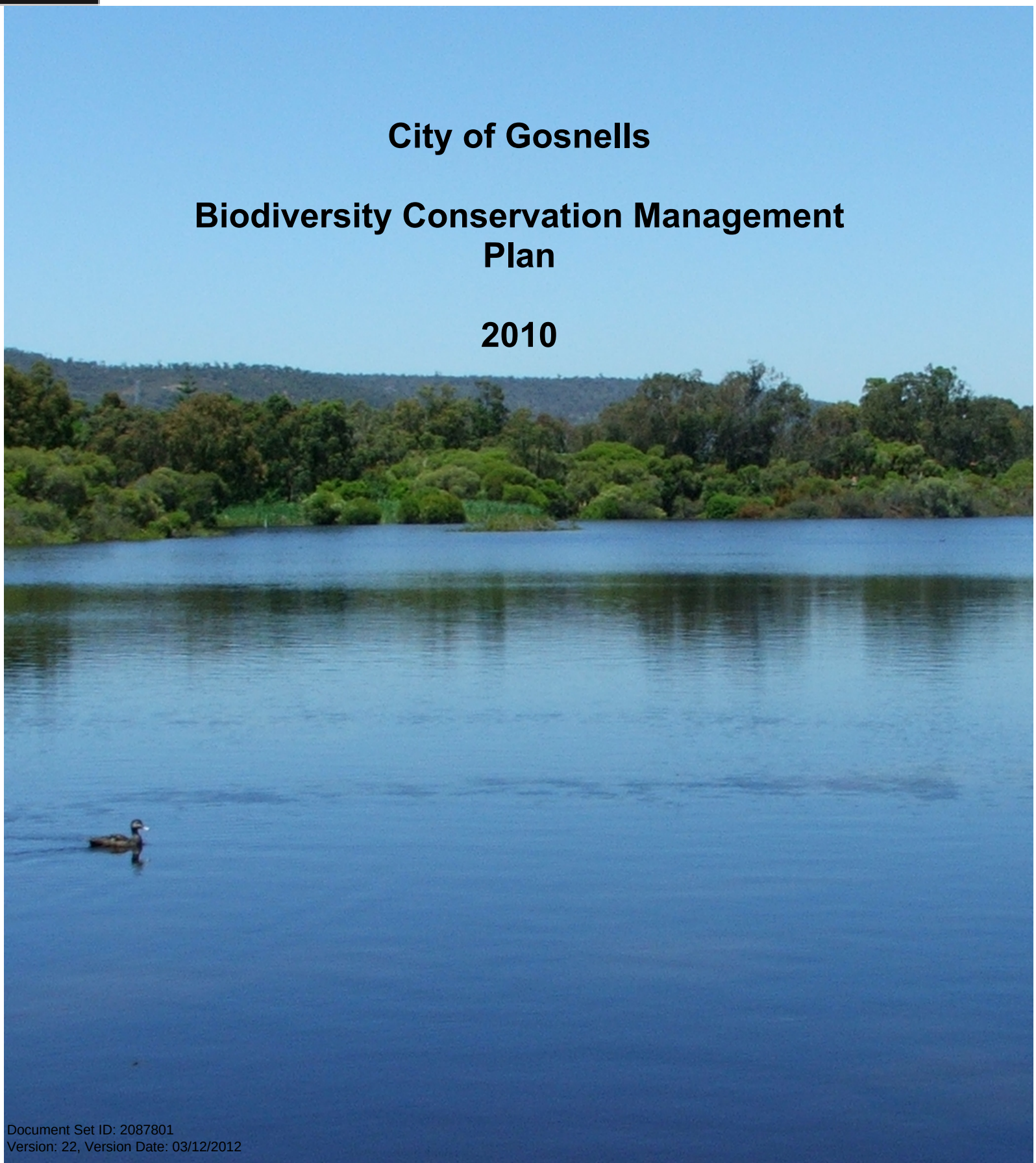
CITY OF GOSNELLS

City of Gosnells

Biodiversity Conservation Management Plan

2010



Council resolved, vide Resolution 420 21 September 2010:

420 "That Council endorse the Biodiversity Conservation Management Plan, as contained in Appendix 13.5.1A, as the guiding document for the City's protection and management of areas of native vegetation under its control."

Acknowledgements:

The City of Gosnells graciously acknowledges funding support and in-kind assistance provided by the Perth Biodiversity Project to this project.

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Executive Summary

The City of Gosnells, through its Strategic Plan for The Future 2007-2010, has committed to the mapping and evaluation of natural areas managed by City of Gosnells, and to the development and implementation of a Management Prioritisation Report.

This study examines 38 bushland areas, or Local Natural Areas (LNA), owned or managed by the City. It has researched the ecological attributes of each area using a methodology developed by the Western Australian Local Government Association's Perth Biodiversity Project (PBP), and used a database developed by the PBP to provide a priority ranking of these areas in terms of ecological importance.

Using this prioritisation and applying local knowledge and understanding of management aspects of the LNAs, this report provides a Management Priority ranking for the 38 sites.

An evaluation of the City's current budgeting and resourcing of management across the 38 sites finds that the current allocation is generally inverse to the Management Priorities of LNAs. The report recommends, to address this anomaly, the redistribution of existing funds and consideration of new monies for LNA management resourcing.

The study further examined protections afforded LNAs through planning mechanisms. It provides an analysis of Metropolitan Region Scheme (MRS) and Town Planning Scheme (TPS) zonings for each of the 38 sites. For those where a Crown Reserve has been created, the reservation purpose was also examined.

The study finds that few of the MRS and TPS zonings reflect the purpose for which the sites have been set aside. Importantly, for those where a Crown Reserve has been created, very few LNAs are afforded specific long-term protection through an appropriate reservation purpose such as Conservation.

This report makes recommendations with regard to the long-term protection of LNAs through appropriate TPS zoning and amendments to reservation purpose.

1 Purpose

This report addresses the City's current management of bushland areas, or Local Natural Areas (LNA), and presents a discussion paper on the development of a Local Biodiversity Conservation Strategy, which provides for a strategic approach to the identification and protection of future LNAs.

This study evaluates 38 bushland areas, or Local Natural Areas (LNA), in the City's management or ownership. It presents an empirical evaluation of each area's biodiversity value and resilience, or sustainability. This provides the basis for a biodiversity management strategy that addresses management prioritisation, management planning, protection and resourcing. The strategy is supported by recommendations for action across the Parks and Environmental Operations, Urban Regeneration, Planning Implementation and City Facilities units.

1.1 The City of Gosnells' Strategic Plan for The Future 2007-2010

The conservation and management of the City of Gosnells' natural areas and the biodiversity they contain and support are objectified in Goal 1 of the City's Strategic Plan for The Future 2007-2010:

To enhance our natural and built environment

Three of the five objectives of Goal 1 directly address biodiversity management:

1.2 Reduce the negative impacts of development on the environment

1.4 Manage and protect areas of environmental and heritage significance

1.5 Make a local contribution towards addressing major regional and global environmental issues

The City's Strategic Plan for The Future 2007-2010 defines success in achieving its biodiversity objectives by as:

- Increasing the percentage of natural areas in good to pristine condition managed or owned by the City.
- Maximising natural areas in good to pristine condition in the City.
- Increasing the preservation of heritage sites of significance owned or managed by the City.

Key to the achievement of the City's biodiversity objectives is Strategy 6 of the Strategic Plan for The Future 2007-2010. Strategy 6 provides for the development of a Biodiversity Conservation Management Plan *(BCMP)*, whose purpose is to identify areas with a high biodiversity value and complete a framework for biodiversity conservation.

The key deliverables of the BCMP are:

1. The mapping and evaluation of natural areas managed by City of Gosnells.
2. The development and implementation of a Management Prioritisation Report.

This Biodiversity Conservation Management Plan provides the City's blueprint for the conservation and management of its current biodiversity assets.

1.2 What is Biodiversity?

Biodiversity is defined as:

'The variety of life forms, the different plants, animals and micro-organisms, the genes they contain, and the ecosystems they form. It is usually considered at three levels: genetic diversity; species diversity; and ecosystem diversity'. (Commonwealth of Australia 1996).

It encompasses a diverse range of living things and ecosystems, which are constantly evolving and adapting to environmental changes and other influences. It is vital in supporting human life on Earth, supplying clean air, clean water and fertile soils, and providing many essentials including food, medicines and industrial products.

The United Nations has declared 2010 to be the International Year of Biodiversity. *"It is a celebration of life on earth and of the value of biodiversity for our lives. The world is invited to take action in 2010 to safeguard the variety of life on earth: biodiversity. Biodiversity is essential to sustaining the living networks and systems that provide us all with health, wealth, food, fuel and the vital services our lives depend on. Human activity is causing the diversity on Earth to be lost at a greatly accelerated rate. These losses are irreversible, impoverish us all and damage the life support systems we rely on everyday. But we can prevent them."* (Convention on Biological Diversity, 2010)

The measurement of biodiversity is a difficult undertaking considering the complexity of natural systems. There is general agreement, though that its measure can best be expressed as the extent and condition of the natural environment remaining in a given area. Biodiversity value decreases, for example, in bushland where the understorey has been cleared or degraded.

The City's measurement of the increase in the percentage of natural areas in good to pristine condition provides a sound target for biodiversity conservation and management. Key to achieving this target is ensuring that we protect natural areas that are in the best possible condition and maintain them in that state.

The maintenance and enhancement of biodiversity is critical to the economic, cultural, social and spiritual well-being of a community. The value of biodiversity (Bennett, 2003) includes:

- Benefits generated by tourism and recreation activities that are dependent on biological resources.
- Life support services such as nutrient removal, flood control, climate stabilisation etc.

- Human ethical considerations relating to matters such as the extinction of species and ecosystems.
- Philanthropic and bequest motives whereby individuals enjoy the pleasure of others (both in the current and future generations) in the continuing availability of the biological resource.
- The “insurance” benefit that is provided through the protection that a resilient ecological system provides.

1.3 Australia’s Only Biodiversity Hotspot

Perth, in south-western Australia, is at the centre of one of the world’s top twenty-five (and Australia’s only) biodiversity hotspots due its high species richness and the level of threat under which it is being placed (Myers, Mittermeier, de Fonseca & Kent, 2000). Recent studies conducted by Dr. Steve Hopper of Kew Gardens and Kings Park Botanic Gardens concluded that "Perth is probably the most biodiverse city in the world" (Newman and Jennings, 2008).

The high number of occurrences of Declared Rare Flora, Threatened Ecological Communities and Conservation and Resource Enhancement management category wetlands in the City of Gosnells underscores the high biodiversity values in the municipality, and the biodiversity conservation and management imperative incumbent upon the City and its community.

1.4 Threats to Biodiversity

The threats facing natural areas in the City of Gosnells are typical of other regions within and around major cities, although the City’s peri-urban location and rate of urban development elevate certain threats. The variety of threats can be broadly captured under the following headings:

- **Land Use** – since settlement and clearing for agricultural land uses, clearing of native vegetation is an external cost to continuing development. The major land use threat to biodiversity in the City of Gosnells today is associated with urban development.
- **Planning and Policy** – historically and, to a certain extent, today, biodiversity has not been adequately considered in the early stages of the land use planning process. Economic and social aspects remain, at the expense of holistic land use planning, dominant considerations in the decision making process.
- **Site Specific Threats** – these include environmental weeds, Phytophthora dieback, inappropriate fire regimes, over-use, vehicle access, rubbish dumping, feral animals, erosion, firewood collection, excessive nutrients and inappropriate or inadequate management.
- **Understanding and Awareness** – key to many of the threats to biodiversity are a general lack of awareness in the community of the importance of biodiversity and a lack of understanding of the management needs of remnant natural areas.
- **Changes to Hydrology** – locally and regionally, changes to surface and sub-surface hydrology are occurring as a result of land use change, drainage and groundwater abstraction. The quality of shallow groundwater is also under

threat, particularly from nutrient enrichment. These changes present an overall threat to biodiversity, especially ecosystems that are dependent on shallow groundwater or flooding.

- **Climate Change** - Climate change is predicted to alter rainfall patterns in the south-west of Western Australia, further exacerbating groundwater and surface water impacts, and affecting established seasonal patterns. Longer-term impacts from climate change include the facilitation of new environmental weed species, shifting climatic zones and eventual vegetation assemblage collapse.

1.5 Planning for Biodiversity Conservation

1.5.1 State Planning Policy 2.8 Bushland Policy for the Perth Metropolitan Region (draft)

The aim of this policy is to provide a statutory policy and implementation framework that will ensure bushland protection and management issues in the Perth Metropolitan Region (PMR) are appropriately addressed.

This policy recognises the protection and management of significant bushland areas, which have been identified for protection through an endorsed strategy, as a fundamental consideration in the planning process. It also seeks to integrate and balance wider environmental, social and economic considerations, thereby reflecting the principles of sustainability.

1.5.2 Wetlands Conservation Policy for Western Australia

The Wetlands Conservation Policy for Western Australia (Government of Western Australia, 1997) is the Western Australian Government's commitment regarding the management of WA wetlands. It provides broad objectives for wetlands, waterways, estuaries and shallow marine areas. It also provides an implementation strategy specifically for the management of wetlands in WA.

The policy's implementation in the Perth Metropolitan Area occurs largely through the land use planning process, considering wetland mapping provided in the Department of Environment and Conservation's Geomorphic Wetlands Swan Coastal Plain Dataset.

1.5.3 Bush Forever

Bush Forever (Government of Western Australia, 2000) is a non-statutory policy under the Western Australian Planning Commission's (WAPC) policy framework that has been endorsed by the Western Australian Government, the WAPC, the Environmental Protection Authority (EPA), the National Parks and Nature Conservation Authority (now the Conservation Commission of WA) and the then Water and Rivers Commission Board of Management.

Bush Forever identifies regionally significant bushland to be protected and managed on the Swan Coastal Plain portion of the PMR and substantially meets the Western Australian Government's commitments in the Urban Bushland Strategy (1995) and the Commonwealth's National Strategy for the Conservation of Australia's Biodiversity (1996) in that it seeks to establish, as far as is achievable, a comprehensive, adequate and representative reserve system. It also addresses Commonwealth policies and

legislation including the Environment Protection and Biodiversity Conservation Act (1999) and the National Objectives and Targets for Biodiversity Conservation 2001-2005 (2001), as well as the ANZECC National Framework for Management and Monitoring of Australia's Native Vegetation (1999) and the International Convention on Biological Diversity (1992).

Bush Forever identifies approximately 51,200 hectares of regionally significant bushland to be protected and managed in 287 Bush Forever sites on the Swan Coastal Plain portion of the Perth Metropolitan Area. Bush Forever sites form the basis of the Bush Forever Protection Areas identified in Draft State Planning Policy 2.8 Bushland Policy for the Perth Metropolitan Region (WAPC, 2004).

Bush Forever sites include lands in a variety of ownerships and land use zoning, with varying degrees of commitments and approvals for development. Overall, around 65% of Bush Forever sites are identified with some existing level of protection. Of the unprotected lands, the majority is owned by either State, local or Commonwealth government (26%), with the remaining 9% is private ownership.

Bush Forever site selection was based on the principles of sustainability, incorporating environmental, social and economic selection criteria. It sought to address a target of at least 10% of the original extent for each vegetation complex on the Swan Costal Plain portion of the Perth Metropolitan Region, recognising it as a constrained area in the context of the 30% target established in the National Objectives and Targets for Biodiversity Conservation 2001–2005 (Commonwealth of Australia, 2001).

Amendment No. 1082/33 to the Metropolitan Region Scheme – Bush Forever and Related Lands provides for:

- The creation of a Special Control Area (Bush Forever Protection Area) and related provisions in the Metropolitan Region Scheme Text.
- The establishment of a Special Control Area (Bush Forever Protection Area) in the Metropolitan Region Scheme (MRS) over all Bush Forever sites.
- The reservation of a number of Bush Forever sites for Parks and Recreation within the MRS.

Bush Forever (Government of WA, 2000) is the complementary "higher order" State Government biodiversity conservation initiative. Its foundation objectives, as outlined in Perth's Bushplan (1998), the planning stage of Bush Forever, were:

- "To develop a plan that meets the needs and aspirations of the community of Western Australia for the appropriate protection of bushland of regional significance in the Swan Coastal Plain portion of the Perth Metropolitan Region.
- To recommend a conservation system that is, as far as is achievable, comprehensive, adequate and representative of the ecological communities and habitats of the region."

The corollary of Bush Forever, addressed briefly in that document, is that the protection of natural areas of local significance is primarily the responsibility of Local Government. The Bush Forever policy encourages Local Governments to prepare local biodiversity strategies to identify Local Natural Areas worthy of protection.

In order to assist Local Governments with the identification and assessment of this local biodiversity, the Perth Biodiversity Project (PBP) was initiated.

1.5.4 The Perth Biodiversity Project

The PBP is a Local Government initiative to improve the conservation of biodiversity in the Perth Metropolitan Region. It is supported by 30 Local Governments, the Western Australian Local Government Association (WALGA), Perth Region Natural Resource Management (PRNRM) and the Australian Government through the Caring for Our Country program.

Since its inception, the project has worked with the key stakeholders in biodiversity conservation, planning and management - the Department of Environment and Conservation (DEC), Department for Planning and Infrastructure (DPI) and Greening Australia WA.

Over a projected 25 years, the project aims to assist Local Governments and their communities to:

- Protect and manage all local biodiversity areas in the Perth Metropolitan Region within a secure conservation network.
- Plan for the enhancement and establishment of ecological linkages between local and regional biodiversity areas.

The PBP has produced the Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region (Western Australian Local Government Association & PBP, 2004). The Guidelines were developed to assist Local Governments in the planning for, and management of, biodiversity conservation. They provide a comprehensive tool to assist Western Australian Local Governments to take a more science-based, rigorous, consistent and strategic approach to the retention, protection and management of bushland, wetlands and other natural areas.

The PBP has, to date, been supported by the Australian Government through the provision of more than $1 million in funding. In addition to, and in support of, the development of the Guidelines, this funding has also assisted Local Governments in their implementation through a variety of other on-ground and capacity building activities.

The PBP processes, tools and methodologies have been endorsed by the Western Australian Planning Commission and the Environmental Protection Authority. They have been integral to the development of the BCMP.

1.6 Native Vegetation in the City of Gosnells

1.6.1 Data and Limitations

PBP (2004) collated and evaluated the best available state government mapping and information related to vegetation, and provided the following data to Local Governments:

- Remnant native vegetation mapping in the Perth Metropolitan Region - derived from dated aerial photography (circa 1997) prepared by the Environmental Protection Authority (2003a) and Department of Environment (unpublished, 2003) with limited ground-truthing.
- Remnant native vegetation in the Bush Forever study area - derived from dated aerial photography (1998) with limited ground-truthing.
- Native Vegetation Extent by Local Government area and Administrative Planning Category - prepared by interpretation and analysis of the Perth Bushland Mapping dataset 2001 with other GIS datasets (Taylor, 2003).

The data are qualified by advice that there is a general over-estimate in the data due to a number of factors, including:

- The preferential mapping of treed landscapes, leading to some mapping of areas that are parkland cleared or completely degraded .
- The inclusion of areas that are/were approved for clearing through development approvals and/or clearing permits.
- The clearing of some areas since the time of the aerial photography.

PBP (2004) advised that it is reasonable to expect that there may be:

- At least a 10% over-estimate in the remnant native vegetation mapping in the Perth Metropolitan Region.
- At least a 5% over-estimate present in the statistics for the Bush Forever study area.
- An error of up to 5% associated with calculated areas for individual polygons in the Perth Bushland mapping dataset, although the overall error for summarised areas from this dataset will be much lower.

As a consequence, figures presented in the following discussion, other than those quoted for specific LNAs, may be regarded as moderate over-estimates at the time of measurement. The actual amounts of remnant vegetation are, due to data limitations and the passage of time, less than the figures presented in the following discussion. Rather than detract from the accuracy of the figures, these discrepancies emphasise the significance of the need and urgency for a strategy to identify, conserve and manage the biodiversity in the City of Gosnells.

1.6.2 An Evaluation of Native Vegetation in the City of Gosnells

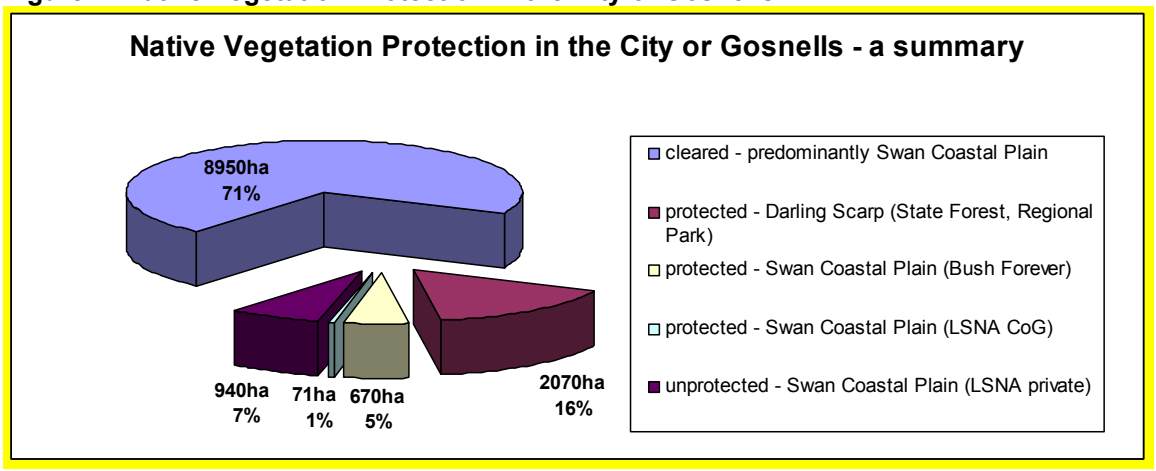
The municipality of the City of Gosnells straddles two distinct landforms - the Darling Scarp and the Swan Coastal Plain - whose soil types, climate, hydrology, soil fertility, and other factors underpin their unique vegetation characteristics and patterns of historical land clearing. Whereas the Swan Coastal Plain has been extensively cleared, the vegetation of the Darling Scarp remains largely intact.

The Darling Scarp in the City of Gosnells can be broadly described as the area east of a roughly north-south line between Canter Court in Orange Grove and Connell Avenue, Martin, comprising those two suburbs only.

The Swan Coastal Plain lies to the west of this line, comprising relatively small areas of Martin and Orange Grove, and the suburbs of Beckenham, Canning Vale, Gosnells, Huntingdale, Langford, Southern River and Thornlie.

Data provided by WALGA & PBP (2004), illustrated in Figure 1, advise that 71% of the original 12,700 hectares of native vegetation in the City of Gosnells have been cleared, leaving 3,750 hectares of remnant vegetation.

Figure 1: Native Vegetation Protection in the City of Gosnells



Of the remaining uncleared native vegetation, 2,070 hectares are located on the largely uncleared Scarp, and are mostly protected as State Forest and Regional Parks.

Looking at the Plain, with its relatively flat terrain and more amenable and fertile soils, the story is very different. Approximately 84% of the native vegetation on the Plain portion of the City has been cleared through historical and contemporary clearing, leaving only 1,680 hectares of native vegetation.

It is the Plain portion of the City of Gosnells where the greatest biodiversity threats and opportunities exist. Of the 1,680 hectares of native vegetation remaining on the Plain, 670 hectares are protected as Bush Forever Sites, including 90 hectares owned or managed by the City of Gosnells. The balance of 1,010 hectares of bushland has no formal protection, although the 71 hectares of bushland managed by the City of Gosnells that is included in this figure could be considered as protected.

It is the161 hectares of City-managed sites, or 1% of the City's total area, that are the subject of this Biodiversity Conservation Management Plan.

1.7 Local Natural Areas

Local Natural Areas (LNA) is the terminology applied to bushland or wetland areas that are generally established and set aside for the purpose of conservation through the land use planning process. The City has existing management responsibility for a range of LNAs whose size, shape, biodiversity value and condition are largely a reflection of evolving community awareness and expectations of natural resource management, land use planning and management.

A significant number of LNAs in the City's care derive more from historical circumstance than considered biodiversity planning. They comprise, in the main, small "pocket parks" in which a greater or lesser extent of native vegetation cover remains by default in lieu of traditional parkland development. Management intervention and resourcing have, similarly, been reflective of historical priorities. The generally degraded condition of these LNAs today is reflective of their history.

In more recent times, LNAs are being established through the land use planning process in response to legislative or policy imperatives. These imperatives, addressing Declared Rare Flora, Threatened Ecological Communities, and Conservation and Resource Enhancement management category wetlands generally provide what may be considered a primary level of biodiversity evaluation. They address critical biodiversity aspects that have been determined by state and/or commonwealth governments.

These more recently acquired LNAs are generally of a larger size and substantially better condition than historical LNAs. The care of these areas presents a challenge to the City in the provision of adequate resources and realisation of sufficient organisational capacity to achieve an appropriate level of management, which is critical to maintaining their good condition and function.

More recently acquired LNAs are outcomes of external policy and legislation and are not the result of their consideration by the City in the context of any overarching City-wide policy or planning strategy. This is a significant shortcoming in light of the City's desire to maximise the conservation and management of areas in good to pristine condition.

The BCMP provides recommendations and strategies to address the challenge of balancing the management of the diverse range of management needs of the City's current LNAs.

1.8 The Value of Local Natural Areas

The City of Gosnells is blessed with many significant bushland habitats and types. It is widely accepted that these assets are a significant aspect of the City's individuality. The actual or perceived value of each LNA varies according to its circumstances. In general, though, higher biodiversity values reside in those LNAs that have been set aside in recent years through land use planning's accommodation of legislative and policy-driven biodiversity conservation requirements.

LNAs provide habitat for flora and fauna, and recreational, educational and scientific research opportunities for children and adults. They also contribute to the City's landscape amenity and unique sense of place, and provide relief in the urban form through the conservation of unique vegetation and landforms.

Importantly, LNAs can provide ecosystem services to their local communities through the regulation of temperature and maintenance of good air quality.

LNAs provide for the conservation of Declared Rare and Priority Flora, Threatened Ecological Communities, poorly conserved vegetation communities and wetlands. They are essential for the maintenance of urban wildlife, providing the support mechanisms and resources essential to local native birds, mammals, reptiles, amphibians and invertebrates. They also provide "linkages", either by direct connection of discrete areas of bushland or as "stepping stones" that provide habitat, food resources and protection that facilitates the movement of fauna.

LNAs support a growing aspect of social and recreational activity in the City as recreation resources, places to connect with and observe the natural environment, places of discovery and important links with the past.

The BCMP provides an empirical evaluation of the biodiversity values of LNAs in the City's care.

1.9 Biodiversity Conservation Management Plan – scope and purpose

The BCMP addresses specific aspects of the City's biodiversity management responsibility:

1. The evaluation and management prioritisation of natural areas already in the City's care, discussed in Section 2 of this report.
2. The appropriate resourcing of management initiatives to ensure quality management of biodiversity assets natural areas already in the City's care.
3. The protection of natural areas already in the City's care through appropriate zoning and Crown Reserve purpose.

The purpose of the BCMP is to:

- Provide an evaluation of the City's current management of LNAs in its care.
- Prioritise LNAs for optimum management result.
- Provide priority for the development of appropriate management planning tools for LNAs.
- Provide informed guidance in the allocation of adequate management resources and capacity to address appropriate management of existing and future LNAs in the City's care.
- Provide recommendations for the improved protection of existing and future LNAs.

2 Management Prioritisation of Natural Areas in the City's Care

The BCMP has evaluated 38 LNAs that fall within the City's management portfolio. These LNAs comprise Crown Reserves with Management Orders in the City's favour, areas that are in the process of coming into the City's management through urban land development, and areas that are owned in fee simple by the City.

The City's current management investment in these areas ranges from significant to nil.

Table 1, overleaf, provides a list in alphabetical order of the 38 LNAs, with a combined area of 175 hectares, that were identified and assessed in the course of this study. Figure 1 provides a visual presentation of the location of the sites.

The BCMP provides advice based on the objective evaluation of the 38 LNAs. The aim of the BCMP is to provide an empirical biodiversity value prioritisation of these areas, informed by an objective methodology, to provide a sound basis for optimising the protection and management of natural areas under the City's care. The BCMP also provides advice and recommendations for appropriate resource allocation and management of those areas.

2.1 Methodology

2.1.1 PBP Assessment Process

The Perth Biodiversity Project's (PBP) methodology provides the City with a dynamic, scientifically rigorous tool to inform LNA protection priority, management priority, management resource allocation and the monitoring of management success.

Mapping and evaluation of the 38 LNAs that are currently, or soon to be, under the City's management was undertaken by consultants using the PBP Natural Areas Initial Assessment (NAIA) desktop analysis and field assessment templates (Cullity and Clarke, 2005) in two separate reports:

- *Strategic Ecological Assessment of Natural Areas, Stage 1: Desktop Analysis (ENV Australia, 2006)*
- *Strategic Ecological Assessment of Natural Areas, Stage 2: Field Assessment and Natural Area Summary (Ecoscape, 2007)*

The synthesis of these two reports provides an assessment of ecological and viability aspects for each site. Standardised and weighted values for each criterion were input to the PBP NAIA database, which ranks individual sites in terms of priority for protection.

The key output of this report is a ranking for management priority, which differs to some extent from the protection prioritisation in that it factors in an emphasis on each LNA's viability factors.

Table 1: City-owned/managed Natural Areas addressed in this study

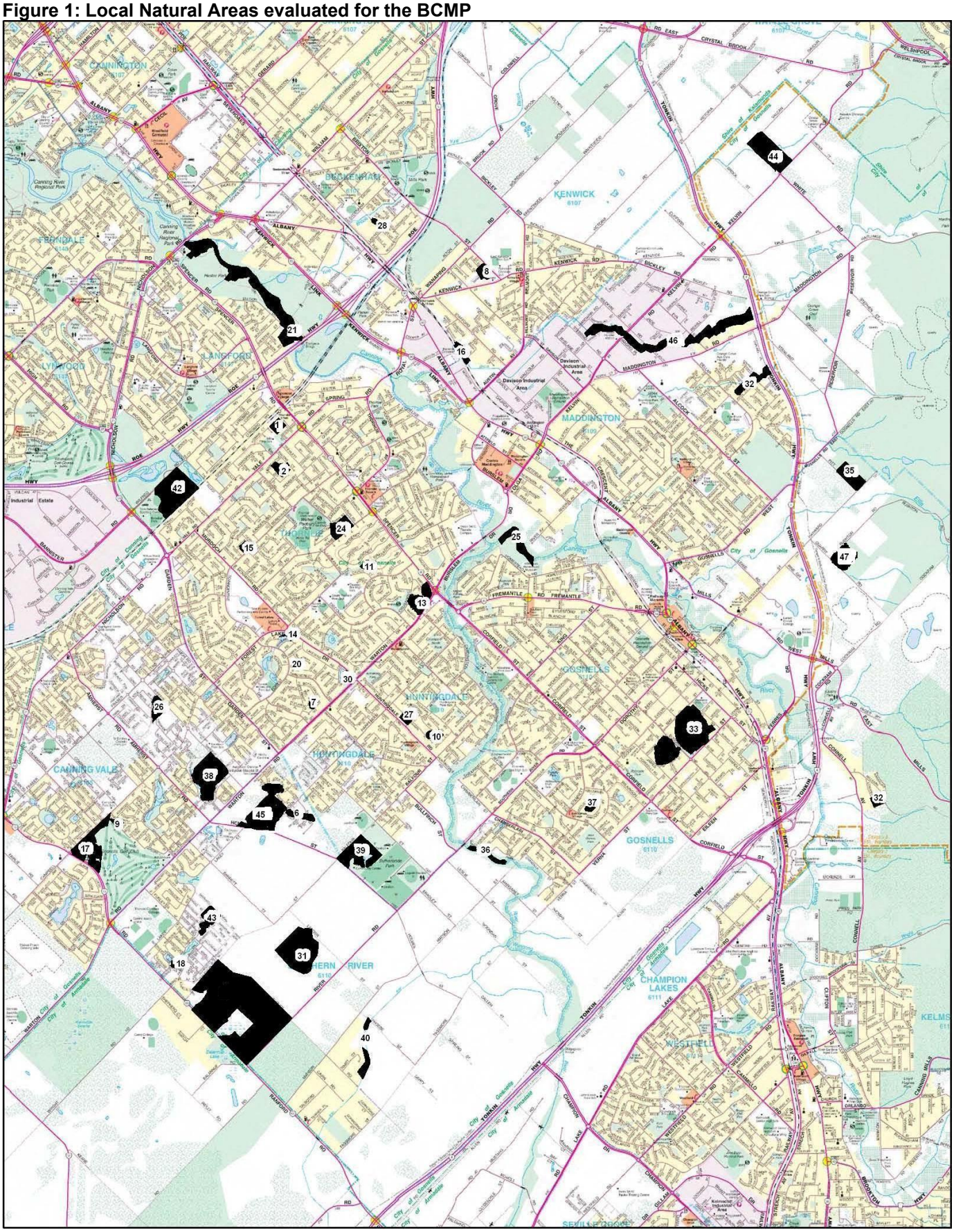
Site Name	Location	Site ID #
Aylesford Way Reserve	Thornlie	1
Barson Court Reserve	Thornlie	2
Bickley Brook, Tonkin Hwy to Mandarin Street	Maddington	46
Bodallin Crescent Reserve	Southern River	6
Bottlebrush Drive Reserve	Thornlie	7
Bridal Crescent Reserve	Kenwick	16
Brixton Street Reserve Wetland (Bush Forever Site 422)	Kenwick	8
Chatsworth Gate Reserve	Canning Vale	9
Crestwood Bushland	Thornlie	11
Curlewis Street Bushland	Huntingdale	10
Empire Way Reserve	Thornlie	13
Forest Crescent Reserve	Thornlie	14
Fulmar Street Reserve	Thornlie	15
Gosnells Golf Club Bushland (Bush Forever Site 467)	Southern River	17
Harpenden St Lot 1585; Holmes St Lots 1 & 2, Tincurrin Drive Reserve (Bush Forever Site 125)	Southern River	45
Haven Place Reserve	Thornlie	20
Hester Park Foreshore (Bush Forever Site 224)	Langford	21
Hume Road Wildlife Reserve	Thornlie	24
John Okey Davis Park Foreshore (Bush Forever Site 246)	Gosnells	25
Katrine Parade Reserve	Canning Vale	26
Kelvin Road "Trotting Track" – Lots 10, 11, 12	Orange Grove	44
Kingsford Way Reserve	Huntingdale	27
Maurie Lyon Reserve	Beckenham	28
Lakeside Drive Reserve	Thornlie	30
Lander Swamp, Southern River[1]	Southern River	31
Lowannaa Road Reserve	Martin	32
Mary Carroll Park Wetlands (Bush Forever Site 124)	Gosnells	33
Millstream Drive Reserve Wetland	Southern River	43
Peace Park (Paskett Pl, Kamber Ct – Tonkin Hwy)[2]	Maddington	34
Phoebe Street Lot 33301	Southern River	40
Pitt Road, Lot 3	Martin	35
Rushton Road Lots 3, 9-12 (Ellis Brook Valley)[3]	Martin	47
Greentree Drive Reserve	Southern River	18
Shannon Ramble Reserve (Bush Forever Site 246)	Gosnells	36
Sherlock Close Reserve	Gosnells	37
Shreeve Road Reserve Wetland	Canning Vale	38
Sutherlands Park Bushland (Bush Forever Site 125)	Huntingdale	39
Tom Bateman Reserve Bushland (Bush Forever Site 456)	Langford	42

*[1] **Lander Swamp**, located within the Bletchley Park residential estate and currently the subject of developer-initiated management planning and rehabilitation, will join the City's management portfolio in the next few years and was therefore deemed appropriate to include in this study. Landowner permission was obtained for access to that portion of Lander Swamp currently within the Bletchley Park development area. For the portion of the site outside of that area, all observations were made from outside that property.*

*[2] A small portion of the site known as **Peace Park** is in private ownership and therefore not currently under the City's management. All observations for this specific portion of the site were made from adjacent lands under the City's management. Peace Court Park is a linear parkland development project under the Maddington Kenwick Sustainable Communities Partnership.*

*[3] The assessment of **Rushton Road Lots 3, 9-12**, a unique and relatively discrete area of the Ellis Brook Valley management area below the Darling Scarp, was undertaken separately by consultants ENV Australia.*

Figure 1: Local Natural Areas evaluated for the BCMP



Note: Numbers are PBP site identifiers only – the total number of sites is 38.

The application of a consistent methodology to the prioritisation of natural areas management also provides for additional natural areas coming into the City's Public Open Space management portfolio to be similarly evaluated and integrated into the biodiversity prioritisation process. Similarly, the methodology supports programmed re-evaluation of areas under management to provide feedback on management success and inform resource allocation.

2.1.2 Site Selection

Initial selection of LNAs for the BCMP was undertaken by the Urban Regeneration and Parks & Environmental Operations units, cross-referencing PBP remnant vegetation and ownership mapping, aerial photography and the City's parks management database.

All areas of natural vegetation on lands owned or managed (in fact or nominally) by the City, with several exceptions, were identified for strategic ecological assessment and evaluation.

The City's most significant LNA, the core Ellis Brook Valley management area was not included in this study due to its size, complexity and unique management aspects, which placed it beyond the resources available to this study. A broad-brush assessment, informally applying the PBP methodology, easily confirms this area's ranking as an asset of high biodiversity content and value. It also confirms that, due to the area's size, condition, connectivity and other factors associated with resilience to threats, its management priority is not critical in the context of the entire LNA management picture.

The City's river foreshore areas were generally not included in this assessment. Due to their fragmented ownership and management, and the extent of these areas, a comprehensive assessment was found to be beyond the scope of this project. The Swan River Trust, under the Swan and Canning Rivers Management Act 2006, is in the process of developing the River Protection Strategy which will provide clear and consistent guidance in river foreshore management.

2.1.3 Natural Area Initial Desktop Assessment

Desktop assessment was performed in autumn 2006 using the PBP NAIA Template to gather preliminary information about each of the sites. The report *Strategic Ecological Assessment of Natural Areas, Stage 1: Desktop Analysis* (ENV Australia, 2006) provides background information including:

- Ownership
- Vesting purpose
- MRS and TPS reservation/zoning
- Recognised conservation status
- Known value to community
- Cultural/Historic heritage value
- Area of bushland
- Perimeter
- Perimeter to area ratio
- Vegetation complex
- Mapped wetland management categories
- Mapped Threatened Ecological Communities
- Mapped priority or significant flora
- Vegetation complex

This information was compiled for use with field data in the Stage 2 scoring and ranking process. Assessment of each area's ecological viability uses the information on the natural area's size, shape, perimeter to area ratio, condition and connectivity to determine its relative viability (Cullity & Clarke 2005).

2.1.4 Natural Area Initial Field Assessment

The Perth Biodiversity Project's Natural Area Initial Field Assessment Templates A and B (Cullity & Clarke 2005) were used in subsequent field assessments to verify information collected during the desktop analysis and to gather additional information and finer detail on ecological values, threatening processes and management infrastructure.

The field assessment also sought to locate any Declared Rare Flora, Threatened Ecological Communities or any other significant species or communities within any of the discrete areas.

Field surveys for the majority of sites were conducted between October and December 2006. Separate field surveys, due to unique circumstances, were conducted at different times for Barson Court Reserve (April 2007) and Lots 3, 9, 10, 11 and12 Rushton Road (ENV Australia, September 2007).

The subsequent reports *Strategic Ecological Assessment of Natural Areas, Stage 2: Field Assessment and Natural Area Summary* (Ecoscape, 2007) and *Flora and Vegetation Survey, Weed and Vegetation Condition Mapping of Lots 9, 10, 11, 12 and 3 Rushton and Quarry Roads* (ENV Australia, 2007) provide a 'snapshot', of each natural area, assessing aspects including:

- Common flora species
- Vegetation condition
- Surrounding land uses
- Social significance
- Disturbance factors
- Threatening processes
- Management infrastructure
- Declared Rare and Significant Flora
- Threatened Ecological Communities
- Observations of feral fauna activity
- Observations of native fauna and habitat
- Observations of native fungi and habitat
- Description and mapping of plant communities
- Description and mapping of weed infestation

Individual management recommendations were made by the assessor, as appropriate, for each natural area. These recommendations will inform management planning and activities in specific LNAs.

Further to the City's BCMP, the information collected through application of the NAIA Templates in this project joins data on all natural areas occurring within Local Governments in the Perth Metropolitan Region and the Shire of Chittering to contribute to a Regional NAIA Database, a web based database administered by the Department of Agriculture and Food Western Australia.

2.1.5 Scoring/Prioritisation

The 38 City of Gosnells sites were prioritised using the PBP NAIA Database. All data for each site were entered into the database, where in-built calculations determined an objective prioritisation list.

The NAIA Database is a Microsoft Access database designed to collate, analyse and interpret selected contents of the four components of the Natural Area Initial Assessment Templates developed by the Perth Biodiversity Project:

- Natural Area Initial Desktop Assessment Template (see Appendix 1)
- Natural Area Initial Field Assessment A Template (see Appendix 2)
- Natural Area Initial Field Assessment B – Significant Species and Communities Template (see Appendix 3)
- Natural Area Initial Assessment Summary Template (see Appendix 4)

Information from the NAIA Templates, providing an assessment of the biodiversity values of individual natural areas, was entered into the database by PBP and City staff. This process provided City staff the opportunity to review data and to correct inaccurate entries, of which a small number were found in the Natural Area Initial Desktop Assessment Template.

The database was then used to rank the sites in order of conservation priority - a critical output of the Biodiversity Planning process that is designed to assist Local Governments to manage their natural areas and target resources appropriately.

2.2 Results

2.2.1 Regionally and Locally Significant Bushland

Underscoring the importance of remnant bushland in the City of Gosnells, all sites owned or managed by the City met the PBP criteria for locally and regionally significant natural areas.

Bush Forever Sites are those that have been identified by the State Government as regionally significant vegetation. Applying the PBP guidelines for the identification of regionally and locally significant bushland, many of the LNAs outside Bush Forever Sites meet the criteria, from an ecological perspective, for regional significance. This includes all sites containing:

- Conservation or Resource Enhancement category wetland or EPP Lake plus buffer
- Forrestfield vegetation complexes.
- Threatened Ecological Community.
- Declared Rare Flora, Specially Protected Fauna or significant habitat for these fauna.
- Priority or other significant flora or fauna or significant habitat for these fauna.

2.2.2 Prioritisation for Management

The prioritisation of natural areas for management ensures that resources are appropriately targeted for optimum outcomes. It provides a strategic framework to assist the City in planning and budgeting for management of natural areas for conservation purposes. It will also assist the City in attracting external funding for the management of its natural areas.

Prioritising of LNAs for management achieves:

- A strategic approach to LNA management for their long term sustainability.
- Sound justification for budget requests on the basis of sound biodiversity conservation principles.
- A more effective application of limited resources.
- A sound basis for attracting external funding to assist in the management of priority LNAs.

Table 2 provides LNA prioritisation, derived from the PBP database, on the basis of ecological criteria and assessment of each area's ecological viability (according to factors such as vegetation patch size, shape and connectivity with other natural areas).

Table 2: City-owned/managed Natural Areas ranked according to Management Priority

Site Name	Location	Management Priority	Area (ha)
Sutherlands Park Bushland (BF Site 125)	Southern River	1	20.8
L3, L9-12 Rushton Road, Martin (Ellis Brook Valley)	Martin	2	14.00
L1585 Harpenden St, L1 & 2 Holmes St, Tincurrin Dr Reserve (BF Site 125)	Southern River	3	10.29
Gosnells Golf Club Bushland (BF Site 467)	Southern River	4	7.3
Tom Bateman Reserve Bushland (BF Site 456)	Langford	5	13.22
Lander Swamp, Southern River	Southern River	6	16.00
Bodallin Crescent Reserve	Southern River	7	1.49
Shreeve Road Reserve Wetland	Canning Vale	8	10.72
Mary Carroll Park Wetlands (BF Site 124)	Gosnells	9	17.57
Empire Way Reserve	Thornlie	10	3.17
Greentree Drive Reserve	Southern River	11	0.71
Millstream Drive Reserve Wetland	Southern River	12	1.89
Hester Park Foreshore (BF Site 224)	Langford	13	15.45
Brixton Street Reserve Wetland (BF Site 422)	Kenwick	14	1.41
Hume Road Wildlife Reserve	Thornlie	15	3.00
Lowannaa Road Reserve	Martin	16	0.79
Maurie Lyon Reserve	Beckenham	17	0.32
Lakeside Drive Reserve	Thornlie	18	0.37
Chatsworth Gate Reserve	Canning Vale	19	0.37
"Trotting Track" – L10, 11, 12 Kelvin Road	Orange Grove	20	7.03
Sherlock Close Reserve	Gosnells	21	0.52
Bottlebrush Drive Reserve	Thornlie	22	0.47
Crestwood Bushland	Thornlie	23	0.47
Haven Place Reserve	Thornlie	24	0.31
Fulmar Street Reserve	Thornlie	25	0.53
John Okey Davis Park Foreshore (BF Site 246)	Gosnells	26	2.55
L3 Pitt Road	Martin	27	3.60
Forest Crescent Reserve	Thornlie	28	0.22
Aylesford Way Reserve	Thornlie	29	1.09
L33301 Phoebe Street	Southern River	30	1.21

Curlewis Street Bushland	Huntingdale	31	0.91
Shannon Ramble Reserve (BF Site 246)	Gosnells	32	0.77
Katrine Parade Reserve	Canning Vale	33	2.05
Barson Court Reserve	Thornlie	34	0.65
Peace Park (Paskett Pl, Kamber Ct – Tonkin Hwy)	Maddington	35	1.97
Bickley Brook, Tonkin Hwy to Mandarin Street	Maddington	36	10.97
Kingsford Way Reserve	Huntingdale	37	0.40
Bridal Crescent Reserve	Kenwick	38	0.41

Priority ranking, as such, is an indication of the overall importance of the protection and management of individual sites, but not necessarily an order of which sites should be managed first. An area may, for example, be assigned a high priority for protection, but may have few threatening processes that require active management. A lower management priority would be assigned in this situation.

Prioritisation for management was undertaken, applying further analysis of the level of the threats to each LNA as well as the City's capacity to ameliorate the threat (see Appendix 5). The output of this process provides a more considered and achievable management prioritisation.

Each of the LNAs in Table 2 was subsequently grouped into one of four Management Categories, each having specific levels of management action and resourcing. Management Category detail is discussed below, and Management Category groupings are provided in Table 3. Consistent colour-coding for each of the four Management Categories has been adopted to provide a visual cue to classifications.

It is worth noting that there is a certain futility in managing for biodiversity conservation the bulk of those LNAs that fall into Management Categories 3 and 4. The management of these LNAs, due to their size, shape and/or condition, can never realistically achieve any measure of restoration of ecological dynamics. In the majority of cases, irreversible degradation thresholds have been reached.

Management Category 1 (high priority nature conservation areas):

It is proposed that management planning be undertaken for these sites to more effectively understand and prioritise threat management. Of these 9 sites, 2 have recently-developed management plans (Lots 3 and Lots 9-12 Rushton Road, Martin; Gosnells Golf Club Bushland). The remainder have no management plan in place, or have a plan that is in need of updating (Lander Swamp; Mary Carroll Park Wetlands).

Initial and/or interim management intervention at these sites will, within current and future budget constraints, address priority threats identified in Management Plans and/or through the PBP field assessment process (detailed in Table 3).

It is proposed that, ultimately and subject to budget considerations, all Management Category 1 LNAs will receive a full conservation management program, including comprehensive weed control (using in-house and contract resources), vegetation and dieback monitoring and management, fire management planning, regular maintenance inspections, fencing and other infrastructure (as required) and frequent litter removal.

Management Category 2 (medium priority nature conservation areas):

It is proposed that Initial Threat Abatement Plans will be developed for these 6 sites and that, over time, more detailed management planning, including fire management planning, will occur. These LNAs will, subject to budget constraints, receive a less-intensive conservation management program targeted at managing or eradicating key threats, and maintaining current vegetation condition. Generally smaller in size, they have complex management issues. It is envisaged that some of these LNAs will eventually upgrade to Management Category 1 following the successful implementation of management actions to address major threats, and the freeing up of resources as management activity in Management Category 1 LNAs moves, over time, to a maintenance mode.

Management Category 3 (medium-low priority nature conservation areas):

It is proposed that these areas will receive a limited conservation management program, including infrequent maintenance inspections and annual or reactive litter removal. A brief set of Generic Management Guidelines will be developed for these areas. These LNAs are generally small in size or in a relatively degraded condition (making them difficult to manage effectively). Some, though, due to their location in residential areas, would be expected have some interest and management expectation from the local community.

Management Category 4 (low priority nature conservation areas):

It is proposed that these reserves will receive a very limited conservation maintenance program, limited to annual or reactive litter removal. These LNAs have little biodiversity value and are resource-intensive from a biodiversity management perspective.

Table 3: City-owned/managed Natural Areas grouped according to Management Category

Site Name	Location	Management Category	Area (ha)
Sutherlands Park Bushland (BF Site 125)	Southern River	1	20.8
L3, L9-12 Rushton Road, Martin (Ellis Brook Valley)	Martin	1	14.00
L1585 Harpenden St, L1 & 2 Holmes St, Tincurrin Dr Reserve (BF Site 125)	Southern River	1	10.29
Gosnells Golf Club Bushland (BF Site 467)	Southern River	1	7.3
Tom Bateman Reserve Bushland (BF Site 456)	Langford	1	13.22
Lander Swamp	Southern River	1	16.00
Bodallin Crescent Reserve	Southern River	1	1.49
Shreeve Road Reserve Wetland	Canning Vale	1	10.72
Mary Carroll Park Wetlands (BF Site 124)	Gosnells	1	17.57
Empire Way Reserve	Thornlie	2	3.17
Greentree Drive Reserve	Southern River	2	0.71
Millstream Drive Reserve Wetland	Southern River	2	1.89
Brixton Street Reserve Wetland (BF Site 422)	Kenwick	2	1.41
Hume Road Wildlife Reserve	Thornlie	2	3.00
Chatsworth Gate Reserve	Canning Vale	2	0.37
Hester Park Foreshore (BF Site 224)	Langford	3	15.45
Lowannaa Road Reserve	Martin	3	0.79
Maurie Lyon Reserve	Beckenham	3	0.32
Lakeside Drive Reserve	Thornlie	3	0.37
"Trotting Track" – L10, 11, 12 Kelvin Road	Orange Grove	3	7.03

	Sherlock Close Reserve	Gosnells	3	0.52
	Bottlebrush Drive Reserve	Thornlie	3	0.47
	Crestwood Bushland	Thornlie	3	0.47
	Haven Place Reserve	Thornlie	3	0.31
	Fulmar Street Reserve	Thornlie	3	0.53
	John Okey Davis Park Foreshore (BF Site 246)	Gosnells	3	2.55
	L3 Pitt Road	Martin	3	3.60
	Forest Crescent Reserve	Thornlie	3	0.22
	Aylesford Way Reserve	Thornlie	3	1.09
	L33301 Phoebe Street	Southern River	3	1.21
	Curlewis Street Bushland	Huntingdale	3	0.91
	Shannon Ramble Reserve (BF Site 246)	Gosnells	4	0.77
	Katrine Parade Reserve	Canning Vale	4	2.05
	Barson Court Reserve	Thornlie	4	0.65
	Peace Park (Paskett Pl, Kamber Ct – Tonkin Hwy)	Maddington	4	1.97
	Bickley Brook, Tonkin Hwy to Mandarin Street	Maddington	4	10.97
	Kingsford Way Reserve	Huntingdale	4	0.40
	Bridal Crescent Reserve	Kenwick	4	0.41

The prioritisation of LNAs for management should be reviewed on a biennial basis. The review will provide for:

- Consideration of any new LNAs that enter the City's management portfolio.
- Any planning or development decisions that will affect natural areas
- Evaluation of the City's management investment in high-priority natural areas.
- Reporting against management interventions and consequent adjustments to management priorities.

Recommendation:

R1	**Review the prioritisation of LNAs for management, incorporating all new LNAs that have come into the City's management, on a biennial basis.**	**Responsibility MP&EO EC**

2.3 Management Resourcing – Evaluation and Recommendations

The purpose of this evaluation of the City's current resourcing of the management of LNAs is to assess the effectiveness of the City's expenditure in terms of return for investment in the sustainable management of natural assets and biodiversity. The evaluation provides a sound basis for recommending improvements to the City's resourcing of LNA management activities.

2.3.1 Evaluation of Current Management Resourcing

A summary and evaluation, based on Management Categories described in 2.2.2, of actual expenditure of budgeted resources applied to the 38 LNAs managed or owned by the City is presented in Table 4. A more detailed summary of budget allocations is provided in Appendix 6.

Figures provided by the Parks and Environmental Operations unit advise that actual expenditure against the City's 2009/10 budget provided a total of $134,400 for bushland management activity across 26 of the 38 sites.

Table 4: Management Category evaluation - 2009/10 actual expenditure - LNA management

Management Category	No. of Sites Budgeted	No. of Sites Not Budgeted	Total actuals 2009/10	Sites Budgeted (ha)	Sites Not Budgeted (ha)	Unit Rate $/m²/yr	Comment
1	5	4*	$47,926	51.08	60.31	$0.09	*Lander Swamp, 16 hectares currently managed by Bletchley Park developer is not yet managed by the City and therefore not budgeted
2	6	0	$33,813	10.55	0	$0.32	
3	12**	4	$37,005**	22.68**	13.16	$0.50	**for the purposes of calculations, Hester Park Foreshore was considered anomalous (15.45 hectares @ $1,147) and was excluded from calculations
4	5	2	$15,656	4.28	12.94	$0.37	
TOTAL	28	10	$134,400	88.59	86.41		

Note: For the purpose of clarity, data for one anomalous site were excluded in Table 4 (see comment column) from consideration in calculations to derive unit rates for management resources.

Numerically, management of 74% of LNAs (24 of 38) was resourced in the 20099/10 budget. In terms of biodiversity management effectiveness, though, this accounted for only 51% of the total bushland area in the 38 LNAs.

In general, the City's LNA focus to date is on a larger number of smaller areas, which is contrary to one of the key bushland management principles – management of larger areas is, in general, significantly more effective due to their resilience; management of smaller natural areas is more costly and much less effective.

The unit rate, budgeted dollars per square metre per year, was calculated for each Management Category by dividing the total natural area management budget for that Category by the known area of bushland to which it was applied. Areas for which no budget allocation was provided were not considered in these calculations.

It is immediately evident from the evaluation that the City's current budgeting for natural areas management does not match the management priorities identified through the Management Category groupings.

It can be seen that the unit rate for lower Management Category areas is considerably higher than for higher Categories. This can be attributed, in part, to the financial effectiveness of managing natural areas of larger size, but also to the limited resources currently applied to these predominantly larger areas and the historical management commitment to smaller areas.

In summary, the City's current approach to the management of LNAs provides for:

- A more concentrated management effort (average unit rate $0.45 per square metre per year) to a larger number (16) of generally smaller individual LNAs in the lower biodiversity value Management Categories 3 and 4.
- A less concentrated management effort (average unit rate $0.32 per square metre per year) to a smaller number (six) of small to medium individual LNAs in the higher biodiversity value Management Category 2.
- A significantly lesser management effort (average unit rate $0.09 per square metre per year) to a smaller number (five) of larger, more resilient LNAs in the high biodiversity value Management Category 1; of critical note, four of the Management Category 1 LNAs currently have no resourced management.

2.3.2 Key Findings and Recommendations

The City's management of LNAs has developed over time as a response to community expectations – the maintenance of areas of bushland associated with Public Open Space in urban environments.

Land development in the 1970s saw small portions of remnant vegetation left as landscape elements of Public Open Space. Through the 1980s and 1990s, areas of remnant vegetation set aside through land use planning gradually increased in size and biodiversity value. Contemporary land development and land use planning sees larger and more significant areas coming into the City's management, in the main through the implementation of State Government policy.

In meeting the growing need and expectation that LNAs are well-managed, and acknowledging that financial resources to undertake this task are limited, the City has undertaken this review of management resourcing and LNA management prioritisation with a view to maximising management outcomes and financial effectiveness.

Analysis of the ecological value of the 38 LNAs shows that, without exception, Management Category 1 and 2 areas contain the majority of the City's important biodiversity assets.

Analysis of the City's current management resourcing of LNAs clearly shows that it does not currently consider biodiversity value as a factor in determining the best allocation for return. The current rationale for budget allocation is historically-based, and does not yet strategically consider biodiversity value, threat abatement or management evaluation and prioritisation.

A number of broad conclusions can be drawn from the figures and results presented in Table 4, and broad recommendations made for improving the effectiveness of currently budgeted funds and, into the future, increasingly targeted and adequately resourced management intervention in high Management Category LNAs.

2.3.2.1 Management Category 1 (nine sites):

The nine Management Category 1 natural areas make up a total area of 111.39 hectares. Only five of the nine areas were allocated budget resources in 2009/10, with actual expenditure totalling $47,926 – a total of 51.08 hectares funded for management.

Key findings and strategy:

- A very low unit rate ($0.09/m^2) is being applied to areas of identified high biodiversity importance.
- Four Management Category 1 natural areas are allocated no management resources (NB Lander Swamp is not yet managed by the City).
- Tenure across the nine sites comprises Crown Reserve with Management Order in favour of the City of Gosnells, and fee simple City lands, with the exception of Lander Swamp, whose transfer to the Crown is not yet complete.
- Zoning and/or purpose does not provide specific protection for conservation purpose.
- Consideration should be given to redirecting budget funds from lower priority Management Category sites towards targeted management works in Management Category 1 sites.
- Management Plans should be developed for all Category 1 sites.
- Consideration should be given to additional budget resourcing of Management Category 1 sites.

Recommendations:

		Responsibility
R2	**Consideration should be given to redirecting budget funds from lower priority Management Category sites to more effective targeted management works in Management Category 1 sites.**	**MP&EO** **EC**
R3	**Management Plans should be developed for all Management Category 1 sites.**	**MP&EO** **EC**
R4	**Consideration should be given in future budget cycles to additional resourcing of Management Category 1 sites.**	**MP&EO** **EC**

2.3.2.2 Management Category 2 (six sites):

The six Management Category 2 natural areas make up a total area of 10.55 hectares. Actual expenditure of budgeted funds accounted for $33,813 of conservation management activity across the six areas.

Key findings and strategy:

- A relatively high unit rate ($0.32/m^2) is being applied with no management guidance to improve the effectiveness of allocated resources to these areas of relatively high biodiversity value.
- All six sites are Crown Reserves with Management Order in favour of the City of Gosnells.
- Management Order purpose does not provide specific protection for conservation purpose.
- Threat Abatement Plans should be developed to target management activity.
- Consideration should be given to rationalising and redirecting some of the allocated total budget for Management Priority 2 sites to higher Management Priority sites.
- Consideration should be given to additional budget resourcing of Management Priority 2 sites.

Recommendations:

		Responsibility
R5	**Threat Abatement Plans should be developed to target management activity in Management Category 2 sites.**	**MP&EO** **EC**
R6	**Consideration should be given to rationalising and redirecting some of the allocated Management Category 2 budget to higher Management Category sites.**	**MP&EO** **EC**
R7	**Consideration should be given in future budget cycles to additional resourcing of Management Category 2 sites.**	**MP&EO** **EC**

2.3.2.3 Management Category 3 (16 sites):

The 16 Management Category 3 natural areas make up a total area of 35.84 hectares. $37,005 was expended across 12 of the 16 areas – a total of 22.68 hectares funded for management. Hester Park foreshore, whose actual management expenditure was only $1,147, accounted for 15.45 hectares, potentially skewing evaluation. Discounting the Hester Park anomaly a total of $35,858 was allocated across a total area of 7.23 hectares, averaging $0.50 per square metre.

Key findings and strategy:

- Most areas are small, in a generally degraded condition with moderate to low ecological priority.
- A very high unit rate ($0.50/m^2) is applied with no appreciable effect in terms of biodiversity management.
- Four Management Category 3 natural areas are allocated no management resources.
- Tenure across the 16 sites comprises Crown Reserve with Management Order in favour of the City of Gosnells, and one fee simple City property (Lot 3 Pitt Road, Martin).
- Zoning and/or purpose does not provide specific protection for conservation purpose.
- No recommendation should be made to fund unbudgeted sites.
- Consideration should be given to redirecting all or most of the allocated total budget of Management Category 3 natural areas to higher Management Category sites.

Recommendations:

		Responsibility
R8	**Generic Management Guidelines should be developed to target management activity in Management Category 3 sites.**	**MP&EO** **EC**
R9	**No consideration should be given, as a general rule, to funding bushland management in Management Category 3 sites that are currently not provided budget resources.**	**MP&EO**
R10	**Consideration should be given to redirecting all or most of the currently allocated budget for Management Category 3 sites to higher Management Priority sites.**	**MP&EO** **EC**

2.3.2.4 Management Category 4 (seven sites):

The seven Management Category 4 natural areas make up a total area of 17.22 hectares. $15,656 was expended across five of the seven Management Category 4 natural areas – a total of 4.28 hectares funded for management.

Key findings and strategy:

- A high unit rate ($0.37/m^2) is being applied to little effect in terms of biodiversity management to mostly degraded areas of low ecological priority.
- Two Management Category 4 natural areas are allocated no management resources.
- Tenure across the seven sites comprises Crown Reserve with Management Order in favour of the City of Gosnells.
- Zoning and/or purpose does not provide specific protection for conservation purpose.
- No recommendation should be made to fund unbudgeted sites.
- Consideration should be given to redirecting all or most of the allocated total budget of Management Category 4 natural areas to higher Management Priority sites.

Recommendations:

		Responsibility
R11	**Generic Management Guidelines should be developed to target management activity in Management Category 4 sites.**	**MP&EO** **EC**
R12	**No consideration should be given, as a general rule, to funding bushland management in Management Category 4 sites that are currently not provided budget resources.**	**MP&EO**
R13	**Consideration should be given to redirecting all or most of the currently allocated budget for Management Category 3 sites to higher Management Priority sites.**	**MP&EO** **EC**

2.4 Biodiversity protection through zoning and reservation purpose

Land-use zoning has a major impact on the opportunities and constraints for protecting LNAs. Within the Perth region, the Metropolitan Region Scheme (MRS) and Local Government Town Planning Schemes (TPS) direct the potential use of a specific area of land. The MRS divides land into broad zones and reservations. A Local Government's TPS is required to reflect to these zonings, but also to provide detailed planning that refines the MRS for the municipality.

At present any land that is set aside for conservation through land use planning and subsequent development is generally retained as public open space, albeit in a natural state. These areas, strictly speaking, have no formal protection and are retained as part of a development and reserved for recreation.

2.4.1 TPS Zonings

Zonings for lands set aside for conservation purposes are generally MRS Parks and Recreation and TPS Local Open Space or Parks and Recreation. A detailed review of the 38 LNAs, provided in Appendix 7, reveals a far from consistent approach in both MRS and TPS zonings.

MRS zonings covering the City's LNAs include:

- Urban
- Private Recreation
- Other Regional Roads
- Parks and Recreation
- Rural, Waterways
- Railways
- Industrial
- Urban Deferred.

TPS zonings covering the City's LNAs include:

- Local Open Space
- Other Regional Road
- Parks and Recreation
- General Rural
- Residential
- Residential Development
- Waterways
- Civic and Cultural
- Watercourse

- Primary Regional Road
- Composite Residential/Light Industry
- General Industry.

The City's TPS 6 does not currently provide for a conservation zoning. The creation of a conservation zoning, which would require amendments to be made to TPS 6, would specifically and legally acknowledge and protect the purpose of the setting aside of the land.

Recommendations:

		Responsibility
R14	**Investigate and consider TPS amendment to provide for the creation of a "conservation" zoning in the City's TPS 6.**	**MPI, EC**
R15	**Subject to the outcome of R14, investigate and consider amendment to TPS 6 to provide for "conservation" zoning to provide protection of all Management Category 1 sites.**	**MPI, MP&EO, MCF, EC**
R16	**Subject to the outcome of R14, investigate and consider amendment to TPS 6 to provide for "conservation" zoning to provide protection of all Management Category 2 sites.**	**MPI, MP&EO, MCF, EC**
R17	**Subject to the outcome of R14, investigate and consider amendment to TPS 6 to provide for "conservation" zoning to provide protection of selected Management Category 3 sites.**	**MPI, MP&EO, MCF, EC**
R18	**Subject to the outcome of R14, investigate and consider amendment to TPS 6 to provide for "conservation" zoning to provide protection of selected Management Category 4 sites.**	**MPI, MP&EO, EC**

2.4.2 Crown Reserves – reservation purpose

Where Crown Reserves are created over lands, a reservation purpose is described. This purpose should reflect the function of the reservation, and provide certainty to that function.

At present, for land that is set aside for conservation purposes through land use planning, a Crown Reserve is created and a purpose prescribed for that reservation. Generally, the purpose prescribed for most Local Open Space (LOS) is Recreation or Public Recreation. This reservation provides no formal protection, with no explicit underwriting that the LNA will be retained for conservation purposes in the long term.

A detailed review of the 38 LNAs, provided in Appendix 7, reveals a far from consistent approach to reservation purpose.In the case of the City's LNAs for which Crown Reserves have been created and Management Orders made in favour of the City, the purposes include:

- Public Recreation
- Recreation Golf Link
- Recreation and Conservation
- Conservation
- Bird Sanctuary and Park
- Drainage
- Parklands
- Recreation
- Foreshore Management

Because these areas have no formal protection there is no guarantee of their retention for conservation purposes in the long term. It is important that the City of Gosnells explores and implements means by which identified areas of high biodiversity value are provided formal protection through appropriate zoning and/or reservation purpose. Amending the reservation purpose to "conservation" would provide long-term security to areas of important biodiversity value.

Recommendations:

		Responsibility
R19	**Ensure that, for all lands set aside as Crown Reserves for the purpose of conservation, the reservation purpose is defined as, or includes in its purpose, "conservation".**	**MPI, EC**
R20	**Investigate and consider amendments to the reservation purpose of all Management Category 1 sites currently set aside as Crown Reserves.**	**MPI, MP&EO, MCF, EC**
R21	**Investigate and consider amendments to the reservation purpose of all Management Category 2 sites currently set aside as Crown Reserves.**	**MPI, MP&EO, MCF, EC**
R22	**Investigate and consider amendments to the reservation purpose of selected Management Category 3 sites currently set aside as Crown Reserves.**	**MPI, MP&EO, MCF, EC**
R23	**Investigate and consider amendments to the reservation purpose of selected Management Category 4 sites currently set aside as Crown Reserves.**	**MPI, MP&EO, EC**

3 Conclusion

3.1 The Biodiversity Value of the City's LNAs

An objective ecological evaluation of 38 LNAs managed or owned by the City advises that the City has management responsibility for a significant number of areas whose biodiversity value is very high and, in many cases, of regional significance. This priority is not reflected in the allocation of management resources to these areas. Management intervention in these areas, given their size and inherent resilience would be very cost-effective.

The evaluation has also identified a large number of areas to which the City currently dedicates management resources, but whose biodiversity value is low or very low. Management intervention in these areas is considered largely cost-ineffective, given the areas' size, shape and condition.

3.2 The Study and its Outcomes

With a view to optimising and improving the City's management of lands supporting biodiversity assets, the City has examined 38 LNAs under its management or ownership with regard to:

- Ecological priority
- Management priority
- Management resourcing
- Protection afforded by TPS zoning
- Protection afforded by reservation purpose

Following detailed evaluation, each of the 38 LNAs was assigned to one of four Management Categories:

- Management Category 1 (high priority nature conservation areas)
- Management Category 2 (medium priority nature conservation areas)
- Management Category 3 (medium-low priority nature conservation areas)
- Management Category 4 (low priority nature conservation areas)

Broad management Recommendations are provided for each Management Category.

Having determined management priorities, a review of the 2008/09 budget allocations for the 38 LNAs was undertaken. It was found that, in the main, the City's current budgeting allocations to LNA management is inverse to the management priority assigned those LNAs – i.e. the bulk of the City's LNA management budgeting focuses on the LNAs in Management Categories 3 and 4.

Recommendations are provided to assist in optimising the City's current budgeting for LNA management, and for future budgeting considerations.

TPS zoning and Crown Reserve purpose can provide recognition of the biodiversity value of an LNA, and afford long-term protection of the asset. An evaluation was undertaken of the TPS zoning and, where a Crown Reserve has been created over an LNA, the reservation purpose of that LNA.

In the main, very few of the City's LNAs are acknowledged or protected through TPS zoning and/or reservation purpose. Recommendations are made with regard to addressing this situation.

3.3 Summary of Recommendations

City officers who have been identified as having responsibility for, or a role in, implementation are:

- MP&EO – Manager Parks and Environmental Operations
- EC – Environmental Coordinator
- MPI – Manager Planning Implementation
- MCF – Manager City Facilities

		Responsibility
R1	**Review the prioritisation of LNAs for management, incorporating all new LNAs that have come into the City's management, on a biennial basis.**	**MP&EO** **EC**
R2	**Consideration should be given to redirecting budget funds from lower priority Management Category sites to more effective targeted management works in Management Category 1 sites.**	**MP&EO** **EC**
R3	**Management Plans should be developed for all Management Category 1 sites.**	**MP&EO** **EC**
R4	**Consideration should be given in future budget cycles to additional resourcing of Management Category 1 sites.**	**MP&EO** **EC**
R5	**Threat Abatement Plans should be developed to target management activity in Management Category 2 sites.**	**MP&EO** **EC**
R6	**Consideration should be given to rationalising and redirecting some of the allocated Management Category 2 budget to higher Management Category sites.**	**MP&EO** **EC**
R7	**Consideration should be given in future budget cycles to additional resourcing of Management Category 2 sites.**	**MP&EO** **EC**

R8	**Generic Management Guidelines should be developed to target management activity in Management Category 3 sites.**	**MP&EO EC**
R9	**No consideration should be given, as a general rule, to funding bushland management in Management Category 3 sites that are currently not provided budget resources.**	**MP&EO**
R10	**Consideration should be given to redirecting all or most of the currently allocated budget for Management Category 3 sites to higher Management Priority sites.**	**MP&EO EC**
R11	**Generic Management Guidelines should be developed to target management activity in Management Category 4 sites.**	**MP&EO EC**
R12	**No consideration should be given, as a general rule, to funding bushland management in Management Category 4 sites that are currently not provided budget resources.**	**MP&EO**
R13	**Consideration should be given to redirecting all or most of the currently allocated budget for Management Category 3 sites to higher Management Priority sites.**	**MP&EO EC**
R14	**Investigate and consider TPS amendment to provide for the creation of a "conservation" zoning in the City's TPS 6.**	**MPI, EC**
R15	**Subject to the outcome of R14, investigate and consider amendment to TPS 6 to provide for "conservation" zoning to provide protection of all Management Category 1 sites.**	**MPI, MP&EO, MCF, EC**
R16	**Subject to the outcome of R14, investigate and consider amendment to TPS 6 to provide for "conservation" zoning to provide protection of all Management Category 2 sites.**	**MPI, MP&EO, MCF, EC**
R17	**Subject to the outcome of R14, investigate and consider amendment to TPS 6 to provide for "conservation" zoning to provide protection of selected Management Category 3 sites.**	**MPI, MP&EO, MCF, EC**
R18	**Subject to the outcome of R14, investigate and consider amendment to TPS 6 to provide for "conservation" zoning to provide protection of selected Management Category 4 sites.**	**MPI, MP&EO, EC**
R19	**Ensure that, for all lands set aside as Crown Reserves for the purpose of conservation, the reservation purpose is defined as, or includes in its purpose, "conservation".**	**MPI, EC**

R20	**Investigate and consider amendments to the reservation purpose of all Management Category 1 sites currently set aside as Crown Reserves.**	**MPI, MP&EO, MCF, EC**
R21	**Investigate and consider amendments to the reservation purpose of all Management Category 2 sites currently set aside as Crown Reserves.**	**MPI, MP&EO, MCF, EC**
R22	**Investigate and consider amendments to the reservation purpose of selected Management Category 3 sites currently set aside as Crown Reserves.**	**MPI, MP&EO, MCF, EC**
R23	**Investigate and consider amendments to the reservation purpose of selected Management Category 4 sites currently set aside as Crown Reserves.**	**MPI, MP&EO, EC**

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Appendix 1

Natural Area Initial Desktop Assessment Template
Example: Aylesford Way Reserve

Natural Area Initial Desktop Assessment

Date of assessment 30/05/2006 Native Vegetation Unique ID No. -

Name of area Aylesford Database Site No. NA

Other names used NA

Location (address/street name incl. suburb, nearest street corner, Local Government)

Corner of Debenham Rd and Aylesford Way

Thornlie

Street Directory: Year, Page and Grid Ref. (Street Smart/ Gregorys/ UBD) 2005 pg 435 B3

Prepare the following maps and label with the name of the area.

Map 1: Location of Aylesford see figure 1.C

Photocopy of street directory showing location of site

Map 2: Reference Sites/Plots and Linkage for Aylesford see fig 2.06

A GIS print-out of general area showing vegetation complexes, potential reference sites and plots, mapped wetlands and their management category, areas of any previously recorded Declared Rare Flora, Specially Protected Fauna, Priority Flora or Fauna or Threatened Ecological Communities plus location of Draft Regional and, if available, Local Ecological Linkages. If no Local Ecological Linkages have been determined for the Local Government area, use this map to mark potential local ecological linkages to other natural areas.

Map 3: Aerial photograph of Aylesford Way see fig 3.34

Date of photography June 2006 Scale 1:5000

GIS print-out of aerial photography (with topography, if available) at a scale that ensures site covers most of an A4 page. Easy-to-use scales are 1:2000 (1 cm = 20 m), 1:3000 (1 cm = 30 m), 1:4000 (1 cm = 40 m) or 1:5000 (1 cm = 50 m). For large sites, spread over several A4 pages at one of these scales if necessary.

Area (ha) 1.046 ha Perimeter (m) 510.1

Perimeter (m) to area (m²) ratio 1.323 Priority for Further Investigation -

Lot/Location/Reserve Number/s N.A.

Ownership (Local Government Reserve / Other Govt (Agency?) / Private)

City of Gosnells

Land Manager City of Gosnells

Vesting Purpose public recreation

MRS Reservation or Zoning Urban

TPS Reservation or Zoning Residential

Protection Status (circle) (none) / conservation covenant / conservation zone / conservation vesting purpose / Bush Forever & Parks and Recreation in the MRS / protected CALM land

Current Status/Use of land part of this area has recently been resmed for new railway station parking

Long term plans? not known

Initial Desktop Assessment Name of area Aylesford

Recognised International/ National/ State/ Regional Conservation Value yes/(no)
Specify no
Part of a Draft Regional Ecological Linkage yes/(no)
Specify (links which areas?): no
Mapped Vegetation Complex/es Bassendean Sand - Southern River Complex
Mapped Soil Type/s (if mapping available) grey/white sands (Bassendean).
Mapped wetland/s: yes/(no) Environmental Protection Policy (EPP) Lake: yes/(no)
Wetland Management Category: CC/RE/MU
Is it a mapped floodplain area? yes/(no)

Potential Reference Sites and Plots (e.g. Bush Forever Sites; CALM Reserves, see Map 2). For Bush Forever Sites note floristic community type/s (FCTs) and whether FCTs actual or inferred.
BF 389 Acourt Rd, Bushland, Banjup
FCTs inferred
#5 mixed shrub damplands
#11 Wet forest and woodlands
#12 Melaleuca teretifolia and/or Astartea aff. fascicularis shrublands

Existing biological information for area or for potential Reference Sites (reports/ surveys/ species lists)
Potential reference site biological information:
BF 389 Acourt Rd Bushland

Clarke K., Longley, M. and volunteers from the Bushland Plant Survey Project (2000).
The vegetation and flora of the Acourt Road Bushland North Banjup Wildflower Society of Western Australia (Inc) Nedlands.

Conservation Management Plan yes/(no) Current or Review needed?
Title/Author/Year

Part of a Local Ecological Linkage (yes/no)
(if these have not already been determined by Local Government mark potential linkages on Map 2)

Time since isolation from other natural areas <5 years/ (5 - 20 years)/ >20 years
(consult local community, historical aerial photography)

Initial Desktop Assessment Name of area Aylesford

Does it contain any mapped Threatened Ecological Communities (see Map 2)? yes/(no)

Specify:

Does it contain any mapped Declared Rare Flora (see Map 2) or is it a known location for any Specially Protected Fauna or significant habitat for these fauna? yes/(no)

Specify:

Does it contain any mapped Priority (see Map 2) or other significant **flora** (e.g. see Table 13, Bush Forever, Vol. 2, p. 51) or is it a known location for any Priority or other significant **fauna** (e.g. see Tables 14 and 15, Bush Forever, Vol. 2, pp. 59-63) or significant habitat for these fauna? yes/(no)

Specify

Riparian streamline vegetation expected yes/(no)

Estuarine fringing vegetation expected yes/(no)

Coastal vegetation expected (foredunes or secondary dunes) yes/(no)

Fire History (consult with FESA/Volunteer Fire Brigades, local community, historical aerial photography)
Not known

Known to be of particular value to the local community for conservation (yes)/no

Active Friends/Environmental Group (yes)/no

Name of group and contact details Yale Primary School 94932088
Armadale, Gosnells Landcare (Brett Kuhlmann 0412713582)

Surrounding land uses with potential for community interest and possibly assistance with management

- educational facility (yes)/no
- residential development (yes)/no
- other (specify) (yes)/no
  train line built adjacent to site

Indigenous or European Cultural or Historical Heritage Value yes/(no)

Notes

Appendix 2

Natural Area Initial Field Assessment A Template
Example: Aylesford Way Reserve

Natural Area Initial Field Assessment A

Date of assessment 10/10/06 Native Vegetation Unique ID No. 7899

Name of area Aylesford Way Reserve Database Site No. 1

Location (address/street name) Corner of Aylesford Way and Debenham St, Thornlie

Assessor Markus Mikli *Skill Level 6b

Recorder Markus Mikli Skill Level 6b

Recorder _____ Skill Level _____

Recorder _____ Skill Level _____

Important Note: Skill level 4 or above is required by the assessor to complete this template (see Appendix 1).

Photographs

Indicate film roll no. and photograph no., location and direction of each photo on Map 4 during the field assessment. e.g. R1/P4 ↗ (Roll 1/Photo 4 looking ↗)

Photographer's Name Markus Mikli

Latitude And Longitude (for various locations noted during assessment, optional)

GPS used: no GPS datum: _____

Descriptor and Location No. (eg. BMX jump GPS 1)	Reading/calculation (mark location number on Map 4) Latitude (S) or Northing	Longitude (E) or Easting

Prepare the following map during the field assessment and label with the name of the area.

Map 4 (transparent overlay on aerial photograph, Map 3): Uplands/Wetlands, Structural Plant Communities, Vegetation Condition, Spot Weed Occurrences, Areas of Disturbance and Management Infrastructure of _____

Uplands, Wetlands And Structural Plant Communities – Description And Mapping

On Map 4 divide the site into upland versus wetland areas and then into broad sections based on structural plant communities. Allocate a number to each community and describe each community using a representative sample point. Note the vegetation condition of each sample point as well as drawing a vegetation condition map for the whole site.

Describe each community using page 5 of these templates OR if preferred the templates of Keighery(1994) (see Appendix 3). If using the Keighery templates, describe each community on Recording Sheets 1 & 2 and list common native species present on Recording Sheet 3. Note that Appendix 3 contains minor modifications to the Keighery (1994) templates to include the additional information required on page 5.

Each structural plant community is described by noting the dominant species in each growth form layer of the community (see Appendix 2). Collect specimens for identification if necessary provided you have a licence from CALM and land owner permission. Carefully label all specimens. DO NOT collect species suspected of being DECLARED RARE FLORA instead take a good photo and accurately note location. Do not collect whole plants unless they are very small species and do not collect at all if only a few are present, take a good photo as an alternative

Photocopy page 5 or Appendix 3 and complete for **each** structural plant community identified.

Initial Field Assessment A

Name of area 1 Aylesford Way Reserve

Structural Plant Community No. 1 Indicate location of sample point described on Map 4.

Latitude and Longitude

GPS used: yes GPS datum: GDA1994 E 401012 N 6453670

Landform and Soils

SLOPE: gentle ASPECT: NW OR

SURFACE SOIL: Colour: grey Texture: sand

EXPOSED ROCK (type and % of surface): n/a

SUB-SURFACE SOIL: Colour: n/a Texture: n/a

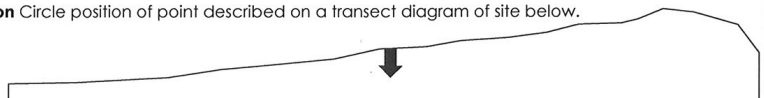
UNDERLYING ROCK (type and depth if known): n/a

DRAINAGE: well WET: OR n/a

CURRENT WATER DEPTH: - cm

LITTER (% cover & depth): 90%, 1mm BARE GROUND (% cover) 5%

Topographic Position Circle position of point described on a transect diagram of site below.



Upland — Valley floor — Lower slope — Mid slope — Upper slope — Hill top / Breakaway (circle one)

Growth Form Layer	Dominant species for each growth form layer list all dominant species, in their order of dominance, up to a maximum of 3*. (* if more than 3 species are obviously dominant record as many as appropriate to describe the layer)	Crown Cover (Keighery 1994) 2-10% / 10-30% / 30-70% / over 70%	Height & Crown Cover (NVIS) Record max. height of layer & % crown cover to nearest 5%
Trees over 30 m			
Trees 10–30 m			
Trees under 10 m	Allocasuarina fraseriana, Eucalyptus marginata	2-10%	10%
Mallees over 8 m			
Mallees under 8 m			
Shrubs over 2 m	Adenanthos cygnorum	2-10%	5%
Shrubs 1-2 m			
Shrubs under 1 m	Hibbertia hypericoides	2-10%	5%
Herbs	Stylidium sp., Laxmannia squarrosa	2-10%	10%
Sedges/ Rushes			
Grasses			
Other (e.g. climbers)			

Common Native Species Note species observed.

Hibbertia hypericoides, Gompholobium tomentosum, Acacia pulchella

Icon Flora Species (Note if present) n/a

Vegetation Condition (Give reasoning and note scale used) (see Appendix 4) best condition plot

Good (Kieghery), vegetation structure altered, little disturbance or weeds

Description Of Structural Plant Community No. __ (see Appendix 2)

Low Open Woodland over Tall Open Shrubland over Very Open Shrubland over Very Open Herbland

Icon Community (tick if an icon community) n/a

Initial Field Assessment A

Name of area 1 Aylesford Way Reserve

Weed Species Note species observed, especially the occurrence of species in better condition areas, even if they only occur in small numbers or in small patches at present. Note the distribution of each species across the site, e.g. throughout the site, spot occurrences or disturbed areas only (edges/tracks/cleared areas). Mark spot occurrences and easily mapped distributions on Map 4. If a species is widespread, note whether it is restricted to specific plant communities or wetland areas.

Weed Species	**Distribution** e.g. throughout the site, spot occurrences or disturbed areas only (edges/tracks/cleared areas)
Bromus diandrus (Great Brome)	occasional, scattered, more concentrated along north-east edge
Ehrharta calycina (Perennial Veldt Grass)	occasional, scattered, more concentrated along north-east edge
Euphorbia sp. (Spurge)	occasional, scattered
Lupinus cosentinii (Western Blue Lupin)	occasional, scattered
Hypochaeris sp.	occasional, scattered
Lactuca serriola (Prickley Lettuce)	occasional, scattered, more concentrated along north-east edge
Gladiolus caryophyllaceus (Pink Gladiolus)	occasional, scattered
Sonchus oleraceus (Sowthistle)	occasional, scattered, more concentrated along north-east edge
Ehrharta longifolia (Annual Veldt Grass)	occasional, scattered
Arctotheca calendula (Capeweed)	occasional, scattered
Taraxacum officinale (Dandelion)	occasional, scattered, more concentrated along north-east edge
Fumaria capreolate (White Fumitory)	occasional, scattered, more concentrated along north-east edge
Fumaria muralis (Pink Fumitory)	occasional, scattered
Orobanche minor (Lesser Broomrape)	occasional, scattered

Feral Fauna Note species observed or evidence for presence of species (scats, tracks or traces).

	✓	**Comments**
Evidence of Foxes (burrows, wildlife kills)		
Evidence of Rabbits (burrows, dung piles, grazing)		
Evidence of Dogs (droppings, scratchings)		
Evidence of Cats (wildlife kills)		
European Honey Bees (hives in tree hollows)		
Evidence of Horses/ Cattle/ Sheep (foot prints, droppings)		
Evidence of Pigs (soil disturbance)		
Rainbow Lorikeets		
Other		

Initial Field Assessment A

Name of area 1 Aylesford Way Reserve

Native Fauna and Fungi. Note species observed or evidence of presence for fauna species. Indicate icon species.

Species	**Comments:** Observed directly, evidence of presence (scats, tracks and traces) or likely habitat?

Native Fauna and Fungi Habitat

Habitat	✓	**Comments**
Areas of trees (with or without understorey)	✓	
Areas of dense understorey vegetation		
Tree hollows in old mature trees	✓	
Dead branches as perches for hunting/ look outs	✓	
Dead vegetation for fungi/invertebrate habitat (leaf litter, branches/logs)	✓	
Large fallen logs on the ground		
Granite or other natural rocky outcrops		
Moss beds for fungi habitat		
Wetlands or waterways		

Vegetation Health

Note dead or dying trees, shrubs, herbs and so on. Note the species concerned and the pattern of deaths/changes in the vegetation. *Phytophthora* Root Rot moves in fronts and along drainage lines therefore noting patterns helps to determine whether *Phytophthora* spp. are present. Appendix 5 defines and provides the website address for a list of common indicator species that are affected by *Phytophthora* spp. Do not automatically assume dead or dying plants means that *Phytophthora* is present.

	✓	**Comments**
Numerous tree stumps (not from logging)		
Dead or dying species		
Obvious reduction of tree canopies (e.g. staghorns)		
Heavy leaf/stem damage by insects (e.g. lerps, stem borers)		
Diseases/pests suspected		
Drought/lowering of groundwater table suspected		
Flooding/rise in groundwater table suspected		

Initial Field Assessment A

Name of area 1 Aylesford Way Reserve

Miscellaneous Disturbance Factors and Threatening Processes

Determine the range and extent of disturbance factors and threatening processes occurring at the site. If appropriate, mark on Map 4 and photograph as required. If site is large it may be beneficial to divide into sections and evaluate each separately.

Factor/Process	✓	Comments
Evidence of salinisation (e.g. scalding, seeps)		
Erosion (e.g. gullies, bank collapse)		
Wetland eutrophication (e.g. algal blooms)		
Stormwater drains/sumps		
Service corridors (e.g. Water Corp, Telstra, Western Power, Alinta Gas)		
Mining/extraction		
Evidence of past logging (e.g. selective removal of large trees)		
Previous clearing (may be partially cleared areas or evidence of previous clearing and regrowth over much of site)		
Overgrazing (e.g. rabbits, stock, goats; over-population by kangaroos)		
Firewood collection (e.g. recent chainsaw/axe cuts, sawdust piles)		
Dope plants/ production equipment		
Soil movement (dumping or removal)		
Rubbish dumping (note type, e.g. construction, garden waste, weed source?)		
Proliferation of tracks (fire breaks, walk trails)		
Off road vehicle use (4WD / trail bikes/ BMX/ mountain bikes)		
Cubby construction		
Vandalism (damage to plants)		
"Enrichment Planting" (revegetation with species not found in that local plant community, are these becoming weeds?)		
Impacts of High Fire Frequency and/or Intensity		
• Reduced range of tree ages		
• Fire scars high up (due to a hot burn)		
• Major trunk damage		
• Trees suckering from trunk and branches		
• Amount of leaf litter reduced		
• Large fallen logs nearly burnt away		
• Evidence of arson (burnt grass tree skirts, matches, cigarette lighters, exploded spray cans)		
Time since last fire (estimate)	✓	>20 years
Other disturbance factors or threatening processes		

Initial Field Assessment A

Name of area 1 Aylesford Way Reserve

Vegetation Condition Map

For initial assessment, the overall vegetation condition of the site can be determined after familiarising yourself with the site. On Map 4, divide the site into broad sections based on condition, draw the boundaries of each section and record their condition. Using the map, estimate the % area each section occupies of the total site and note in the relevant boxes below using either the Keighery (1994) or Kaesenhagen (1994) condition scale(see Appendix 4). For example, 'Very Good: Section 1, 75% of site.' 'Degraded: Section 2, 25% of site.' For most sites there will be very degraded areas along tracks, for example, where rubbish has been dumped. If not extensive, these can be referred to by adding a statement such as 'areas of severe localised disturbance' in the comments.

Vegetation Condition Scales Indicate % area each section occupies of the total site (ensure adds up to 100%).						
Keighery (1994)	Pristine	Excellent	Very Good	Good	Degraded	Completely Degraded
% area				72	28	
Kaesehagen (1994)		Very Good to Excellent	Fair to Good		Poor	Very Poor
% area			72		28	

Comments

Existing Management Infrastructure

Describe type in box below and mark location on Map 4, photograph if required.

	✓	Comments
Fencing		
Fence condition		
Gates		
Paths		Soil; concrete; limestone; mulch
Path condition		
Path fencing		
Path fence condition		
Fire access tracks		Slashed; sprayed; ploughed
Signs		Name of area; other (purpose?)
Previous works		

Social Significance Values

	✓	Comments
Evidence of Community/ Passive recreation/ Education interest		
Landscape amenity (e.g. area screens/ buffers conflicting land uses)		
Scenic features (e.g. high point in landscape)		
Indigenous/ European Heritage (Cultural or Historical)		
Other		

Initial Field Assessment A

Name of area 1 Aylesford Way Reserve

Surrounding Land Uses (mark on Map 4)

	Comments
Surrounding Land Uses (note type/s and indicate likely impacts/benefits e.g. source of rubbish; weed seeds blowing into site; potential for community interest and perhaps volunteers to assist management)	

Recommendations for Management

List potential management actions (for example, assessment for the presence of *Phytophthora* species by an accredited assessor; fencing; signage to identify as a conservation area; rubbish removal; detailed weed survey and mapping; fire response and management planning; detailed flora/fauna/fungi surveys).

Some weed control is required to improve this reserve. In order of priority:

1 - control and eradiate priority weeds - Perennial Veldt Grass, Gladiolus, Brome Grass and Euphorbia before populations spread throughout reserve

2 - control and eradicate serious weeds - White and Pink Fumitory, Annual Veldt Grass, Lupin

3 - general non targeted weed control of all other species

4 - general inspection and collection of any litter

Initial Field Assessment A

Name of area 1 Aylesford Way Reserve

Confirmation of GIS Mapped Boundaries

Prepare the following map if recommending changes to native vegetation (A) or wetland (B) mapping and label with the name of the area.

Map 5: (overlay on aerial photo): Recommended GIS Boundary Changes for _____

When recommending changes, forward a completed copy of all 4 Initial Natural Area Assessment templates to the Perth Biodiversity Project, WALGA, 15 Altona St, West Perth 6005 for distribution to relevant custodian of database.

GIS dataset		Changes recommended (yes/no) Outline the rationale for each change against the relevant category (A, B or C). Prepare Map 5 if recommending changes to A or B only. Draw boundaries that correspond to your field assessment and assign accordingly to 'A' and/or 'B'.
A	**Mapped Native Vegetation** (DPI/Dept of Agriculture 2001)	
	Rationale: no change	
B	**Mapped Wetland/s and Management Category** CC, RE or MU (DoE current update)	For changes to the mapping of wetlands on the Swan Coastal Plain complete and attach the current Department of the Environment guidelines for evaluating wetlands in this bioregion.
	Rationale: no change	
C	**Mapped Vegetation Complex/es** (Heddle, Loneragan and Havel 1980 or Mattiske & Havel 1998)	More likely to be _____
	Rationale: (do not map) no change	

Appendix 3

Natural Area Initial Field Assessment B Template
Example: Aylesford Way Reserve

Natural Area Initial Field Assessment B –

Significant Species and Communities

General Information

Date of assessment 10/10/06 Native Vegetation Unique ID No. 7899

Name of area Aylesford Way Reserve Database Site No. 1

Location (address/street name) Corner of Aylesford Way and Debenham St, Thornlie

Assessor Markus Mikli *Skill Level 6b

Recorder Markus Mikli Skill Level 6b

Recorder _____ Skill Level _____

Recorder _____ Skill Level _____

**Important Note: Skill level 5 or above is required by the assessor to survey natural areas for significant species. Skill Level 6 is required to survey for threatened ecological communities (see Appendix 1).*

NO significant species or communities recorded through Field Assessment B	✓
If searches for significant flora, significant fauna and Threatened Ecological Communities by an appropriately skilled assessor have **NOT** recorded any significant species or communities on this site during this assessment, tick the box and continue no further.	✓

Partial Assessment ONLY	✓
In situations where significant species or communities have been recorded during Field Assessment A but a comprehensive Field Assessment B has **NOT** yet taken place, transfer the relevant information to these forms for databasing purposes and tick this box.	

Appendix 4

Natural Area Initial Assessment Summary Template
Example: Aylesford Way Reserve

Natural Area Initial Assessment Summary

Database Site Number 1 Name of area Aylesford Way Reserrve

ECOLOGICAL CRITERIA	
1. Representation	
1a. Regional Representation	
i) recognised International, National, State or Regional conservation value but not already protected Specify:	no
ii) of an ecological community with only 1500 ha or 30% or less (whichever is the greater) remaining in IBRA subregion Specify: Swan Coastal Plain	yes
iii) large (greater than 20 ha), viable natural areas in good or better condition of an ecological community with more than 30% remaining within the IBRA subregion	no
iv) of an ecological community with only 1500 ha or 15% or less (whichever is the greater) protected for conservation in the Jarrah Forest IBRA subregion Specify:	no
v) of an ecological community with only 400 ha or 10% or less (whichever is the greater) protected for conservation in the Bush Forever Study Area Specify:	yes
1b. Local Representation	
i) of an ecological community with 10% or less remaining of its pre-European extent within the Local Government Area Specify:	no
ii) of an ecological community with 30% or less remaining of its pre-European extent within the Local Government Area Specify:	yes
iii) large (greater than 10 ha), viable natural areas in good or better condition of an ecological community with more than 30% remaining within the Local Government Area	no
2. Diversity	
i) natural area in good or better condition that contains both upland and wetland structural plant communities	no
3. Rarity	
i) of an ecological community with only 1500 ha or 10% or less (whichever is the greater) remaining in the IBRA subregion Specify:	yes
ii) of an ecological community with only 400 ha or 10% or less (whichever is the greater) remaining in the Bush Forever Study Area Specify:	no
iii) contains a Threatened Ecological Community Specify:	no
iv) contains Declared Rare Flora, Specially Protected Fauna or significant habitat for these fauna Specify:	no
v) contains Priority or other significant flora or fauna or significant habitat for these fauna Specify:	no
4. Maintaining Ecological Processes or Natural Systems - Connectivity	
i) natural areas acting as stepping stones in a Regionally Significant Ecological Linkage	no
ii) natural areas acting as stepping stones in a locally significant ecological linkage	yes
5. Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation	
i) Conservation or Resource Enhancement category wetland plus buffer	no
ii) EPP Wetland plus buffer	no
iii) riparian vegetation plus buffer	no
iv) floodplain area plus buffer	no
v) estuarine fringing vegetation plus buffer	no
vi) coastal vegetation on foredunes and secondary dunes	no

Initial Assessment Summary

Name of area Aylesford Way Reserrve

VIABILITY ESTIMATE				
Viability Factor	**Category**			**Score**
Size	Greater than 20 ha (5)			2
	Greater than 10 ha less than 20 ha (4)			
	Greater than 4 ha less than 10 ha (3)			
	Greater than 1 ha less than 4 ha (2)			
	Less than 1 ha (1)			
Shape	Circle, square or squat rectangle (3.5)			3
	Oval, rectangle or symmetrical triangle (3)			
	Irregular shape with few indentations (2.5)			
	Irregular shape with many indentations (2)			
	Long thin shape with large proportion of area greater than 50 m wide (1.5)			
	Long thin shape with large proportion of area less than 50 m wide (1)			
Perimeter to area ratio	Less than 0.01 (4)			2
	Greater than 0.01 less than 0.02 (3)			
	Greater than 0.02 less than 0.04 (2)			
	Greater than 0.04 (1)			
Vegetation condition NB: based on Keighery (1994) condition scale	Pristine	10 x	% = 0	3.44
	Excellent	8 x	% = 0	
	Very Good	6 x	% = 0	
	Good	4 x	% = 72	
	Degraded	2 x	% = 28	
	Completely Degraded	0 x	% = 0	
			Total calculated score =	
Connectivity	**A.** Forms part of a Regional Ecological Linkage and is contiguous with a protected natural area greater than 4ha (5)			1
	B. Not part of a Regional Ecological Linkage but contiguous with a protected natural area greater than 4ha (4.5)			
	C. Forms part of a Regional Ecological Linkage and is within 500 m of more than 4 protected natural areas having an area greater than 4 ha (4)			
	D. Not part of a Regional Ecological Linkage but within 500 m of more than 4 protected natural areas having an area greater than 4 ha (3.5)			
	E. Forms part of a Regional Ecological Linkage and is within 500 m of 3 or 4 protected natural areas having an area greater than 4 ha (3)			
	F. Not part of a Regional Ecological Linkage but within 500 m of 3 or 4 protected natural areas having an area greater than 4 ha (2.5)			
	G. Forms part of a Regional Ecological Linkage and is within 500 m of 2 protected natural areas having an area greater than 4 ha (2)			
	H. Not part of a Regional Ecological Linkage but within 500 m of 2 protected natural areas having an area greater than 4 ha (1.5)			
	I. Forms part of a Regional Ecological Linkage and is within 500 m of 1 protected natural area having an area greater than 4 ha (1)			
	J. Not part of a Regional Ecological Linkage but within 500 m of 1 protected natural area having an area greater than 4 ha (0.5)			
	K. Forms part of a Regional Ecological Linkage but is not within 500 m of any protected natural areas having an area greater than 4 ha (0.25)			
TOTAL SCORE (Viability Estimate)				11.44

Appendix 5

LNAs - Priority, Vegetation Condition and Threat Abatement Actions

Site Name	Priority Grouping	Overall Condition (Keighery)	Threat Abatement Actions
Sutherlands Park Bushland (BF Site 125)	1	Excellent – Very Good	• Management Plan to be developed • Rationalise and control access points and trails – fencing required • Control/eradicate priority weeds – veldt grass, wild gladiolus • Non-specific weed management, especially perimeter and edges
L3, L9-12 Rushton Road, Martin (Ellis Brook Valley)	1	Excellent – Very Good	• Management Plan in development. • Dieback disease – mapping completed; further fencing to manage access, targeted phosphite applications every 3 years as per Management Plan • Environmental weeds - target weed management as per Management Plan
1585 Harpenden St, L1 & 2 Holmes St, Tincurrin Dr Reserve (BF Site 125)	1	Excellent	• Management Plan to be developed • Access management – fencing to exclude off-road vehicles • Rubbish dumping – regular clean-ups • Fire – consider fuel reduction burns • Specific weed control – love grass, veldt grass, couch, wild gladiolus • Routine non-specific perimeter weed management • Remove planted exotic native species (Tincurrin perimeter)
Gosnells Golf Club Bushland (BF Site 467)	1	Very Good - Good	• Management Plan close to finalisation • Dieback disease – mapping completed, MP programmed 2009/10; develop code of practice for GCC management practices; targeted phosphite applications every 3 years • Environmental weeds – target weed management as per Management Plan
Tom Bateman Reserve Bushland (BF Site 456)	1	Good - Degraded	• Management Plan to be developed • Access management – fencing to exclude off-road vehicles • Remove dumped vehicles • Priority weed control – veldt grass, love grass, carnation weed, cape tulip, freesia, arum lily, kikuyu, couch wild gladiolus • Medium priority weed management – Geraldton wax, soursob, wild oat, Guildford grass • Remove exotic trees – edible fig, Victorian ti-tree • Revegetate as appropriate
Lander Swamp, Southern River	1	Very Good	• Management Plan to be developed for whole wetland once ceded to public ownership • Access management – fencing to exclude off-road vehicles at northern end • Environmental weeds being addressed by Developer • Rubbish clean-ups to be programmed
Bodallin Crescent Reserve	1	Excellent	• Management Plan to be developed • Weed management around edge of reserve; remove Typha • Block and revegetated informal tracks
Shreeve Road Reserve Wetland	1	Very Good - Good	• Management Plan in place • Repair leaking bund to adjacent artificial waterbody

Site Name	Priority Grouping	Overall Condition (Keighery)	Threat Abatement Actions
			• Eradicate priority weeds – blackberry, golden dodder, pampas grass, Sydney golden wattle, bridal creeper • Reduce and eliminate medium priority weeds – kikuyu, couch, love grass, castor oil • Non-specific weed management elsewhere, particularly edges • Remove japans pepper trees • Regular inspections and action with regard to unauthorised access and activity
Mary Carroll Park Wetlands (BF Site 124)	1	Degraded	• Existing Management Plan (1991) to be reviewed • Exotic tree removal – Japanese pepper, edible fig, coral tree, cape lilac • Reduce or eradicate priority weeds – kikuyu, couch, giant reed, morning glory, dodder • General non-specific weed control • revegetation
Empire Way Reserve	2	Good - Very Good	• Threat Abatement Plan to be developed • Eradicate watsonia, fumaria and other weeds along watercourse • Manage grassy weeds, especially at bushland edges
Greentree Drive Reserve	2	Excellent	• Threat Abatement Plan to be developed • Weed control – veldt grass and wild gladiolus • Non-specific weed management
Millstream Drive Reserve Wetland	2	Very Good	• Threat Abatement Plan to be developed • Priority control of love grass • General non-specific weed management over entire site • Remove informal tracks, bike jump, rubbish
Chatsworth Gate Reserve	2	Very Good - Excellent	• Threat Abatement Plan to be developed • Remove/manage Eucalyptus robusta, Acacia longifolia • Control grassy weeds • Revegetate Completely Degraded portion (0.5ha)
Brixton Street Reserve Wetland (BF Site 422)	2	Good	• Threat Abatement Plan to be developed • Eliminate kikuyu, Tambookie Grass, Harlequin Flower, Watsonia • Protect DRF Eleocharis keigheryi • Introduce understorey into community 1 (fringing revegetation area)
Hume Road Wildlife Reserve	2	Excellent – Very Good	• Threat Abatement Plan to be developed • Non-specific perimeter weed control • Formalise main path, close others
Lowannaa Road Reserve	3	Excellent	• Non-specific perimeter weed control • Fencing to manage access
Maurie Lyon Reserve	3	Excellent	• Eliminate golden dodder • General non-specific weed control

Site Name	Priority Grouping	Overall Condition (Keighery)	Threat Abatement Actions
			• Prevent kikuyu from surrounding lawn entering wetland
Lakeside Drive Reserve	3	Very Good	• Eradication of priority weeds – veldt grass, love grass • General non-specific weed control
Hester Park Foreshore (BF Site 224)	3	Degraded	• Significant weed management required: blackberry, cotton bush, edible fig, paterson's curse, giant reed, kikuyu, couch, Japanese pepper, Sydney golden wattle • Revegetation of understorey
"Trotting Track" – L10, 11, 12 Kelvin Road	3	Good – Very Good	• Priority weed management – giant reed, watsonia • Rubbish removal • Remove Cootamundra wattle, Washington palm
Sherlock Close Reserve	3	Excellent	• Revegetation of understorey as required • Target and eliminate veldt grass • Undertake routing non-specific weed control
Bottlebrush Drive Reserve	3	Excellent	• Routine maintenance – weeds and litter; focus on wild gladiolus
Crestwood Bushland	3	Excellent	• Remove hybrid kangaroo paws around edge • Weed management, esp. targeting veldt grass
Haven Place Reserve	3	Excellent	• Little work required • Routine non-specific weed control • Revegetation – understorey • Routine inspection and litter clean-up
Fulmar Street Reserve	3	Very Good	• Close informal tracks • Remove BMX hump • Routine rubbish removal • Routine non-specific weed control
John Okey Davis Park Foreshore (BF Site 246)	3	Degraded	• Eradicate arum lily • Control veldt grass, couch, kikuyu • Understorey revegetation
L3 Pitt Road	3	Excellent	• Targeted weed management – watsonia, morning glory • Non-specific weed management for entire site • Close informal access tracks
Forest Crescent Reserve	3	Very Good	• Revegetation to improve understorey • Routine rubbish removal • Routine non-specific weed control
Aylesford Way Reserve	3	Good-Degraded	• Fire potential – estimated 20 years since last burn • Routine maintenance – weeds and litter
L33301 Phoebe Street	3	Good -	• Priority weed control – love grass, veldt grass, watsonia, cape tulip

Site Name	Priority Grouping	Overall Condition (Keighery)	Threat Abatement Actions
		Degraded	• Medium priority weed control – inkweed, couch, buffalo grass, oats • Eradicate exotic trees – Sydney golden wattle, spotted gum • General non-specific weed control • revegetation
Curlewis Street Bushland	3	Good - Very Good	• Informal tracks require closure • Control veldt grass • Revegetate degraded areas
Shannon Ramble Reserve (BF Site 246)	4	Completely Degraded	• Reduce and control priority weeds – watsonia, love grass, kikuyu, couch • Remove exotic trees – Japanese pepper, cape lilac • revegetation
Katrine Parade Reserve	4	Degraded	• Target and eliminate high priority weeds – blackberry, bridal creeper, arum lily, veldt grass
Barson Court Reserve	4	Degraded	• Rubbish dumping • Bike jump constructed • Weeds – targeted and general control; removal of exotic trees on southern boundary • Understorey revegetation required • Fire in NW section
Peace Park (Paskett Pl, Kamber Ct – Tonkin Hwy)	4	Degraded	• Reduce and control priority weeds – love grass, kikuyu, watsonia • Revegetate “very poor” bushland areas • Fencing to control access
Bickley Brook, Tonkin Hwy to Mandarin Street	4	Completely Degraded	• Erosion control • Remove significant amount of rubbish in watercourse (esp. Tonkin-Eva) • Stop industrial rubbish dumping • Remove industrial activity from Crown Reserves • Significant weed management • Revegetation • Manage access – install strategic fencing
Kingsford Way Reserve	4	Completely Degraded - Degraded	• Target veldt grass and wild gladiolus • General non-specific weed control • General revegetation
Bridal Crescent Reserve	4	Completely degraded	• Intensive weed control – kikuyu and couch • Revegetate • Regular rubbish clean-ups

Appendix 6

2008/09 budget allocations to LNAs

Site Name	Area (ha)	Management Priority	Conservation Activities – 2009/10 actual expenditure	Comments
Sutherlands Park Bushland (BF Site 125)	20.8	1	$0	Management provided to active sports areas only - no programmed management activity to BF Site
L3, L9-12 Rushton Road, Martin (Ellis Brook Valley)	14.00	1	$1,800	
L1585 Harpenden St, L1 & 2 Holmes St, Tincurrin Dr Reserve (BF Site 125)	10.29	1	$0	No programmed management activity
Gosnells Golf Club Bushland (BF Site 467)	7.3	1	$5,585	
Tom Bateman Reserve Bushland (BF Site 456)	13.22	1	$0	No programmed management activity in BF Site. $9,555 allocated to wetland management.
Lander Swamp, Southern River	16.00	1	$0	Management currently by Developer pending handover
Bodallin Crescent Reserve	1.49	1	$4,504	
Shreeve Road Reserve Wetland	10.72	1	$8,160	
Mary Carroll Park Wetlands (BF Site 124)	17.57	1	$27,877	
SUBTOTAL	**111.39**		**$47,926**	
Empire Way Reserve	3.17	2	$9,036	
Greentree Drive Reserve	0.71	2	$1,000	Total budget is for Greentree, Millstream and Sandmartin Drives
Millstream Drive Reserve Wetland	1.89	2	$8,704	
Brixton Street Reserve Wetland (BF Site 422)	1.41	2	$4,408	
Hume Road Wildlife Reserve	3.00	2	$6,815	
Chatsworth Gate Reserve	0.37	2	$3,850	
SUBTOTAL	**10.55**		**$33,813**	
Hester Park Foreshore (BF Site 224)	15.45	3	$1,147	
Lowannaa Road Reserve	0.79	3	$2,306	
Maurie Lyon Reserve	0.32	3	$2,711	
Lakeside Drive Reserve	0.37	3	$4,150	
"Trotting Track" – L10, 11, 12 Kelvin Road	7.03	3	$0	No programmed management activity
Sherlock Close Reserve	0.52	3	$2,306	

Bottlebrush Drive Reserve	0.47	3	$2,007	
Crestwood Bushland	0.47	3	$0	No programmed management activity
Haven Place Reserve	0.31	3	$2,286	
Fulmar Street Reserve	0.53	3	$654	
John Okey Davis Park Foreshore (BF Site 246)	2.55	3	$10,370	
L3 Pitt Road	3.60	3	$0	No programmed management activity
Forest Crescent Reserve	0.22	3	$2,223	
Aylesford Way Reserve	1.09	3	$2,382	
L33301 Phoebe Street	1.21	3	$0	No programmed management activity
Curlewis Street Bushland	0.91	3	$4,463	
SUBTOTAL	**35.84**		**$37,005**	
Shannon Ramble Reserve (BF Site 246)	0.77	4	$1,698	
Katrine Parade Reserve	2.05	4	$9,842	
Barson Court Reserve	0.65	4	$2,691	
Peace Park (Paskett Pl, Kamber Ct – Tonkin Hwy)	1.97	4	$0	No programmed management activity
Bickley Brook, Tonkin Hwy to Mandarin Street	10.97	4	$0	No programmed management activity
Kingsford Way Reserve	0.40	4	$699	
Bridal Crescent Reserve	0.41	4	$726	
SUBTOTAL	**17.22**		**$15,656**	
TOTAL	**175.00**		**$148,430**	

Appendix 7

Review of LNA zoning, reservation and reservation purpose

Evaluation of zoning, reservation, purpose of City-owned/managed Natural Areas

Site Name	Management Category	MRS	TPS	Purpose	Owner/Manager
Sutherlands Park Bushland (BF Site 125)	1				
L1 Balfour Street		Urban	LOS		CoG
L1595 Gay Street		Urban	LOS		CoG
L1596 Gay Street		Urban	LOS		CoG
L1645 Balfour Street		Private Recreation, Other Regional Roads	Other Regional Road, LOS		CoG
L1646 Balfour Street		Private Recreation	LOS		CoG
L1647 Balfour Street		Private Recreation	LOS		CoG
L3, L9-12 Rushton Road, Martin (Ellis Brook Valley)	1				
L9 Rushton Road		P&R	P&R		CoG
L10 Rushton Road		P&R	P&R		CoG
L11 Rushton Road		P&R	P&R		CoG
L12 Rushton Road		P&R	P&R		CoG
L3 Rushton Road		P&R, Rural	P&R, General Rural		CoG
L1585 Harpenden St, L1 & 2 Holmes St, Tincurrin Dr Reserve (BF Site 125)	1				
L1585 Harpenden Street		Urban	Res		CoG
L1 Holmes Street		Urban	Res Dev		CoG
L2 Holmes Street		Urban	Res Dev		CoG
Tincurrin Drive Reserve (Crown Reserve 45771)		Urban	LOS	Public Recreation	Management Order CoG
Gosnells Golf Club Bushland (BF Site 467)	1				
Crown Reserve 24862		Private Recreation	LOS	Recreation Golf Link	Management Order CoG
Tom Bateman Reserve Bushland (BF Site 456)	1				
Crown Reserve 49160		P&R	P&R	Recreation and Conservation	Management Order CoG
Lander Swamp	1				
L9025 Lander Street		Urban	Res Dev		Private
L1642 Lander Street		Urban	Res Dev		Private
L9029 Southern River Road		Urban	Res Dev		Private
Bodallin Crescent Reserve	1				

Site Name	Management Category	MRS	TPS	Purpose	Owner/Manager
Crown Reserve 47575		Urban	Res	Public Recreation	Management Order CoG
Shreeve Road Reserve Wetland	1				
Crown Reserve 38134		Urban	Res Dev	Public Recreation	Management Order CoG
Crown Reserve 47209		Urban	Res Dev	Conservation	Management Order CoG
Lot 1 Shreeve Road		Urban	Res Dev		Private
Mary Carroll Park Wetlands (BF Site 124)	1				
Crown Reserve 31993		Urban	LOS	Bird Sanctuary & Park	Management Order CoG
Crown Reserve 28361		Urban	LOS	Public Recreation	Management Order CoG
L23 Shipton Street		Urban	LOS		CoG
L108 Eudoria Street		Urban	LOS		CoG
L91 Barcombe Way		Urban	LOS		CoG
Empire Way Reserve	2				
Crown Reserve 39298		Urban	LOS	Public Recreation	Management Order CoG
Greentree Drive Reserve	2				
Crown Reserve 47208		Urban	Res Dev	Conservation	Management Order CoG
Millstream Drive Reserve Wetland	2				
Crown Reserve 48497		Urban	Res Dev	Conservation, Public Recreation & Drainage	Management Order CoG
Hester Park Foreshore (BF Site 224)	3				
L806 Spencer Road		P&R	P&R		WAPC
Crown Reserve 29223		P&R	P&R	Public Recreation	Management Order CoG
L3 Nicholson Road		P&R	P&R		PTA
L2 Spencer Road		P&R	P&R		WAPC
L3 Spencer Road		P&R	P&R		WAPC
L4 Spencer Road		P&R	P&R		WAPC

	Site Name	Management Category	MRS	TPS	Purpose	Owner/Manager
	L150 Ellison Drive		P&R	P&R		WAPC
	L141 Ellison Drive		P&R	P&R		WAPC
	Crown Reserve 32677		P&R	P&R	Recreation	Management Order CoG
	L55 Ellison Drive		P&R	P&R		WAPC
	L500 Hester Street		P&R	P&R		WAPC
	Crown Reserve 34180		Waterways, P&R	Waterways, P&R	Recreation	Management Order CoG
	L69 Latimer Way		P&R	P&R		WAPC
	Crown Reserve 34179		P&R	P&R	Recreation	Management Order CoG
	Crown Reserve 32677		P&R	P&R	Recreation	Management Order CoG
	Brixton Street Reserve Wetland (BF Site 422)	2				
	L504 Kenwick Road		Urban	Res, Civic & Cultural, LOS		CoG
	L7 Kenwick Road		Urban	Res, Civic & Cultural, LOS		CoG
	Hume Road Wildlife Reserve	2				
	Crown Reserve 26272		Urban	LOS	Parklands	Management Order CoG
	Lowannaa Road Reserve	3				
	Lot 40 Lowannaa Road		Rural	General Rural		CoG
	Maurie Lyon Reserve	3				
	Crown Reserve 44190		Urban	LOS	Public Recreation	Management Order CoG
	Lakeside Drive Reserve	3				
	Crown Reserve 44570		Urban	LOS	Public Recreation	Management Order CoG
	Chatsworth Gate Reserve	2				
	Crown Reserve 47070		Urban	Res	Public Recreation	Management Order CoG
	"Trotting Track" – L10, 11, 12 Kelvin Road	3				
	L10 Kelvin Road		Rural	General Rural		CoG
	L11 Kelvin Road		Rural	General Rural		CoG

	Site Name	Management Category	MRS	TPS	Purpose	Owner/Manager
	L12 Kelvin Road		Rural	General Rural		CoG
	Sherlock Close Reserve	3				
	Crown Reserve 36264		Urban	LOS	Public Recreation	Management Order CoG
	Bottlebrush Drive Reserve	3				
	Crown Reserve 43616		Urban	LOS	Public Recreation	Management Order CoG
	Crestwood Bushland	3				
	Lot 309 Grenadier Drive, Thornlie		Urban	LOS		CoG
	Haven Place Reserve	3				
	Crown Reserve 39680		Urban	LOS	Public Recreation	Management Order CoG
	Fulmar Street Reserve	3				
	Crown Reserve 37353		Urban	LOS	Public Recreation	Management Order CoG
	John Okey Davis Park Foreshore (BF Site 246)	3				
	Crown Reserve 37270		Waterways, P&R	Waterways, P&R	Public Recreation	Management Order CoG
	L3 Pitt Road	3				
	Lot 3 Pitt Road		P&R	P&R		CoG
	Forest Crescent Reserve	3				
	Crown Reserve 40134		Urban	LOS	Public Recreation	Management Order CoG
	Aylesford Way Reserve	3				
	Crown Reserve 28429		Urban, Railways	LOS	Recreation	
	L33301 Phoebe Street	3				
	Crown Reserve 37632		Rural	LOS	Public Recreation	Management Order CoG
	Curlewis Street Bushland	3				
	Crown Reserve 36494		Urban	Res, LOS	Public Recreation	Management Order CoG
	Shannon Ramble Reserve (BF Site 246)	4				
	Crown Reserve 47001		Urban, P&R	Res, P&R	Public	Management Order

Site Name	Management Category	MRS	TPS	Purpose	Owner/Manager
				Recreation & Conservation	CoG
Crown Reserve 47210		Urban	Res	Public Recreation	Management Order CoG
Katrine Parade Reserve	4				
Crown Reserve 47832		Urban	Res Dev	Public Recreation	Management Order CoG
Crown Reserve 47862		Urban	Res Dev	Conservation	Management Order CoG
Barson Court Reserve	4				
Crown Reserve 36974		Urban	Res, LOS	Public Recreation	Management Order CoG
Peace Park (Paskett Pl, Kamber Ct – Tonkin Hwy)	4				
Crown Reserve 41566		Urban	Watercourse	Public Recreation	Management Order CoG
L513 Kirin Way		Urban	Res		Private
L105 Tarling Place		Urban	Res		CoG
Bickley Brook, Tonkin Hwy to Mandarin Street	4				
Crown Reserve 36328		Industrial	Primary Regional Road, LOS	Public Recreation	Management Order CoG
42830		Urban Deferred, Industrial	Composite Residential/Light Industry, LOS	Drainage	Management Order Water Corporation
Crown Reserve 36328		Urban Deferred	LOS	Public Recreation	Management Order CoG
L308 Bickley Road		Industrial	LOS, General Industry		Private
Crown Reserve 36894		Industrial	LOS, General Industry	Public Recreation, Drainage	Management Order CoG
Crown Reserve 36328		Urban Deferred	LOS	Public Recreation	Management Order CoG
Crown Reserve 36894		Urban Deferred	LOS	Public Recreation, Drainage	Management Order CoG
Crown Reserve 47321		Industrial	LOS	Foreshore Management	Management Order CoG

	Site Name	Management Category	MRS	TPS	Purpose	Owner/Manager
	L10 Maddington Road		Urban Deferred	Composite Residential/Light Industry, LOS		Private
	L11 Maddington Road		Urban Deferred	Composite Residential/Light Industry, LOS		Private
	L57 Eva Street		Urban Deferred	Composite Residential/Light Industry, LOS		Private
	Crown Reserve 37418		Urban Deferred, Industrial	LOS	Drainage	Management Order Water Corporation
	Crown Reserve 43050		Urban Deferred, Industrial	LOS	Public Recreation	Management Order CoG
	L2 Maddington Road		Urban Deferred	Composite Residential/Light Industry, LOS		Private
	L10 Maddington Road		Urban Deferred, Industrial	Composite Residential/Light Industry, LOS		Private
	L9 Maddington Road		Urban Deferred, Industrial	Composite Residential/Light Industry, LOS		Private
	Crown Reserve 43050		Urban Deferred, Industrial	Composite Residential/Light Industry, LOS	Public Recreation	Management Order CoG
	L6 Maddington Road		Urban Deferred	Composite Residential/Light Industry, LOS		Private
	L285 Kelvin Road		Urban Deferred, Industrial	LOS, General Industry		Private
	L800 Myola South Place		Urban Deferred	Composite Residential/Light Industry, LOS		Private
	Crown Reserve 44901		Industrial	LOS	Drainage	Management Order Water Corporation
	L233 Myola South Place		Industrial	Composite Residential/Light Industry, LOS,		Private

	Site Name	Management Category	MRS	TPS	Purpose	Owner/Manager
				General Industry		
	Crown Reserve 44217		Industrial	LOS	Public Recreation	Management Order CoG
	Crown Reserve 44217		Industrial	LOS	Public Recreation, Drainage	Management Order CoG
	Crown Reserve 41530		Industrial	LOS	Public Recreation	Management Order CoG
	L2 Wildfire Road		Industrial	LOS, General Industry		Private
	Crown Reserve 42865		Industrial	LOS	Public Recreation	Management Order CoG
	Kingsford Way Reserve	4				
	Crown Reserve 36513		Urban	LOS	Public Recreation	Management Order CoG
	Crown Reserve 36625		Urban	LOS	Public Recreation	Management Order CoG
	L296 Kingsford Way		Urban	LOS		CoG
	Bridal Crescent Reserve	4				
	Crown Reserve 31129		Urban	LOS	Public Recreation	Management Order CoG
	Crown Reserve 33871		Urban	LOS	Public Recreation	Management Order CoG