	Default increase in all management scores.
MZ8	8	HN538	Natural regeneration in Grey Myrtle dry rainforest	1.3	Default increase in all management scores.
MZ9	9	HN566	Natural regeneration in Red Bloodwood -	5.0	Default increase in all

Zone ID	Vegetation Zone ID	Veg Type ID	Management Zone	Area (ha)*	Management / Site Attribute Scores
			scribbly gum heathy woodland		management scores.
MZ11	11	HN542	Natural regeneration in Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland	2.0	Default increase in all management scores
MZ15	15	HN630	Natural regeneration in Coastal freshwater wetland	2.7	Default increase in all management scores.
MZ16	16	HN556	Natural regeneration in Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest (high)	9.5	Default increase in all management scores.
MZ17	17	HN566	Natural regeneration in Red Bloodwood - Grey Gum woodland	5.3	Default increase in all management scores.
MZ18	18	HN606	Natural regeneration in Turpentine - Smooth-barked Apple moist shrubby forest	0.7	Default increase in all management scores.
MZ19	19	HN538	Natural regeneration in Grey Myrtle dry rainforest	0.4	Default increase in all management scores.

* A number of 'slivers' that were the result of splitting mapped mapped zones between CMA sub-regions were merged with adjacent polygons.



4.5 Threatened Species Assessment

4.5.1 Predicted Ecosystem Species

The BioBanking credit calculator reports the suite of threatened fauna species that are predicted to be associated with ecosystem credits generated for the biobank. The suite of threatened species associated with ecosystem credits for the biobank is shown in Table 8.

Table 8 Predicted threatened species (ecosystem species)

Scientific name *	Common name	Habitat on site ?
<i>Calyptorhynchus lathami</i>	Glossy Black-cockatoo	Yes
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	Yes
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	Yes
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	Yes
<i>Glossopsitta pusilla</i>	Little Lorikeet	Yes
<i>Isodon obesulus obesulus</i>	Southern Brown Bandicoot (eastern)	Yes
<i>Lathamus discolor</i>	Swift Parrot	Yes
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	Yes
<i>Meridolum corneovirens</i>	Cumberland Land Snail	No
<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-bat	Yes
<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat	Yes
<i>Myotis macropus (formally Myotis adversus)</i>	Large-footed Myotis	Yes
<i>Neophema pulchella</i>	Turquoise Parrot	Yes
<i>Ninox connivens</i>	Barking Owl	Yes
<i>Ninox strenua</i>	Powerful Owl	Yes
<i>Petaurus australis</i>	Yellow-bellied Glider	Yes
<i>Petroica boodang</i>	Scarlet Robin	Yes
<i>Phascolarctos cinereus</i>	Koala	Yes
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Yes
<i>Ptilinopus superbus</i>	Superb Fruit-dove	Yes
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	Yes
<i>Stagonopleura guttata</i>	Diamond Firetail	Yes
<i>Tyto novaehollandiae</i>	Masked Owl	Yes
<i>Tyto tenebricosa</i>	Sooty Owl	Yes
<i>Xanthomyza phrygia</i>	Regent Honeyeater	Yes

4.5.2 Species Credits

The BBAM references geographic, vegetation and habitat data for the biobank site to generate a list of the species credit-type threatened species predicted to occur at the site and requiring targeted survey.

No targeted, seasonal surveys for threatened species were conducted and no species credits were generated as part of the current assessment. In order to complete the credit calculations default data for each threatened species was entered at the 'Threatened species survey results' stage, comprising: 'Managed at site?' = 'No' ; 'ID Method' = 'Survey'; and 'Survey data' = '26/9/2013'. Species credits may be generated at the site at a later date after completion of further targeted surveys. The generation of species credits would be included in a modification to the biobanking agreement for the Fernhill Central West biobank.

5. Biodiversity Credits

This Section of the report summarises the results of credit calculations completed for the biobank.

The data from the fieldwork and GIS analysis was entered into the credit calculator to determine the number of biodiversity credits that would be generated if the site was established as a biobank site. The BioBanking Credit Report is included in Appendix A and summarised below.

5.1 Ecosystem Credits

A total of 1,233 ecosystem credits would be generated at the Fernhill Central West biobank site. A breakdown of the credits generated for each ecosystem credit type is provided in Table 9. The BioBanking Credit Report is included as Appendix A.

Table 9 Ecosystem credits generated at Fernhill Central West biobank

Veg Code	Vegetation Type	Area	Ecosystem credits generated	Minimum percent native vegetation cover class	Minimum adjacent remnant area class
HN556	Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest	41.4	351	>70%	>100 ha
HN606	Turpentine - Smooth-barked Apple moist shrubby forest	5	39	>70%	>100 ha
HN564	Red Bloodwood - Grey Gum woodland	89.5	750	>70%	>100 ha
HN564	Red Bloodwood - Grey Gum woodland	1.5	18	>70%	0-5ha
HN538	Grey Myrtle dry rainforest	1.7	12	>70%	>100 ha
HN566	Red Bloodwood - scribbly gum heathy woodland	5	42	>70%	>100 ha
HN542	Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland	2	17	>70%	>100 ha
HN630	Coastal freshwater wetlands	2.7	22	>70%	>100 ha
	Total	147.3	1233		

5.2 Species Credits

No species credits were calculated for the site.

5.3 Assumptions and Limitations

The following assumptions have been made for the site in calculating the above ecosystem credits:

- This assessment has been undertaken determine the number of ecosystem credits generated from the Fernhill Central West biobank site if placed under a biobanking agreement.
- The 'Lapstone Slopes' is considered the most appropriate Mitchell landscape for the assessment (Steenbeeke, G. OEH pers. comm.).
- Detailed targeted surveys for threatened flora and fauna species were not conducted as part of the current assessment. Targeted surveys at appropriate times of year and/or specifically targeting threatened biota will be completed at a later date and may yield additional species credits. These would be included in a modification to the biobanking agreement.
- Default data for each threatened species was entered at the 'Threatened species survey results' stage, comprising: 'Managed at site?' = 'No' ; 'ID Method' = 'Survey'; and 'Survey date' = '26/9/2013'. Species credits may be generated at the site at a later date after completion of further targeted surveys. Generation of species credits would be included in a modification to the biobanking agreement for the Fernhill Central West biobank.
- Supplementary planting is proposed in one management zone (MZ20b) and so an additional half point increase in site value score for overstorey cover and mid storey cover was entered.
- The default increase in site value score was entered into the BioBanking credit calculator for all other management zones.

6. Management Actions

6.1 Management Actions

Improvement in biodiversity values through management actions at a biobank site is the basis for creation of species and ecosystem credits. The following sections provide an outline of the actions that would be required for ongoing management of the biobank and to achieve the proposed improvements in biodiversity values within each management zone (as per the scores entered into the credit calculator). A Management Action Plan (MAP), detailing rehabilitation activities for each management zone, cost estimates for proposed rehabilitation works over the life of the biobank and a management program, has been prepared and included in the biobanking agreement application.

6.1.1 Standard Management Actions

Standard management actions are those actions required on biobank sites to improve vegetation condition when entering into a biobanking agreement. A detailed description of these actions and their relevance to the biobank site would be described in a Management Actions Plan. The standard management actions for all biobank sites are:

- Management of grazing for conservation.
- Weed control.
- Management of fire for conservation.
- Management of human disturbance.
- Retention of regrowth and remnant native vegetation.
- Replanting or supplementary planting where natural regeneration will not be sufficient.
- Retention of dead timber.
- Erosion control.
- Retention of rocks.

Biobanking agreements require all of the above management actions to be carried out. Completing these actions would increase the site value score and biodiversity value of the biobank site.

6.1.2 Site Specific Management Actions

Based on field observations and the BioBanking Agreement Credit Report, the following management actions would be required to alleviate site-specific threats:

- Supplementary planting within MZ20b to assist natural regeneration
- Complete livestock exclusion from the entire biobank site.
- Exclude and/or manage feral herbivores (rabbits, goats, deer etc).
- Nutrient control, through exclusion of livestock or runoff from the biobank and maintenance of vegetated buffers around drainage lines.
- Implement feral cat and/or fox control, in line with existing control programs in the locality, as required.
- Maintain natural flow regimes in drainage lines.

Native plant species, representing all strata typical of a forest ecosystems (i.e. canopy, shrub and ground layer) are regenerating across the site, including all canopy species. This indicates that there is likely to be a good store of viable native seed in the soil throughout the biobank and that the native forest and derived grassland vegetation has high natural resilience and will recover relatively well with the removal of key disturbance factors. Notwithstanding the amount of natural regeneration of native vegetation observed within the site, supplementary planting is proposed for MZ20b at the location of a former tip. This vegetation zone features native vegetation in low condition with very little canopy vegetation, patchy groundcover and weed infestation. Supplementary establishment of mid and overstorey vegetation would help arrest soil degradation, organic matter accumulation and create a more favourable microclimate for regeneration of groundcover vegetation.

Rubbish removal is required in MZ20b at the location of a disused tip. It may be beneficial to remove weed material and potentially also topsoil in this area to assist with regeneration.

Dry sclerophyll forest vegetation types at the site (MZ2, MZ10, MZ13, MZ7, MZ9, MZ 11, MZ16, MZ17 and MZ21) are likely to benefit from ecological burns. Purposefully managed fire is likely to maintain their characteristic vegetation structure and would assist with regeneration or recruitment of many plant species. Conversely moist forest types (MZ4, MZ8, MZ9 and MZ18) should be burnt as infrequently as possible. These vegetation types would benefit from reduced frequency and/or severity of wild fire as a result of reduced fuel loads when the dry sclerophyll forest vegetation types are burnt. GHD are developing a fire management plan for the Fernhill Estate (GHD, in prep.) in consultation with the Rural Fire Surveys that will consider these ecological factors as well as hazard reduction.

7. Biobanking Agreement Summary

The proposed biobanking agreement for the Fernhill Central West biobank site would see approximately 147.3 ha of native vegetation and habitat within Part Lot 10, DP615085 conserved as a biobank site. This would generate 1,233 ecosystem credits. The biodiversity credit profile is summarised in Table 9 and the BioBanking credit report is provided in Appendix A.

No species credits were generated as part of the current assessment. Species credits may be generated at the site at a later date after completion of further targeted surveys. These would be included as a modification to the biobanking agreement.

This report makes no comment on:

- The regulations and requirements for trading of credits within the NSW BioBanking and Offsets Scheme or as biodiversity offsets for projects assessed outside of the scheme.
- The financial factors associated with trading (sale or purchase) of credits.

8. Disclaimer

This report: has been prepared by GHD for INO Angas Securities Ltd and may only be used and relied on by INO Angas Securities Ltd for the purpose agreed between GHD and the INO Angas Securities Ltd as set out in Section 1.3 of this report.

GHD otherwise disclaims responsibility to any person other than INO Angas Securities Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by INO Angas Securities Ltd and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

9. References

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Appendices

Appendix A – BioBanking Credit Report

BioBanking credit report



Office of
Environment
& Heritage

This report identifies the number and type of credits required at a BIOBANK SITE.

Date of report: 11/02/2014

Time: 11:52:21AM

Tool version: v2.1

Biobank details

Proposal ID: 0073/2013/0876B

Proposal name: Fernhill Central West biobank

Proposal address: Number 1041-1117 Mulgoa Road Mulgoa NSW 2745

Proponent name: INO Angas Securities Limited

Proponent address: Level 14, 26 Flinders Street Adelaide SA 5000

Proponent phone: 08 8410 4343

Assessor name: Ben Harrington

Assessor address: Level 15 133 Castleraegh St Sydney NSW 2000

Assessor phone: 0407 449 406

Assessor accreditation: 073

Additional information required for approval:

- ☐ Use of local benchmark
- ☐ Expert report...
- ☐ Request for additional gain in site value

Ecosystem credits summary

Vegetation type	Area (ha)	Credits created
Grey Myrtle dry rainforest of the Sydney Basin and South East Corner	1.70	12.00
Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland of the Cumberland Plain, Sydney Basin	2.00	17.00
Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin	41.40	351.00
Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin	2.70	22.00
Red Bloodwood - Grey Gum woodland on the edges of the Cumberland Plain, Sydney Basin	89.50	750.00
Red Bloodwood - scribbly gum heathy woodland on sandstone plateaux, Sydney Basin	5.00	42.00
Turpentine - Smooth-barked Apple moist shrubby forest of the lower Blue Mountains, Sydney Basin	5.00	39.00
Total	147.30	1,233

Credit profiles

1. Grey Myrtle dry rainforest of the Sydney Basin and South East Corner, (HN538)

Number of ecosystem credits created	9
CMA sub-region	Wollemi - Hawkesbury/Nepean
Minimum percent native vegetation cover class	>70%
Minimum adjacent remnant area class	>100 ha

2. Grey Myrtle dry rainforest of the Sydney Basin and South East Corner, (HN538)

Number of ecosystem credits created	3
CMA sub-region	Cumberland - Hawkesbury/Nepean
Minimum percent native vegetation cover class	>70%
Minimum adjacent remnant area class	>100 ha

3. Turpentine - Smooth-barked Apple moist shrubby forest of the lower Blue Mountains, Sydney Basin, (HN606)

Number of ecosystem credits created	33
CMA sub-region	Wollemi - Hawkesbury/Nepean
Minimum percent native vegetation cover class	>70%
Minimum adjacent remnant area class	>100 ha

4. Turpentine - Smooth-barked Apple moist shrubby forest of the lower Blue Mountains, Sydney Basin, (HN606)

Number of ecosystem credits created	6
CMA sub-region	Cumberland - Hawkesbury/Nepean
Minimum percent native vegetation cover class	>70%
Minimum adjacent remnant area class	>100 ha

5. Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin, (HN556)

Number of ecosystem credits created	251
CMA sub-region	Wollemi - Hawkesbury/Nepean
Minimum percent native vegetation cover class	>70%
Minimum adjacent remnant area class	>100 ha

6. Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin, (HN556)

Number of ecosystem credits created	100
CMA sub-region	Cumberland - Hawkesbury/Nepean
Minimum percent native vegetation cover class	>70%
Minimum adjacent remnant area class	>100 ha

7. Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland of the Cumberland Plain, Sydney Basin, (HN542)

Number of ecosystem credits created	17
CMA sub-region	Wollemi - Hawkesbury/Nepean
Minimum percent native vegetation cover class	>70%
Minimum adjacent remnant area class	>100 ha

8. Red Bloodwood - Grey Gum woodland on the edges of the Cumberland Plain, Sydney Basin, (HN564)

Number of ecosystem credits created	663
CMA sub-region	Wollemi - Hawkesbury/Nepean
Minimum percent native vegetation cover class	>70%
Minimum adjacent remnant area class	>100 ha

9. Red Bloodwood - Grey Gum woodland on the edges of the Cumberland Plain, Sydney Basin, (HN564)

Number of ecosystem credits created	18
CMA sub-region	Wollemi - Hawkesbury/Nepean
Minimum percent native vegetation cover class	>70%
Minimum adjacent remnant area class	0-5 ha

10. Red Bloodwood - Grey Gum woodland on the edges of the Cumberland Plain, Sydney Basin, (HN564)

Number of ecosystem credits created	69
CMA sub-region	Cumberland - Hawkesbury/Nepean
Minimum percent native vegetation cover class	>70%
Minimum adjacent remnant area class	>100 ha

11. Red Bloodwood - scribbly gum heathy woodland on sandstone plateaux, Sydney Basin, (HN566)

Number of ecosystem credits created	42
CMA sub-region	Wollemi - Hawkesbury/Nepean
Minimum percent native vegetation cover class	>70%
Minimum adjacent remnant area class	>100 ha

12. Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin, (HN630)

Number of ecosystem credits created	22
CMA sub-region	Wollemi - Hawkesbury/Nepean
Minimum percent native vegetation cover class	>70%
Minimum adjacent remnant area class	>100 ha

Species credits summary

Additional management actions

Additional management actions are required for:

Vegetation type or threatened species	Management action details
Grey Myrtle dry rainforest of the Sydney Basin and South East Corner	Exclude miscellaneous feral species
Grey Myrtle dry rainforest of the Sydney Basin and South East Corner	Feral and/or over-abundant native herbivore control
Grey Myrtle dry rainforest of the Sydney Basin and South East Corner	Fox control
Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland of the Cumberland Plain, Sydney Basin	Exclude miscellaneous feral species
Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland of the Cumberland Plain, Sydney Basin	Feral and/or over-abundant native herbivore control
Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland of the Cumberland Plain, Sydney Basin	Fox control
Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin	Exclude miscellaneous feral species
Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin	Feral and/or over-abundant native herbivore control
Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest of the edges of the Cumberland Plain, Sydney Basin	Fox control
Red Bloodwood - Grey Gum woodland on the edges of the Cumberland Plain, Sydney Basin	Exclude miscellaneous feral species
Red Bloodwood - Grey Gum woodland on the edges of the Cumberland Plain, Sydney Basin	Feral and/or over-abundant native herbivore control
Red Bloodwood - Grey Gum woodland on the edges of the Cumberland Plain, Sydney Basin	Fox control
Red Bloodwood - scribbly gum heathy woodland on sandstone plateaux, Sydney Basin	Exclude miscellaneous feral species
Red Bloodwood - scribbly gum heathy woodland on sandstone plateaux, Sydney Basin	Feral and/or over-abundant native herbivore control
Red Bloodwood - scribbly gum heathy woodland on sandstone plateaux, Sydney Basin	Fox control
Turpentine - Smooth-barked Apple moist shrubby forest of the lower Blue Mountains, Sydney Basin	Exclude miscellaneous feral species
Turpentine - Smooth-barked Apple moist shrubby forest of the lower Blue Mountains, Sydney Basin	Feral and/or over-abundant native herbivore control
Turpentine - Smooth-barked Apple moist shrubby forest of the lower Blue Mountains, Sydney Basin	Fox control

Appendix B – BioBanking Data Summary

Appendix Table 1 Fernhill Central West biobank dominant plant species in vegetation zones

Vegetation Zone ID	Vegetation Type (OEH, 2013a)	Condition	Canopy species	Mid storey species	Groundcover species
2 and 16	Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest (HN556)	Moderate/good - high	Narrow-leaved Ironbark, Broad-leaved Ironbark (<i>Eucalyptus fibrosa</i>), Grey Gum (<i>E. punctata</i>), Thin-leaved Stringybark (<i>E. eugenioides</i>), Yellow Bloodwood (<i>Corymbia eximia</i>).	Box-leaved Wattle (<i>Acacia buxifolia</i>), Thin-leaved Geebung (<i>Persoonia linearis</i>), Black Wattle (<i>A. decurrens</i>).	Large-leaf Hop-bush (<i>Dodonaea triquetra</i>), Purple Wiregrass (<i>Aristida ramosa</i>), Bushy Hedgehog-grass (<i>Echinopogon caespitosus</i>), Weeping Meadow Grass, Burr-daisy (<i>Calotis dentex</i>), <i>Lomandra obliqua</i> , <i>Glycine clandestina</i> , and Indian Pennywort (<i>Centella asiatica</i>).
13	Narrow-leaved Ironbark - Broad-leaved Ironbark - Grey Gum open forest (HN556)	Moderate/good - poor	Narrow-leaved Ironbark, Broad-leaved Ironbark Grey Gum, Thin-leaved Stringybark.	Box-leaved Wattle, Thin-leaved Geebung, Black Wattle.	Large-leaf Hop-bush (<i>Dodonaea triquetra</i>), Purple Wiregrass (<i>Aristida ramosa</i>), Bushy Hedgehog-grass (<i>Echinopogon caespitosus</i>), Weeping Meadow Grass, Burr-daisy (<i>Calotis dentex</i>), <i>Lomandra obliqua</i> , <i>Glycine clandestina</i> , and Indian Pennywort (<i>Centella asiatica</i>).
20	Red Bloodwood – Grey Gum woodland (HN564)	Low	Narrow-leaved Ironbark, , Grey Gum, Sydney Red Gum (<i>Angophora costata</i>).	Box-leaved Wattle, Black Wattle.	Large-leaf Hop-bush (<i>Dodonaea triquetra</i>), Purple Wiregrass (<i>Aristida ramosa</i>), Bushy Hedgehog-grass (<i>Echinopogon caespitosus</i>), Weeping Meadow Grass, Burr-daisy (<i>Calotis dentex</i>), <i>Lomandra obliqua</i> , <i>Glycine clandestina</i> , and Indian Pennywort (<i>Centella asiatica</i>).
4 and 18	Turpentine - Smooth-barked Apple moist shrubby forest (HN606)	Moderate/good	Smooth-barked Apple (<i>Angophora costata</i>), Grey Gum and Turpentine (<i>Syncarpia glomulifera</i>).	Thin-leaved Geebung, Blueberry Ash (<i>Elaeocarpus reticulatus</i>) and Forest Oak (<i>Allocasuarina torulosa</i>).	Large-leaf Hop-bush, Prickly Shaggy Pea (<i>Podolobium ilicifolium</i>), Slender Rice Flower (<i>Pimelea linifolia</i>) and Hairy Clerodendrum. Native grasses include Purple Wiregrass (<i>Aristida ramosa</i>), Bushy Hedgehog-grass (<i>Echinopogon caespitosus</i>), Weeping Meadow Grass, Variable Sword-sedge (<i>Lepidosperma laterale</i>), (<i>Dianella caerulea</i> var. <i>producta</i>), and <i>Lomandra obliqua</i> . Climbers and scramblers include Wonga Wonga Vine (<i>Pandorea pandorana</i>), Dusky Coral Pea (<i>Kennedia rubicunda</i>) and Wombat Berry (<i>Eustrephus latifolius</i>).

Vegetation Zone ID	Vegetation Type (OEI, 2013a)	Condition	Canopy species	Mid storey species	Groundcover species
7 and 17	Red Bloodwood – Grey Gum woodland (HN564)	Moderate/good	Red Bloodwood (<i>Corymbia gummifera</i>), Grey Gum, Turpentine, Brown Stringybark (<i>Eucalyptus oblonga</i>), Sydney Red Gum and Thin-leaved Stringybark (<i>Eucalyptus eugenioides</i>).	Forest Oak (<i>Allocasuarina torulosa</i>), Woody Pear (<i>Xylomelum pyriforme</i>), Thin-leaved Geebung, Slender Tea-tree (<i>Leptospermum trinervium</i>) and Flax-leaved Wattle (<i>Acacia linifolia</i>).	Prickly Shaggy Pea, Mountain Devil (<i>Lambertia formosa</i>), Spiny Bossiaea (<i>Bossiaea obcordata</i>), <i>Monotoca scoparia</i> , Prickly Moses (<i>Acacia ulicifolia</i>); Bottle Washers (<i>Enneapogon avenaceus</i>), Brown's Lovegrass (<i>Eragrostis brownii</i>); <i>Xanthorrhoea media</i> ; <i>Dianella caerulea</i> var. <i>producta</i> , Slender Violet-bush (<i>Hybanthus monopetalus</i>), <i>Calochilus paludosus</i> , <i>Lomandra</i> species, Lacy Wedge Fern (<i>Lindsaea microphylla</i>).
8 and 19	Grey Myrtle dry rainforest (HN538)	Moderate/good	Rusty Fig (<i>Ficus rubiginosa</i>) and Grey Myrtle (<i>Backhousia myrtifolia</i>) with occasional Lilly Pilly (<i>Acmena smithii</i>).	Veiny Wilkiea (<i>Wilkiea huegeliana</i>), Kanooka (<i>Tristaniopsis laurina</i>) and Large Mock-olive (<i>Notelaea longifolia</i>).	Prickly Rasp Fern (<i>Doodia aspera</i>), Necklace Fern (<i>Asplenium flabellifolium</i>), Common Maidenhair and Giant Maidenhair (<i>Adiantum formosum</i>), Rough-fruited Pittosporum, Hairy Clerodendrum, <i>Oplismenus aemulus</i> and Weeping Meadow Grass, Pastel Flower (<i>Pseuderanthemum variabile</i>), Variable Sword-sedge, <i>Dianella caerulea</i> var. <i>producta</i> and <i>Stellaria flacida</i> . Climbers and scramblers include Wonga Wonga Vine, Scrambling Lily and Wombat Berry.
9	Red Bloodwood - scribbly gum heathy woodland (HN566)	Moderate/good	Thin-leaved Scribbly gum (<i>Eucalyptus racemosa</i>), Hard-leaved Scribbly Gum (<i>E. sclerophylla</i>), Narrow-leaved Apple (<i>Angophora bakeri</i>), Yellow Bloodwood, Red Bloodwood and Brown Stringybark.	Thin-leaved Geebung, Slender Tea-tree and Flax-leaved Wattle (<i>Acacia linifolia</i>).	Mountain Devil, <i>Monotoca scoparia</i> , Grey Spider Flower (<i>Grevillea sphacelata</i>), Pink Spider Flower (<i>G. sericea</i>), Showy Wedge Pea (<i>Gompholobium grandiflorum</i> , Kangaroo Grass (<i>Themeda australis</i>), Wiry Panic and wallaby grasses (<i>Rhytidosperra</i> spp.); Variable Sword-sedge, Curly Wig (<i>Caustis flexuosa</i>); Slender Violet-bush, <i>Mitrasacme polymorpha</i> , Lacy Wedge Fern, <i>Glycine</i> species and Netted Shaggy Pea (<i>Podolobium scandens</i>).

Vegetation Zone ID	Vegetation Type (OEH, 2013a)	Condition	Canopy species	Mid storey species	Groundcover species
12	Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland (HN542)	Moderate/good	Hard-leaved Scribbly Gum, Narrow-leaved Apple and Yellow Bloodwood.	Finger Hakea (<i>Hakea dactyloides</i>), Tantoon (<i>Leptospermum polygalifolium</i>), Slender Tea-tree and Lance-leaved Geebung.	Hairpin Banksia (<i>Banksia spinulosa</i>), Fern-leaved Banksia (<i>Banksia oblongifolia</i>), Heathy Mirbelia (<i>Mirbelia rubiifolia</i>) Pinnate Wedge Pea (<i>Gompholobium pinnatum</i>); <i>Lepyrodia scariosa</i> , <i>L. anarthria</i> , Curly Wig (<i>Caustis flexuosa</i>), Poverty Raspwort (<i>Gonocarpus tetragynus</i>), Grass Triggerplant (<i>Stylidium graminifolium</i>) and Silky Purple-Flag (<i>Patersonia sericea</i>), <i>Cassytha glabella</i> .
15	Coastal freshwater wetland (HN630)	Moderate/good	Absent.	A narrow fringe of Flax-leaved Paperbark (<i>Melaleuca linariifolia</i>) up to seven metres in height around its margins.	Tall Spike Rush (<i>Eleocharis sphacelata</i>), <i>Chorizandra cymbaria</i> , <i>Lepyrodia anarthria</i> ; <i>Triglochin microtuberosa</i> ; Frogsmouth (<i>Philydrum lanuginosum</i>); <i>Goodenia paniculata</i> , <i>Drosera spatulata</i> and Indian Pennywort.

Appendix Table 2 Fernhill Central West biobank BioBanking plot/transect data

Veg. Zone	Veg Type ID	Plot ID	Native plant species richness	Native over-storey cover	Native mid-storey cover	Native ground cover (grasses)	Native ground cover (shrubs)	Native ground cover (other)	Exotic plant cover	Number of trees with hollows	Over storey regeneration	Total length of fallen logs	Easting	Northing	Zone
2	HN556	Benchmark	36	18.5-23.5	13-23	15-21	0-10	15-21	0	> = 0	1	> = 0			
2		5	39	13	20.5	58	4	16	0	1	1	7	281049	6254730	56
2		21	36	27	6	76	0	12	0	1	1	36	280727	6254976	56
2		25	45	14.5	19.5	82	2	16	16	0		5	280074	6254187	56
2		26	51	34.5	22.5	90	6	40	36	0		0	280019	6254665	56
2		39	43	18.5	6.1	64	6	16	0	2	1	11	280852	6254511	56
13	HN556	Benchmark	36	18.5-23.5	13-23	15-21	0-10	15-21	0	> = 0	1	> = 0			
13		10	16	16	6	16	0	10	78	0	0.8	25	279996	6254148	56
13		11	24	0.5	4	4	0	22	92	0	0.8	0	279934	6254451	56
13		37	27	16.5	14.5	94	0	18	54	0	0.8	0	279896	6254638	56
4	HN606	Benchmark	31	41-51	31.5-46.5	0-15	0-5	45.5-53.5	0	> = 0	1	> = 0			
4		4	48	5.5	58	16	4	20	6	1	1	34	281167	6254708	56
4		18	57	19	37	0	2	48	0.2	3	1	36	280732	6254293	56
4		27	27	50	30.5	16	2	60	0	0		51	280522	6254207	56
8	HN538	Benchmark	32	38-58	24.5-39.5	0-5	0-5	26.6-34.6	0	> = 0	1	> = 50			
8		6	37	55	8	0	2	34	2.5	1	1	21	281066	6254496	56
7	HN564	Benchmark	40	27.5-32.5	35-45	1-10	8.5-12.5	14.5-18.5	0	> = 0	1	> = 0			
7		8	32	32	33.5	18	0	26	0	3	1	6	280440	6254172	56
7		9	40	36	12	36	2	6	0	1	1	30	280205	6254139	56
7		12	45	33	17	64	2	8	0	1	1	14.5	280141	6255012	56
7		14	44	43	12	50	4	24	0	6	1	40	280738	6255132	56
7		15	44	32	30	38	6	48	0	3	1	21	280631	6254663	56
7		20	45	39	15	36	6	60	0	3	1	26	280334	6254488	56

Veg. Zone	Veg Type ID	Plot ID	Native plant species richness	Native over-storey cover	Native mid-storey cover	Native ground cover (grasses)	Native ground cover (shrubs)	Native ground cover (other)	Exotic plant cover	Number of trees with hollows	Over storey regeneration	Total length of fallen logs	Easting	Northing	Zone
7		22	47	27	30	76	14	20	0	6	1	13	280312	6255136	56
7		23	36	31	14.5	38	4	58	0	2	1	14	280381	6254849	56
7		24	42	19.5	13.5	48	10	20	0	3	1	13	280274	6255027	56
7		38	36	23.3	9	52	8	2	0	1	1	66	280901	6254646	56
9	HN566	Benchmark	39	17-27	75-85	1-10	7.45-11.45	12.85-16.85	0	> = 1	1	> = 30			
9		13	42	32.5	10	62	22	28	0	2	1	14	280113	6255235	56
9		35	44	32	14	92	16	4	0	1	1	2	280056	6254974	56
9		36	38	29	36	78	22	32	0	1	1	11	280033	6255111	56
11	HN542	Benchmark	40	10-20	23-33	12-24	0-10	12-24	0	> = 1	1	> = 30			
11		1	40	11	35.5	32	32	62	0	4	1	59	279970	6255227	56
11		3	39	22.5	46.5	16	8	56	0	3	1	23	279955	6254999	56
15	HN630	Benchmark	12	3-37	15-68	19-55	0-20	10-30	0	> = 0	1	> = 0			
15		16	17	3.4	0	0	2	44	0	0	1	0	280058	6254222	56
15		19	9	0	0.8	0	0	100	0	0	1	0	280033	6254321	56
16	HN556	Benchmark	36	18.5-23.5	13-23	15-21	0-10	15-21	0	> = 0	1	> = 0			
16		7	43	34	21	72	0	18	7	1	1	36	281060	6254335	56
16		31	42	25.5	31.5	90	4	52	40.5	0	1	39.5	281020	6254221	56
16		32	49	29.5	32.5	60	6	4	9.6	0	1	92	280970	6254094	56
18	HN606	Benchmark	31	41-51	31.5-46.5	0-15	0-5	45.5-53.5	0	> = 0	1	> = 0			
18		33	44	56.5	38	10	4	20	29	1	1	94	280958	6254401	56
17	HN564	Benchmark	39	17-27	75-85	1-10	7.45-11.45	12.85-16.85	0	> = 1	1	> = 30			
17		28	39	52.5	21	48	0	6	20	0	1	29	280575	6254021	56
17		29	39	28.5	38.5	36	4	3	0	0	1	39	280758	6254127	56
17		30	35	26.5	40	66	18	4	18	0	1	56	280842	6254258	56

Veg. Zone	Veg Type ID	Plot ID	Native plant species richness	Native over-storey cover	Native mid-storey cover	Native ground cover (grasses)	Native ground cover (shrubs)	Native ground cover (other)	Exotic plant cover	Number of trees with hollows	Over storey regeneration	Total length of fallen logs	Easting	Northing	Zone
19	HN538	Benchmark	32	38-58	24.5-39.5	0-5	0-5	26.6-34.6	1	> = 0	1	> = 50			
19		34	33	57	26	6	14	58	12	0	1	90	281006	6254021	56
20	HN564	Benchmark	40	27.5-32.5	35-45	1-10	8.5-12.5	14.5-18.5	2	> = 0	1	> = 0			
20		17	22	8.5	13	0	0	0	38	2	0.5	61	280605	6254101	56
21	HN564	Benchmark	40	27.5-32.5	35-45	1-10	8.5-12.5	14.5-18.5	3	> = 0	1	> = 0			
21		2	34	19	7.1	48	2	4	38	1	0.8	0	279961	6254832	56

Appendix Table 3 Fernhill Central West biobank geographic / habitat assessment results

Impact?	Common name	Scientific name	Feature
<input checked="" type="checkbox"/>	Rosenberg's Goanna	<i>Varanus rosenbergi</i>	land within 250 m of termite mounds or rock outcrops
<input checked="" type="checkbox"/>	Giant Burrowing Frog	<i>Heleioporus australiacus</i>	land within 40 m of heath, woodland or forest
<input checked="" type="checkbox"/>	Red-crowned Toadlet	<i>Pseudophryne australis</i>	heath or eucalypt forest on sandstone with a build-up of litter or other debris and containing, or within 40 m of, ephemeral or intermittent drainage lines
<input checked="" type="checkbox"/>	Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	land containing escarpments, cliffs, caves, deep crevices, old mine shafts or tunnels
<input checked="" type="checkbox"/>	Stuttering Barred Frog	<i>Mixophyes balbus</i>	rainforest or tall open wet forest with understorey and/or leaf litter and within 100 m of streams
<input checked="" type="checkbox"/>	Giant Barred Frog	<i>Mixophyes iteratus</i>	land below 1000 m in altitude and within 40 m of rainforest or eucalypt forest with deep leaf litter
<input checked="" type="checkbox"/>	Broad-headed Snake	<i>Hoplocephalus bungaroides</i>	land within 50 m of sandstone escarpments with hollow-bearing trees, rock crevices or flat sandstone rocks on exposed cliff edges
<input checked="" type="checkbox"/>	<i>Hygrocybe anomala</i> var. <i>ianthinomarginata</i>	<i>Hygrocybe anomala</i> var. <i>ianthinomarginata</i>	land within Blue Mountains National Park in Wollemi CMA subregion
<input checked="" type="checkbox"/>	<i>Hygrocybe aurantipes</i>	<i>Hygrocybe aurantipes</i>	land within Blue Mountains National Park, Mt Wilson & Hazelbrook in Wollemi CMA subregion
<input checked="" type="checkbox"/>	<i>Hygrocybe reesiae</i>	<i>Hygrocybe reesiae</i>	land within Blue Mountains National Park, Hazelbrook in Wollemi CMA subregion
<input checked="" type="checkbox"/>	Bristly Shield Fern	<i>Lastreopsis hispida</i>	Moist wet forest and rainforest gullies
<input checked="" type="checkbox"/>	<i>Acrophyllum australe</i>	<i>Acrophyllum australe</i>	land containing sheltered gullies beneath waterfalls or drip zones of rock overhangs/cliff faces
<input checked="" type="checkbox"/>	Brush-tailed Rock-wallaby	<i>Petrogale penicillata</i>	land within 1 km of rock outcrops or cliff lines
<input checked="" type="checkbox"/>	<i>Euphrasia bowdeniae</i>	<i>Euphrasia bowdeniae</i>	wet or damp rock faces on sandstone cliff lines
<input checked="" type="checkbox"/>	Booroolong Frog	<i>Litoria booroolongensis</i>	land within 100 m of stream or creek banks

Impact?	Common name	Scientific name	Feature
<input checked="" type="checkbox"/>	Littlejohn's Tree Frog	Litoria littlejohni	land within 100 m of permanent rocky streams with thick fringing vegetation
<input checked="" type="checkbox"/>	Black Bittern	Ixobrychus flavicollis	land within 40 m of freshwater and estuarine wetlands, in areas of permanent water and dense vegetation or emergent aquatic vegetation
<input checked="" type="checkbox"/>	Green and Golden Bell Frog	Litoria aurea	land within 100 m of emergent aquatic or riparian vegetation
<input checked="" type="checkbox"/>	Matted Bush-pea	Pultenaea pedunculata	land within 5 km of coast in South East Coastal Plains CMA subregion
<input checked="" type="checkbox"/>	Hibbertia superans	Hibbertia superans	ridgetops
<input checked="" type="checkbox"/>	Wahlenbergia multicaulis (Tadgell's Bluebell) population, Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield local government areas	Wahlenbergia multicaulis - endangered population	land situated in damp, disturbed sites

Appendix Table 4 Fernhill Central West biobank plant species recorded in plots 1-12

Family	Exotic	Scientific Name	Common Name	Plot_ID 1	Plot_ID 2	Plot_ID 3	Plot_ID 4	Plot_ID 5	Plot_ID 6	Plot_ID 7	Plot_ID 8	Plot_ID 9	Plot_ID 10	Plot_ID 11	Plot_ID 12
Acanthaceae		<i>Brunoniella australis</i>	Blue Trumpet			1		2	1	2		2			1
Acanthaceae		<i>Pseuderanthemum variable</i>	Pastel Flower				1								
Adiantaceae		<i>Adiantum aethiopicum</i>	Common Maidenhair				1		2						
Adiantaceae		<i>Adiantum formosum</i>	Giant Maidenhair												
Adiantaceae		<i>Adiantum hispidulum</i>	Rough Maidenhair				2								
Adiantaceae		<i>Cheilanthes sieberi subsp. sieberi</i>	Rock Fern		2		1	1		2	2			1	
Amaranthaceae		<i>Alternanthera denticulata</i>	Lesser Joyweed									1			
Apiaceae		<i>Centella asiatica</i>	Indian Pennywort				2		2					2	
Apiaceae		<i>Daucus glochidiatus</i>	Native Carrot												
Apiaceae		<i>Hydrocotyle tripartita</i>	Pennywort											1	
Apiaceae		<i>Platysace lanceolata</i>	Shrubby Platysace					2		1					
Apocynaceae		<i>Marsdenia suaveolens</i>	Scented Marsdenia					1	2						
Araceae	*	<i>Zantedeschia aethiopica</i>	Arum Lily				3		1						
Aspleniaceae		<i>Asplenium flabellifolium</i>	Necklace Fern	2		2			1						
Asteraceae	*	<i>Bidens pilosa</i>	Cobbler's Pegs				1			1					
Asteraceae		<i>Calotis dentex</i>	Burr-daisy							2					
Asteraceae	*	<i>Cirsium vulgare</i>	Spear Thistle												

Family	Exotic	Scientific Name	Common Name	Plot_ID 1	Plot_ID 2	Plot_ID 3	Plot_ID 4	Plot_ID 5	Plot_ID 6	Plot_ID 7	Plot_ID 8	Plot_ID 9	Plot_ID 10	Plot_ID 11	Plot_ID 12
Asteraceae	*	<i>Conyza bonariensis</i>	Flaxleaf Fleabane				1								
Asteraceae		<i>Cotula spp.</i>													
Asteraceae	*	<i>Hypochaeris radicata</i>	Catsear										1		
Asteraceae		<i>Lagenophora stipitata</i>	Common Lagenophora				1	1		1					1
Asteraceae		<i>Olearia elliptica</i>	Sticky Daisy-bush												
Asteraceae		<i>Senecio dialschides</i>													
Asteraceae	*	<i>Senecio madagascariensis</i>	Fireweed		1								1	1	
Asteraceae		<i>Sigesbeckia orientalis subsp. orientalis</i>	Indian Weed												
Asteraceae		<i>Solenogyne belliioides</i>	Solengyne												
Asteraceae	*	<i>Soliva sessilis</i>	Bindyi												
Asteraceae	*	<i>Sonchus oleraceus</i>	Common Sowthistle												
Asteraceae	*	<i>Taraxacum officinale</i>	Dandelion		1	1							2	2	1
Asteraceae		<i>Vernonia cinerea</i>													1
Basellaceae	*	<i>Anredera cordifolia</i>	Madeira Vine												
Blechnaceae		<i>Doodia aspera</i>	Prickly Rasp Fern						1						
Brassicaceae	*	<i>Cardamine hirsuta</i>	Common Bittercress												
Campanulaceae		<i>Wahlenbergia</i>	Tufted												1

Family	Exotic	Scientific Name	Common Name	Plot_ID 1	Plot_ID 2	Plot_ID 3	Plot_ID 4	Plot_ID 5	Plot_ID 6	Plot_ID 7	Plot_ID 8	Plot_ID 9	Plot_ID 10	Plot_ID 11	Plot_ID 12
		<i>communis</i>	Bluebell												
Caryophyllaceae		<i>Stellaria flaccida</i>					1								
Caryophyllaceae	*	<i>Stellaria media</i>	Common Chickweed												
Casuarinaceae		<i>Allocasuarina littoralis</i>	Black She-Oak					4							
Casuarinaceae		<i>Allocasuarina torulosa</i>	Forest Oak				3		1			2			
Clusiaceae		<i>Hypericum gramineum</i>	Small St John's Wort									1	1	2	
Convolvulaceae	*	<i>Cuscuta spp.</i>	Dodder												
Convolvulaceae		<i>Dichondra repens</i>	Kidney Weed							1					
Cunoniaceae		<i>Ceratopetalum gummiferum</i>	Christmas Bush												
Cyperaceae		<i>Caustis flexuosa</i>	Curly Wig	2											
Cyperaceae		<i>Chorizandra cymbaria</i>													
Cyperaceae		<i>Cyperus imbecillis</i>							1						
Cyperaceae		<i>Cyperus sanguinolentus</i>											2		
Cyperaceae		<i>Cyperus spp.</i>													
Cyperaceae	*	<i>Eleocharis minuta</i>													
Cyperaceae		<i>Eleocharis sphacelata</i>	Tall Spike Rush												
Cyperaceae		<i>Gahnia aspera</i>	Rough Saw-sedge				1	2		2			1	2	
Cyperaceae		<i>Lepidosperma laterale</i>	Variable Sword-	2			2	2	2	2	1				2

Family	Exotic	Scientific Name	Common Name	Plot_ID 1	Plot_ID 2	Plot_ID 3	Plot_ID 4	Plot_ID 5	Plot_ID 6	Plot_ID 7	Plot_ID 8	Plot_ID 9	Plot_ID 10	Plot_ID 11	Plot_ID 12
			sedge												
Cyperaceae		<i>Lepidosperma neesii</i>				2									
Cyperaceae		<i>Lepidosperma spp.</i>		2											
Cyperaceae		<i>Schoenus melanostachys</i>					2		2						
Dicksoniaceae		<i>Calochlaena dubia</i>	Rainbow Fern				2		2						
Dilleniaceae		<i>Hibbertia aspera</i>	Rough Guinea Flower												
Dilleniaceae		<i>Hibbertia decumbens</i>				1				2		2			
Dilleniaceae		<i>Hibbertia obtusifolia</i>	Hoary Guinea Flower												1
Dilleniaceae		<i>Hibbertia pedunculata</i>		1				1							
Droseraceae		<i>Drosera peltata</i>	A Sundew											1	
Droseraceae		<i>Drosera spatulata</i>													
Elaeocarpaceae		<i>Elaeocarpus reticulatus</i>	Blueberry Ash						1						
Elaeocarpaceae		<i>Tetralthea spp.</i>													
Ericaceae		<i>Dracophyllum secundum</i>													
Ericaceae		<i>Leucopogon muticus</i>	Blunt Beard-heath												
Ericaceae		<i>Lissanthe strigosa</i>	Peach Heath												2
Ericaceae		<i>Monotoca scoparia</i>						1							
Ericaceae		<i>Styphelia laeta</i>													

Family	Exotic	Scientific Name	Common Name	Plot_ID 1	Plot_ID 2	Plot_ID 3	Plot_ID 4	Plot_ID 5	Plot_ID 6	Plot_ID 7	Plot_ID 8	Plot_ID 9	Plot_ID 10	Plot_ID 11	Plot_ID 12
		<i>subsp. laeta</i>													
Ericaceae		<i>Woolfsia pungens</i>		1											
Fabaceae (Faboideae)		<i>Bossiaea heterophylla</i>	Variable Bossiaea			1									
Fabaceae (Faboideae)		<i>Bossiaea obcordata</i>	Spiny Bossiaea												2
Fabaceae (Faboideae)		<i>Daviesia ulicifolia</i>	Gorse Bitter Pea		1						1	1			3
Fabaceae (Faboideae)		<i>Desmodium rhytidophyllum</i>					1			1					1
Fabaceae (Faboideae)		<i>Desmodium varians</i>	Slender Tick-trefoil		1			1							
Fabaceae (Faboideae)		<i>Dillwynia floribunda</i>				3									
Fabaceae (Faboideae)	*	<i>Erythrina sykesii</i>	Coral Tree												
Fabaceae (Faboideae)		<i>Glycine clandestina</i>	Twining glycine		1							1			1
Fabaceae (Faboideae)		<i>Glycine microphylla</i>	Small-leaf Glycine		1		1	1		2	1			1	1
Fabaceae (Faboideae)		<i>Glycine tabacina</i>	Variable Glycine												1
Fabaceae (Faboideae)		<i>Gompholobium glabratum</i>	Dainty Wedge Pea			1						1			
Fabaceae (Faboideae)		<i>Gompholobium grandiflorum</i>	Large Wedge Pea												

Family	Exotic	Scientific Name	Common Name	Plot_ID 1	Plot_ID 2	Plot_ID 3	Plot_ID 4	Plot_ID 5	Plot_ID 6	Plot_ID 7	Plot_ID 8	Plot_ID 9	Plot_ID 10	Plot_ID 11	Plot_ID 12
Fabaceae (Faboideae)		<i>Gompholobium pinnatum</i>	Pinnate Wedge Pea	2		2									
Fabaceae (Faboideae)		<i>Hardenbergia violacea</i>	False Sarsaparilla		1		1	1		1	1	1			1
Fabaceae (Faboideae)		<i>Hovea heterophylla</i>													
Fabaceae (Faboideae)		<i>Hovea linearis</i>				2									
Fabaceae (Faboideae)		<i>Indigofera australis</i>	Australian Indigo												
Fabaceae (Faboideae)		<i>Kennedia rubicunda</i>	Dusky Coral Pea												
Fabaceae (Faboideae)	*	<i>Medicago polymorpha</i>	Burr Medic												
Fabaceae (Faboideae)		<i>Mirbelia rubiifolia</i>	Heathy Mirbelia	2		2									
Fabaceae (Faboideae)		<i>Mirbelia rubiifolia</i>	Heathy Mirbelia												2
Fabaceae (Faboideae)		<i>Podolobium ilicifolium</i>	Prickly Shaggy Pea					1			3	2			3
Fabaceae (Faboideae)		<i>Podolobium scandens</i>	Netted Shaggy Pea												2
Fabaceae (Faboideae)		<i>Pultenaea tuberculata</i>		2											
Fabaceae (Faboideae)	*	<i>Trifolium subterraneum</i>	Subterranean Clover										2		

Family	Exotic	Scientific Name	Common Name	Plot_ID 1	Plot_ID 2	Plot_ID 3	Plot_ID 4	Plot_ID 5	Plot_ID 6	Plot_ID 7	Plot_ID 8	Plot_ID 9	Plot_ID 10	Plot_ID 11	Plot_ID 12
Fabaceae (Mimosoideae)		<i>Acacia buxifolia</i>	Box-leaved Wattle		3				1	3		1			
Fabaceae (Mimosoideae)		<i>Acacia decurrens</i>	Black Wattle				2	1		3				2	2
Fabaceae (Mimosoideae)		<i>Acacia elongata</i>	Swamp Wattle												
Fabaceae (Mimosoideae)		<i>Acacia implexa</i>	Hickory Wattle		1										
Fabaceae (Mimosoideae)		<i>Acacia linifolia</i>	White Wattle												2
Fabaceae (Mimosoideae)		<i>Acacia longifolia subsp. longifolia</i>	Sydney Golden Wattle							1					
Fabaceae (Mimosoideae)		<i>Acacia parramattensis</i>	Parramatta Wattle										2	2	
Fabaceae (Mimosoideae)		<i>Acacia parvipinnula</i>	Silver-stemmed Wattle												
Fabaceae (Mimosoideae)		<i>Acacia terminalis subsp. angustifolia</i>										1			
Fabaceae (Mimosoideae)		<i>Acacia ulicifolia</i>	Prickly Moses	1	1	1						1			
Gentianaceae		<i>Schenkia spicata</i>	Spike Centaury		1										
Goodeniaceae		<i>Goodenia hederacea</i>	Ivy Goodenia							1		1			2
Goodeniaceae		<i>Goodenia paniculata</i>													
Goodeniaceae		<i>Goodenia spp.</i>				1									

Family	Exotic	Scientific Name	Common Name	Plot_ID 1	Plot_ID 2	Plot_ID 3	Plot_ID 4	Plot_ID 5	Plot_ID 6	Plot_ID 7	Plot_ID 8	Plot_ID 9	Plot_ID 10	Plot_ID 11	Plot_ID 12
Haloragaceae		<i>Gonocarpus tetragynus</i>	Poverty Raspwort	2		2					2				2
Hymenophyllaceae		<i>Hymenophyllum cupressiforme</i>	Common Filmy Fern												
Iridaceae		<i>Patersonia sericea</i>	Silky Purple-Flag	1								1			
Juncaceae		<i>Juncus usitatus</i>											2	2	
Juncaginaceae		<i>Triglochin microtuberosa</i>													
Lamiaceae		<i>Plectranthus parviflorus</i>					1		1						
Lamiaceae		<i>Prostanthera incana</i>	Velvet Mint-bush						1						
Lauraceae		<i>Cassytha glabella</i>		1		1									
Lauraceae	*	<i>Cinnamomum camphora</i>	Camphor Laurel	1											
Lindsaeaceae		<i>Lindsaea linearis</i>	Screw Fern						2						
Lindsaeaceae		<i>Lindsaea microphylla</i>	Lacy Wedge Fern												1
Lobeliaceae		<i>Pratia purpurascens</i>	Whiteroot	1	2		1	2		2	1	1			2
Loganiaceae		<i>Mitrasacme polymorpha</i>													
Lomandraceae		<i>Lomandra confertifolia</i> subsp. <i>rubiginosa</i>					2	2			1				
Lomandraceae		<i>Lomandra cylindrica</i>													
Lomandraceae		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	Wattle Matt-rush								2	2			

Family	Exotic	Scientific Name	Common Name	Plot_ID 1	Plot_ID 2	Plot_ID 3	Plot_ID 4	Plot_ID 5	Plot_ID 6	Plot_ID 7	Plot_ID 8	Plot_ID 9	Plot_ID 10	Plot_ID 11	Plot_ID 12
Lomandraceae		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>													
Lomandraceae		<i>Lomandra glauca</i>	Pale Mat-rush	2											
Lomandraceae		<i>Lomandra gracilis</i>						1							2
Lomandraceae		<i>Lomandra longifolia</i>	Spiny-headed Mat-rush		1		3	2	2		2				2
Lomandraceae		<i>Lomandra multiflora</i> subsp. <i>multiflora</i>	Many-flowered Mat-rush	2	1		2	2		2	2	2			2
Lomandraceae		<i>Lomandra obliqua</i>				1					2	2			2
Luzuriagaceae		<i>Eustrephus latifolius</i>	Wombat Berry				1		2	1					
Luzuriagaceae		<i>Geitonoplesium cymosum</i>	Scrambling Lily							1					
Malvaceae	*	<i>Sida rhombifolia</i>	Paddy's Lucerne												
Menispermaceae		<i>Sarcopetalum harveyanum</i>	Pearl Vine						1						
Monimiaceae		<i>Wilkiea huegeliana</i>	Veiny Wilkiea						2						
Moraceae		<i>Ficus rubiginosa</i>	Port Jackson Fig						3						
Myrsinaceae	*	<i>Anagallis arvensis</i>	Scarlet Pimpernel												
Myrsinaceae		<i>Myrsine howittiana</i>	Brush Muttonwood				1								
Myrsinaceae		<i>Myrsine variabilis</i>					2								

Family	Exotic	Scientific Name	Common Name	Plot_ID 1	Plot_ID 2	Plot_ID 3	Plot_ID 4	Plot_ID 5	Plot_ID 6	Plot_ID 7	Plot_ID 8	Plot_ID 9	Plot_ID 10	Plot_ID 11	Plot_ID 12
Myrtaceae		<i>Acmena smithii</i>	Lilly Pilly						2						
Myrtaceae		<i>Angophora bakeri</i>	Narrow-leaved Apple	3		3									
Myrtaceae		<i>Angophora costata</i>	Sydney Red Gum				3	3			3				
Myrtaceae		<i>Backhousia myrtifolia</i>	Grey Myrtle				5		5						
Myrtaceae		<i>Corymbia eximia</i>	Yellow Bloodwood	3		3	3	3		3	3	3			4
Myrtaceae		<i>Corymbia gummifera</i>	Red Bloodwood												
Myrtaceae		<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark											2	
Myrtaceae		<i>Eucalyptus eugenioides</i>	Thin-leaved Stringybark		3	1		3		4		3	3		4
Myrtaceae		<i>Eucalyptus fibrosa</i>	Red Ironbark					3		1					
Myrtaceae		<i>Eucalyptus oblonga</i>	Brown Stringybark	1											
Myrtaceae		<i>Eucalyptus piperita</i>	Sydney Peppermint								4	1			
Myrtaceae		<i>Eucalyptus punctata</i>	Grey Gum					3				4		2	
Myrtaceae		<i>Eucalyptus racemosa</i>	Narrow-leaved Scribbly Gum												
Myrtaceae		<i>Eucalyptus sclerophylla</i>	Hard-leaved Scribbly Gum	3		4									

Family	Exotic	Scientific Name	Common Name	Plot_ID 1	Plot_ID 2	Plot_ID 3	Plot_ID 4	Plot_ID 5	Plot_ID 6	Plot_ID 7	Plot_ID 8	Plot_ID 9	Plot_ID 10	Plot_ID 11	Plot_ID 12
Myrtaceae		<i>Eucalyptus sparsifolia</i>	Narrow-leaved Stringybark												1
Myrtaceae		<i>Leptospermum grandifolium</i>	Woolly Teatree	1											
Myrtaceae		<i>Leptospermum polygalifolium</i>	Tantoon	2	2	2							3	2	
Myrtaceae		<i>Leptospermum trinervium</i>	Slender Tea-tree	3		3						1			
Myrtaceae		<i>Melaleuca linariifolia</i>	Flax-leaved Paperbark				3						3	2	
Myrtaceae		<i>Syncarpia glomulifera</i>	Turpentine		2		4		3	3	2				
Myrtaceae		<i>Tristaniaopsis laurina</i>	Kanooka						5						
Oleaceae	*	<i>Ligustrum sinense</i>	Small-leaved Privet				3								
Oleaceae		<i>Notelaea longifolia</i>	Large Mock-olive				1			1					
Orchidaceae		<i>Calochilus paludosus</i>	Red Beard Orchid												
Orchidaceae		<i>Calochilus robertsonii</i>	Purplish Beard Orchid												
Orchidaceae		<i>Cestichis reflexa</i>													
Orchidaceae		<i>Corybas spp.</i>													
Orchidaceae		<i>Cryptostylis subulata</i>	Large Tongue Orchid			1									
Orchidaceae		<i>Dendrobium speciosum</i>	Rock Lily												
Orchidaceae		<i>Thelymitra nuda</i>	Plain Sun												

Family	Exotic	Scientific Name	Common Name	Plot_ID 1	Plot_ID 2	Plot_ID 3	Plot_ID 4	Plot_ID 5	Plot_ID 6	Plot_ID 7	Plot_ID 8	Plot_ID 9	Plot_ID 10	Plot_ID 11	Plot_ID 12
			Orchid												
Orchidaceae		<i>Thelymitra</i> spp.			1								1		1
Oxalidaceae	*	<i>Oxalis corniculata</i>	Creeping Oxalis										2		
Oxalidaceae		<i>Oxalis perennans</i>			1				1				1	1	
Passifloraceae		<i>Passiflora herbertiana</i>							1						
Philydraceae		<i>Philydrum lanuginosum</i>	Frogsmouth												
Philydraceae		<i>Philydrum lanuginosum</i>	Frogsmouth												
Phormiaceae		<i>Dianella caerulea</i> var. <i>producta</i>			1		1	2	1	2	1	1			1
Phormiaceae		<i>Dianella revoluta</i>	Blueberry Lily												
Phormiaceae		<i>Dianella revoluta</i> var. <i>revoluta</i>	A Blue Flax Lily		1										
Phyllanthaceae		<i>Breynia oblongifolia</i>	Coffee Bush				1		1	2					
Phyllanthaceae		<i>Glochidion ferdinandi</i>	Cheese Tree				1		2						
Phyllanthaceae		<i>Phyllanthus hirtellus</i>	Thyme Spurge			2		2		1	2	2			2
Pittosporaceae		<i>Billardiera scandens</i>	Hairy Apple Berry	2			1	1		2	1	2			1
Pittosporaceae		<i>Bursaria spinosa</i>	Native Blackthorn				1	1							
Pittosporaceae		<i>Pittosporum revolutum</i>	Rough Fruit Pittosporum				2	1	1	1		1			
Plantaginaceae		<i>Plantago</i>	Narrow							1				1	

Family	Exotic	Scientific Name	Common Name	Plot_ID 1	Plot_ID 2	Plot_ID 3	Plot_ID 4	Plot_ID 5	Plot_ID 6	Plot_ID 7	Plot_ID 8	Plot_ID 9	Plot_ID 10	Plot_ID 11	Plot_ID 12
		<i>gaudichaudii</i>	Plantain												
Plantaginaceae	*	<i>Plantago lanceolata</i>	Lamb's Tongues										2	2	
Poaceae	*	<i>Andropogon virginicus</i>	Whisky Grass		3								4	5	
Poaceae		<i>Anisopogon avenaceus</i>	Oat Speargrass												
Poaceae		<i>Aristida ramosa</i>	Purple Wiregrass	1	1					2		1			1
Poaceae		<i>Aristida vagans</i>	Threeawn Speargrass	1	2	2		2		2					2
Poaceae		<i>Austrostipa spp.</i>	A Speargrass					1		2	2	1			
Poaceae	*	<i>Briza maxima</i>	Quaking Grass										2		
Poaceae	*	<i>Briza subaristata</i>											4	3	
Poaceae		<i>Cymbopogon refractus</i>	Barbed Wire Grass								1				2
Poaceae		<i>Cynodon dactylon</i>	Common Couch		2								3	3	
Poaceae		<i>Deyeuxia spp.</i>	A Bent Grass												2
Poaceae		<i>Dichelachne micrantha</i>	Shorthair Plumegrass										2		
Poaceae		<i>Digitaria ramularis</i>	Finger Panic Grass	2											
Poaceae	*	<i>Digitaria spp.</i>	A Finger Grass										1		
Poaceae		<i>Echinopogon caespitosus</i>	Bushy Hedgehog-grass		2					2				2	
Poaceae	*	<i>Ehrharta erecta</i>	Panic Veldtgrass												

Family	Exotic	Scientific Name	Common Name	Plot_ID 1	Plot_ID 2	Plot_ID 3	Plot_ID 4	Plot_ID 5	Plot_ID 6	Plot_ID 7	Plot_ID 8	Plot_ID 9	Plot_ID 10	Plot_ID 11	Plot_ID 12
Poaceae		<i>Enneapogon avenaceus</i>	Bottle Washers			2					2				
Poaceae		<i>Entolasia marginata</i>	Bordered Panic				1						1	2	
Poaceae		<i>Entolasia stricta</i>	Wiry Panic	1		2	2	2	2	3	3	2			2
Poaceae		<i>Eragrostis brownii</i>	Brown's Lovegrass	2											
Poaceae	*	<i>Eragrostis curvula</i>	African Lovegrass												
Poaceae		<i>Eragrostis leptostachya</i>	Paddock Lovegrass		2							1		2	
Poaceae		<i>Imperata cylindrica</i>	Blady Grass	1	2	2	1								2
Poaceae		<i>Microlaena stipoides</i>	Weeping Grass			1	2	1		2	1		3	3	
Poaceae		<i>Oplismenus aemulus</i>								1					
Poaceae		<i>Oplismenus imbecillis</i>					2		1						
Poaceae		<i>Panicum effusum</i>	Hairy Panic		2										
Poaceae		<i>Panicum simile</i>	Two-colour Panic			2						1	2		
Poaceae		<i>Rytidosperma spp.</i>	A Wallaby Grass									2			
Poaceae		<i>Rytidosperma spp.</i>	A Wallaby Grass												3
Poaceae		<i>Rytidosperma spp.</i>	A Wallaby Grass												
Poaceae	*	<i>Setaria spp.</i>											2		
Poaceae		<i>Themeda australis</i>	Kangaroo Grass	2											1
Polygalaceae		<i>Comesperma volubile</i>													

Family	Exotic	Scientific Name	Common Name	Plot_ID 1	Plot_ID 2	Plot_ID 3	Plot_ID 4	Plot_ID 5	Plot_ID 6	Plot_ID 7	Plot_ID 8	Plot_ID 9	Plot_ID 10	Plot_ID 11	Plot_ID 12
Portulacaceae		<i>Calandrinia pickeringii</i>							1						
Potamogetonaceae		<i>Potamogeton</i> spp.													
Proteaceae		<i>Banksia oblongifolia</i>	Fern-leaved Banksia	2		2									
Proteaceae		<i>Banksia spinulosa</i>	Hairpin Banksia	3		2									
Proteaceae		<i>Grevillea robusta</i>	Silky Oak				1								
Proteaceae		<i>Grevillea sericea</i>	Pink Spider Flower												
Proteaceae		<i>Grevillea sphacelata</i>	Grey Spider Flower												
Proteaceae		<i>Hakea dactyloides</i>	Finger Hakea	2		3									
Proteaceae		<i>Hakea sericea</i>	Needlebrush												
Proteaceae		<i>Isopogon anemonifolius</i>	Broad-leaf Drumsticks	1											
Proteaceae		<i>Lambertia formosa</i>	Mountain Devil			2									
Proteaceae		<i>Lomatia silaifolia</i>	Crinkle Bush												
Proteaceae		<i>Persoonia lanceolata</i>	Lance Leaf Geebung	3	1	2	1								1
Proteaceae		<i>Persoonia levis</i>	Broad-leaved Geebung										1		
Proteaceae		<i>Persoonia linearis</i>	Narrow-leaved Geebung	3	2		1	3		1	1	2		2	
Proteaceae		<i>Xylomelum pyriforme</i>	Woody Pear								2				

Family	Exotic	Scientific Name	Common Name	Plot_ID 1	Plot_ID 2	Plot_ID 3	Plot_ID 4	Plot_ID 5	Plot_ID 6	Plot_ID 7	Plot_ID 8	Plot_ID 9	Plot_ID 10	Plot_ID 11	Plot_ID 12
Restionaceae		<i>Lepyrodia anarthria</i>		2		2									
Restionaceae		<i>Lepyrodia scariosa</i>		2		2									
Rhamnaceae		<i>Pomaderris ferruginea</i>						2				3			
Rosaceae	*	<i>Rubus fruticosus</i> sp. agg.	Blackberry complex											1	
Rubiaceae		<i>Galium binifolium</i>							1						
Rubiaceae		<i>Morinda jasminoides</i>	Sweet Morinda				1		2						
Rubiaceae		<i>Opercularia aspera</i>	Coarse Stinkweed		1										
Rubiaceae		<i>Opercularia hispida</i>	Hairy Stinkweed			1									
Rubiaceae		<i>Opercularia varia</i>	Variable Stinkweed												
Rubiaceae		<i>Pomax umbellata</i>	Pomax		1			1		1	1	2			1
Rutaceae		<i>Boronia ledifolia</i>	Sydney Boronia												
Rutaceae		<i>Phebalium squamulosum</i> subsp. <i>squamulosum</i>													
Rutaceae		<i>Philotheca hispidula</i>													
Rutaceae		<i>Zieria smithii</i>	Sandfly Zieria				1								
Santalaceae		<i>Exocarpos strictus</i>	Dwarf Cherry		1			2		1		2			
Sapindaceae		<i>Dodonaea triquetra</i>	Large-leaf Hop-bush		1		2	4		2	2				
Schizaeaceae		<i>Schizaea bifida</i>	Forked								1				

Family	Exotic	Scientific Name	Common Name	Plot_ID 1	Plot_ID 2	Plot_ID 3	Plot_ID 4	Plot_ID 5	Plot_ID 6	Plot_ID 7	Plot_ID 8	Plot_ID 9	Plot_ID 10	Plot_ID 11	Plot_ID 12
			Comb Fern												
Simaroubaceae	*	<i>Ailanthus altissima</i>	Tree of Heaven				1								
Smilacaceae		<i>Smilax glyciphylla</i>	Sweet Sarsparilla												
Solanaceae	*	<i>Solanum nigrum</i>	Black-berry Nightshade												
Solanaceae		<i>Solanum pungetium</i>	Eastern Nightshade							1					
Stackhousiaceae		<i>Stackhousia viminea</i>	Slender Stackhouseia		1										
Stylidiaceae		<i>Stylidium graminifolium</i>	Grass Triggerplant												
Thymelaeaceae		<i>Pimelea linifolia</i>	Slender Rice Flower			1									
Verbenaceae	*	<i>Lantana camara</i>	Lantana				2		2	2					
Verbenaceae	*	<i>Verbena bonariensis</i>	Purpletop										1		
Violaceae		<i>Hybanthus monopetalus</i>	Slender Violet-bush								1	2			1
Violaceae		<i>Viola hederacea</i>	Ivy-leaved Violet				1		2					2	
Xanthorrhoeaceae		<i>Xanthorrhoea media</i>									3	2			
Xanthorrhoeaceae		<i>Xanthorrhoea minor subsp. minor</i>		1		1									
Xanthorrhoeaceae		<i>Xanthorrhoea spp.</i>													

*** = Exotic**

1 = Vegetation Zones:

2 = Cover Abundance:

1. Less than 5% and rare; 2. Less than 5% and common; 3. 6 – 15%; 4. 16 – 25%; 5. 26 – 50%; 6. 51 – 75%; 7. 76 – 100%.

Appendix Table 5 Fernhill Central West biobank plant species recorded in plots 13-24

Family	Exotic	Scientific Name	Common Name	Plot_ID13	Plot_ID14	Plot_ID15	Plot_ID16	Plot_ID17	Plot_ID18	Plot_ID19	Plot_ID20	Plot_ID21	Plot_ID22	Plot_ID23	Plot_ID24
Acanthaceae		<i>Brunoniella australis</i>	Blue Trumpet			1			2		1	1	1	1	1
Acanthaceae		<i>Pseuderanthemum variable</i>	Pastel Flower		1										
Adiantaceae		<i>Adiantum aethiopicum</i>	Common Maidenhair						2						
Adiantaceae		<i>Adiantum formosum</i>	Giant Maidenhair						2						
Adiantaceae		<i>Adiantum hispidulum</i>	Rough Maidenhair												
Adiantaceae		<i>Cheilanthes sieberi subsp. sieberi</i>	Rock Fern			1						2			
Amaranthaceae		<i>Alternanthera denticulata</i>	Lesser Joyweed												
Apiaceae		<i>Centella asiatica</i>	Indian Pennywort				1		2	2					
Apiaceae		<i>Daucus glochidiatus</i>	Native Carrot					2							
Apiaceae		<i>Hydrocotyle tripartita</i>	Pennywort												
Apiaceae		<i>Platysace lanceolata</i>	Shrubby Platysace						1						
Apocynaceae		<i>Marsdenia suaveolens</i>	Scented Marsdenia												
Araceae	*	<i>Zantedeschia aethiopica</i>	Arum Lily												
Aspleniaceae		<i>Asplenium flabellifolium</i>	Necklace Fern						1						
Asteraceae	*	<i>Bidens pilosa</i>	Cobbler's Pegs					2							
Asteraceae		<i>Calotis dentex</i>	Burr-daisy												

Family	Exotic	Scientific Name	Common Name	Plot_ID13	Plot_ID14	Plot_ID15	Plot_ID16	Plot_ID17	Plot_ID18	Plot_ID19	Plot_ID20	Plot_ID21	Plot_ID22	Plot_ID23	Plot_ID24
Asteraceae	*	<i>Cirsium vulgare</i>	Spear Thistle					1							
Asteraceae	*	<i>Conyza bonariensis</i>	Flaxleaf Fleabane												
Asteraceae		<i>Cotula spp.</i>						2							
Asteraceae	*	<i>Hypochaeris radicata</i>	Catsear												
Asteraceae		<i>Lagenophora stipitata</i>	Common Lagenophora			1								1	
Asteraceae		<i>Olearia elliptica</i>	Sticky Daisy-bush	1											
Asteraceae		<i>Senecio diascides</i>							1						
Asteraceae	*	<i>Senecio madagascariensis</i>	Fireweed												
Asteraceae		<i>Sigesbeckia orientalis subsp. orientalis</i>	Indian Weed					1							
Asteraceae		<i>Solenogyne bellioides</i>	Solengyne									1			
Asteraceae	*	<i>Soliva sessilis</i>	Bindyi					1							
Asteraceae	*	<i>Sonchus oleraceus</i>	Common Sowthistle					2							
Asteraceae	*	<i>Taraxacum officinale</i>	Dandelion												
Asteraceae		<i>Vernonia cinerea</i>							1						
Basellaceae	*	<i>Anredera cordifolia</i>	Madeira Vine					2							
Blechnaceae		<i>Doodia aspera</i>	Prickly Rasp Fern												
Brassicaceae	*	<i>Cardamine</i>	Common					2							

Family	Exotic	Scientific Name	Common Name	Plot_ID13	Plot_ID14	Plot_ID15	Plot_ID16	Plot_ID17	Plot_ID18	Plot_ID19	Plot_ID20	Plot_ID21	Plot_ID22	Plot_ID23	Plot_ID24
		<i>hirsuta</i>	Bittercress												
Campanulaceae		<i>Wahlenbergia communis</i>	Tufted Bluebell												
Caryophyllaceae		<i>Stellaria flaccida</i>							2						
Caryophyllaceae	*	<i>Stellaria media</i>	Common Chickweed					2							
Casuarinaceae		<i>Allocasuarina littoralis</i>	Black She-Oak												
Casuarinaceae		<i>Allocasuarina torulosa</i>	Forest Oak			3			1			3			
Clusiaceae		<i>Hypericum gramineum</i>	Small St John's Wort												
Convolvulaceae	*	<i>Cuscuta spp.</i>	Dodder		1										
Convolvulaceae		<i>Dichondra repens</i>	Kidney Weed					1							
Cunoniaceae		<i>Ceratopetalum gummiferum</i>	Christmas Bush						3						
Cyperaceae		<i>Caustis flexuosa</i>	Curly Wig										1		
Cyperaceae		<i>Chorizandra cymbaria</i>					2			2					
Cyperaceae		<i>Cyperus imbecillis</i>													
Cyperaceae		<i>Cyperus sanguinolentus</i>						1							
Cyperaceae		<i>Cyperus spp.</i>					1								
Cyperaceae	*	<i>Eleocharis minuta</i>					1			2					
Cyperaceae		<i>Eleocharis sphacelata</i>	Tall Spike Rush				5			5					
Cyperaceae		<i>Gahnia aspera</i>	Rough Saw-sedge					1							

Family	Exotic	Scientific Name	Common Name	Plot_ID13	Plot_ID14	Plot_ID15	Plot_ID16	Plot_ID17	Plot_ID18	Plot_ID19	Plot_ID20	Plot_ID21	Plot_ID22	Plot_ID23	Plot_ID24
Cyperaceae		<i>Lepidosperma laterale</i>	Variable Sword-sedge	2	1	2			1		2	2		X	1
Cyperaceae		<i>Lepidosperma neesii</i>													
Cyperaceae		<i>Lepidosperma spp.</i>		2		2								1	
Cyperaceae		<i>Schoenus melanostachys</i>					3		2						
Dicksoniaceae		<i>Calochlaena dubia</i>	Rainbow Fern						1						
Dilleniaceae		<i>Hibbertia aspera</i>	Rough Guinea Flower			1	1				2		1	2	1
Dilleniaceae		<i>Hibbertia decumbens</i>										2			
Dilleniaceae		<i>Hibbertia obtusifolia</i>	Hoary Guinea Flower			1					1			1	
Dilleniaceae		<i>Hibbertia pedunculata</i>													
Droseraceae		<i>Drosera peltata</i>	A Sundew												
Droseraceae		<i>Drosera spatulata</i>					1								
Elaeocarpaceae		<i>Elaeocarpus reticulatus</i>	Blueberry Ash						1						
Elaeocarpaceae		<i>Tetradlea spp.</i>			1										
Ericaceae		<i>Dracophyllum secundum</i>							2						
Ericaceae		<i>Leucopogon muticus</i>	Blunt Beard-heath		1										
Ericaceae		<i>Lissanthe strigosa</i>	Peach Heath	2	1								1	2	1
Ericaceae		<i>Monotoca</i>									2		1		

Family	Exotic	Scientific Name	Common Name	Plot_ID13	Plot_ID14	Plot_ID15	Plot_ID16	Plot_ID17	Plot_ID18	Plot_ID19	Plot_ID20	Plot_ID21	Plot_ID22	Plot_ID23	Plot_ID24
		<i>scoparia</i>													
Ericaceae		<i>Styphelia laeta</i> <i>subsp. laeta</i>				1									
Ericaceae		<i>Woolfsia pungens</i>											1		
Fabaceae (Faboideae)		<i>Bossiaea heterophylla</i>	Variable Bossiaea												
Fabaceae (Faboideae)		<i>Bossiaea obcordata</i>	Spiny Bossiaea	2							1		1	3	2
Fabaceae (Faboideae)		<i>Daviesia ulicifolia</i>	Gorse Bitter Pea												1
Fabaceae (Faboideae)		<i>Desmodium rhytidophyllum</i>							1						
Fabaceae (Faboideae)		<i>Desmodium varians</i>	Slender Tick-trefoil												
Fabaceae (Faboideae)		<i>Dillwynia floribunda</i>													
Fabaceae (Faboideae)	*	<i>Erythrina sykesii</i>	Coral Tree					1							
Fabaceae (Faboideae)		<i>Glycine clandestina</i>	Twining glycine									1	1		1
Fabaceae (Faboideae)		<i>Glycine microphylla</i>	Small-leaf Glycine					1	1			1			1
Fabaceae (Faboideae)		<i>Glycine tabacina</i>	Variable Glycine						1						1
Fabaceae (Faboideae)		<i>Gompholobium glabratum</i>	Dainty Wedge Pea	1	2						1		1		

Family	Exotic	Scientific Name	Common Name	Plot_ID13	Plot_ID14	Plot_ID15	Plot_ID16	Plot_ID17	Plot_ID18	Plot_ID19	Plot_ID20	Plot_ID21	Plot_ID22	Plot_ID23	Plot_ID24
Fabaceae (Faboideae)		<i>Gompholobium grandiflorum</i>	Large Wedge Pea											2	
Fabaceae (Faboideae)		<i>Gompholobium pinnatum</i>	Pinnate Wedge Pea	1	2										1
Fabaceae (Faboideae)		<i>Hardenbergia violacea</i>	False Sarsaparilla			1			1		1	1	1		
Fabaceae (Faboideae)		<i>Hovea heterophylla</i>													1
Fabaceae (Faboideae)		<i>Hovea linearis</i>			1								1	1	1
Fabaceae (Faboideae)		<i>Indigofera australis</i>	Australian Indigo												1
Fabaceae (Faboideae)		<i>Kennedia rubicunda</i>	Dusky Coral Pea						1						
Fabaceae (Faboideae)	*	<i>Medicago polymorpha</i>	Burr Medic					1							
Fabaceae (Faboideae)		<i>Mirbelia rubiifolia</i>	Heathy Mirbelia	2									2		
Fabaceae (Faboideae)		<i>Mirbelia rubiifolia</i>	Heathy Mirbelia												
Fabaceae (Faboideae)		<i>Podolobium ilicifolium</i>	Prickly Shaggy Pea		2	1					2	1	1	1	
Fabaceae (Faboideae)		<i>Podolobium scandens</i>	Netted Shaggy Pea												
Fabaceae (Faboideae)		<i>Pultenaea tuberculata</i>		1											

Family	Exotic	Scientific Name	Common Name	Plot_ID13	Plot_ID 14	Plot_ID 15	Plot_ID 16	Plot_ID 17	Plot_ID 18	Plot_ID 19	Plot_ID 20	Plot_ID 21	Plot_ID 22	Plot_ID 23	Plot_ID 24
Fabaceae (Faboideae)	*	<i>Trifolium subterraneum</i>	Subterranean Clover												
Fabaceae (Mimosoideae)		<i>Acacia buxifolia</i>	Box-leaved Wattle			1		3	2						
Fabaceae (Mimosoideae)		<i>Acacia decurrens</i>	Black Wattle												
Fabaceae (Mimosoideae)		<i>Acacia elongata</i>	Swamp Wattle						1						
Fabaceae (Mimosoideae)		<i>Acacia implexa</i>	Hickory Wattle					3							
Fabaceae (Mimosoideae)		<i>Acacia linifolia</i>	White Wattle	2							2		3	3	3
Fabaceae (Mimosoideae)		<i>Acacia longifolia</i> subsp. <i>longifolia</i>	Sydney Golden Wattle												
Fabaceae (Mimosoideae)		<i>Acacia parramattensis</i>	Parramatta Wattle					2							
Fabaceae (Mimosoideae)		<i>Acacia parvipinnula</i>	Silver-stemmed Wattle		1							2			
Fabaceae (Mimosoideae)		<i>Acacia terminalis</i> subsp. <i>angustifolia</i>			2										
Fabaceae (Mimosoideae)		<i>Acacia ulicifolia</i>	Prickly Moses		1						1			1	1
Gentianaceae		<i>Schenkia spicata</i>	Spike Centaury												
Goodeniaceae		<i>Goodenia hederacea</i>	Ivy Goodenia		1						2	1	2	1	

Family	Exotic	Scientific Name	Common Name	Plot_ID13	Plot_ID14	Plot_ID15	Plot_ID16	Plot_ID17	Plot_ID18	Plot_ID19	Plot_ID20	Plot_ID21	Plot_ID22	Plot_ID23	Plot_ID24
Goodeniaceae		<i>Goodenia paniculata</i>					1			2					
Goodeniaceae		<i>Goodenia spp.</i>													
Haloragaceae		<i>Gonocarpus tetragynus</i>	Poverty Raspwort	1		2			1			1	2		1
Hymenophyllaceae		<i>Hymenophyllum cupressiforme</i>	Common Filmy Fern						1						
Iridaceae		<i>Patersonia sericea</i>	Silky Purple-Flag			1					2				
Juncaceae		<i>Juncus usitatus</i>						1							
Juncaginaceae		<i>Triglochin microtuberosa</i>								2					
Lamiaceae		<i>Plectranthus parviflorus</i>							2						
Lamiaceae		<i>Prostanthera incana</i>	Velvet Mint-bush						1						
Lauraceae		<i>Cassytha glabella</i>		1		1	1								
Lauraceae	*	<i>Cinnamomum camphora</i>	Camphor Laurel												
Lindsaeaceae		<i>Lindsaea linearis</i>	Screw Fern												
Lindsaeaceae		<i>Lindsaea microphylla</i>	Lacy Wedge Fern		1						1			1	
Lobeliaceae		<i>Pratia purpurascens</i>	Whiteroot			1		1	2		1	2	1	1	1
Loganiaceae		<i>Mitrasacme polymorpha</i>		1									2		
Lomandraceae		<i>Lomandra confertifolia</i> subsp. <i>rubiginosa</i>										2			
Lomandraceae		<i>Lomandra cylindrica</i>		2	2	2					1		2	1	2

Family	Exotic	Scientific Name	Common Name	Plot_ID13	Plot_ID14	Plot_ID15	Plot_ID16	Plot_ID17	Plot_ID18	Plot_ID19	Plot_ID20	Plot_ID21	Plot_ID22	Plot_ID23	Plot_ID24
Lomandraceae		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	Wattle Mat-rush	2	2				2			1	2	1	2
Lomandraceae		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>										1			
Lomandraceae		<i>Lomandra glauca</i>	Pale Mat-rush												
Lomandraceae		<i>Lomandra gracilis</i>		1											
Lomandraceae		<i>Lomandra longifolia</i>	Spiny-headed Mat-rush			2			4			1			
Lomandraceae		<i>Lomandra multiflora</i> subsp. <i>multiflora</i>	Many-flowered Mat-rush	1	2	2					1		2	1	
Lomandraceae		<i>Lomandra obliqua</i>		2	2	1					2		2	2	2
Luzuriagaceae		<i>Eustrephus latifolius</i>	Wombat Berry						2						
Luzuriagaceae		<i>Geitonoplesium cymosum</i>	Scrambling Lily												
Malvaceae	*	<i>Sida rhombifolia</i>	Paddy's Lucerne					1							
Menispermaceae		<i>Sarcopetalum harveyanum</i>	Pearl Vine												
Monimiaceae		<i>Wilkiea huegeliana</i>	Veiny Wilkiea												
Moraceae		<i>Ficus rubiginosa</i>	Port Jackson Fig						1						
Myrsinaceae	*	<i>Anagallis arvensis</i>	Scarlet Pimpernel					2							
Myrsinaceae		<i>Myrsine</i>	Brush												

Family	Exotic	Scientific Name	Common Name	Plot_ID13	Plot_ID14	Plot_ID15	Plot_ID16	Plot_ID17	Plot_ID18	Plot_ID19	Plot_ID20	Plot_ID21	Plot_ID22	Plot_ID23	Plot_ID24
		<i>howittiana</i>	Muttonwood												
Myrsinaceae		<i>Myrsine variabilis</i>													
Myrtaceae		<i>Acmena smithii</i>	Lilly Pilly						4						
Myrtaceae		<i>Angophora bakeri</i>	Narrow-leaved Apple	3									3		3
Myrtaceae		<i>Angophora costata</i>	Sydney Red Gum		4				3		1				
Myrtaceae		<i>Backhousia myrtifolia</i>	Grey Myrtle						1						
Myrtaceae		<i>Corymbia eximia</i>	Yellow Bloodwood	4								3	4		3
Myrtaceae		<i>Corymbia gummifera</i>	Red Bloodwood	1	4	4					4		3	5	3
Myrtaceae		<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark									3			
Myrtaceae		<i>Eucalyptus eugenioides</i>	Thin-leaved Stringybark	3								4			
Myrtaceae		<i>Eucalyptus fibrosa</i>	Red Ironbark												
Myrtaceae		<i>Eucalyptus oblonga</i>	Brown Stringybark		3	3					4		3	3	3
Myrtaceae		<i>Eucalyptus piperita</i>	Sydney Peppermint						3						
Myrtaceae		<i>Eucalyptus punctata</i>	Grey Gum			3		3				3			
Myrtaceae		<i>Eucalyptus racemosa</i>	Narrow-leaved Scribbly Gum	2									3		3
Myrtaceae		<i>Eucalyptus sclerophylla</i>	Hard-leaved Scribbly Gum										3		

Family	Exotic	Scientific Name	Common Name	Plot_ID13	Plot_ID14	Plot_ID15	Plot_ID16	Plot_ID17	Plot_ID18	Plot_ID19	Plot_ID20	Plot_ID21	Plot_ID22	Plot_ID23	Plot_ID24
Myrtaceae		<i>Eucalyptus sparsifolia</i>	Narrow-leaved Stringybark												
Myrtaceae		<i>Leptospermum grandifolium</i>	Woolly Teatree												
Myrtaceae		<i>Leptospermum polygalifolium</i>	Tantoon		1		2			1	1				
Myrtaceae		<i>Leptospermum trinervium</i>	Slender Teatree	3	2	2							3		1
Myrtaceae		<i>Melaleuca linariifolia</i>	Flax-leaved Paperbark				3			2					
Myrtaceae		<i>Syncarpia glomulifera</i>	Turpentine			1			4						
Myrtaceae		<i>Tristaniopsis laurina</i>	Kanooka						4						
Oleaceae	*	<i>Ligustrum sinense</i>	Small-leaved Privet												
Oleaceae		<i>Notelaea longifolia</i>	Large Mock-olive			1			1						
Orchidaceae		<i>Calochilus paludosus</i>	Red Beard Orchid		X						1		1		
Orchidaceae		<i>Calochilus robertsonii</i>	Purplish Beard Orchid		1						1				1
Orchidaceae		<i>Cestichis reflexa</i>							2						
Orchidaceae		<i>Corybas spp.</i>									2				
Orchidaceae		<i>Cryptostylis subulata</i>	Large Tongue Orchid												
Orchidaceae		<i>Dendrobium speciosum</i>	Rock Lily						2						
Orchidaceae		<i>Thelymitra nuda</i>	Plain Sun Orchid								1				

Family	Exotic	Scientific Name	Common Name	Plot_ID13	Plot_ID14	Plot_ID15	Plot_ID16	Plot_ID17	Plot_ID18	Plot_ID19	Plot_ID20	Plot_ID21	Plot_ID22	Plot_ID23	Plot_ID24
Orchidaceae		<i>Thelymitra</i> spp.		1								1			1
Oxalidaceae	*	<i>Oxalis corniculata</i>	Creeping Oxalis												
Oxalidaceae		<i>Oxalis perennans</i>							1						
Passifloraceae		<i>Passiflora herbertiana</i>													
Philydraceae		<i>Philydrum lanuginosum</i>	Frogsmouth				2								
Philydraceae		<i>Philydrum lanuginosum</i>	Frogsmouth							3					
Phormiaceae		<i>Dianella caerulea</i> var. <i>producta</i>			1	1		1	2		1	1			1
Phormiaceae		<i>Dianella revoluta</i>	Blueberry Lily									1			
Phormiaceae		<i>Dianella revoluta</i> var. <i>revoluta</i>	A Blue Flax Lily												
Phyllanthaceae		<i>Breynia oblongifolia</i>	Coffee Bush												
Phyllanthaceae		<i>Glochidion ferdinandi</i>	Cheese Tree						2						
Phyllanthaceae		<i>Phyllanthus hirtellus</i>	Thyme Spurge	2	1	2					2	2	2	1	2
Pittosporaceae		<i>Billardiera scandens</i>	Hairy Apple Berry		1	1			1		1	2	1	1	1
Pittosporaceae		<i>Bursaria spinosa</i>	Native Blackthorn					1							
Pittosporaceae		<i>Pittosporum revolutum</i>	Rough Fruit Pittosporum						2						
Plantaginaceae		<i>Plantago gaudichaudii</i>	Narrow Plantain					1							
Plantaginaceae	*	<i>Plantago</i>	Lamb's					2							

Family	Exotic	Scientific Name	Common Name	Plot_ID13	Plot_ID14	Plot_ID15	Plot_ID16	Plot_ID17	Plot_ID18	Plot_ID19	Plot_ID20	Plot_ID21	Plot_ID22	Plot_ID23	Plot_ID24
		<i>lanceolata</i>	Tongues												
Poaceae	*	<i>Andropogon virginicus</i>	Whisky Grass												
Poaceae		<i>Anisopogon avenaceus</i>	Oat Speargrass								3				
Poaceae		<i>Aristida ramosa</i>	Purple Wiregrass								1				
Poaceae		<i>Aristida vagans</i>	Threeawn Speargrass	1	2	2						2		1	1
Poaceae		<i>Austrostipa spp.</i>	A Speargrass												
Poaceae	*	<i>Briza maxima</i>	Quaking Grass					1							
Poaceae	*	<i>Briza subaristata</i>													
Poaceae		<i>Cymbopogon refractus</i>	Barbed Wire Grass									2			
Poaceae		<i>Cynodon dactylon</i>	Common Couch					1							
Poaceae		<i>Deyeuxia spp.</i>	A Bent Grass												
Poaceae		<i>Dichelachne micrantha</i>	Shorthair Plumegrass												
Poaceae		<i>Digitaria ramularis</i>	Finger Panic Grass												
Poaceae	*	<i>Digitaria spp.</i>	A Finger Grass												
Poaceae		<i>Echinopogon caespitosus</i>	Bushy Hedgehog-grass	1				1				2			
Poaceae	*	<i>Ehrharta erecta</i>	Panic Veldtgrass					2							
Poaceae		<i>Enneapogon avenaceus</i>	Bottle Washers			2					3			2	
Poaceae		<i>Entolasia</i>	Bordered				1	1	1						

Family	Exotic	Scientific Name	Common Name	Plot_ID13	Plot_ID14	Plot_ID15	Plot_ID16	Plot_ID17	Plot_ID18	Plot_ID19	Plot_ID20	Plot_ID21	Plot_ID22	Plot_ID23	Plot_ID24
		<i>marginata</i>	Panic												
Poaceae		<i>Entolasia stricta</i>	Wiry Panic	2	3	2	2	2	2		3	3	2	2	2
Poaceae		<i>Eragrostis brownii</i>	Brown's Lovegrass	2	X	1							2		1
Poaceae	*	<i>Eragrostis curvula</i>	African Lovegrass					2							
Poaceae		<i>Eragrostis leptostachya</i>	Paddock Lovegrass									2			
Poaceae		<i>Imperata cylindrica</i>	Blady Grass			1	1	1					1		
Poaceae		<i>Microlaena stipoides</i>	Weeping Grass			1			1				2		
Poaceae		<i>Opismenus aemulus</i>						1							
Poaceae		<i>Opismenus imbecillis</i>							2						
Poaceae		<i>Panicum effusum</i>	Hairy Panic												
Poaceae		<i>Panicum simile</i>	Two-colour Panic	1	1	1									1
Poaceae		<i>Rytidosperma spp.</i>	A Wallaby Grass	2	2							2	2	2	
Poaceae		<i>Rytidosperma spp.</i>	A Wallaby Grass												
Poaceae		<i>Rytidosperma spp.</i>	A Wallaby Grass	2											
Poaceae	*	<i>Setaria spp.</i>						1							
Poaceae		<i>Themeda australis</i>	Kangaroo Grass	1							1		1	1	1
Polygalaceae		<i>Comesperma volubile</i>				1									
Portulacaceae		<i>Calandrinia pickeringii</i>													

Family	Exotic	Scientific Name	Common Name	Plot_ID13	Plot_ID14	Plot_ID15	Plot_ID16	Plot_ID17	Plot_ID18	Plot_ID19	Plot_ID20	Plot_ID21	Plot_ID22	Plot_ID23	Plot_ID24
Potamogetonaceae		<i>Potamogeton</i> spp.								4					
Proteaceae		<i>Banksia oblongifolia</i>	Fern-leaved Banksia												
Proteaceae		<i>Banksia spinulosa</i>	Hairpin Banksia			2					2		3		
Proteaceae		<i>Grevillea robusta</i>	Silky Oak												
Proteaceae		<i>Grevillea sericea</i>	Pink Spider Flower										1		
Proteaceae		<i>Grevillea sphacelata</i>	Grey Spider Flower	2									2		
Proteaceae		<i>Hakea dactyloides</i>	Finger Hakea	2	1						1		1		1
Proteaceae		<i>Hakea sericea</i>	Needlebush	1											
Proteaceae		<i>Isopogon anemonifolius</i>	Broad-leaf Drumsticks												
Proteaceae		<i>Lambertia formosa</i>	Mountain Devil								2			3	
Proteaceae		<i>Lomatia silaifolia</i>	Crinkle Bush								1			1	
Proteaceae		<i>Persoonia lanceolata</i>	Lance Leaf Geebung	1	1								1		1
Proteaceae		<i>Persoonia levis</i>	Broad-leaved Geebung												
Proteaceae		<i>Persoonia linearis</i>	Narrow-leaved Geebung	2	2				1		2	1	1	1	
Proteaceae		<i>Xylomelum pyriforme</i>	Woody Pear		2	3					2				
Restionaceae		<i>Lepyrodia anarthria</i>					2								
Restionaceae		<i>Lepyrodia scariosa</i>			3										

Family	Exotic	Scientific Name	Common Name	Plot_ID13	Plot_ID14	Plot_ID15	Plot_ID16	Plot_ID17	Plot_ID18	Plot_ID19	Plot_ID20	Plot_ID21	Plot_ID22	Plot_ID23	Plot_ID24
Rhamnaceae		<i>Pomaderris ferruginea</i>													
Rosaceae	*	<i>Rubus fruticosus</i> sp. agg.	Blackberry complex												
Rubiaceae		<i>Galium binifolium</i>							2						
Rubiaceae		<i>Morinda jasminoides</i>	Sweet Morinda						3						
Rubiaceae		<i>Opercularia aspera</i>	Coarse Stinkweed												
Rubiaceae		<i>Opercularia hispida</i>	Hairy Stinkweed												
Rubiaceae		<i>Opercularia varia</i>	Variable Stinkweed	1											
Rubiaceae		<i>Pomax umbellata</i>	Pomax		1	2					2	1	1	2	1
Rutaceae		<i>Boronia ledifolia</i>	Sydney Boronia								1				
Rutaceae		<i>Phebalium squamulosum</i> subsp. <i>squamulosum</i>							1						
Rutaceae		<i>Philotheca hispidula</i>			1										
Rutaceae		<i>Zieria smithii</i>	Sandfly Zieria												
Santalaceae		<i>Exocarpos strictus</i>	Dwarf Cherry			1						2		1	1
Sapindaceae		<i>Dodonaea triquetra</i>	Large-leaf Hop-bush		2				1						
Schizaeaceae		<i>Schizaea bifida</i>	Forked Comb Fern												
Simaroubaceae	*	<i>Ailanthus altissima</i>	Tree of Heaven												
Smilacaceae		<i>Smilax</i>	Sweet						2						

Family	Exotic	Scientific Name	Common Name	Plot_ID13	Plot_ID14	Plot_ID15	Plot_ID16	Plot_ID17	Plot_ID18	Plot_ID19	Plot_ID20	Plot_ID21	Plot_ID22	Plot_ID23	Plot_ID24
		<i>glyciphylla</i>	Sarsparilla												
Solanaceae	*	<i>Solanum nigrum</i>	Black-berry Nightshade					2							
Solanaceae		<i>Solanum pungetium</i>	Eastern Nightshade												
Stackhousiaceae		<i>Stackhousia viminea</i>	Slender Stackhousia												
Stylidiaceae		<i>Stylidium graminifolium</i>	Grass Triggerplant	1											
Thymelaeaceae		<i>Pimelea linifolia</i>	Slender Rice Flower		1						1				
Verbenaceae	*	<i>Lantana camara</i>	Lantana					3	2						
Verbenaceae	*	<i>Verbena bonariensis</i>	Purpletop					2							
Violaceae		<i>Hybanthus monopetalus</i>	Slender Violet-bush		2	1					2		2	1	2
Violaceae		<i>Viola hederacea</i>	Ivy-leaved Violet				1		2						
Xanthorrhoeaceae		<i>Xanthorrhoea media</i>		2	3	2					3			3	2
Xanthorrhoeaceae		<i>Xanthorrhoea minor subsp. minor</i>													
Xanthorrhoeaceae		<i>Xanthorrhoea spp.</i>											2		

Appendix Table 6 Fernhill Central West biobank plant species recorded in plots 25-39

Family	Common Name	Scientific Name	Exotic	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Acanthaceae	Blue Trumpet	<i>Brunoniella australis</i>		1	1	2	1	1		1	1	1		1				1
	Dwarf Blue Trumpet	<i>Brunoniella pumilio</i>															1	1
	Pastel Flower	<i>Pseuderanthemum variabile</i>				1							1					
Adiantaceae	Common Maidenhair	<i>Adiantum aethiopicum</i>				1						1	1					

Family	Common Name	Scientific Name	Exotic	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
	Giant Maidenhair	<i>Adiantum formosum</i>										1	1					
	Rock Fern	<i>Cheilanthes sieberi</i>		1	1	1	1			1	1					2	1	1
Amaranthaceae	Lesser Joyweed	<i>Alternanthera denticulata</i>				1												
Anthericaceae		<i>Caesia parviflora</i> var. <i>parviflora</i>						1	1									
		<i>Thysanotus juncifolius</i>													1			
	Slender Wire Lily	<i>Laxmannia gracilis</i>		1	1			1	1								1	1
Apiaceae		<i>Platysace ericoides</i>															1	
	Indian Pennywort	<i>Centella asiatica</i>				1						1						
	Pennywort	<i>Hydrocotyle tripartita</i>														1		
	Shrubby Platysace	<i>Platysace lanceolata</i>				1					1							1
Apocynaceae	Scented Marsdenia	<i>Marsdenia suaveolens</i>											1					
Araliaceae		<i>Astrotricha floccosa</i>										1	1					
Aspleniaceae	Necklace Fern	<i>Asplenium flabellifolium</i>												1	1			
Asteraceae		<i>Vernonia cinerea</i>		1	1		1							1		1		
	Burr-daisy	<i>Calotis dentex</i>					1	1		1	1							1
	Creeping Cudweed	<i>Euchiton gymnocephalus</i>			1													
	Solenogyne	<i>Solenogyne bellioides</i>		1	1						1							
	Sticky Cassinia	<i>Cassinia uncata</i>																1
	White Dogwood	<i>Ozothamnus diosmifolius</i>		1														
Bignoniaceae	Wonga Wonga Vine	<i>Pandorea pandorana</i>				1												
Blechnaceae	Gristle Fern	<i>Blechnum cartilagineum</i>				1												
	Prickly Rasp Fern	<i>Doodia aspera</i>										1	1					
Campanulaceae	Sprawling Bluebell	<i>Wahlenbergia gracilis</i>			1	1												
Caryophyllaceae		<i>Stellaria flaccida</i>											1					
Casuarinaceae	Black She-Oak	<i>Allocasuarina littoralis</i>									1							
	Forest Oak	<i>Allocasuarina torulosa</i>				1	1										1	1

Family	Common Name	Scientific Name	Exotic	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Clusiaceae	Small St John's Wort	<i>Hypericum gramineum</i>		1										1				
Commelinaceae	Native Wandering Jew	<i>Commelina cyanea</i>										1						
Convolvulaceae		<i>Polymeria calycina</i>			1			1			1					1		
	Kidney Weed	<i>Dichondra repens</i>		1	1		1			1	1	1	1					
	Pink Bindweed	<i>Convolvulus erubescens</i>		1														
Cunoniaceae	Christmas Bush	<i>Ceratopetalum gummiferum</i>				1												
Cyperaceae		<i>Cyperus imbecillis</i>										1	1					
		<i>Lepidosperma filiforme</i>													1			
		<i>Lepidosperma gunnii</i>							1						1			
		<i>Lepidosperma sp.</i>												1	1			
		<i>Lepidosperma sp. 2</i>												1				
		<i>Schoenus melanostachys</i>				1												
	Curly Wig	<i>Caustis flexuosa</i>												1				
	Rough Saw-sedge	<i>Gahnia aspera</i>			1					1	1							1
	Variable Sword-sedge	<i>Lepidosperma laterale</i>		1	1	1	1	1	1	1	1	1	1	1			1	1
Dennstaedtiaceae	Bracken	<i>Pteridium esculentum</i>				1												
Dicksoniaceae	Rainbow Fern	<i>Calochlaena dubia</i>				1												
Dilleniaceae		<i>Hibbertia aspera subsp. aspera</i>		1														
		<i>Hibbertia monogyna</i>		1			1											
	Rough Guinea Flower	<i>Hibbertia aspera</i>			2		1	1			1	1		1		1	1	1
Elaeocarpaceae	Blueberry Ash	<i>Elaeocarpus reticulatus</i>				1												
Ericaceae	Blunt Beard-heath	<i>Leucopogon muticus</i>													1			
	Native Cranberry	<i>Lissanthe sapida</i>																1
	Peach Heath	<i>Lissanthe strigosa</i>					1							1	1			
	#N/A	<i>Eriostemon/ Philotheca sp.</i>															1	
Fabaceae (Faboideae)		<i>Desmodium rhytidophyllum</i>			1	1	1											

Family	Common Name	Scientific Name	Exotic	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
		<i>Hovea lanceolata</i>							1									
		<i>Hovea linearis</i>				1												
		<i>Pultenaea tuberculata</i>													1			
	Dainty Wedge Pea	<i>Gompholobium glabratum</i>							1									
	Dogwood	<i>Jacksonia scoparia</i>							1									
	Dusky Coral Pea	<i>Kennedia rubicunda</i>										1						
	Dwarf Wedge Pea	<i>Gompholobium minus</i>												1				
	False Sarsaparilla	<i>Hardenbergia violacea</i>			1		1	1	1		1	1		1				
	Gorse Bitter Pea	<i>Daviesia ulicifolia</i>		1	1			1	1					1	1	1		
	Heathy Mirbelia	<i>Mirbelia rubiifolia</i>												1	1			
	Netted Shaggy Pea	<i>Podolobium scandens</i>												1				
	Pinnate Wedge Pea	<i>Gompholobium pinnatum</i>												1	1			
	Prickly Shaggy Pea	<i>Podolobium ilicifolium</i>				1		1	1									
	Slender Tick-trefoil	<i>Desmodium varians</i>			1					1	1	1	1					
	Small-leaf Glycine	<i>Glycine microphylla</i>		1		1	1	1	1	1						1		1
	Spiny Bossiaea	<i>Bossiaea obcordata</i>							1					1				
	Twining glycine	<i>Glycine clandestina</i>		1	1		1		1									
	Variable Glycine	<i>Glycine tabacina</i>			1		1				1	1				1		1
Fabaceae (Mimosoideae)	Box-leaved Wattle	<i>Acacia buxifolia</i>		1	1		1	1		1	1	1	1			1		
	Green Wattle	<i>Acacia irrorata</i>				1												
	Hickory Wattle	<i>Acacia implexa</i>			1													
	Parramatta Wattle	<i>Acacia parramattensis</i>		1	1					1	1					1		
	Prickly Moses	<i>Acacia ulicifolia</i>			1				1									
	Silver-stemmed Wattle	<i>Acacia parvipinnula</i>						1									1	1
	White Wattle	<i>Acacia linifolia</i>												1	1			
Gentianaceae	Spike Centaury	<i>Schenkia spicata</i>		1	1													

Family	Common Name	Scientific Name	Exotic	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Goodeniaceae	Ivy Goodenia	<i>Goodenia hederacea</i>		1					1					1	1			
Iridaceae	Silky Purple-Flag	<i>Patersonia sericea</i>												1	1			
Lamiaceae		<i>Plectranthus parviflorus</i>											1					
	Hairy Clerodendrum	<i>Clerodendrum tomentosum</i>								1	1							
Lauraceae		<i>Cassytha glabella</i>													1			
Lentibulariaceae	Fairy Aprons	<i>Utricularia dichotoma</i>												1				
Lindsaeaceae	Lacy Wedge Fern	<i>Lindsaea microphylla</i>															1	
Lobeliaceae	Whiteroot	<i>Pratia purpurascens</i>		1	1	1	1	1		1	1			1		1		
Loganiaceae		<i>Logania pusilla</i>							1									
Lomandraceae		<i>Lomandra confertifolia</i> subsp. <i>rubiginosa</i>									1							1
		<i>Lomandra cylindrica</i>							1		1						1	
		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>				1	1	1		1	1	1		1			1	1
		<i>Lomandra gracilis</i>									1							
		<i>Lomandra obliqua</i>						1	1					1	1		1	
	Many-flowered Mat-rush	<i>Lomandra multiflora</i> subsp. <i>multiflora</i>		1	1		1	1	1	1	1	1		1	1		1	1
	Spiny-headed Mat-rush	<i>Lomandra longifolia</i>		1	1	1						1				1		1
Luzuriagaceae	Scrambling Lily	<i>Geitonoplesium cymosum</i>				1				1	1	1	1					
	Wombat Berry	<i>Eustrephus latifolius</i>				1					1	1	1					
Myrsinaceae		<i>Myrsine variabilis</i>				1	1				1	1	1					
Myrtaceae		<i>Eucalyptus resinifera</i> subsp. <i>resinifera</i>										1						
	Blackbutt	<i>Eucalyptus pilularis</i>				1	1	1										
	Eucalyptus oblonga population at Bateau Bay, Forresters Beach and Tumby Umbi in the Wyong local	<i>Eucalyptus oblonga</i>												1	1			

Family	Common Name	Scientific Name	Exotic	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
	government area																	
	Grey Gum	<i>Eucalyptus punctata</i>		1			1	1	1	1	1	1				1	1	1
	Grey Myrtle	<i>Backhousia myrtifolia</i>										1	1					
	Hard-leaved Scribbly Gum	<i>Eucalyptus sclerophylla</i>												1				
	Kanooka	<i>Tristaniopsis laurina</i>				1												
	Narrow-leaved Apple	<i>Angophora bakeri</i>												1	1			
	Narrow-leaved Ironbark	<i>Eucalyptus crebra</i>		1	1		1			1	1						1	1
	Red Bloodwood	<i>Corymbia gummifera</i>						1	1					1	1		1	
	Red Ironbark	<i>Eucalyptus fibrosa</i>								1	1					1		
	Scrub Turpentine	<i>Rhodamnia rubescens</i>										1						
	Slender Tea-tree	<i>Leptospermum trinervium</i>							1					1	1			
	Sydney Red Gum	<i>Angophora costata</i>				1		1				1					1	
	Tantoon	<i>Leptospermum polygalifolium</i>		1		1												
	Thin-leaved Stringybark	<i>Eucalyptus eugenioides</i>		1	1		1		1	1	1						1	
	Turpentine	<i>Syncarpia glomulifera</i>			1		1	1	1			1	1				1	1
	White Stringybark	<i>Eucalyptus globoidea</i>														1		
	Yellow Bloodwood	<i>Corymbia eximia</i>			1			1	1	1	1			1			1	1
Oleaceae		<i>Notelaea longifolia f. longifolia</i>					1											
	Large Mock-olive	<i>Notelaea longifolia</i>								1	1	1	1					
Orchidaceae		<i>Cestichis reflexa</i>				1												
		<i>Dipodium variegatum</i>									1							
		<i>Thelymitra sp.</i>												1	1	1		
	Rock Lily	<i>Dendrobium speciosum</i>				1												
	Snake Orchid	<i>Cymbidium suave</i>										1						
Oxalidaceae		<i>Oxalis perennans</i>		1	1					1			1					
Passifloraceae		<i>Passiflora herbertiana</i>								1			1					

Family	Common Name	Scientific Name	Exotic	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Phormiaceae		<i>Dianella caerulea</i> var. <i>producta</i>		1	1	1	1	1	1	1		1	1				1	1
	A Blue Flax Lily	<i>Dianella revoluta</i> var. <i>revoluta</i>			1										1		1	1
Phyllanthaceae	Cheese Tree	<i>Glochidion ferdinandi</i>					1						1					
	Coffee Bush	<i>Breynia oblongifolia</i>						1		1	1	1	1					
	Thyme Spurge	<i>Phyllanthus hirtellus</i>		1				1	1	1				1	1		1	1
Pittosporaceae	Hairy Apple Berry	<i>Billardiera scandens</i>		1	1				1		1						1	1
	Native Blackthorn	<i>Bursaria spinosa</i>								1					1			1
	Orange Thorn	<i>Pittosporum multiflorum</i>										1	1					
	Rough Fruit Pittosporum	<i>Pittosporum revolutum</i>				1	1			1	1	1						
Plantaginaceae	Trailing Speedwell	<i>Veronica plebeia</i>		1	1													
Poaceae		<i>Austrostipa pubescens</i>		1			1	1	1						1		1	1
		<i>Austrostipa rudis</i> subsp. <i>rudis</i>		1							1							
		<i>Dichelachne inaequiglumis</i>			1											1		
		<i>Lachnagrostis filiformis</i>				1												
		<i>Oplismenus aemulus</i>										1	1					
		<i>Oplismenus imbecillis</i>									1		1					
		<i>Rytidosperma</i> sp.													1			
	A Speargrass	<i>Austrostipa rudis</i> subsp. <i>nervosa</i>					1											
	A Wallaby Grass	<i>Rytidosperma tenuius</i>		1										1	1		1	
	Barbed Wire Grass	<i>Cymbopogon refractus</i>			1													
	Blady Grass	<i>Imperata cylindrica</i>						1										1
	Bordered Panic	<i>Entolasia marginata</i>			1	1				1								
	Common Couch	<i>Cynodon dactylon</i>			1											1		
	Corkscrew Grass	<i>Austrostipa setacea</i>														1		
	Forest Hedgehog Grass	<i>Echinopogon ovatus</i>								1								
	Kangaroo Grass	<i>Themeda australis</i>		1	1			1	1					1	1	1		

Family	Common Name	Scientific Name	Exotic	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
	Paddock Lovegrass	<i>Eragrostis leptostachya</i>		1	1					1	1					1		
	Purple Wiregrass	<i>Aristida ramosa</i>			1													1
	Threeawn Speargrass	<i>Aristida vagans</i>		1	1		1	1		1	1			1		1	1	1
	Tufted Hedgehog Grass	<i>Echinopogon caespitosus</i> var. <i>caespitosus</i>		1	1		1			1						1	1	1
	Two-colour Panic	<i>Panicum simile</i>		1	1		1	1		1	1			1				1
	Weeping Grass	<i>Microlaena stipoides</i>		1	2		1					1	1					
		<i>Microlaena stipoides</i> var. <i>stipoides</i>								1	1					1		
	Wiry Panic	<i>Entolasia stricta</i>		1	1	1	1	1	1	1	1		1	1	1	1	1	1
Potamogetonaceae	Sago Pondweed	<i>Potamogeton pectinatus</i>				1												
Proteaceae	Broad-leaved Geebung	<i>Persoonia levis</i>																1
	Crinkle Bush	<i>Lomatia silaifolia</i>				1												
	Finger Hakea	<i>Hakea dactyloides</i>													1			
	Hairpin Banksia	<i>Banksia spinulosa</i>												2	1			
	Lance Leaf Geebung	<i>Persoonia lanceolata</i>												1	1			
	Mountain Devil	<i>Lambertia formosa</i>													1			
	Narrow-leaved Geebung	<i>Persoonia linearis</i>		1	1	1	1	1	1	1		1		1	1	1	1	1
	Woody Pear	<i>Xylomelum pyriforme</i>							1									
Ranunculaceae	Old Man's Beard	<i>Clematis aristata</i>				1					1							
Rhamnaceae		<i>Pomaderris ferruginea</i>																1
Rubiaceae		<i>Galium binifolium</i>										1	1					
	Coarse Stinkweed	<i>Opercularia aspera</i>										1		1				
	Hairy Stinkweed	<i>Opercularia hispida</i>										1						
	Maori Bedstraw	<i>Galium propinquum</i>				1												
	Pomax	<i>Pomax umbellata</i>		1	1		1	1	1	1	1				1		1	1
	Sweet Morinda	<i>Morinda jasminoides</i>				1						1	1					

Family	Common Name	Scientific Name	Exotic	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Rutaceae		<i>Philotheca hispidula</i>				1												
	Sandfly Zieria	<i>Zieria smithii</i>										1						
Santalaceae	Cherry Ballart	<i>Exocarpos cupressiformis</i>		1													1	1
	Dwarf Cherry	<i>Exocarpos strictus</i>					1	1		1	1							
Sapindaceae	Large-leaf Hop-bush	<i>Dodonaea triquetra</i>				1		1		1	1						1	1
Smilacaceae	Lawyer Vine	<i>Smilax australis</i>										1	1					
	Sweet Sarsparilla	<i>Smilax glyciphylla</i>				1												
Solanaceae	Forest Nightshade	<i>Solanum prinophyllum</i>				1				1	1							
Stackhousiaceae		<i>Stackhousia sp.</i>									1							
	Creamy Candles	<i>Stackhousia monogyna</i>						1										
	Slender Stackhousia	<i>Stackhousia viminea</i>		1	1			1		1								1
Thymelaeaceae	Slender Rice Flower	<i>Pimelea linifolia</i>															1	
Violaceae	Slender Violet-bush	<i>Hybanthus monopetalus</i>													1			
Vitaceae	Native Grape	<i>Cayratia clematidea</i>											1					
	Water Vine	<i>Cissus antarctica</i>										1						
Xanthorrhoeaceae		<i>Xanthorrhoea media</i>						1						1			1	1
		<i>Xanthorrhoea minor</i>													1			
		<i>Xanthorrhoea sp.</i>							1									

* = Exotic

1 = Vegetation Zones:

2 = Cover Abundance: 1. Less than 5% and rare 2. Less than 5% and common 3. 6 – 15% 4. 16 – 25% 5. 26 – 50% 6. 51 – 75% 7. 76 – 100%

Appendix Table 7 Fernhill Central West biobank opportunistic fauna observations

Class	Family	Exotic	Scientific Name	Common Name	TSC Status	EPBC Status	Observation Type
Amphibia	Hylidae		<i>Litoria fallax</i>	Eastern Dwarf Tree Frog	0		OW
Amphibia	Hylidae		<i>Litoria peronii</i>	Peron's Tree Frog	0		W
Amphibia	Hylidae		<i>Litoria taylori</i>	Taylor's Tree Frog	0		W
Amphibia	Hylidae		<i>Litoria verreauxii verreauxii</i>	Verreaux's Tree Frog (subsp)	0		O, W
Amphibia	Myobatrachidae		<i>Limnodynastes peronii</i>	Brown-striped Frog	0		W
Amphibia	Myobatrachidae		<i>Crinia signifera</i>	Common Eastern Froglet	0		W
Amphibia	Myobatrachidae		<i>Pseudophryne australis</i>	Red-crowned Toadlet	V		W
Amphibia	Myobatrachidae		<i>Limnodynastes tasmaniensis</i>	Spotted Grass Frog	0		W
Aves	Acanthizidae		<i>Acanthiza pusilla</i>	Brown Thornbill	0		OW
Aves	Acanthizidae		<i>Origma solitaria</i>	Rockwarbler	0		O
Aves	Acanthizidae		<i>Acanthiza lineata</i>	Striated Thornbill	0		W
Aves	Acanthizidae		<i>Smicronis brevirostris</i>	Weebill	0		O
Aves	Acanthizidae		<i>Sericornis frontalis</i>	White-browed Scrubwren	0		O
Aves	Acanthizidae		<i>Acanthiza nana</i>	Yellow Thornbill	0		O
Aves	Accipitridae		<i>Accipiter fasciatus</i>	Brown Goshawk	0		O
Aves	Accipitridae		<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk	0		O
Aves	Alcedinidae		<i>Ceyx azureus</i>	Azure Kingfisher	0		O
Aves	Alcedinidae		<i>Dacelo novaeguineae</i>	Laughing Kookaburra	0		O
Aves	Anatidae		<i>Cygnus atratus</i>	Black Swan	0		O
Aves	Anatidae		<i>Aythya australis</i>	Hardhead	0		O

Class	Family	Exotic	Scientific Name	Common Name	TSC Status	EPBC Status	Observation Type
Aves	Anatidae		<i>Anas superciliosa</i>	Pacific Black Duck	0		O
Aves	Ardeidae		<i>Ardea ibis</i>	Cattle Egret	0		O
Aves	Ardeidae		<i>Ardea pacifica</i>	White-necked Heron	0		O
Aves	Artamidae		<i>Cracticus tibicen</i>	Australian Magpie	0		W
Aves	Artamidae		<i>Cracticus torquatus</i>	Grey Butcherbird	0		W
Aves	Artamidae		<i>Strepera graculina</i>	Pied Currawong	0		O
Aves	Cacatuidae		<i>Eolophus roseicapillus</i>	Galah	0		O
Aves	Cacatuidae		<i>^Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	V		O
Aves	Cacatuidae		<i>Cacatua sanguinea</i>	Little Corella	0		O
Aves	Cacatuidae		<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	0		W
Aves	Cacatuidae		<i>Calyptorhynchus funereus</i>	Yellow-tailed Black-cockatoo	0		O
Aves	Charadriidae		<i>Vanellus miles</i>	Masked Lapwing	0		W
Aves	Climacteridae		<i>Cormobates leucophaea</i>	White-throated Treecreeper	0		O
Aves	Columbidae		<i>Geopelia humeralis</i>	Bar-shouldered Dove	0		O
Aves	Columbidae		<i>Macropygia amboinensis</i>	Brown Cuckoo-dove	0		O
Aves	Columbidae		<i>Leucosarcia picata</i>	Wonga Pigeon	0		O
Aves	Corvidae		<i>Corvus coronoides</i>	Australian Raven	0		W
Aves	Cuculidae		<i>Scythrops novaehollandiae</i>	Channel-billed Cuckoo	0		W
Aves	Cuculidae		<i>Eudynamys orientalis</i>	Eastern Koel	0		W
Aves	Cuculidae		<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	0		O
Aves	Cuculidae		<i>Chalcites lucidus</i>	Shining Bronze-cuckoo	0		W

Class	Family	Exotic	Scientific Name	Common Name	TSC Status	EPBC Status	Observation Type
Aves	Estrildidae		<i>Taeniopygia bichenovii</i>	Double-barred Finch	0		O
Aves	Estrildidae		<i>Neochmia temporalis</i>	Red-browed Finch	0		W
Aves	Hirundinidae		<i>Hirundo neoxena</i>	Welcome Swallow	0		O
Aves	Maluridae		<i>Malurus cyaneus</i>	Superb Fairy-wren	0		W
Aves	Meliphagidae		<i>Manorina melanophrys</i>	Bell Miner	0		W
Aves	Meliphagidae		<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater	0		W
Aves	Meliphagidae		<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill	0		O
Aves	Meliphagidae		<i>Meliphaga lewinii</i>	Lewin's Honeyeater	0		O
Aves	Meliphagidae		<i>Manorina melanocephala</i>	Noisy Miner	0		W
Aves	Meliphagidae		<i>Anthochaera carunculata</i>	Red Wattlebird	0		W
Aves	Meliphagidae		<i>Myzomela sanguinolenta</i>	Scarlet Honeyeater	0		OW
Aves	Meliphagidae		<i>Lichenostomus leucotis</i>	White-eared Honeyeater	0		OW
Aves	Meliphagidae		<i>Melithreptus lunatus</i>	White-naped Honeyeater	0		W
Aves	Meliphagidae		<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	0		OW
Aves	Meliphagidae		<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater	0		OW
Aves	Monarchidae		<i>Myiagra rubecula</i>	Leaden Flycatcher	0		W
Aves	Monarchidae		<i>Grallina cyanoleuca</i>	Magpie-lark	0		W
Aves	Monarchidae		<i>Myiagra inquieta</i>	Restless Flycatcher	0		W
Aves	Neosittidae		<i>Daphoenositta chrysoptera</i>	Varied Sittella	V		O
Aves	Oriolidae		<i>Oriolus sagittatus</i>	Olive-backed Oriole	0		OW
Aves	Pachycephalidae		<i>Pachycephala pectoralis</i>	Golden Whistler	0		OW

Class	Family	Exotic	Scientific Name	Common Name	TSC Status	EPBC Status	Observation Type
Aves	Pachycephalidae		<i>Colluricincla harmonica</i>	Grey Shrike-thrush	0		W
Aves	Pardalotidae		<i>Pardalotus punctatus</i>	Spotted Pardalote	0		W
Aves	Pardalotidae		<i>Pardalotus striatus</i>	Striated Pardalote	0		W
Aves	Petroicidae		<i>Eopsaltria australis</i>	Eastern Yellow Robin	0		O
Aves	Petroicidae		<i>Microeca fascinans</i>	Jacky Winter	0		O
Aves	Petroicidae		<i>Petroica rosea</i>	Rose Robin	0		O
Aves	Phalacrocoracidae		<i>Microcarbo melanoleucos</i>	Little Pied Cormorant	0		O
Aves	Phasianidae		<i>Coturnix ypsilophora</i>	Brown Quail	0		O
Aves	Podargidae		<i>Podargus strigoides</i>	Tawny Frogmouth	0		W
Aves	Podicipedidae		<i>Tachybaptus novaehollandiae</i>	Australasian Grebe	0		O
Aves	Psittacidae		<i>Alisterus scapularis</i>	Australian King-Parrot	0		O
Aves	Psittacidae		<i>Platycercus elegans</i>	Crimson Rosella	0		OW
Aves	Psittacidae		<i>Platycercus eximius</i>	Eastern Rosella	0		O
Aves	Psittacidae		<i>Trichoglossus haematodus</i>	Rainbow Lorikeet	0		W
Aves	Psittacidae		<i>Psephotus haematonotus</i>	Red-rumped Parrot	0		OW
Aves	Psophodidae		<i>Psophodes olivaceus</i>	Eastern Whipbird	0		W
Aves	Ptilonorhynchidae		<i>Ptilonorhynchus violaceus</i>	Satin Bowerbird	0		O
Aves	Rallidae		<i>Gallinula tenebrosa</i>	Dusky Moorhen	0		O
Aves	Rallidae		<i>Fulica atra</i>	Eurasian Coot	0		W
Aves	Rallidae		<i>Porphyrio porphyrio</i>	Purple Swamphen	0		W
Aves	Rhipiduridae		<i>Rhipidura albiscapa</i>	Grey Fantail	0		O

Class	Family	Exotic	Scientific Name	Common Name	TSC Status	EPBC Status	Observation Type
Aves	Rhipiduridae		<i>Rhipidura leucophrys</i>	Willie wagtail	0		O
Aves	Strigidae		<i>Ninox novaeseelandiae</i>	Southern Boobook	0		W
Aves	Threskiornithidae		<i>Threskiornis spinicollis</i>	Straw-necked Ibis	0		O
Aves	Threskiornithidae		<i>Platalea flavipes</i>	Yellow-billed Spoonbill	0		O
Aves	Timaliidae		<i>Zosterops lateralis</i>	Silvereye	0		O
Aves	Turdidae	*	<i>Turdus merula</i>	Eurasian Blackbird	0		O
Mammalia	Bovidae	*	<i>Bos taurus</i>	European cattle	0		O
Mammalia	Bovidae	*	<i>Capra hircus</i>	Goat	0		O
Mammalia	Cervidae	*	<i>Cervus timorensis</i>	Rusa deer	0		O
Mammalia	Leporidae	*	<i>Lepus capensis</i>	Brown Hare	0		O
Mammalia	Macropodidae		<i>Macropus giganteus</i>	Eastern Grey Kangaroo	0		O
Mammalia	Macropodidae		<i>Macropus rufogriseus</i>	Red-necked wallaby	0		O
Mammalia	Molossidae		<i>Mormopterus "Species 2"</i>	Undescribed Freetail Bat	0		W
Mammalia	Petauridae		<i>Petaurus breviceps</i>	Sugar Glider	0		W
Mammalia	Phalangeridae		<i>Trichosurus vulpecula</i>	Common Brushtail Possum	0		O
Mammalia	Pteropodidae		<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V		W
Mammalia	Rhinolophidae		<i>Rhinolophus megaphyllus</i>	Eastern Horseshoe-bat	0		W
Reptilia	Agamidae		<i>Physignathus lesueurii</i>	Eastern Water Dragon	0		O
Reptilia	Boidae		<i>Morelia spilota spilota</i>	Diamond Python	0		O
Reptilia	Elapidae		<i>Demansia psammophis</i>	Yellow-faced Whip Snake	0		O
Reptilia	Scincidae		<i>Lampropholis delicata</i>	Dark-flecked Garden Sunskink	0		O

Class	Family	Exotic	Scientific Name	Common Name	TSC Status	EPBC Status	Observation Type
Reptilia	Scincidae		<i>Eulamprus quoyii</i>	Eastern Water-skink	0		W

Key: E – endangered, M – migratory, V – vulnerable. B – burrow; F – tracks, H – skin, K – dead, O – observed, P – scat, W - heard

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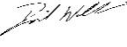
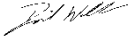
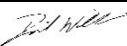

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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0.	B Harrington	J Pepper D Williams		J Pepper		1/10/2013
1.	B Harrington	D Williams		D Williams		15/01/2014
2	B Harrington	D Williams		D Williams		11/02/2014

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