October 2011 Final Report

LOCAL ENVIRONMENTAL PLANNING STRATEGY

landinsights
PLANNING DESIGN ENVIRONMENT

Adopted by Council for final approval on 12 October 2011.

contents

LIST OF FIGURES

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executive summary

INTRODUCTION

The Shire of Busselton is currently reviewing its planning framework with a view to preparing a Local Planning Strategy and subsequent Local Planning Scheme to guide development in the Shire in the future. While the statutory timeframe of the scheme will be five years, the Local Planning Strategy itself will provide a longer-term framework of up to 30 years. It will set in place long term principles to achieve the Shire's vision for development over that time.

The Local Environmental Planning Strategy (LEPS) is one of six 'sector-based strategies' that will feed into the Shire's Local Planning Strategy. The LEPS will help guide development and environmental protection for the next 30 years. It will also provide significant input and context for the future development of the Shire's Local Planning Strategy and new Local Planning Scheme.

REPORT SCOPE

This report presents the findings and recommendations of the Local Environmental Planning Strategy. It should be read in conjunction with the background information provided in previous reports, notably:

- **Report 1** Environmental Profile (published document)
- **Report 2** Spatial Planning Units (internal unpublished document).

The information in the above reports, along with the significant consultation that has occurred over the past 18 months, has provided the context to the objectives, strategies and recommendations presented in this document. This report has been prepared to provide the Shire with guidance on key environmental matters relating to development and land use planning. More specific consideration has also been provided for areas where development pressures are expected to be greatest – Busselton/Vasse and Dunsborough/Commonage.

Within each section of the report consideration has been given to what the desired environmental outcomes are and how these can be achieved through the land use planning system.

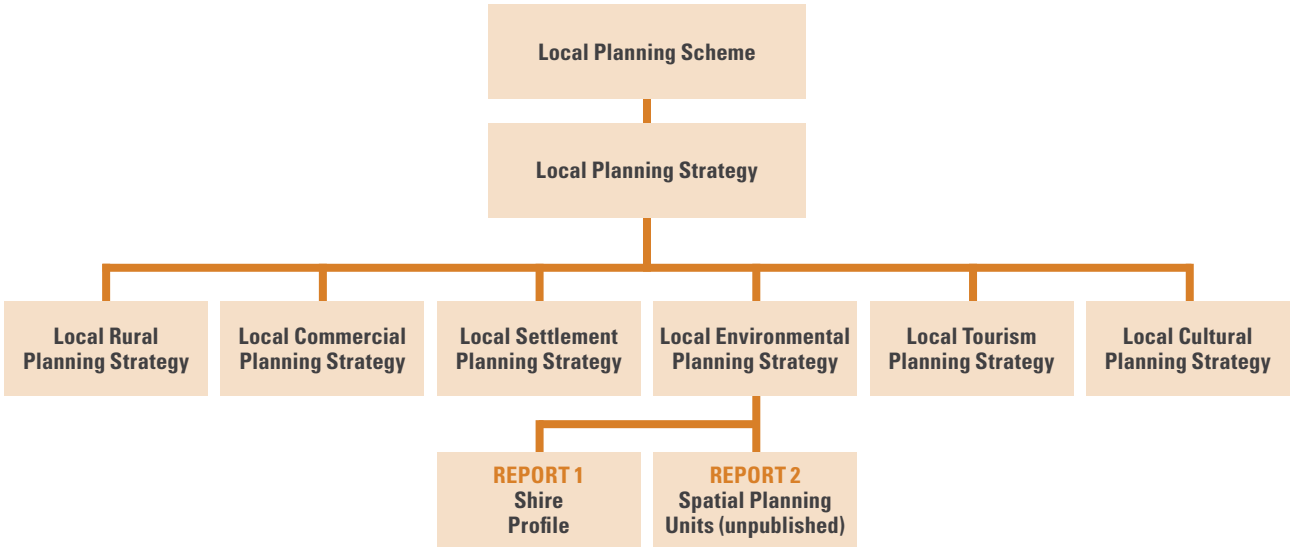
VISION

The overall vision for the Local Environmental Planning Strategy is:

The Shire of Busselton will accommodate its current and future populations in environmentally sustainable communities characterised by settlements that recognise and embrace the physical and environmental features of the Shire.

Areas of environmental and cultural significance will be identified and protected by the Shire's planning framework, which will result in land use and development being environmentally sensitive.

Shire of Busselton proposed Planning Framework Hierarchy



ENVIRONMENTAL ISSUES

The LEPS focuses on the key environmental issues relating to development and land use planning and outlines the objectives, strategies and recommendations for each. The environmental issues discussed in this report are:

- Biodiversity
- Water, wetlands and watercourses
- Landscape and land qualities
- Coastal management and foreshores
- Basic Raw Materials

A summary of each of the environmental issues, including objectives, strategies and recommendations, are presented below. Recommendations have been assigned a priority as follows:

- **I** Immediate term – within the next financial year
- **M** Medium term – within the next five years
- **L** Long term – 5+ years
- **O** Ongoing – as required.

BIODIVERSITY

BACKGROUND

The Shire of Busselton is located within the south-west of Western Australia, which is identified as being an international 'Biodiversity Hotspot' (Conservation International, 2007). The biodiversity within the Shire is an important asset, and therefore, it is essential that all future planning decisions take into account the issue of biodiversity protection.

ISSUES

Some of the major issues caused from development and detrimental land uses can include the following:

- **Loss and modification of habitats and poorly represented vegetation and plant communities**
  Clearing of vegetation to facilitate development results in the loss of habitats and plant communities. Development within close proximity of natural features can also produce 'edge effects' which causes detrimental impacts on these areas even if the original development did not involve clearing.
- **Maintaining/enhancing the biodiversity hotspot**
  The detrimental impacts that humans have on the environment have an effect on the biodiversity values of the area and threatens the area's status as a biodiversity hotspot.
- **Introduction and spread of weeds, feral animals and pathogens**
  The spread of weeds, feral animals and pathogens have significant impacts on the natural environment and biodiversity values.
- **Fragmentation of bushland areas and disruption of environmental linkages**
  Clearing of vegetation for development can result in fragmentation of larger areas of vegetation into smaller areas which has an impact on habitat values and the movement of native fauna. Fragmentation can also have a negative impact on ecological linkages across the landscape.
- **Clearing of vegetation for fire management purposes**
  Bushfire management is a serious and important issue from a safety perspective. However, it also involves clearing of vegetation to meet the requirements of bushfire safety. This sometimes results in a conflict between bushfire risk reduction and conservation of vegetation complexes.

OBJECTIVES

The planning framework of the Shire shall:

1. **Maintain and enhance the quality and quantity of remnant vegetation throughout the Shire.**
2. **Ensure that protection and enhancement of biodiversity assets in the Shire is considered early in the planning process.**
3. **Protect and enhance the biodiversity 'hotspot' status of the Shire.**

RECOMMENDATIONS

NO.	RECOMMENDATION	PRIORITY
BD1	**Protect and enhance biodiversity values** as part of town planning scheme amendment, development guide plan, subdivision and development application processes by: i. continuing to apply State planning and environmental policies as appropriate, and reviewing and updating the local planning scheme, local planning policy and other local planning instruments as appropriate in response to changes in State level policies; ii. requiring applicants to assess biodiversity values and potential development impacts (including impacts arising from development of services and infrastructure) as part of town planning scheme amendment, development guide plan, subdivision and development application processes; iii. identifying mechanisms and incentives to protect areas of high biodiversity value (including via the development guide plan process and the continuation and periodic review of the Shire's Biodiversity Incentives Strategy); iv. identifying means of protecting and enhancing habitat for threatened fauna and flora (including habitat in urban areas); v. requiring the offsetting of biodiversity impacts by the planting and protection of local endemic species in local public reserves or other suitable locations; and vi. requiring the planting of local native species in any landscape, amenity or environmental revegetation programs, other than in densely developed and high density traffic areas.	O
BD2	Undertake broad-scale **dieback risk assessment** mapping for the Shire, and set out in the local planning framework when and where site-specific dieback risk assessments and/or management strategies are required as part of town planning scheme amendment, development guide plan, subdivision and development application processes.	M

BD3	**Enhance, protect and manage roadside vegetation** by: i. ensuring that, other than in densely developed and high pedestrian traffic areas, local native species are planted on verges and median strips in all new development areas; ii. encouraging and, where practicable, requiring the preservation of remnant vegetation in road design and in existing road reserves; and iii. identifying road reserves that have value as environmental linkages and retain and enhance these corridors.	O
BD4	Work with relevant State agencies to **incorporate the outcomes of the South West Biodiversity Project** on regional ecological linkages into the local planning framework.	M
BD5	Minimise development being located so that it will result in the need for clearing or thinning of vegetation to establish bush **fire hazard and building protection zones.**	O

WATER, WETLANDS AND WATERCOURSES

BACKGROUND

Wetlands are biologically productive systems that support a diverse array of plants and animals. Most wetlands present in the Shire are situated along Geographe Bay. The Vasse-Wonnerup System is located to the east of the Busselton city centre and is listed as a Ramsar wetland. The Busselton region also contains a series of watercourses and coastal wetlands that are hydraulically linked to Geographe Bay.

Groundwater is an important water source in the Shire for a variety of purposes including agriculture, horticulture, industry, mining, public water supplies and for environmental requirements.

ISSUES

Environmental impacts on wetlands and watercourses from human activity can be summarised as follows:

- **Erosion and siltation of the river and wetland banks**
  This generally occurs as a result of vegetation clearing and uncontrolled stock access along watercourses and wetlands and can have detrimental impacts on water quality.
- **Removal of native fringing vegetation and habitat for native fauna**
  Degradation and destruction of wetland habitats has severe impacts on the biodiversity value of the region and causes irrepairable damage. Vegetation buffers are essential to help protect wetlands from potential negative impacts and help to protect wetland environmental processes and functions, from impacting on nearby development
- **Low biodiversity of remaining fringing vegetation**
  Clearing of vegetation and other general impacts can lower the biodiversity of the plant species present, which in turn can lower the habitat value of the area.
- **Weed infestation**
  Wetland and watercourse ecosystems are extremely vulnerable to weed invasion, particularly if they have been impacted through vegetation clearing. Weeds can out compete native plants and can further contribute to the decline in biodiversity and habitat value.
- **Poor water quality**
  Human activity in catchment areas can have significant impacts on water quality. For example, water runoff from farming areas can cause high nutrient levels, as does urban development. Clearing of vegetation around watercourses and wetlands can cause siltation and erosion and reduce the nutrient uptake of those systems.
- **Altered water regimes**
  This is generally caused when water is artificially drained or pumped into wetlands and watercourses (such as the creation of dams and stormwater systems). Removal of water can affect the natural balance of the system and can affect vegetation composition and habitat areas for fauna species. Increases in water flow along watercourses can increase erosion and siltation which can lead to changes in habitat areas.

OBJECTIVES

The planning framework of the Shire shall:

1. **Protect the integrity of wetlands of international, national and state significance.**
2. **Encourage protection and enhancement of all wetlands and watercourses in the Shire.**
3. **Ensure the importance of wetlands and watercourses is acknowledged in the strategic and statutory planning processes.**
4. **Assist in the provision and implementation of solutions to catchment management issues.**
5. **Protect groundwater quality.**
6. **Protect Groundwater Dependent Ecosystems.**
7. **Assist in the management of sustainable use of groundwater for all uses.**
8. **Control land use to prevent groundwater contamination or degradation.**
9. **Minimise groundwater-influenced land degradation such as salinity and waterlogging.**

RECOMMENDATIONS

NO.	RECOMMENDATION	PRIORITY
W1	Ensure a planned approach to the **management of water, wetlands and watercourses** by: i. considering the recommendations of the *Water Quality Improvement Plan for the Vasse-Wonnerup Estuary and Geographe Bay*, and the Sabina, Ludlow, Abba, Carbunup, Vasse and Yallingup Brook River Action Plans in the making of planning decisions; ii. requiring the submission of local water management plans, urban water management strategies and other water planning documents, as appropriate, and as required by relevant State Government policy, development guide plans and other relevant planning instruments, as part of town planning scheme amendment, development guide plan, subdivision and development application processes; and iii. preparing and implementing district water management strategies for Busselton and Dunsborough.	O/M

W2	Protect and **enhance wetlands and watercourses** by: i. requiring biophysical assessments and management plans, as appropriate, for development that may impact upon wetlands and/or watercourses, to establish appropriate development setbacks, protect and enhance riparian vegetation, and prevent water quality impacts; and ii. Considering water flow issues as well as other relevant matters in the assessment of proposals for dams outside proclaimed surface water catchments.	M
W3	**Manage water quality** by: i. working with appropriate State agencies to ensure that approval for on-site effluent disposal is assessed against both health and environmental objectives, including, if and where necessary, the introduction of town planning scheme provisions, especially in the industrial area and low-density or unsewered residential areas in proximity to Conservation Category Wetlands; ii. considering introduction of a 'Water Quality Improvement Special Control Area' in the town planning scheme for the catchments that drain into the Vasse-Wonnerup Estuary (which are identified in the Department of Water's *Water Quality Improvement Plan for the Vasse-Wonnerup Estuary and Geographe Bay* as being 'recovery' catchments) where it is vital that there is a net reduction in nutrient export); iii. requiring planning approval for any development within that Special Control Area that may increase the risk of nutrient export and infiltration, including intensive agriculture, but which currently does not require a license pursuant to the *Environmental Protection Act 1986,* and set out further guidance in local planning policy regarding the information required to assess such applications and the objectives to be met; and iv. ensuring that new and infill urban development achieves the best practicable water quality outcomes, including the development and review over time of local planning policies and more detailed strategies to achieve a reduction in nutrient export from existing urban areas.	M

LANDSCAPE AND LAND QUALITIES

BACKGROUND

Three distinct landforms are immediately noticeable in the Shire, comprising the broad and low-lying coastal plain, bounded by the Leeuwin-Naturaliste Ridge along the west coast, and the Whicher Range Scarp to the south-east. The landscape of the Shire assists in identifying a 'sense of place'.

The land qualities and degradation risks are inherent characteristics generally associated with the different soil-landscape units and soils types in a specific area. The land qualities and degradation risks also affect the land capability or suitability for certain land uses.

ISSUES

Key threats to the identified values associated with landscape are identified below:

- **Highly visible development**
  Development of areas that are highly visible and have natural landscape character will result in the erosion of the aesthetic and cultural values associated with the Shire's landscape, which is an important component of the identity and attraction of the Shire.
- **Improved access**
  Unmanaged access has the potential to result in land degradation problems including erosion, damage to vegetation and soil structure.
- **Impacts on character**
  Changes to important landscapes, such as the wetland chain near Busselton, as well as the topography and remnant vegetation surrounding Dunsborough, may alter the character of the townsites, even if development in these areas is not necessarily highly visible.
- **Impacts on biodiversity**
  Many of the significant landscapes within the Shire overlap important environmental features.
- **Protection of views**
  Views of significant landscapes are highly valued and there is a natural tendency for development to be sited in such a manner as to maximise views. Public views and landscapes should wherever possible be protected so that development does not diminish or unnecessarily restrict the views that would otherwise be available.
- **Maintenance of existing urban areas**
  While not necessarily an environmental issue, some consideration should be given to the landscapes within the existing urban centres of the Shire.

Key threats to the land qualities and land degradation risks in the Shire include the following activities.

- **Development impacts**
  Inappropriately located development has the potential to change land qualities. For instance, removal of vegetation for development can change the local ground and water surface flows, increase risk of water and wind erosion, and exacerbate soil salinity.
- **Acid sulphate soils**
  Excavation for development can lead to exposure of acid sulphate soils.

OBJECTIVES

The planning framework of the Shire shall:

1. **Protect the current level of landscape integrity on the Leeuwin-Naturaliste Ridge.**
2. **Protect, and where possible improve through the development process, the current level of landscape integrity around Busselton and Dunsborough.**
3. **Ensure that landscape is a legitimate issue to be considered during the subdivision and development process.**
4. **Encourage landscape improvements.**
5. **Prevent the worsening of land qualities in the Shire, particularly on the coastal plain.**
6. **Ensure development proposals recognise and manage land qualities during the development process.**
7. **Recognise that some land degradation issues can be dealt with through engineering solutions and land management practices.**

RECOMMENDATIONS

NO.	RECOMMENDATIONS	PRIORITY
LS1	Review the **'Landscape Value Area'** provisions in the Scheme, focusing on identifying and managing the areas of the Shire with the greatest landscape value.	I
LS2	Maintain the **physical and visual separateness of urban settlements**, especially Busselton and Dunsborough.	O
LS3	Review and supplement **visual landscape local planning policies** to ensure that the local planning framework: i. identifies areas of visual landscape significance; ii. identifies and protect the landscape values of key entry points to Busselton and Dunsborough as depicted on Figure 5.1; iii. considers/supplements existing TPS provisions for landscape protection in and around Busselton and Dunsborough; iv. reflects and updates the Caves Road Visual Management Policy; v. is consistent with *State Planning Policy 6.1: Leeuwin-Naturaliste Ridge Policy;* vi. gives due consideration to *Visual Landscape Planning in Western Australia;* and vii. sets out appropriate requirements for viewshed analysis as part of town planning scheme amendment, development guide plan, subdivision and development application processes.	M
LS4	Manage acid sulphate soils by: i. identifying an **'Acid Sulphate Soil Special Control Area'** for the areas where best available mapping indicates that acid sulphate soils are high and moderate risk; ii. ensuring that 'permitted development' (i.e. development that may occur without the need for planning approval) provisions are modified in areas susceptible to acid sulphate soils (the Special Control Area) to ensure that planning approval is required for development with significant potential to disturb acid sulphate soils; iii. requiring any development application in the Special Control Area to be supported by a 'self-assessment' of acid sulphate soil risk; and iv. providing additional regulatory oversight and adopting a conservative approach to development where acid sulphate soils are present in proximity to wetlands, especially Ramsar and Conservation Category wetlands.	O/M

COASTAL MANAGEMENT AND FORESHORES

BACKGROUND

The Shire of Busselton has two distinctly different coastal regions, separated by Point Daking, Dunsborough. Eastwards from Dunsborough, the Shire's coastline is sandy, facing northward, sandy and with low-relief. From Dunsborough north to Cape Naturaliste and then south along the western coast, the shoreline is primarily rocky, with a small number of sandy beaches.

ISSUES

The issues and implications associated with the coastal environment are as follows:

- **Removal of coastal vegetation, modification of landscapes, dune erosion, and degradation of coastal habitats**
  Coastal development typically involves removal of coastal vegetation which can lead to dune erosion, landscape changes and loss of habitat.
- **Climate change projections**
  The most documented coastal impact of projected climate change is erosion exacerbated through sea level rise. Development setbacks are implemented in an attempt to reduce the risk of erosion and inundation on development.
- **Coastal erosion, storm surge and inundation**
  In Busselton, the coastal areas are low lying, with only small inland dunes. Several structures have been developed to manage erosion and sediment movement. Potential impacts associated with climate change may lead to further, event-driven erosion. A general rise in sea levels has implications for coastal stability and erosion.
- **Coastal protection works**
  There are several existing coastal protection structures along the coast of Geographe Bay which result in modification to coastal processes. Placement of infrastructure that changes natural coastal processes can often have dramatic effects on the stability of a coastline.
- **Management of the coast**
  Coastal areas are attractive for development due to the lifestyle opportunities associated with being close to the beach. Development pressure on the coast has led to a range of associated issues such as uncontrolled access, impacts on the biodiversity values of coastal areas and on landscape quality, increased pressure from tourism, increased pressure for further development along the coast, inadequate understanding about the long term impacts that coastal development has on coastal ecology, lack of funds to adequately manage coastal areas and incremental removal of coastal vegetation.
- **Fragmentation of ownership**
  Coastal management can be difficult where a management response is required over a large area and management is fragmented (meaning access to sites and willingness to participate in management programs can be varied).

OBJECTIVES

The planning framework of the Shire shall:

1. **Maintain, enhance and improve the quality of coastal environments.**
2. **Ensure development is appropriately protected from coastal processes.**
3. **Maximise the cost-effectiveness of coastal protection structures.**

4. **Provide a mechanism for facilitating environmental management of the coast.**
5. **Promote further research and investigation on coastal environments, focussing on the impact of human development and use on natural processes and the impact that coastal processes can have on development.**
6. **Promote awareness and education of coastal protection and management.**

RECOMMENDATIONS

NO.	RECOMMENDATION	PRIORITY
CM1	Continue to develop and review over time strategies for **coastal adaptation and management** in response to coastal erosion and inundation risk, including the potential impacts of climate change, especially climate-change induced sea level rise, through the identification of viable coastal defence and/or managed retreat strategies for all of the Shire's coast, including the consideration of identifying, securing and expanding coastal foreshore reserves.	O/M
CM2	**Protect the coastal environment** and other foreshores by: i. managing public access to sensitive areas by focussing public use at established locations; ii. ensuring development does not provide unmanaged access to the beach, dunes or other foreshores; and iii. seeking to secure the transfer of land to provide for appropriate coastal and other foreshore reserves as part of town planning scheme amendment, development guide plan, subdivision, development application processes or other opportunities.	M/O

BASIC RAW MATERIALS

BACKGROUND

Basic Raw Materials (BRMs) are an important resource for the Shire and as such it is essential that, where possible, this land is protected from development which would prevent extraction in the future. The presence of some BRMs also coincides with the location of significant environmental features which can constrain the development of extractive industries. The BRMs found in the Shire include gravel, limestone and sand. The Shire's Extractive Industry Policy identifies priority areas for gravel and sand and establishes policy measures as appropriate based on a range of land use, environmental, amenity and other factors.

ISSUES

Some of the issues relating to BRMs are:

- **Remnant vegetation**
  Some BRM areas are located in and around remnant vegetation and other important environmental assets.
- **Management of BRM operations**
  Issues that need to be considered include spread of dieback and other disease, noise and road access issues and minimum separation distances from sensitive land uses.
- **Incompatible land uses**
  Although not necessarily an environmental issue, consideration should be given to protecting accessible sources of BRM within the Shire from incompatible land uses (such as rural residential) to ensure that access to the BRM site can occur over time.

OBJECTIVES

The planning framework of the Shire shall:

1. **Recognise the importance of the environmentally sustainable exploitation of BRM.**
2. **Protect high value conservation areas as priority over BRM (e.g. ESAs, DRF, TEC's, habitat for threatened fauna etc.).**
3. **Ensure activities associated with exploitation of BRM do not impact unduly on surrounding landholders.**
4. **Promote and accommodate the needs of sustainable mining enterprises, although not at the expense of the environmental objectives.**

RECOMMENDATIONS

NO.	RECOMMENDATION	PRIORITY
M1	Further consider the need to develop an extractive industry local law to supplement town planning controls over extractive industry.	M
M2	Review the 'Rural Areas Land Use and Development Policy' to ensure that the local planning policy framework makes reference to areas of environmental significance identified in this Strategy.	M
M3	In partnership with the State Government and other local authorities, promote the preparation of a regional Basic Raw Materials Strategy.	M

SETTLEMENTS

BACKGROUND

Consideration has been given to the environmental constraints to the future growth and development of the Shire's settlements. The settlements considered include the major settlements of Busselton and Dunsborough (including Vasse and Commonage), and the minor settlements of Eagle Bay, Yallingup, Carbunup River, Metricup and Jarrahwood. The implications for protection of the environment and some guidance for future management have been outlined.

OBJECTIVES

The planning framework of the Shire shall:

1. **Protect all remaining areas of poorly represented vegetation and provide opportunities for revegetation where possible.**
2. **Protect property and life by restricting development within the 1:100 year floodway.**
3. **Ensure that coastal management, climatic change and inundation/flooding is taken into account as part of the development approvals process.**
4. **Ensure that that development continues to be subjected to thorough Structure Planning and Development Guide Plan processes that incorporate relevant environmental assessment and management.**
5. **Protect major watercourses and riparian zones.**
6. **Maintain the integrity of wetland systems.**

7. **Ensure that essential infrastructure is protected from incompatible land use.**
8. **Protect important landscapes within and around the town centre and adjoining residential areas.**
9. **Protect and encourage agricultural industries, particularly intensive agricultural enterprises to maximise use of good quality agricultural land.**
10. **Protect the lifestyle opportunities provided for within the Vasse and Commonage areas.**

RECOMMENDATIONS FOR MAJOR SETTLEMENTS

The following recommendations are made in relation to the major settlements and the land in proximity to these settlements.

RECOMMENDATIONS

NO.	RECOMMENDATIONS	PRIORITY
MAJ1	**Discourage expansion of the urban footprint,** especially but not only in the area between the coast and the wetland chain, to improve environmental outcomes, by:	
	i. in the development of the Local Planning Strategy, seeking to identify opportunities for the redevelopment and consolidation of existing urban areas to reduce the pressure for expansion of the urban footprint;	O
	ii. in the development of the Local Planning Strategy, not supporting the rezoning of land that would result in an expansion of the urban footprint into areas identified as having medium or high environmental constraints *(as depicted on Figures 8.4, 8.9 and 8.14)* unless there is a clear strategic case for doing so, and following the consideration and assessment of alternatives and the environmental impacts of urban development;	
	iii. in the development of the Local Planning Strategy, considering alternative zonings for areas of land currently zoned for urban or rural development, but which contain Conservation Category Wetlands *(as depicted on Figure 8.5)* and/or other significant environmental constraints; that would make approval of the development unlikely; and	
	iv. in the development of the Local Planning Strategy, and/or subsequently, identifying means, in consultation with affected landowners, of providing for the long-term protection, enhancement and management of the wetland chain (and adjoining areas of remnant vegetation and significant environmental constraints) between Busselton and Dunsborough (and outside the area subject of the *Busselton Wetlands Conservation Strategy*).	
MAJ2	In Busselton and Dunsborough, consider introducing **development incentives** and/or transferrable development rights to facilitate the protection and enhancement of urban biodiversity and character.	M
MAJ3	**Provide buffers around key infrastructure** by:	M
	i. liaising with the Water Corporation to identify and protect appropriate buffers around the Busselton and Dunsborough Wastewater Treatment Plants;	
	ii. reviewing the identified buffer around the Busselton Regional Airport and seeking to ensure the identification of an appropriate buffer; and	
	iii. considering the creation of differentiated industrial zones to ensure that industrial development that may be incompatible with residential development is not proposed in areas in proximity to existing or proposed residential development.	
MAJ4	Include areas of remnant vegetation in public ownership and currently in *Recreation* reserves pursuant to the town planning scheme in a new *Conservation* reserve.	O

OBJECTIVES

The planning framework of the Shire shall:

1. **Protect all areas of remnant vegetation, particularly areas of poorly represented vegetation and TECs and provide opportunities for revegetation where possible.**
2. **Ensure that any proposed development in the area is subjected to thorough Structure Planning and Development Guide Plan processes that incorporate relevant environmental assessment and management.**
3. **Protect important landscapes within and around the townsite.**
4. **Protect the lifestyle opportunities provided for within minor settlements.**
5. **Protect the environmental values of the Carbunup River through the implementation of an appropriate vegetated buffer.**

RECOMMENDATIONS FOR MINOR SETTLEMENTS

The minor settlements are Eagle Bay, Yallingup, Carbunup River, Metricup and Jarrahwood.

RECOMMENDATIONS

NO.	RECOMMENDATION	PRIORITY
MIN1	Do not support further expansion of **Yallingup and Eagle Bay** outside existing structure plans.	O
MIN2	In considering proposals for the expansion of **Carbunup River, Metricup and Jarrahwood**, do not support the rezoning of land that would result in an expansion of development into areas identified as having medium or high environmental constraints unless there is a clear strategic case for doing so, and following consideration of the environmental impacts of urban development.	O
MIN3	In **Yallingup, Eagle Bay, Carbunup River and Metricup**, promote the enhancement and protection of all remnant vegetation, and consider introduction of clearing controls in the town planning scheme to support that objective.	M

definitions

Amenity – those factors which combine to form the present character and likely future character of an area

Biodiversity – the variety of life: the different plants, animals and microorganisms and the ecosystems of which they are a part.

Buffer – the area (or 'physical buffer') required to maintain wetland function, usually defined by biophysical criteria.

Catchment – the area of land from which water drains to form creeks, rivers, lakes, wetlands, reservoirs and aquifers.

Coastal foreshore reserve – the area of land on the coast set aside in public ownership to allow for coastal processes and provide protection of ecological values, landscape, visual landscape, indigenous and cultural heritage, and public access, recreation and safety.

Conservation – the protection, management, sustainable use and enhancement of the natural environment.

Development – any change to land use, including housing, any demolition, erection, construction, alteration of or addition to any building or structure on the land and any excavation or other works.

Dieback – the common name given to the pathogen *Phytophthora cinnamomi* which is a soil borne water mould that invades and destroys the root systems of many native flora species in Western Australia.

Environmentally sustainable development – development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.

Ecological linkage – a series of (both contiguous and non-contiguous) natural areas that, within a landscape context, connect larger natural areas by forming stepping stones of habitat that allow the movement of organisms and genetic material between these larger natural areas.

Ecology – study of the relationships of animals and plants, particularly of animal and plant communities, to their surroundings, living and non-living.

Ecosystem – a term used to describe a specific environment to include all the biological, chemical and physical resources and the inter-relationships and dependencies that occur between those resources.

Groundwater Dependant Ecosystems – ecosystems which rely on the water present in the ground for their survival.

Land capability – the ability of the land to accept a type and intensity of use permanently, or for specified periods under specific management, without permanent damage. Based on an assessment of available biophysical land resources information.

Landscape values – natural and/or cultural landscape features that are highly valued, as defined by documented research.

Land suitability – the potential use of the land based upon a multi-disciplinary evaluation of physical, technical, social and economic factors.

Ramsar – *The Convention on Wetlands* (commonly known as the *Ramsar Convention*) is an intergovernmental treaty adopted at the Iranian city of Ramsar the purpose of which is to promote the conservation and wise use of wetlands, particularly those that possess high ecological values.

Remnant vegetation – stands of remaining native vegetation indigenous to a locality.

Reserves – may be either land classified in local planning schemes for public purposes or areas of Crown land reserved for public purposes as determined by the *Land Act 1933* and the *Land Administration Act 1997.*

Riparian zone – the area along or surrounding a water body where the vegetation and natural ecosystems benefit from and are influenced by the passage and storage of water.

Rural-residential – land use for residential purposes in a rural setting which provides for alternative residential lifestyle and which seeks to preserve the amenity of such areas and to control land use impacts.

Setback – the area outside a sensitive area (such as a wetland) and the 'buffer' that is required to adequately protect the area from potential impacts of adjacent land uses in order to maintain the function of the sensitive area and its buffer. It is largely determined by the type of land use and management measures proposed.

Sustainability – meeting the needs of current and future generations through and integration of environmental protection, social advancement and economic prosperity.

Threatened Ecological Community – communities which consist of native vegetation which are poorly represented and in endanger of extinction.

Visual landscape – the appearance of landscape elements such as landform, vegetation, waterbodies and human land use that makes an area identifiable and unique.

Visually sensitive/exposed areas – areas that are visible from communities, public use areas, and travel corridors (such as roads and waterways) and any other viewpoint.

Wetlands – areas of marsh, fen, peat land or water; whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish, or salt including areas of marine water the depth of which at low tide does not exceed six metres.

abbreviations

ATU ..... Aerobic Treatment Unit

BIS..... Biodiversity Incentives Strategy

BRM..... Basic Raw Materials

DAFWA ..... Department of Agriculture and Food Western Australia

DEC..... Department of Environment and Conservation

DGP..... Development Guide Plan

DIA ..... Department of Indigenous Affairs

DMP..... Department of Mines and Petroleum

DOP..... Department of Planning

DOW..... Department of Water

DRF..... Declared Rare Flora

EPA..... Environmental Protection Authority

EPP..... Environmental Protection Policy

ESA..... Environmentally Sensitive Area

GeoCatch... Geographe Catchment Council

GDE ..... Groundwater Dependant Ecosystem

LEPS..... Local Environmental Planning Strategy

LPP..... Local Planning Policy

LPS..... Local Planning Strategy

SCA ..... Special Control Area

SGP ..... Subdivision Guide Plan

SPP..... State Planning Policy

SEWPaC .... Department of Sustainability, Environment, Water, Population and Communities

SWBP..... South West Biodiversity Project

TEC..... Threatened Ecological Community

TPS..... Town Planning Scheme

WAPC..... Western Australian Planning Commission

1. INTRODUCTION

introduction

1.1 BACKGROUND

The Shire of Busselton is currently reviewing its planning framework with a view to preparing a Local Planning Strategy and subsequent Local Planning Scheme to guide development in the Shire in the future. While the statutory timeframe of the scheme will be five years, the Local Planning Strategy itself will provide a longer-term framework of up to 30 years. It will set in place long term principles to achieve the Shire's vision for development over that time.

The Local Environmental Planning Strategy (LEPS) is one of six 'sub-strategies' that will feed into the Shire's Local Planning Strategy. The LEPS will help guide development and environmental protection for the next 30 years. It will also provide significant input and context for the future development of the Shire's Local Planning Strategy and new Local Planning Scheme.

The Shire of Busselton is located within a 'Biodiversity Hotspot' and consists of many significant environmental features. Present and past land uses have often had an adverse impact on the environment within the Shire. With high anticipated population growth rates and subsequent land development pressures, the environment will continue to be placed under pressure and degraded from human impact. It is anticipated that the LEPS will provide guidelines for future land use, development and environmental protection within the Shire. It is hoped that this will result in sustainable development and protection of the environment for many years into the future.

The intent of the LEPS is to provide succinct recommendations that can be implemented via the Shire's planning framework. It is important to note that it is not an Environmental Management Plan, but rather a guide for incorporating environmental issues into the Local Planning Strategy and Local Planning Scheme.

1.2 STUDY AREA

The Study Area comprises the entire Shire of Busselton municipal area. It is bound by the Shire of Capel to the north, the Shire of Donnybrook-Balingup to the east and the Shires of Augusta-Margaret River and Nannup to the south. The extent of the Shire's municipal boundary is *shown in Figure 1.1.*

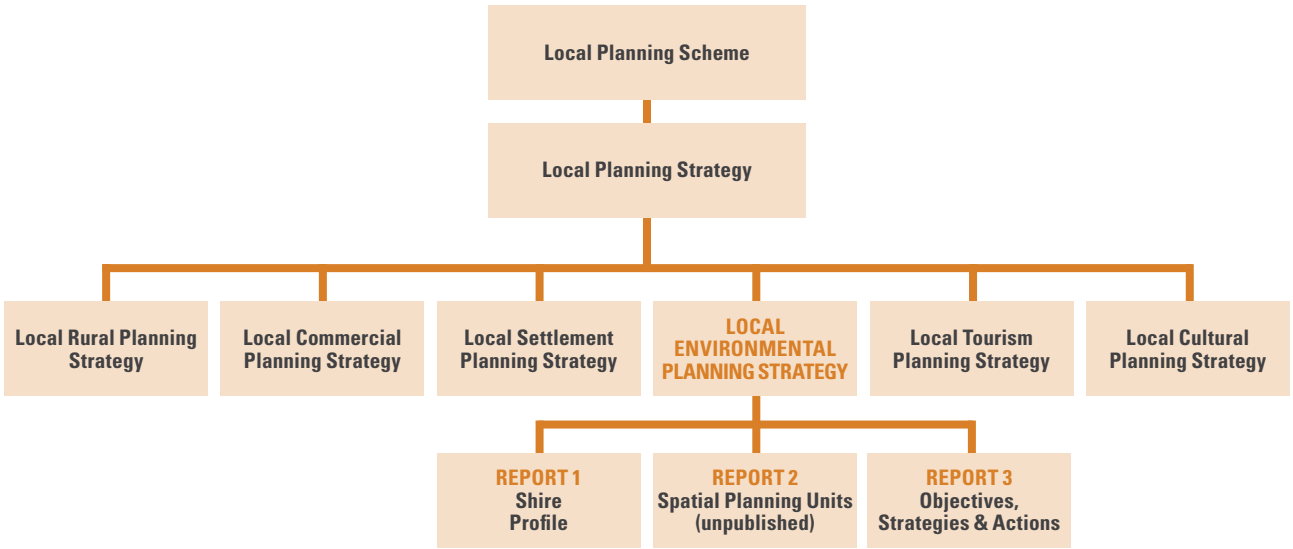
The Shire covers an area of 145,500 hectares on the west coast of Western Australia, approximately 220 kilometres south of Perth. It has a population of approximately 32,000 people. The Busselton city centre and Dunsborough town centre are the principal settlements and together with Yallingup, as well as Cape Naturaliste and the west coast, are popular tourist destinations for recreational activities such as swimming, boating and fishing in association with the Shire's wine and food industry. The central area of the Shire is primarily used for agricultural purposes, and is largely cleared of vegetation. The western coastal areas, the west coast and a large area of land at the eastern end of the Shire are largely reserved for conservation and/or recreation purposes.

1.3 SCOPE OF THIS REPORT

This report presents the findings and recommendations of the Local Environmental Planning Strategy. It builds on the background information provided in previous reports, notably:

- **Report 1** Environmental Profile
- **Report 2** Spatial Planning Units (unpublished internal background document).

Shire of Busselton proposed Planning Framework Hierarchy



Background information pertaining to the environmental features of the Shire is contained within these two reports. This information, along with the significant consultation that has occurred, has provided the context to the strategies and actions presented in this document. Numerous planning and environmental policies and reports exist which are applicable to the Shire and help guide development and land use. These have been looked at in detail in Report 1. Updated policies and information should be considered in conjunction with the outcomes of this report when necessary.

The format of this document has been derived to provide the Shire with guidance on key environmental matters relating to development and land use planning. More specific consideration has also been provided for areas where development pressures are expected to be greatest – Busselton, Vasse, Dunsborough and Commonage.

Within each section of the report consideration has been given to what the desired environmental outcomes are and how these can be achieved through the land use planning system. The intention is that the objectives and recommendations for specific environmental issues in the Shire be considered in conjunction with, or complement, the recommendations which are specific to the settlements and towns in the Shire, as well as recommended changes and the TPS zones and reserves.

1.4 OBJECTIVES, STRATEGIES AND RECOMMENDATIONS

Detailed objectives and recommendations have been developed for each key environmental issue in the Shire, as well as for the major and minor settlements. Attached to each recommendation is a priority.

PRIORITIES

Priorities have been classified as follows:

- **I** Immediate term – within the next financial year
- **M** Medium term – within the next five years
- **L** Long term – 5+ years
- **O** Ongoing – as required.

1.5 MONITORING AND REVIEW

The Local Environmental Planning Strategy has been prepared following consultation with the community and the Shire of Busselton. As such, it has been prepared on the basis of consultation as well as scientific review and takes into account the views and desires of those consulted, as appropriate.

Implementation of the LEPS will occur over time. Some recommendations can be implemented in the short term, however there are some that will be implemented in the medium to long term. As such, there is always the possibility that attitudes, external policies and type of development may change over time. It is therefore recommended that this plan be reviewed in five years or in conjunction with a review of the local planning strategy, to determine its ongoing relevance and in accord with long term planning timeframes considered by Council. Any review should include an audit of implemented recommendations and an analysis of the reasons as to why any recommendations remain unimplemented (if that is the case).

It is possible that activities, development or uses that have not been specifically addressed in this report may be promoted at some time in the future. Should this arise, it is recommended the Council be guided by the general vision and objectives contained within this document.

A thorough assessment of the proposed activity, development or use will need to be undertaken following a process similar to that used to prepare this strategy. This is presented graphically below.

2. VISION

vision

2.1 DEVELOPMENT OF THE VISION

The *vision* provides the overall foundation for subsequent strategies and recommendations contained in the LEPS.

The vision has been developed following consultation with the community during the course of preparing the LEPS. Community consultation occurred early in the process during an open community meeting.

A separate *Community and Industry Reference Group* was also established. This group provided input into the project at key intervals as the LEPS was being prepared, and provided comment and guidance as to the key environmental features of the Shire, and the values attached to them.

It became clear that there were certain 'themes' emerging in relation to the most important environmental features of the Shire – those things that the LEPS should strive to protect, and enhance if possible. It also became apparent that there were certain issues that the LEPS has the opportunity to address.

Overall, the following were environmental features that were of value and of concern to the local community:

KEY VALUES

- The remaining natural environmental and conservation values of the Shire
- Low levels of development in specific areas
- Current lifestyle attributes.

KEY CONCERNS

- Loss of biodiversity and bushland
- Degradation of the environment and conservation value of the Shire
- Unsustainable development and the impact it has on the environment
- Impact of increased development on water resources.

KEY VISION STATEMENTS ALSO BEGAN TO MATERIALISE

- Environmentally sensitive development
- Retention of all remnant bushland
- Protection of coastline (no further development in these areas)
- Increase in the amount of reserved land (government secures more land that has high environmental values)
- Promotion of ecotourism

These issues capture the aspirations of the community and form the basis for preparing a vision for protecting and enhancing the environment as the Shire grows over the next 30 years.

2.2 VISION STATEMENT

The overall vision for the Local Environmental Planning Strategy is:

The Shire of Busselton will accommodate its current and future populations in environmentally sustainable communities characterised by settlements that recognise and embrace the physical and environmental features of the Shire.

Areas of environmental and cultural significance will be identified and protected by the Shire's planning framework, which will result in land use and development being environmentally sensitive.

2.3 ACHIEVING THE VISION

The Local Environmental Planning Strategy provides the basis for environmentally sensitive and sustainable development in the Shire over the next 30 years. Objectives, strategies and recommendations are identified for a range of key physical and environmental features of the Shire.

Within the context of the Shire's future planning framework, consideration is also given to principles of sustainability, in particular sustainable settlements, sustainable transport and sustainable urban design.

Focus is given to the key growth areas of Busselton, Vasse and Dunsborough/Commonage. A broader consideration is provided for the entire Shire, including all minor settlements.

3. BIODIVERSITY

biodiversity

3.1 BACKGROUND

INTRODUCTION

Biodiversity is defined by the Department of Sustainability, Environment, Water, Population and Communities as: t*he variety of life: the different plants, animals and microorganisms and the ecosystems of which they are a part.* The Shire of Busselton is located within the south west of Western Australia, which is identified as being an international 'Biodiversity Hotspot'. This means that the region has met two strict criteria: it contains at least 1, 500 species of vascular plants as endemics, and it has lost at least 70% of its original habitat (Conservation International, 2007).

As the level of biodiversity is an important asset to the Shire, it is important that all future planning decisions take into account the issue of biodiversity protection.

REMNANT VEGETATION

Approximately 48% of the Shire comprises remnant vegetation (Shire of Busselton, 2004). A majority of this remnant vegetation is contained within National Park or State Forest, vested in the Conservation Commission of Western Australia and managed by the Department of Environment and Conservation. The central area of the Shire is mostly cleared of native vegetation which occurred in the past for agricultural pursuits. To accommodate urban development clearing has also occurred in places along the coastline between the eastern Shire boundary and Dunsborough. Much of the remnant vegetation exists in the eastern section of the Shire (which covers approximately one third of the Shire) and along the western coastal areas.

VEGETATION COMPLEXES

The vegetation complexes vary across the Shire and correspond with the various landforms that exist. In general, most of the complexes exist in 'bands' which run parallel with either the western or northern coastlines. The vegetation complexes that exist along the northern coastal area include Quindalup (which occurs closest to the coast) and Ludlow (exists further inland to the south of the Quindalup complex). Much of the central agricultural region consists of vegetation belonging to the Abba vegetation complex. The Yelverton and Treeton vegetation complexes occur at the southern end of the Shire.

Different vegetation complexes also run parallel to the western coast. Some patches of Kilcarnup vegetation complex occur along the rocky coastline and the Gracetown vegetation complex occupies the remainder of this rocky coastline. Beyond this exists a relatively larger strip of vegetation belonging to the Cowaramup complex.

The vegetation complexes found in the eastern section of the Shire include Rosa, Telera, Kingia, Bidella, Jalbaragup, Preston and Coate.

Vegetation complexes and vegetation classes which have less than 30% of the pre-European extent remaining are commonly referred to as 'poorly represented' (EPA, 2000). Vegetation complexes with less than 400 ha remaining in the state are also considered to be poorly represented. Most poorly represented vegetation complexes are found along the northern coastal areas of the Shire, as well as the central region. This can largely be attributed to the extent of clearing carried out for agriculture and urban development in these areas. The poorly represented vegetation complexes and classes in the Shire are as follows:

- Abba
- Cartis
- Cowaramup (Cw2)
- Jarrahwood
- Southern River.
- Kilcarnup (KB)
- Kilcarnup (KbE)
- Southern River
- Treeton (Td)
- Yelverton (Yf)
- Yelverton (Yw)
- Whicher Scarp (WCv)
- Wilyabrup (Wd)
- Wilyabrup (We)

The following vegetation complexes within the Shire are also close to being below thresholds:

- Cowaramup (Cr)
- Metricup (M)
- Metricup (Mv)
- Treeton (Tw)
- Wilyabrup (W2)
- Wilyabrup (Ww2)

ENVIRONMENTAL LINKAGES

Environmental linkages form an essential component of a healthy ecosystem and contribute to the biological diversity of the area. They consist of areas of native vegetation, which link larger or more significant areas of vegetation to one another. Environmental linkages are utilised by native fauna when they travel from one area of vegetation to another. Regional Environmental Linkages in the Shire have been identified by the South West Biodiversity Project (SWBP) and have been published in Environmental Protection Bulletin No. 8 (EPA, 2009). This bulletin also states that future planning and development proposals should consider and support the retention and enhancement of regional environmental linkages.

FAUNA

Many vulnerable and threatened fauna species are found in the Shire including birds, mammals, reptiles and aquatic species. Of these, three species of mammals are classified as being vulnerable or at high risk of extinction. These are the Western Ringtail Possum, the Chuditch and the Quokka. The coastal vegetation in urban areas from Dunsborough to Busselton along Geographe Bay is particularly important habitat for the Western Ringtail Possum. The Shire contains habitat and known occurrences of a threatened species of freshwater crayfish, *Engawaea reducta.*

The Shire also contains important habitat areas (for foraging, breeding and roosting) for three species of threatened black cockatoos; Carnaby's Black Cockatoo, Baudin's Black Cockatoo and the Forest Red-Tailed Black Cockatoo. Given that mapping of habitat areas for the above-mentioned cockatoos is not currently available, the below definitions should be taken into account to ensure that the impacts on these values are considered as part of any future development proposals -

Foraging habitat - Includes the presence of any combination of the following species: Marri *(Corymbia calophylla)*, Mountain Marri *(C. haematoxylon)*, Jarrah *(Eucalyptus marginata)*, Black Butt *(E. patens)*, Flooded Gums *(E. rudis)*, Tuarts *(E. gomphocephala)*, Banksias spp. (including *B. attenuate, B. grandis, B mezesii, B. littoralis* and species formerly known as *Dryandra* spp.), *Hakea* spp., and *Agonis* spp. Also includes pine plantations and cape lilac.

Breeding habitat - Potential nest trees are any Marri *(C. calophylla)*, Jarrah *(E. marginata)*, Black Butt *(E. patens)*, Flooded Gums *(E. rudis)*, Tuart *(E. gomphocephala)* or Wandoo *(E. wandoo)* (either alive or dead stags) with a Diameter Breast Height of more than 500 mm.

Roosting habitat - Generally prefer large stands of tall trees close to permanent water, with dense canopy. Tree species used for roosting include Marri *(C. calophylla)*, Jarrah *(E. marginata)*, Tuart *(E. gomphocephala)*, Wandoo *(E. wandoo)*, introduced eucalypts and introduced pines.

The distribution of threatened fauna is fairly even throughout the western section of the Shire and the northern coastal area. In general, threatened fauna are typically located where remnant vegetation is present (and therefore habitat is still available). Although a large area of vegetation exists in the eastern section of the Shire, threatened fauna are also found in this area.

OTHER BIODIVERSITY ASSETS

Threatened Ecological Communities (TEC's) are communities which consist of native vegetation which are poorly represented and in danger of extinction. Eight threatened ecological communities are known to be present in the Shire. The DEC database also indicates that 22 taxa of *Declared Rare Flora* and 69 taxa of *Priority Flora* are present in the Shire. 160 taxa are at the end of their range on the Busselton Plain, with 60 of these being at the northern end of their range and 35 at the southern end (Webb, 2009).

DIEBACK

'Dieback' is the common name given to the pathogen *Phytophthora cinnamomi*. It is a soil borne water mould which invades and destroys the root systems of 40% native species in Western Australia. The ease with which the pathogen can spread has greatly contributed to its extensive occurrence and consequent destruction of large areas of native vegetation in Western Australia. Therefore, it is important that areas of vegetation that are susceptible to dieback are closely monitored for signs of infection, the soils are tested and that if dieback is found, measures are put into place to prevent its further spread. A report prepared by the Dieback Working Group in 2000 called *Managing Phythophthora Dieback, Guidelines for Local Government* contains advice on how dieback can be managed.

FIRE RISK

Fire is a natural occurrence in the Australian environment, with some vegetation communities and species relying on the occurrence of fires for continued growth and regeneration. However, it is important that fire prevention and management is promoted in order to reduce the impact of fires on human safety and on the natural environment (WAPC, 2010).

Fire management can have negative effects on vegetation composition and fauna if undertaken at inappropriate intervals/times. Major issues associated with fires that can have a negative effect on natural vegetation include the frequency of fires, the intensity of fires, the time of the year in which they occur and the distribution of the fire.

Fire risk throughout the Shire is largely associated with remnant vegetation – with these areas being classified as having high or extreme risk, and cleared areas generally having low risk. The potential impact of a wild fire is however related to the proximity of assets in areas of high and extreme fire risk.

3.2 ISSUES AND IMPLICATIONS

The most significant impact of development on biodiversity is the modification of habitats. Some ways in which humans modify habitats is through vegetation clearing, modifying river flows, filling and draining of wetlands, introduction of feral animals, weeds and diseases and from various land uses.

Some of the major issues caused by development and detrimental land use include the following:

- Loss of poorly represented communities
- Maintaining/enhancing biodiversity hotspot
- Protecting environmental linkages
- Introduction and spread of weeds, feral animals, pathogens
- Increased 'edge effects', particularly when large areas of remnant vegetation are subdivided into rural residential properties
- Fragmentation of bushland areas and disruption of ecological linkages
- Conflicting needs of bushfire risk reduction and conservation of vegetation complexes
- Recognising the needs of agriculture/mining/tourism.

The issues and implications associated with biodiversity are as follows:

- **Remnant vegetation**
  As was stated earlier, vegetation complexes are considered to be poorly represented if less than 30% of the pre-European extent remains. A number of poorly represented vegetation complexes exist in the Shire, with some that have less than 10% of the pre-European extent remaining. In general, the reasons why these complexes are poorly represented is because they have been cleared for agricultural and urban land uses, and thus most of these complexes are on the flat coastal plain portion of the Shire. It is important that future development does not result in the reduction in the area of these vegetation complexes and that more effort should be spent to conserve more areas, such as through the Biodiversity Incentives Strategy, and good quality vegetation.

  It is also important that future development and land use does not negatively affect the identified Regional Ecological Linkages (LNRSPP) in the Shire.

  Development in areas of high or extreme fire risk is generally not supported under State policy. Fire management in Western Australia generally requires the reduction of fuel loads and to reduce the risk of fire to facilitate development, the removal of vegetation is promoted (WAPC, 2010). While from a fire management perspective this may be acceptable, clearing of vegetation for fire management will have detrimental impacts on biodiversity as described above. It is therefore recommended the management of fire risk in the Shire is not solely dependent on the removal of remnant vegetation but for new development is also linked to the location of that development. This may effectively mean that some areas will not be able to be developed further or areas historically identified for development may not be able to proceed. As discussed later in this document, in certain areas such as Commonage, alternative and innovative mechanisms for development could also be considered so as to allow some form of development but not at the expense of protecting the important remnant vegetation.

- **Threatened species**
  The south-west of WA has been identified as a biodiversity hotspot because of the variety of endemic plant and animals found in the area. It is important that future planning decisions do not have a detrimental impact on the biodiversity status of the Shire. Therefore, future development should avoid areas which contain threatened species such as DRF, priority flora and threatened fauna. It is also important that if future development is proposed for an area of remnant vegetation appropriate surveys are conducted in order to determine whether significant flora, vegetation and fauna are present.
- **Dieback**
  The known and potential dieback areas are also associated with areas of native vegetation. Although some forms of land use are permitted in these areas, dieback does pose a major constraint to development and can result in strict management guidelines being enforced. If development is proposed in an area that contains or is close to remnant vegetation, it is recommended that it is tested for dieback regardless of whether it has been identified as a dieback area or not.

3.3 OBJECTIVES

The planning framework of the Shire shall:

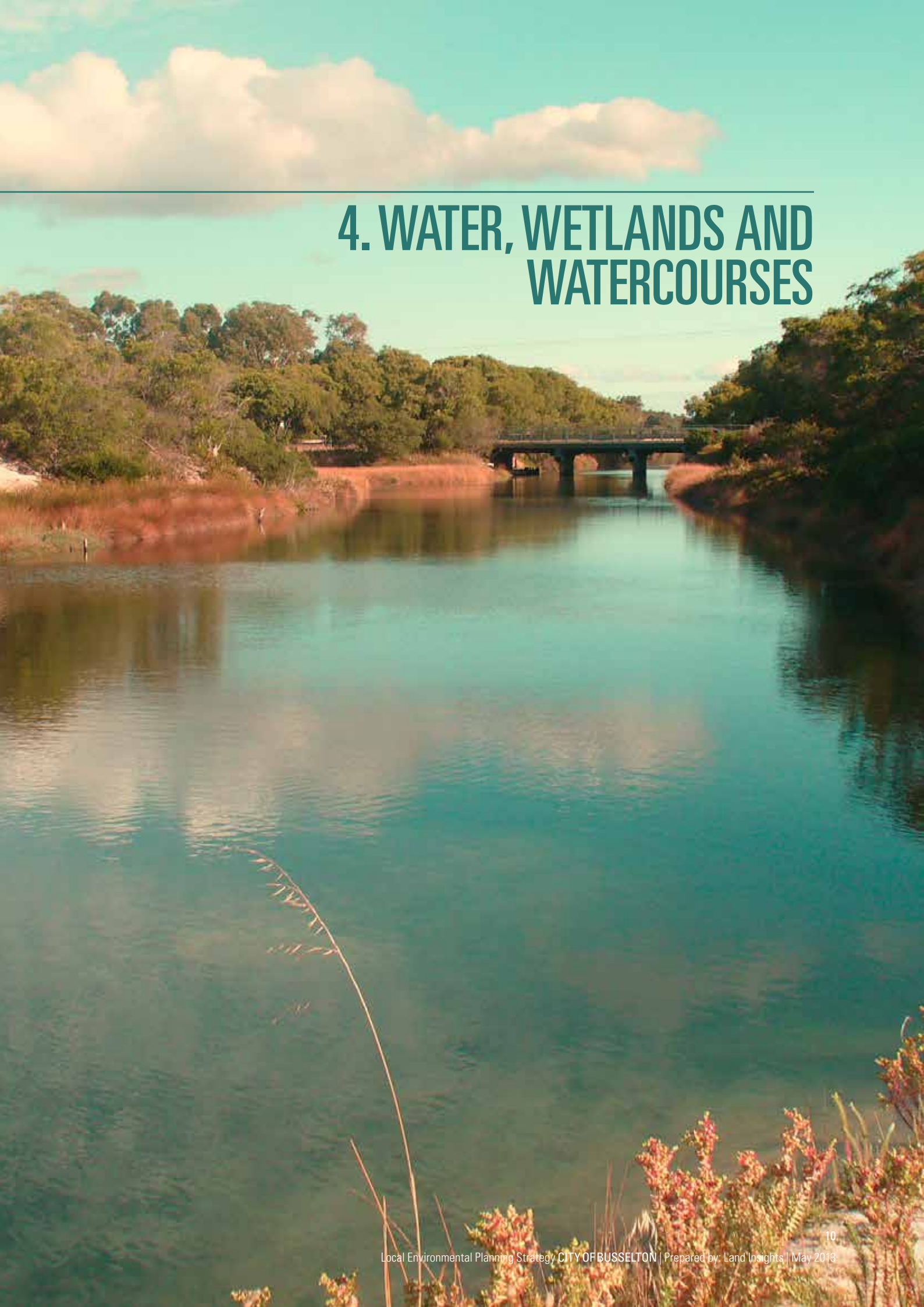
1. **Maintain and enhance the quality and quantity of remnant vegetation throughout the Shire.**
2. **Ensure that protection and enhancement of biodiversity assets in the Shire is considered early in the planning process.**
3. **Protect and enhance the biodiversity 'hotspot' status of the Shire.**

3.4 RECOMMENDATIONS

The recommendations for the Shire's planning framework are identified in the following table.

NO.	RECOMMENDATION	PRIORITY
BD1	**Protect and enhance biodiversity values** as part of town planning scheme amendment, development guide plan, subdivision and development application processes by: i. continuing to apply State planning and environmental policies as appropriate, and reviewing and updating the local planning scheme, local planning policy and other local planning instruments as appropriate in response to changes in State level policies; ii. requiring applicants to assess biodiversity values and address potential development impacts (including impacts arising from development of services and infrastructure) as part of town planning scheme amendment, development guide plan, subdivision and development application processes; iii. identifying mechanisms and incentives to protect areas of high biodiversity value (including via the development guide plan process and the continuation and periodic review of the Shire's Biodiversity Incentives Strategy); iv. identifying means of protecting and enhancing habitat for threatened fauna and flora (including habitat in urban areas); v. requiring the offsetting of biodiversity impacts by the planting and protection of local endemic species in local public reserves or other suitable locations; and vi. requiring the planting of locally native species in any landscape, amenity or environmental revegetation programs, other than in densely developed and high density traffic areas.	O
BD2	Undertake broad-scale **dieback risk assessment** mapping for the Shire, and set out in the local planning framework when and where site-specific dieback risk assessments and/or management strategies are required as part of town planning scheme amendment, development guide plan, subdivision and development application processes.	M
BD3	**Enhance, protect and manage roadside vegetation** by: i. ensuring that, other than in densely developed and high pedestrian traffic areas, local native species are planted on verges and median strips in all new development areas; ii. encouraging and, where practicable, requiring the preservation of remnant vegetation in road design and in existing road reserves; and iii. identifying road reserves that have value as ecological linkages, and retain and enhance these corridors.	O
BD4	Work with relevant State agencies to **incorporate the outcomes of the South West Biodiversity Project** on regional ecological linkages into the local planning framework.	M
BD5	Minimise development being located so that it will result in the need for clearing or thinning of vegetation to establish bush **fire hazard and building protection zones.**	O

4. WATER, WETLANDS AND WATERCOURSES



water, wetlands & watercourses

4.1 BACKGROUND

WETLANDS

Wetlands are biologically productive systems that support a diverse array of plants and animals. They have also been identified as one of the key life support systems along with agricultural land and forests (Ramsar Convention Secretariat, 2007). It is estimated that a significant proportion of wetlands along the Swan Coastal Plain have been destroyed since European settlement. Some of the major impacts on wetlands as a result of human activity including vegetation clearing (on foreshore areas and within the catchment), pollution, water consumption, modification of water flow and encroaching development.

Most wetlands present in the Shire are situated along Geographe Bay, although it should be noted that current wetland mapping does not extend across the entire Shire. The Busselton region also contains a series of watercourses and coastal wetlands that are hydraulically linked to Geographe Bay. Major features include the following:

- Carbunup River
- Mary Brook
- Lennox River
- Buayanup Drain
- Vasse Diversion Drain
- Vasse River
- Sabina River
- Abba River
- Ludlow River
- Toby Inlet
- Broadwater Area
- New River Area
- Vasse & Wonnerup Estuaries
- The Deadwater

The Vasse-Wonnerup System is located to the east of the Busselton city centre and is listed as a Ramsar wetland. Historically, the waterbodies were estuarine basins which have been functioning as low-salinity lagoons since floodgates were installed (WAPC, 2005). The floodgates are used to help control the water levels in the Vasse and Wonnerup waterbodies. When the water levels rise above that of sea level, the floodgates open to release some water into the sea. In general, the water is fresh during winter and more saline during summer. During the summer months, the system also has high nutrient levels which results in algal blooms. This has public health implications and is damaging to the ecology of the system.

The system has the largest regular breeding colony of Black Swans in the south-west. In fact, the ecology of the system satisfies two Ramsar criteria in relation to waterbirds:

- it *regularly supports 20,000 waterfowl* (more than 20,000 waterbirds have regularly been counted, including occasions when this number has exceeded 33,000) and
- it *regularly supports 1% of the individuals in a population of one species or subspecies of waterbird* (at least 1% of the Australian population of Black-winged Stilt *Himantopus himantopus* and at least 1% of the world population of Red-necked Avocet *Recurvirostra novaehollandiae* use the Vasse-Wonnerup System in most years.

(Department of Conservation and Land Management, 1990).

Significant wetlands located to the west of the Vasse-Wonnerup Estuary are the New River and the Broadwater.

Wetlands in Western Australia are categorised based on their environmental qualities and use as *Conservation, Resource Enhancement or Multiple Use.* The evaluation categories are *described in Table 4.1.*

Table 4.1 – Wetland Evaluation Categories

CATEGORY	GENERAL DESCRIPTION	MANAGEMENT OBJECTIVES
C Conservation (incorporates EPA Bulletin 686 categories H and C)	Wetlands support a high level of ecological attributes and functions.	Highest priority wetlands. Objective is preservation of wetland attributes and functions through various mechanisms including: • reservation in national parks, Crown reserves and State owned land, • protection under Environmental Protection Policies, and • wetland covenanting by landowners. These are the most valuable wetlands and the Commission will oppose any activity that may lead to further loss or degradation. No development.
R Resource enhancement (incorporates EPA Bulletin 686 categories O and R)	Wetlands which may have been partially modified but still support substantial ecological attributes and functions.	Priority wetlands. Ultimate objective is for management, restoration protection towards improving their conservation value. These wetlands have the potential to be restored to conservation category. This can be achieved by restoring wetland structure, function and biodiversity. Protection is recommended through a number of mechanisms.
M Multiple use (aligned with EPA Bulletin 686 category M)	Wetlands with few important ecological attributes and functions remaining.	Use, development and management should be considered in the context of ecologically sustainable development and best management practice catchment planning through land care. Should be considered in strategic planning (e.g. drainage, town/ land use planning).

(Water and Rivers Commission, 2001)

WATERCOURSES

There are several major rivers, numerous minor-perennial watercourses, and several inlets within the Shire. The most significant inlet is Toby Inlet, which is located approximately 4 kilometres from Dunsborough along the edge of Geographe Bay. The inlet itself is a narrow, linear estuarine lagoon running roughly parallel to the coast with one connection to the ocean at its eastern end. It is characterised by no flow during the summer. However, when water quality is deemed to be poor, an agreement exists between the Shire and environmental agencies to manually open the mouth. When this occurs, the inlet experiences short periods of tidal movement until the mouth naturally closes itself off again.

A number of action plans have been prepared by the Geographe Catchment Council (Geocatch) in response to general concerns about the health and quality of the rivers in the Geographe Catchment. Action plans have been prepared for the Sabina, Abba, Ludlow, Carbunup and Vasse Rivers, and the Yallingup Brook. The aim of the action plans is to provide guidelines for the management of these watercourses.

Groundwater

Groundwater is an important water source in the Shire and is utilised for a variety of purposes including agriculture industry, mining, public water supplies and for environmental requirements. The three main aquifers underlying the Shire, in order of depth from the surface, are the superficial, Leederville and Yarragadee. Groundwater is extracted from all three aquifers for consumption purposes.

The superficial aquifer is unconfined and generally occurs with a thickness of less than 10 metres, although it can be up to 20 metres thick in some areas. The water table occurs at depths up to about 3 metres and is mainly recharged by direct infiltration of rainfall, supplemented in some areas with limited upward leakage from the underlying Leederville aquifer under the Swan Coastal Plain. Groundwater discharges into streams, drains, wetlands, downwards into underlying formations as well as directly into the ocean. Groundwater flow in the superficial aquifer on the Swan Coastal Plain is northward towards Geographe Bay.

The Leederville aquifer consists of interbedded sand and shale. Its thickness in the Bunbury Trough averages between 150 and 200 metres. The Yarragadee is a major confined aquifer which occurs throughout most of the southern Perth Basin.

In the confined aquifers, such as Leederville and Yarragadee, groundwater is generally fresh, with minor areas of brackish water (usually near the coast). Salinity is generally lowest in the recharge areas, increasing along the groundwater flow path towards the coast. Water table (generally superficial aquifer) groundwater can become saline through secondary salinity processes such as recirculation of irrigation water.

Historically, water quality measurements in the Department of Water's regional monitoring bore network has occurred infrequently, so regional trends in water quality, including salinity, are difficult to ascertain. A regional water quality measurement program is currently being developed.

The Shire is located within the Busselton-Capel Groundwater Area, and the Busselton-Capel sub-area. The Busselton-Capel Groundwater Area was proclaimed in 1984. The area is divided into nine sub-areas, based on groundwater flow systems, to manage the quantity of groundwater resources. The groundwater catchment has been "proclaimed" under the *Rights in Water and Irrigation Act 1914* and a license is therefore required to extract water from the superficial aquifer. Extracting groundwater from the deeper artesian aquifers requires a license throughout the State.

There are some exemptions to licensing. Domestic groundwater usage is permitted and is therefore exempt from licensing. Other groundwater uses exempt from licensing include:

- fire fighting purposes
- water for cattle and other stock (other than those being raised under intensive conditions)
- water for an area of lawn or garden that does not exceed 0.2 hectares in size
- other ordinary domestic uses.

GROUNDWATER-DEPENDANT ECOSYSTEMS

Groundwater-dependant ecosystems (GDEs) are ecosystems that rely on groundwater for their survival. Some GDEs depend on the water supplied from superficial aquifers which means that their health can also be affected by local changes in the water regime (such as drainage, increased abstraction and reduced rainfall). Alternatively, some GDEs rely on the supply of water from deep aquifers such as the Leederville and Yarragadee which are not significantly affected by seasonal variations in groundwater inflow from rainfall. However, both have been affected by groundwater extraction.

4.2 VALUES, ISSUES AND IMPLICATIONS

WETLANDS AND WATERCOURSES

It is evident that past human activities have had a negative impact on the health of many wetlands in the Shire and that the current pattern of development places additional pressures on these environments. Other environmental elements around wetlands (such as the presence of threatened fauna and remnant vegetation) increases the constraints to development in their vicinity.

Environmental impacts largely associated with the wetlands and watercourses from human activity can be summarised as follows:

- Erosion and siltation of the river and wetland banks
- Lack of native fringing vegetation and habitat for native fauna
- Low biodiversity of remaining fringing vegetation
- Weed infestation
- Poor water quality (which affects receiving waters such as the Vasse-Wonnerup Estuary)

The issues and implications associated with wetlands and watercourses in the Shire are as follows:

- A significant proportion of the coastal plain consists of wetlands and watercourses
- The 'edge effects' that intensive development and land use have on wetlands and watercourses (particularly those with high conservation value)
- Confusion over regulation of environmental water flows
- The construction of dams on watercourses
- Re-alignment of watercourses
- Altered water regimes caused by drainage and filling
- Nutrient enrichment and eutrophication of wetlands and watercourses from agriculture as well as stormwater runoff and septic tanks from urban and other developed areas
- Contamination of wetlands with other pollutants such as heavy metals and chemicals
- Nuisance insects that breed in wetlands and watercourses and sometimes impact on developed/populated areas

- Vegetation removal, degradation and weed infestation around wetlands and watercourses
- Filling of wetlands and watercourses
- Conflicting needs of the community in relation to wetlands and watercourses – eg recreation verses conservation.

Key threats to the health and condition of wetlands and watercourses in the Shire are further explained below:

- **Lack of appropriate buffers**
  Buffers are designed to protect wetlands from potential negative impacts and help to protect wetland ecological processes and functions. Buffers also act to protect the community from potential impacts such as nuisance midge problems. They should ideally consist of native fringing vegetation in order to help achieve these functions.

  The presence of wetlands and their respective buffers pose a major constraint to proposed development. EPA Guidance Statement Number 33 states that Wetlands that are to be protected require a minimum 50 metre buffer distance (EPA, 2008). Other issues relate to the current wetland mapping and information. The extent of data on wetlands in the Shire is limited and further studies are required to determine the location of wetlands throughout the remainder of the Shire. Once this mapping is completed it will assist in the management of the wetland and with the assessment of development applications. Where wetlands have not been mapped a qualified professional should be assigned to determine the extent of wetland based on the hydric soils, hydrology and wetland vegetation.

  Being a Ramsar site, the Vasse-Wonnerup Estuary is listed as a matter of national environmental significance in the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 and the government is bound by an international agreement to ensure the wetland is protected and its environmental qualities maintained or enhanced. Therefore any development proposed within the catchment of this waterbody will be referred to the Commonwealth, rigorously assessed and management actions enforced.
- **Poor water quality**
  The issue of nutrient leaching and the effect of water quality is one of the major environmental concerns in the Shire. Recent studies have been aimed at identifying which land uses contribute most to nutrient levels in waterbodies and therefore have the most impact. At present, it is certain that human activities resulting from more intensive land uses (such as agriculture, urban development etc.) have the greatest impact on water quality. This impact is more severe the closer the development is to waterbodies.

  Therefore, it is important that any proposed developments or land use changes are assessed based on the amount of nutrient runoff that could occur and their potential impact on water quality. The results of this assessment could pose a constraint to development if the impact is such that it will prevent water quality targets being met.

  Contamination of wetlands with other pollutants such as heavy metals and chemicals is also a significant issue as it can poison native flora and fauna which in turn affects the natural ecological processes of the system.
- **Altered water regimes**
  Altered water regimes of wetlands and watercourses are generally caused when water is artificially drained or pumped into these systems. This generally occurs when dams are created or when the natural drainage pattern of the area is modified to suit the needs of developed areas. Removal of water can affect the natural balance of the system and can affect vegetation composition and habitat areas for fauna species. Increases in water flow along watercourses can increase erosion and siltation which can lead to changes in habitat areas. Decreases in water flow can affect the natural migration of certain fauna species. Degradation in water quality such as higher salinity levels or nutrient levels can also occur from changes in the water regime.

GROUNDWATER

Groundwater underlies the entire area of the Shire and is a vital environmental asset. It is important that the impact of development proposals and land use changes is considered to help ensure that groundwater quality will not be affected. Overall however, the presence of groundwater should not pose a significant constraint to development, providing appropriate management of wastewater discharge and runoff occurs.

The issues and implications associated with groundwater in the Shire are as follows:

- **Impacts of development on groundwater quality**
  If not appropriately planned and managed development can have a detrimental impact on groundwater quality, with increased contaminants and nutrients entering groundwater. In addition, potential changes in groundwater levels as a result of development can mobilise other contaminants (natural or artificial) in the soil.
- **Groundwater over-use**
  Over-use of groundwater can lead to groundwater depletion, which has flow-on effects on biodiversity. There is a general trend across the south-west of the State that has seen groundwater levels slowly fall, and a resultant change in vegetation structure – particularly with species dependent on higher groundwater levels. Overuse of the superficial groundwater in coastal areas has resulted in saltwater intrusion and loss of the water resource.
- **Rising groundwater levels**
  In contrast to the point made above, removal of vegetation in certain areas can result in rising groundwater levels. This can have an associated impact on waterlogging and biodiversity. Certain areas may be subjected to greater inundation rates which has the potential to alter vegetation structure.
- **Reduced rainfall**
  The recent trend in the reduction in annual rainfall results in lower groundwater replenishment rates. There is little that can be done to address this directly but it does have implications for management of other water resources.
- **Groundwater contamination**
  Some land uses can lead to contamination or pollution of groundwater (through soil leaching and stormwater runoff into water features). As stated earlier in this document, areas with high groundwater levels that are susceptible to waterlogging are particularly at risk. Any development, particularly on sandy soils, has the potential to lead to groundwater contamination if not appropriately managed.
- **Groundwater Dependent Ecosystems**
  Changes in groundwater levels and/or quality can impact the ecosystems dependent on that groundwater – in particular vegetation structure (and therefore habitat). There are also a range of social values associated with GDE's that will also invariably be affected by decline in ecosystem quality.

4.3 OBJECTIVES

The planning framework of the Shire shall:

1. **Protect the integrity of wetlands of international, national and state significance.**
2. **Encourage protection and enhancement of all wetlands and watercourses in the Shire, regardless of their current condition.**
3. **Ensure the importance of wetlands and watercourses are acknowledged in the strategic and statutory planning processes.**
4. **Assist in the provision and implementation of solutions to catchment management issues.**
5. **Protect groundwater quality.**
6. **Protect Groundwater Dependent Ecosystems (including social and environmental values).**
7. **Assist in the management of sustainable use of groundwater for all uses.**
8. **Control land use to prevent groundwater contamination or degradation.**
9. **Minimise groundwater-influenced land degradation such as salinity and waterlogging.**

4.4 RECOMMENDATIONS

The recommendations for the Shire's planning framework are identified in the following table.

NO.	RECOMMENDATION	PRIORITY
W1	Ensure a planned approach to the **management of water, wetlands and watercourses** by: i. considering the recommendations of the *Water Quality Improvement Plan for the Vasse-Wonnerup Estuary and Geographe Bay*, and the Sabina, Ludlow, Abba, Carbunup, Vasse and Yallingup Brook River Action Plans in the making of planning decisions; ii. requiring the submission of local water management plans, urban water management strategies and other water planning documents, as appropriate, and as required by relevant State Government policy, development guide plans and other relevant planning instruments, as part of town planning scheme amendment, development guide plan, subdivision and development application processes; and iii. preparing and implementing district water management strategies for Busselton and Dunsborough.	O/M
W2	Protect and **enhance wetlands and watercourses** by: i. requiring biophysical assessments and management plans, as appropriate, for development that may impact upon wetlands and/or watercourses, to establish appropriate development setbacks, protect and enhance riparian vegetation, and prevent water quality impacts; and ii. Considering environmental water flow issues as well as other relevant matters in the assessment of proposals for dams outside proclaimed surface water catchments.	M
W3	**Manage water quality** by: i. working with appropriate State agencies to ensure that approval for on-site effluent disposal is assessed against both health and environmental objectives, including, if and where necessary, the introduction of town planning scheme provisions, especially in industrial area and low-density or unsewered residential area in proximity to wetlands of high conservation significance; ii. considering introduction of a 'Water Quality Improvement Special Control Area' in the town planning scheme for the catchments that drain into the Vasse-Wonnerup Estuary (which are identified in the Department of Water's *Water Quality Improvement Plan for the Vasse-Wonnerup Estuary and Geographe Bay* as being 'recovery' catchments) where it is vital that there is a net reduction in nutrient export); iii. requiring planning approval for any development within that Special Control Area that may increase the risk of nutrient export and infiltration, including intensive agriculture, but which currently does not require a license pursuant to the *Environmental Protection Act 1986*, and set out further guidance in local planning policy regarding the information required to assess such applications and the objectives to be met; and iv. ensuring that new and infill urban development achieves the best practicable water quality outcomes, including via the development and review over time of local planning policies and more detailed strategies to achieve a reduction in nutrient export from existing urban areas.	M

5. LANDSCAPE AND LAND QUALITIES

landscape & land qualities

5.1 BACKGROUND

The Shire has three distinct landforms: the broad and low-lying coastal plain; the Leeuwin-Naturaliste Ridge along the west coast and the Whicher Range Scarp to the south-east.

The Shire has a unique landscape, with certain areas such as the Leeuwin-Naturalise Ridge identified for protection within a State Planning Policy. The landscape provides opportunities for tourism, agricultural purposes as well as being a desirable setting for (mainly rural-based) settlement purposes. The landscape of the Shire assists in identifying a 'sense of place'.

The Department of Agriculture and Food (DAFWA) has identified various land degradation risks associated with the soil-landscape units across the Shire. The different soil qualities that affect the level of land degradation include salinity, wind erosion, water erosion, waterlogging, flood risk, microbial purification and phosphorus export.

The capability of land to support various land uses is strongly influenced by the land qualities and degradation risks. An assessment of land capability considers the specific requirements of the land use (e.g. unrestricted rooting depth or soil water availability) plus the risks of degradation associated with the land use. Land capability is more commonly used in relation to agricultural land uses, but can also be used to help determine the suitability of the land for more intensive forms of development.

5.2 VALUES, ISSUES AND IMPLICATIONS

LANDSCAPE

The distinctiveness of the Shire's landscape is recognised as being significant – both at a local level and a regional level. It has intrinsic value, as well as supporting various ecological values associated with each of the landform units that comprise the broader landscape. The landscapes within the Shire have different capacities to accept change – and this has been recognised in certain areas. Many of the existing settlements within the Shire have distinctive, and highly attractive, entrances. There are also important views and vistas along travel corridors and other areas of the Shire. Some of these are shown on Figure 5.1 however it is also recommended that further investigation of areas of landscape significance be undertaken.

The importance of landscape planning has been identified in the WAPC document Visual Landscape Planning in Western Australia (WAPC, 2007). The guidelines within this document have been reviewed and applied as appropriate. Further information relating to landscape in the Shire is included in the Busselton Wetlands Conservation Strategy (Shire of Busselton, 2005), which includes strategies and actions relating to the maintenance and improvement of the amenity values of the Busselton wetlands and the LNSRPP.

The value associated with the landscape, and in particular the Leeuwin-Naturaliste ridge, is best described by State Planning Policy 6.1 Leeuwin-Naturalise Ridge (WAPC, 1998) – which states:

> *The Leeuwin-Naturaliste Ridge policy area is well known for its rich mosaic of agricultural land uses and remnant vegetation, spectacular coastline, marine-based recreation opportunities, the dominant and dividing "ridge", National Park, magnificent stands of karri, limestone features, and coastal and inland settlements. Its unique character and identity are based on its location, the high concentration of significant natural and cultural features, and outstanding opportunities for people wishing to experience the special lifestyle and recreation opportunities of the area.*
>
> *People are attracted to the policy area for a variety of reasons and similarly they respond to the natural and cultural features in a variety of ways, which is reflected in the activities they undertake, and the different types and patterns of existing development. This interplay between existing natural and cultural characteristics, and the perceptions, experience and enjoyment people derive from them creates the landscape of the Leeuwin-Naturaliste region. This landscape has been described as embodying local character, features, identity, beauty, ambience, heritage, amenity and attractiveness. It is extremely important for maintaining the quality of life, sense of place, history, understanding of natural and cultural processes, and the work and recreation of those who live in and visit the region.*

The LEPS seeks to maintain the integrity of the Leeuwin-Naturaliste Ridge, not only for the cultural, recreation and aesthetic values identified above, but also to protect the biodiversity values and ecosystems supported by the landscape in this area – which is unique in both the remainder of the Shire and the broader region.

Away from the Leeuwin-Naturaliste Ridge the landscape is characterised by the broad, flat Swan Coastal Plain. The topography rises sharply at the Whicher Scarp. The wetland chains around Busselton, along with the remnant vegetation in these areas, provide another significant landscape within the Shire. The wetland chains also have significant ecological value and the environmental features of these areas will mean that they generally remain undeveloped.

Dunsborough is nestled at the base of the Leeuwin-Naturaliste Ridge, which forms a visual backdrop to the town. Development on the ridge or upper slopes will be, in most areas, highly visible and as such inappropriate.

Road reserves also provide a function as vegetation corridors, particularly in the heavily cleared areas on the coastal plain. The remnant vegetation on these roads provides a visual reference when travelling through the Shire and can form part of the visual foreground in the landscape. It is therefore important that they be recognised and protected in proposals for subdivision and development.

Key 'visually attractive areas' within the Shire are shown on *Figure 5.1*. These generally encompass areas that surround townsites, on the approaches to townsites or along travel routes.

Key threats to the identified values associated with landscape and topography are identified below:

- **Highly visible development**
  Development of areas that are highly visible and / or have high visual quality will result in the continual erosion of the aesthetic and cultural values associated with a particular landscape. This will be experienced greater where there are dramatic changes in topography and where there are significant landscape features. Within the Shire, these are along the entire length of the Leeuwin-Naturalise ridge (including the Commonage rural living area) and to a lesser extent on the Whicher Scarp.

- **Improved access**
  New development, regardless of where it is created, generally requires improved access. Both vehicle and pedestrian traffic has the potential to result in land degradation problems including erosion, damage to vegetation and degrading soil structure. Once degradation has commenced it becomes much more difficult to control and manage.
- **Impacts on character**
  The wetland chain near Busselton, as well as the topography and remnant vegetation surrounding Dunsborough, are key elements in defining the 'character' of these locations. Changes to these important landscapes may alter the character of the town sites, even if development in these areas may not necessarily be highly visible (as compared to development that may occur in certain parts of the Leeuwin-Naturaliste Ridge).
- **Impacts on biodiversity**
  Many of the significant landscapes within the Shire are contiguous with important environmental features, including for instance the vegetation and ecological linkages of the Leeuwin-Naturaliste ridge, and the wetland chains and associated poorly represented vegetation and habitat around Busselton. Changes to the landscape in these areas have the potential to adversely affect important biodiversity values.
- **Protection of views**
  Views of significant landscapes are valued highly and there is a natural tendency for development to be sited to maximise views. Public views and high quality landscapes should wherever possible be protected so that development does not diminish or unnecessarily restrict the views that would otherwise be available. Consideration should therefore be given to development that is sensitive to the landform on which it is located, and which does not seek to dominate that landscape or restrict views from surrounding areas.
- **Urban Character**
  Aesthetic values associated with the streetscape of the town centres and entrance routes to the towns are significant in defining and maintaining a sense of place. The proliferation of commercial uses if it was to occur along major urban entry points has the potential to dilute the town character and thus should be avoided if possible. This is particularly relevant to Busselton, where the main entry road (Causeway Road) is still relatively free from the linear commercial strips that are apparent on the outskirts of many other significant rural towns.
- **Development impacts**
  Development has the potential to change land qualities. For instance, removal of vegetation for development, or earthworks associated with drainage infrastructure, can change the local ground and surface water flows, increase risk of water and wind erosion, and exacerbate soil salinity.
- **Waterlogging**
  Significant areas of the coastal plain within the Shire are susceptible to waterlogging. Further removal of vegetation can increase susceptibility, change groundwater regimes and have impacts on remnant vegetation. The issue of waterlogging is usually overcome by importing fill to a site. While this can be an acceptable solution, it also has the potential to further change natural water flows, groundwater levels, and result in the loss of vegetation and landscape impacts.
- **Nutrients**
  Many soils in the Shire have low capabilities with respect to retention of nutrients and microbial purification. These issues are important where development is proposed that does not include appropriate infrastructure that is usually found in urban areas – such as rural living and agricultural developments. Consideration needs to be given to the use of appropriate wastewater treatment systems, and the impacts of nutrient application associated with other forms of rural activity.
- **Acid sulphate soils**
  Excavation for development can lead to the exposure or development of acid sulphate soils. This is obviously a greater issue in areas where there is higher risk of acid sulphate soils being present, and in some instances the risk can be managed. As a general position, development should avoid areas where there is high risk of acid sulphate soils being present, and detailed investigations should occur in other areas where there is a possibility of occurrence. Self-assessment of acid sulphate soils (using a form similar to that published by the WAPC) should be required to accompany any application for development. The WAPC *Acid Sulphate Soils Guidelines* should form the basis for any consideration and management of development with the potential to intercept or affect acid sulphate soils.

5.3 OBJECTIVES

The planning framework of the Shire shall:

1. **Protect the current level of landscape integrity on the Leeuwin-Naturaliste Ridge.**
2. **Protect, and where possible improve through the development process, the current level of landscape integrity around Busselton and Dunsborough.**
3. **Ensure that landscape is a legitimate issue to be considered during the subdivision and development process.**
4. **Encourage landscape improvements.**
5. **Prevent the worsening of land qualities in the Shire, particularly on the coastal plain.**
6. **Ensure development proposals recognise and manage land qualities during the development process.**
7. **Recognise that some land degradation issues can be dealt with through engineering solutions and land management practices.**

5.4 RECOMMENDATIONS

The recommendations for the Shire's planning framework are identified in the following table.

NO.	RECOMMENDATION	PRIORITY
LS1	Review the '**Landscape Value Area**' provisions in the Scheme, focusing on identifying and managing the areas of the Shire with the greatest landscape value.	I
LS2	Maintain the **physical and visual separateness of urban settlements**, especially Busselton and Dunsborough.	O
LS3	Review and supplement **visual landscape local planning policies** to ensure that the local planning framework: i. identifies areas of visual landscape significance; ii. identifies and protect the landscape values of key entry points to Busselton and Dunsborough as depicted on Figure 5.1;	M

	iii. considers/supplements existing TPS provisions for landscape protection in and around Busselton and Dunsborough; iv. reflects and updates the Caves Road Visual Management Policy; v. is consistent with State Planning Policy 6.1: Leeuwin-Naturaliste Ridge Policy; vi. gives due consideration to Visual Landscape Planning in Western Australia; and vii. sets out appropriate requirements for viewshed analysis as part of town planning scheme amendment, development guide plan, subdivision and development application processes.	
LS4	Manage acid sulphate soils by: i. identifying an '**Acid Sulphate Soil Special Control Area**' for the areas where best available mapping indicates that acid sulphate soils are high and moderate risk; ii. ensuring that 'permitted development' (i.e. development that may occur without the need for planning approval) provisions are modified in areas susceptible to acid sulphate soils (the Special Control Area) to ensure that planning approval is required for development with significant potential to disturb acid sulphate soils; iii. requiring any development application in the Special Control Area to be supported by a 'self-assessment' of acid sulphate soil risk; and iv. providing additional regulatory oversight and adopting a conservative approach to development where acid sulphate soils are present in proximity to wetlands, especially Ramsar and Conservation Category wetlands.	O/M

6. COASTAL MANAGEMENT AND FORESHORES

coastal management & foreshores

6.1 BACKGROUND

The Shire of Busselton has two distinctly different coastal regions, separated by Point Daking, Dunsborough. To the west, the shore is mostly west-facing, rocky and high relief. Eastward, the shore is north-facing, sandy and low-relief. The west coast is exposed to prevailing wave conditions and the eastern region experiences significant sheltering from Cape Naturaliste and the relatively shallow waters of Geographe Bay.

The overall wave climate is seasonal, with energetic conditions associated with mid-latitude low pressure systems located in the southern Indian and Southern Oceans. These events are more intense, sustained and frequent over winter months, producing generally higher wave conditions. Summer conditions produce lower energy offshore wave conditions.

The Busselton region experiences amongst the lowest daily tide ranges in the world for a marine coast. Although it has a maximum tide range of 1.2m, the average daily range is only 0.5m, and nearly 0.3m of the tide range is determined by seasonal sea level fluctuations. Busselton is predominantly diurnal, experiencing a single tidal cycle on most days. The tidal cycle is bi-annual, with solstitial tidal peaks occurring in June and December. The seasonal mean sea level cycle peaks in May-June and is lowest in October-November, which approximately corresponds with winter westerly wind events and summer easterly winds respectively.

6.2 VALUES, ISSUES AND IMPLICATIONS

Coastal implications of development include the removal of vegetation, modification of the landscape, destruction of ecological linkages for fauna movement, removal or degradation of fauna habitat and modification to drainage systems.

The most well documented coastal impact of projected climate change is erosion exacerbated through sea level rise. This has a potential significant impact on development and land use located close to the coast. Development setbacks are implemented in an attempt to reduce the risk of flooding and inundation on the development. Current views on climate change indicate that there is going to be a need for adaptation, given that it is now considered too late to prevent any climatic changes occurring.

The issues and implications associated with the coastal environment are as follows:

- **Coastal erosion, storm surge and inundation**
  Coastal erosion and accretion are part of a normal coastal cycle. In Busselton, the eastern coastal areas are low lying, with only small inland dunes. Several structures have been developed to manage erosion and sediment movement. Likely impacts associated with climate change may lead to further long term and event-driven erosion. A general rise in sea levels is also likely to result in increased coastal management implications.

  It should be noted that a more detailed study of the impact of coastal erosion, inundation and storm surge is currently underway. The outcomes of this study will provide the baseline for the actions recommended in the local planning strategy to address this issue.

- **Coastal protection works**
  The Busselton coastline is likely to be subject to increased risk of erosion and inundation over time. As stated above, the implications of this are to be assessed in a future study.

  At present, there are several existing coastal protection structures along the coast of Geographe Bay, including seawall, groynes and infrastructure such as boat ramps which can result in modification to coastal processes.

  Most of these assets are currently managed by the Shire. Decisions will need to be made by the Council as to whether long-term ongoing maintenance of these structures is sustainable in terms of their:

  - ongoing ability to protect public and private land
  - ability to protect environmental and landscape values associated with the Shire's coastal areas
  - ongoing economic cost

The cost of establishing, upgrading or maintaining these structures is expensive, particularly in a typical environment of increasing pressure on budgets. Consideration therefore needs to be given to the most effective and efficient manner in which to protect the Shire's coast. Options to be considered may include focussing development in one or more 'strategic' areas where coastal infrastructure can be concentrated; or allowing private investment into protection structures. Other scenarios could include maintaining existing structures at current standards and planning for potential greater impacts associated with event-driven erosion and inundation; or removing existing infrastructure altogether in certain locations with a view to concentrating on specific nodes as identified above.

While ultimately the approach adopted in the Shire of Busselton will be driven by the Council this needs to be based on the outcomes of the coastal erosion and inundation study and an assessment of cost implications. It is likely that there will be a need to continue maintenance of existing structures. Where development decisions have been based on the existence of these structures but new structures should be considered in terms of the long term maintenance cost and the potential need to improve these to address rising sea levels.

Furthermore, the Shire is anticipating a significant increase in population over the next 30 years and this will likely lead to the need for key coastal protection nodes where significant coastal protection infrastructure can be concentrated (unless there is a decision to situate / relocate future development further inland).

If the approach taken is to maintain infrastructure and focus future development in existing coastal nodes, the issues then become:

1. How will coastal protection works be prioritised?
2. Who will implement them?
3. How will they be funded?

These questions and their implications are still being worked through by the State Government and many local governments around Australia. It is, however, suggested that the following actions be considered:

- Identify, in conjunction with sound settlement planning principles, the most important components of development nodes along the coast.

- Undertake engineering feasibility and cost analysis to provide maximum protection to these areas using worst-case scenario climate change.
- Investigate options for funding and maintaining protection works, including ongoing liaison with State and Commonwealth governments; considering developer contributions or levies, or allowing fully privately-funded works.
- Implementing 'managed retreat' solution in areas where it is not appropriate or viable to protect the coast.

Placement of infrastructure that changes natural coastal processes can often have dramatic effects on the stability of a coastline. It should therefore be noted that any coastal protection works, particularly where private development is located, need to be designed and implemented at a strategic level to minimise the risk of small-scale works creating a new problem on adjoining land.

- **Management of the coast**
  Coastal areas are attractive for development due to the lifestyle opportunities associated with being close to the beach. It is clear that the development patterns in the Shire have followed a general Australian trend of locating development near the coast.

  Invariably, development pressure on the coast has led to a range of associated issues as follows:
  - Maintenance and control of public access
  - Development is usually focussed around coastal areas which has subsequent impacts on the biodiversity values of coastal areas and on landscape quality
  - Tourism is also concentrated in coastal areas and population and land use pressures increase substantially during holiday periods
  - Increased pressure for further development along the coast
  - Inadequate knowledge and understanding about the long term impacts that coastal development has on coastal ecology
  - Lack of funds which are required to adequately manage coastal areas

While the planning system cannot address all of these issues, it can provide input and guidance on many.

- **Fragmentation of ownership**
  Coastal areas are highly valued and while the beaches themselves are largely in public ownership, many of the areas immediately behind the beach/dunes are in private ownership or a mix of crown reserves. The majority of these areas are affected by coastal processes. Coastal management can be difficult where a management response is required over a large area and ownership is fragmented (meaning access to sites and willingness to participate in management programs can be varied).

6.3 OBJECTIVES

The planning framework of the Shire shall:

1. **To maintain, enhance and restore the quality of coastal environments.**
2. **Ensure development is appropriately protected from coastal processes.**
3. **Maximise the cost-effectiveness of coastal protection structures.**
4. **Provide a mechanism for facilitating environmental management of the coast.**
5. **Promote further research and investigation on coastal environments, focussing on the impact of human development and use on natural processes and the impact that coastal processes can have on development.**
6. **Promote awareness and education of coastal protection and management.**

6.4 RECOMMENDATIONS

The recommendations for the Shire's planning framework are identified in the following table.

NO.	RECOMMENDATION	PRIORITY
CM1	Continue to develop and review over time strategies for **coastal adaptation and management** in response to coastal erosion and inundation risk, including the potential impacts of climate change, especially climate-change induced sea level rise, through the identification of viable coastal defence and/or managed retreat strategies for all of the Shire's coast, including the consideration of identifying, securing and expanding coastal foreshore reserves.	O/M
CM2	**Protect the coastal environment** and other foreshores by: i. managing public access to sensitive areas by focussing public use at established locations; ii. ensuring development does not provide unmanaged access to the beach, dunes or other foreshores; and iii. seeking to secure the transfer of land to provide for appropriate coastal and other foreshore reserves as part of town planning scheme amendment, development guide plan, subdivision, development application processes or other opportunities.	M/O

7. BASIC RAW MATERIALS

basic raw materials

7.1 BACKGROUND

The rural areas of the Shire contain sand, gravel, limestone and limesand deposits, which are important to the ongoing development of the Shire from a land development, building and road construction perspective.

Sand and limestone potential largely correlates to the Swan Coastal Plain and Leeuwin-Naturaliste Coast areas with some additional, although more patchy, potential within the interface between the Swan Coastal Plain and the plateau systems. Limesand potential is limited to the near shore coastal areas on the west coast.

The Shire also has coal, natural gas, petroleum and mineral resources. These resources are not specifically addressed by this strategy as exploration and extraction are governed by the *Mining Act 1978.*

7.2 VALUES, ISSUES AND IMPLICATIONS

Basic Raw Materials are an important resource for the Shire and as such it is essential that, where possible, this land is protected from development which would prevent extraction in the future. The presence of some BRM also coincides with the location of significant environmental features which constrain the development of extractive land uses.

The Shire's Extractive Industry Policy identifies priority areas for gravel and sand and establishes policy measures as appropriate based on a range of land use, environmental, amenity and other factors. For this reason many of the gravel deposits in the west of the Shire are not likely to be accessible due to environmental and planning constraints. However, it should be noted that the majority of existing and undeveloped pits within the Shire are for gravel resources located within the Blackwood Plateau system.

Sand deposits are generally less constrained with many being in the central and eastern rural parts of the Shire.

Some of the issues resulting from the presence of BRM are as follows:

- **Some BRM areas are located in and around remnant vegetation and other important environmental assets**
  Report 1 of the LEPS identified several locations throughout the Shire where BRM occurrences were located in areas containing remnant vegetation – some of it poorly represented vegetation. Given the importance of remnant vegetation in the Shire, priority should be given to protection of these areas as opposed to clearing for BRM extraction.
- **Management of BRM operations**
  The operation of BRM within the Shire will be subject to a planning approval under the local planning scheme. Many other local governments also issue a licence separately to the local planning scheme. The dual approach provides an opportunity for the initial land use planning issues to be considered, and the licence provides the ability of the Shire to manage the day-to-day operation of the site. Issues that would need to be considered include spread of dieback and other disease, through inappropriate hygiene procedures (spread via machinery etc), noise and road access issues and minimum separate distances from sensitive land uses.
- **Incompatible land use**
  Although not necessarily an environmental issue, consideration should be given to protecting accessible sources of BRM within the Shire from incompatible land uses (such as rural residential) to ensure that access to the BRM can occur over time. This will ensure that currently accessible sites are not sterilised and that increased pressure for access to BRM will not be placed on those sites containing important environmental features.

7.3 OBJECTIVES

The planning framework of the Shire shall:

1. **Recognise the importance of the environmentally sustainable exploitation of BRM.**
2. **Protect higher value conservation areas as priority over BRM (e.g. ESAs, DRF, TEC's, habitat for threatened fauna etc).**
3. **Ensure activities associated with exploitation of BRM do not impact on surrounding landholders.**
4. **Promote and accommodate the needs of sustainable mining enterprises, although not at the expense of the environmental objectives.**

7.4 RECOMMENDATIONS

The recommendations for the Shire's planning framework are identified in the following table.

NO.	RECOMMENDATION	PRIORITY
M1	Further consider the need to develop an extractive industry local law to supplement town planning controls over extractive industry.	M
M2	Review the 'Rural Areas Land Use and Development Policy' to ensure that the local planning policy framework makes reference to areas of environmental significance identified in this Strategy.	M
M3	In partnership with the State Government and other local authorities, promote the preparation of a regional Basic Raw Materials Strategy.	M

8. MAJOR SETTLEMENTS

major settlements

8.1 BACKGROUND

This chapter of the document presents key features, constraints analysis and actions for areas of the Shire where more site-specific consideration of issues is required. Constraint plans have been provided for the key settlements of Busselton, Vasse and Dunsborough, as well as the Commonage precinct. The extent of each settlement area considered is *shown on Figure 8.1.* Constraints mapping for other areas in the Shire is provided in the following chapter.

8.2 LEVEL OF CONSTRAINT

The purpose of determining a 'level of constraint' is to guide management decisions and land use allocation by identifying areas where future development may be more suitable It is anticipated that the constraint assessment should consider and differentiate between the areas suitable for different land uses such as urban development, agriculture and conservation.

The first step in undertaking a constraints assessment involves identifying the key environmental features of the area being considered. This work has to a large degree been completed in Reports 1 and 2 of the LEPS, and the key features associated with future development of urban, rural-residential, commercial or industrial areas form the basis of the constraints assessment.

Due to the potential large-scale impacts of urban development it is important to determine which areas are more capable of supporting this particular land use. As the physical and biological features of the environment vary, it is important to ascertain which areas are more suitable to urban development while proposals are still in their planning stages.

As a consequence of the constraints assessment areas more appropriate for other land uses such as conservation, agriculture or resource utilisation can also be identified and allocated in the planning process.

CONSTRAINT LEVELS

The key environmental features of the Shire have been addressed in detail by *Report 1 – Environmental Profile*, along with key environmental issues that relate to planning and development. These key features or issues are the aspects of the Shire's environment that the LEPS is seeking to protect or address via the Shire's land use planning framework and are identified as:

- Poorly represented communities (including communities with 400ha or less remaining)
- Other remnant vegetation
- Threatened Ecological Communities, Priority Ecological Communities and their buffers
- Declared Rare and Priority Flora
- Regional Ecological Linkages
- Areas of high potential for Acid Sulphate Soils
- Ramsar, Conservation and Resource Enhancement category wetlands
- Major waterways and their riparian zones
- Areas subject to high and extreme fire risk
- Areas prospective for Basic Raw Materials (sand, gravel, limestone, limesand)
- Areas prospective for other minerals subject to the *Mining Act 1978*
- Priority Agricultural Areas (soil-landscape units having over 60% of soils Class 1 or Class 2 for a variety of agricultural uses)
- Areas subject to waterlogging (soil-landscape units having over 60% of soils with high or very high susceptibility to waterlogging).

In order to consider the impact of future land use and development it is necessary to consider the spatial extent of each of these key features, along with a relative level of constraint associated with each so that their relative importance can be considered. The value scale applied consists of a value of *High, Medium, Low or No Significant Environmental Constraints.* A description of each is as follows:

- **High:** significant constraints that cannot be easily addressed. Development in these areas should generally be avoided where possible as they generally contain areas of highly significant environmental importance.
- **Medium:** significant constraints that may, with appropriate planning and environmental mitigation, be addressed. Development in these areas should only proceed if suitable environmental assessment has occurred and it has been determined by the Shire and other agencies that there will be no significant environmental degradation.
- **Low:** constraints to the development of land are apparent in these areas, but these constraints can usually be overcome with appropriate planning.
- **No known significant environmental constraints:** these areas are not affected by environmental constraints, using known data in relation to the key environmental features listed above.

It should be noted that:

1. The level of constraint listed is based on currently known and available information. Environmental conditions continually change and the importance and distribution of environmental features can change over time.
2. The levels of constraint identified on the maps in this document consider only the key environmental features identified. It is important to note that there has been no consideration given to other important aspects of settlement planning (such as proximity to key settlements, provision of infrastructure etc.). As a result, the level of constraint maps contained within this document should form one of the key inputs of the future Local Planning Strategy, where more detailed settlement analysis can occur.

8.3 BUSSELTON

CURRENT LAND USE AND DESCRIPTION

The coastal areas of Busselton are the main residential areas of the Shire. The majority of this area is zoned Residential under the TPS with much of the land fully developed. In some areas higher density codings have been applied, particularly closer to the city centre. Once fully developed at the higher densities many of the older, 1000m^2+ properties will be redeveloped into 300-400m^2 lots.

Further inland the wetland chain initially prevented the expansion of urban land to the south, however urban development has occurred

south of the wetland chain as the east-west expansion became constrained.

The Shire's main industrial area is also located adjacent to the Busselton Bypass. The majority of this area is relatively old and the Shire has identified several environmental issues associated with some of the existing land use practices, mainly relating to drainage and water quality.

The remainder of lots in the southern portion of the Busselton area are zoned *Rural, Rural Residential or Conservation*. The wetland areas are primarily reserved for Recreation.

The Structure Plan areas for Vasse, Ambergate North and Yalyalup (Provence) are also located on the outskirts of Busselton. All of these areas have already been identified by Council as areas suitable for future development. Development has commenced in some areas while the remainder are progressing through planning and environmental approvals at the present time.

Busselton's topography is very flat and low-lying, being generally less than five metres above sea level. The area is characterised by the central wetland chain that runs east-west and extends to the Vasse-Wonnerup Estuary and beyond. This chain contains important environmental features and has been largely classified as being a Conservation Category Wetland. The New Water and Broadwater wetlands are included in this wetland chain.

The Quindalup vegetation complex is the major complex in the Busselton area. This complex is poorly represented across the entire Swan Coastal Plain. There are approximately 440 hectares of Quindalup vegetation remaining in the broader Busselton area, with 68% of that vegetation within an appropriate zoning in the existing TPS. The remnant vegetation within Busselton is focussed on two east-west linkages – one through the central wetland area and the other along the coast. While there are some north-south linkages, these are generally fragmented. In addition, small areas of local bushland reserve have been retained in many urban subdivision areas.

All of the remaining vegetation areas are likely to retain environmental and habitat values in addition to the intrinsic value of the poorly represented vegetation itself. In particular, the Quindalup vegetation is a key habitat for the Western Ringtail Possum. The Shire of Busselton is currently preparing a policy to identify mechanisms to protect the Western Ringtail Possum habitat.

Climate change, and in particular rising sea levels, may increase storm and inundation risk, and may have a significant impact on Busselton. Given the low-lying land, the inland wetlands and the limitations on the drainage system, any adverse changes in climate and sea level will result in additional areas of Busselton becoming more susceptible to impact.

KEY FEATURES SUMMARY

The following key features were identified and addressed in detail in Report 1. They are summarised below, and form the *basis for Figure 8.3*.

REMNANT VEGETATION

The majority of remnant vegetation in the Busselton area is poorly represented (that is, less than 30% of it remains).

Table 81 – Remnant vegetation within Busselton.

COMPLEX	TOTAL		SOME PROTECTION	
	HA	%	HA	%
Abba	11.997	0.39	0.000	0.00
Abba Complex				
Bidella				
Blackwood				
Cartis				
Cartis Complex				
Coate				
Cowaramup				
Darradup				
Gracetown				
Jalbaragup				
Jarrahwood Complex				
Kilcarnup				
Kingia				
Ludlow	226.927	15.43	37.252	16.42
Metricup				
Preston				
Preston Complex				
Quindalup	440.212	22.44	299.511	68.04
Rosa				
Southern River Complex				
Telerah				
Treeton				
Whicher Scarp				
Willyabrup				
Yelverton				
TOTALS	**679.136**		**336.763**	**49.59**

Notes:

1. *Total ha* reflects the hectares of each complex within the area
2. *Total %* reflects the % of the complex that occurs within the area compared to the total amount in the Shire
3. *Some protection* refers to vegetation that is reserved for Recreation under the TPS, or zoned Bushland Protection or Conservation
4. Complexes in blue are poorly represented and have significant environmental value.

THREATENED FAUNA

Rare fauna are indicated at scattered locations throughout the Shire and the entire Busselton urban area is identified as containing important habitat for the Western Ringtail Possum and black cockatoos. It is important to note that many locations also coincide with the poorly represented vegetation complexes. This further accentuates the importance of retaining and protecting this vegetation as habitat for rare fauna. It is highly possible that the reason that those particular fauna species are rare is because of the significant loss of these vegetation complexes/habitats.

THREATENED AND PRIORITY ECOLOGICAL COMMUNITIES

There are no TECs within the Busselton area. A number of PECs are known to occur within the Busselton area. Mapping for PECs is currently incomplete and therefore not included on the environmental features and constraints analysis mapping.

WATERBODIES AND WATERCOURSES

The Vasse-Wonnerup Estuary (also a Ramsar site) is located in close proximity to current Busselton town site and to the north of planned

growth areas. This wetland, the surrounding land as well as other land along the coastal area is also identified as Environmentally Sensitive Areas (ESAs). It is widely acknowledged that urban and agricultural development has a negative impact on the health of the wetlands. Recent water quality studies completed by the Department of Water also confirm the impact that increased nutrient runoff has on these wetlands (White, 2008). Further development within the Vasse Wonnerup catchment area will likely have a negative impact on the wetland, including the area identified in the strategy. Other waterbodies are also located in this area, which are likely to be impacted in a similar way.

The Vasse-Wonnerup wetland system extends further to the west to encompass the New River and Broadwater wetlands. The New River wetland exists directly to the west of the Vasse-Wonnerup Estuary system in a parallel alignment to the coast. The Vasse Diversion Drain diverts water from the Vasse River approximately 6km upstream from the coast. The section of the Vasse River cut off by the Vasse Diversion Drain is known as the Lower Vasse River. The Broadwater wetland is located further west of the New River and mainly consists of a floodplain and shallow lagoon. It is located on a conservation reserve and private property and is generally surrounded by less intensive land uses such as agriculture, some adjoining land is currently zoned for urban purposes. Although the water quality is very poor, the wetland is an important waterbird habitat and contains the rare aquatic herb *Villarsia submerse.*

1 IN 100 YEAR FLOOD BOUNDARY

The Department of Water has identified the 1:100 year flood boundary. This is the area that would be affected by a major flooding event that has an average annual recurrence potential of 1%. Modelling has been completed in and around the coastal wetlands and lagoons adjacent to Geographe Bay. DAFWA has also indicated that high flood risk areas are also prevalent adjacent to watercourses within the Abba soil-landscape system, as well as some upland areas of the Cowaramup Uplands soil-landscape system.

Flood levels and extents will be reviewed in light of new topographical data and to take into account climate change. This information will need to be included on updated plans once the revised data is available.

ACID SULPHATE SOILS

The highest risk is around the wetland chain which extends parallel to the coast from the eastern boundary of the Shire through to the Dunsborough town site. Most of the remainder of the Busselton area is identified as having a moderate to low acid sulphate soil risk.

FIRE HAZARD

The areas with high or extreme fire hazard risk largely coincide with areas of remnant vegetation, including some areas that are currently close to existing residential development. Therefore, appropriate precautions and fire management should occur during any future development to help avoid any detrimental impacts caused by fire.

Fire hazard can generally be reduced by clearing vegetation. Given, however, that the majority of the remnant vegetation in and around Busselton is already poorly represented, the focus should be on location of development to achieve preservation of the vegetation rather than on it's clearing for fire management/development purposes.

PRIORITY AGRICULTURAL AREAS

Priority agricultural areas have been determined by identifying soil-landscape units within which over 60% are classified as being within Class 1 (very high) and 2 (high) capability for a range of agricultural land uses.

Within and around Busselton there are only limited areas identified. They are all located in-land of the wetland chain. Where possible it is important to protect priority agricultural areas and ensure that agricultural activities on these areas are not restricted by allowing incompatible (eg urban, rural residential) uses on land adjoining.

BRM AND MINERAL RESOURCES

A large proportion of the Shire, including the area around Busselton, is prospective for a range of Basic Raw Materials. The extent of prospectively does not necessarily mean that these areas are suited to exploitation of the resource – in developed areas around Busselton it is unlikely that Basic Raw Material extraction would be permitted.

WATERLOGGING

Inland areas, away from immediate coastal strip, are prone to waterlogging. Development in these areas is likely to require fill. There are two implications in relation to this as follows:

1. Importing fill needs to be considered in the context of local water management – and specifically potential impacts on groundwater levels, changes in hydrology and surface flow, and impact on remnant vegetation (relating to both changes in water levels and ground level).
2. There is a finite volume of fill available and it is likely to be sourced from a significant distance away.

The level of constraint associated with each of the abovementioned features/issues is *presented on Figure 8.4.*

8.4 VASSE

CURRENT LAND USE AND DESCRIPTION

The Vasse settlement is located to the south-west of the Busselton townsite. It is currently zoned *Vasse Development* with small areas also zoned *Residential, Public Purpose, Industrial and Business.* The surrounding land is largely zoned *Agriculture.*

There are European Heritage Sites located within the settlement, including the Old Vasse School and the Westbrook Homestead. The route of the Augusta-Busselton railway line also runs through the town. One Aboriginal Heritage Site is located at the intersection of the Bussell Highway and the Busselton Bypass.

KEY FEATURES SUMMARY

REMNANT VEGETATION

A majority of the Vasse settlement and surrounds is cleared of native vegetation. The patches remaining have been identified as the Abba and Ludlow vegetation complexes. Both of these complexes are also identified as being poorly represented, which makes them worthy of conservation and protection.

THREATENED FAUNA

Threatened fauna have been recorded by the DEC near the Vasse townsite area (classified as Priority 4). The area is known to contain important habitat for the Western Ringtail Possum and black cockatoos.

THREATENED AND PRIORITY ECOLOGICAL COMMUNITIES

No TECs have been identified in the Vasse settlement area. A number of PECs are known to occur within the Vasse area. Mapping for PECs is currently incomplete and therefore not included on the environmental features and constraints analysis mapping.

WATERBODIES AND WATERCOURSES

An Environmentally Sensitive Area (ESA) is identified within the settlement which extends along the southern edge of the area zoned

Vasse Development. One small Conservation Category Wetland is identified in the south-west of the settlement area and a larger Resource Enhancement Wetland is located within the southern section of the ESA.

1 IN 100 YEAR FLOOD BOUNDARY

The 1 in 100 year flood boundary is largely associated with the location of wetlands and watercourses. The watercourses to the east of the Vasse townsite have a 1 in 100 year flood boundary which extend into the settlement area to a small extent. However, a majority of the Vasse townsite is not affected by the flood boundary.

ACID SULPHATE SOILS

Acid sulphate soil mapping for the area shows that the Vasse settlement largely has a moderate to low risk of acid sulphate soils occurring within 3 metres of the soil surface and the surrounds have a high to moderate risk.

FIRE HAZARD

Areas of extreme fire hazard risk are identified in areas consisting of remnant vegetation such as the areas to the north and east of the existing development within the townsite. The others areas are identified as having a lower fire hazard risk.

Priority Agricultural Areas

The Vasse settlement and surrounding area is located within a Priority Agricultural Area.

WATERLOGGING

The Vasse settlement area has been generally identified as having a low waterlogging risk, although some of the surrounding area (such as the land to the east) associated with wetlands are identified as having a high waterlogging risk.

8.5 DUNSBOROUGH

CURRENT LAND USE AND DESCRIPTION

Urban development in Dunsborough follows a similar pattern to Busselton, with the majority of the land adjacent to the coast zoned for residential purposes. Further urban expansion areas have been developed inland, including Dunsborough Lakes. The Dunsborough town centre is zoned Business and remains the focal point of the town, however an area of Industrial zoned land has been identified at the southern extremity of the planned Dunsborough area. Development has been guided by the Dunsborough Structure Plan.

The coastal areas of Dunsborough contain significant linear remnants of the *Quindalup* vegetation complex, much of it associated with the Toby Inlet. The other significant vegetation complex in the Dunsborough area is the *Abba* complex, which is located in a large contiguous block either side of the Cape Naturaliste Road. The western portion of this vegetation block is reserved *Recreation*, however the eastern side is zoned *Rural Residential*.

Overall there are approximately 58 hectares of Abba and 93 hectares of *Quindalup* complex vegetation in and around Dunsborough, with 28% and 73% respectively afforded some protection due to existing zoning.

There is one TEC (Eucalyptus calophylla – Eucalyptus marginata woodlands on sandy clay soils of the southern Swan Coastal Plain) within the Dunsborough, located in a small reserve amongst an established residential area. The buffer for this TEC also extends into the surrounding areas. Another TEC is located further north along the coast.

Toby Inlet is located approximately 4 kilometres from Dunsborough. The inlet itself is a narrow, linear estuarine lagoon running roughly parallel to the coast with one connection to the ocean at its eastern end. It is characterised by tidal movements in summer only when the mouth is open, which is rare and usually only after it has been artificially opened to improve water quality, and an outflow of fresh water during winter.

Similarly to the Busselton area, climate change, and in particular rising sea levels, increasing storm and inundation risk, may have a significant impact on the Dunsborough area. The areas around Toby Inlet will be particularly susceptible to impact.

Other environmental features of the location include the following:

- Elevation and topography is generally flat, other than in the northern part of Dunsborough.
- Consists of a relatively low level of remnant vegetation cover – most of the vegetation complexes present in this area are also identified as being 'poorly represented'
- Includes the vegetation complexes 'Quindalup' and 'Ludlow'
- Includes the soil-landscape systems 'Quindalup', 'Vasse' and 'Spearwood' and a small portion of 'Abba' further inland at Busselton and 'Abba' at Dunsborough
- A large portion of land is identified as an Environmentally Sensitive Area which generally correspond to the areas of remnant vegetation and/or wetland areas
- The area is not indicated as having a high capability for agricultural land uses.

KEY FEATURES SUMMARY

The following key features were identified and addressed in detail in Report 1. They are summarised below, and form the *basis for Figure 8.8.*

REMNANT VEGETATION

The remnant vegetation associated with the coastal plain is generally poorly represented within conservation reserves and should have priority for protection. There remain significant areas of other remnant vegetation associated with the slopes and ridgeline. This vegetation forms a backdrop to the Dunsborough townsite.

Table 8.2 – Remnant vegetation within Dunsborough.

COMPLEX	TOTAL		SOME PROTECTION	
	HA	%	HA	%
Abba	57.819	1.89	16.461	28.47
Abba Complex				
Bidella				
Blackwood				
Cartis				
Cartis Complex				
Coate				
Cowaramup	3.246	0.06	0.483	14.87
Darradup				
Gracetown				
Jalbaragup				
Jarrahwood Complex				
Kilcarnup				
Kingia				
Ludlow	33.553	2.28	21.946	65.41
Metricup	0.780	0.07	0.011	1.40
Preston				

Preston Complex				
Quindalup	93.324	4.76	68.302	73.19
Rosa				
Southern River Complex				
Telerah				
Treeton				
Whicher Scarp				
Willyabrup	57.302	2.21	22.625	39.48
Yelverton	8.929	0.18	0.004	0.04
TOTALS	**254.953**		**129.831**	**50.92**

Notes:

1. *Total ha* reflects the hectares of each complex within the area
2. *Total %* reflects the % of the complex that occurs within the area compared to the total amount in the Shire
3. *Some protection* refers to vegetation that is reserved for Recreation under the TPS, or zoned Bushland Protection or Conservation
4. Complexes in blue are poorly represented and have significant environmental value.

The zoned Industrial area (yet to be developed) on Commonage Road contains some remnant vegetation that is classified as being poorly represented. The Development Guide Plan for this site requires the retention of the vegetation. Subject to the vegetation in this area being protected from development and appropriately managed, together with a review of water management of the site, there are no issues with the development of the remainder of the site for light industrial purposes.

THREATENED FAUNA

Rare fauna are indicated at scattered locations throughout the Shire and the entire Dunsborough urban area is identified as containing important habitat for the Western Ringtail Possum and black cockatoos. It is important to note that many locations also coincide with the poorly represented vegetation complexes. This further accentuates the importance of retaining and protecting this vegetation as habitat for rare fauna. It is highly possible that the reason that those particular fauna species are rare is because of the significant loss of these vegetation complexes/habitats.

THREATENED AND PRIORITY ECOLOGICAL COMMUNITIES

There are two TEC's within the Dunsborough area – one located adjacent to the coast and the other in a reserve near the golf course. The buffers of both TEC's extend over developed urban areas. A number of PECs are known to occur within the Dunsborough area. Mapping for PECs is currently incomplete and therefore not included on the environmental features and constraints analysis mapping.

WATERBODIES AND WATERCOURSES

Toby Inlet and surrounding areas are classified as Conservation Category wetlands. The inlet is a narrow, linear estuarine lagoon running roughly parallel to the coast with one connection to the ocean at its eastern end. It is characterised by tidal movements in summer only when the mouth is open, which is rare and usually only after it has been artificially opened to improve water quality, and an outflow of fresh water during winter. There are no other significant waterways or watercourses within or immediately adjacent to the Dunsborough townsite.

1 IN 100 YEAR FLOOD BOUNDARY

The 1 in 100 floodway data does not extend to Dunsborough.

ACID SULPHATE SOILS

The highest risk is associated with Toby Inlet and other near coastal areas of the coastal plain. The presence of acid sulphate soils has been independently and previously confirmed within Toby Inlet.

FIRE HAZARD

There is a significant amount of remnant vegetation within and around Dunsborough, most notably on the slopes associated with the ridge. All of these areas represent a high or extreme fire hazard.

Fire hazard can generally be reduced by clearing vegetation. Given, however, that the majority of the remnant vegetation in and around Dunsborough is already poorly represented, the focus should be on the preservation of the vegetation rather than clearing for fire management/development purposes.

PRIORITY AGRICULTURAL AREAS

Priority agricultural areas have been determined by identifying soil-landscape units within which over 60% are classified as being within Class 1 (very high) and 2 (high) capability for a range of agricultural land uses.

Within and around Dunsborough there are only limited areas identified, with some identified in areas already subject to plans for future urban development (within DGPs or Structure Plan areas).

BRM AND MINERAL RESOURCES

- Apart from coastal areas there are only relatively small areas subject to areas of BRM potential. It is not considered these would represent a significant constraint to future development. The extent of prospectively does not necessarily mean that these areas are suited to exploitation of the resource – in developed areas around Dunsborough it is unlikely that Basic Raw Material extraction would be permitted.

WATERLOGGING

The majority of the coastal plain south and south-east of Dunsborough (including part of Dunsborough Lakes) is susceptible to waterlogging. A significant difference in Dunsborough however is that areas prone to waterlogging are also at risk of acid sulphate soils.

Level of constraint associated with some of the above-mentioned features/issues is *presented on Figure 11.9*.

8.6 COMMONAGE

CURRENT LAND USE AND DESCRIPTION

The Commonage area is largely zoned Rural Residential however also contains small areas which are reserved for Recreation. The land use is predominantly rural residential, although a few larger lots still exist throughout the area which are used for agricultural land uses (viticulture, grazing and agroforestry). A relatively high amount of remnant vegetation still exists throughout the area, although it is fragmented due to past clearing and existing development.

Lot sizes within the precinct range in area from 118 hectares to 5,000m^2. The average lot size of subdivided rural living lots is 3.6 hectares. Some agricultural pursuits on a smaller scale are still prevalent in the area.

All of the Commonage area (except for two small areas) has been identified as Rural Residential under the LNRSPP. The remaining areas are either existing conservation reserves or National Park.

There are numerous tourist operations within the area, ranging from small-scale accommodation through to a significant number of artisan food and art business.

There are several European heritage sites within the area, including Keenans Track which dissects the Commonage area, Millbrook Precinct and the site of the 'Meleri' Winery in the southern portion of the site. Big Rock Nature Reserve in the northern portion of the site is also registered. Several Aboriginal Heritage Sites and their buffers extend into the northern end of the area.

There are a number of inactive extractive industry sites within the area, mainly gravel or sand. There are four extractive industry sites recorded as being active – these being for sand and/or gravel.

The Commonage area contains a relatively large amount of remnant vegetation, although it is fragmented in some locations. Of the vegetation complexes present, only the 'Abba' complex is poorly represented because it is only present in a few areas and elsewhere has been cleared. There are no TECs identified.

The remnant vegetation in and around Commonage provides habitat for native fauna. The DEC has indicated that threatened fauna have been identified within this area.

Other environmental features of the location include the following:

- Topography is varied, elevation is high and generally slopes in a westerly direction towards the coast
- Surface water systems are limited except minor perennial streams which flow to the west coast or Geographe Bay
- Includes the vegetation complexes 'Cowaramup' and 'Metricup'
- Includes the soil-landscape systems 'Cowaramup Uplands' and 'Wilyabrup Valleys'.

KEY FEATURES SUMMARY

The following key features were identified and addressed in detail in Report 1. They are summarised below, and form the *basis for Figure 8.13*.

REMNANT VEGETATION

There are significant stands of remnant vegetation in the Commonage area, however only relatively small areas contain poorly represented vegetation.

Table 8.3 – Remnant vegetation within Commonage

COMPLEX	TOTAL		SOME PROTECTION	
	HA	%	HA	%
Abba	41.875	1.37	2.220	5.30
Abba Complex				
Bidella				
Blackwood				
Cartis				
Cartis Complex				
Coate				
Cowaramup	842.054	14.51	204.087	24.24
Darradup				
Gracetown	0.811	0.02	0.219	26.96
Jalbaragup				
Jarrahwood Complex				
Kilcarnup				
Kingia				
Ludlow	4.806	0.33	0.270	5.61
Metricup	589.679	51.48	61.060	10.35
Preston				
Preston Complex				
Quindalup				
Rosa				
Southern River Complex				
Telerah				
Treeton				
Whicher Scarp				
Willyabrup	189.535	7.30	0.669	0.35
Yelverton	271.238	5.32	20.805	7.67
TOTALS	**1939.998**		**289.331**	**14.91**

Notes:

1. *Total ha* reflects the hectares of each complex within the area
2. *Total %* reflects the % of the complex that occurs within the area compared to the total amount in the Shire
3. *Some protection* refers to vegetation that is reserved for Recreation under the TPS, or zoned Bushland Protection or Conservation
4. Complexes in blue are poorly represented and have significant environmental value.

THREATENED FAUNA

Rare fauna are indicated at scattered locations throughout the Shire and the entire Commonage urban area is identified as containing important habitat for the Western Ringtail Possum and black cockatoos.

The DEC has indicated that threatened fauna classified as Endangered, Vulnerable, Priority 1 and Priority 4 have been identified within this area.

THREATENED AND PRIORITY ECOLOGICAL COMMUNITIES

There are no known TEC's within the Commonage area. A number of PECs are known to occur within the Commonage area. Mapping for PECs is currently incomplete and therefore not included on the environmental features and constraints analysis mapping.

WATERBODIES AND WATERCOURSES

There are no wetlands or significant watercourses in the Commonage area.

1 IN 100 YEAR FLOOD BOUNDARY

The 1 in 100 year flood boundary does not extend to the Commonage area.

ACID SULPHATE SOILS

There are no areas of high or moderate risk within the Commonage area.

FIRE HAZARD

There is a significant amount of remnant vegetation throughout Commonage, most notably on the slopes associated with the ridge. All of these areas represent a high or extreme fire hazard.

Fire hazard can generally be reduced by clearing vegetation. Given, however, that the majority of the remnant vegetation in and around Commonage is already poorly represented, the focus should be on the preservation of the vegetation rather than clearing for fire management/development purposes.

PRIORITY AGRICULTURAL AREAS

Priority agricultural areas have been determined by identifying soil-landscape units within which over 60% are classified as being within Class 1 (very high) and 2 (high) capability for a range of agricultural land uses.

The majority of the cleared areas in the Commonage area meet the requirements for priority agricultural land, and there are several small-scale agricultural operations in this area. Changing settlement patterns in the area will need to be cognisant of existing agricultural uses, with a preference given to maintaining these usually small-scale industries.

BRM

A significant amount of land within Commonage is prospective for a variety of BRM. Each application would need to be considered on its merits in terms of both environmental and amenity issues.

WATERLOGGING

There are limited areas of land susceptible to localised waterlogging in the Commonage area.

Level of constraint associated with some of the above-mentioned features/issues is *presented on Figure 8.14.*

8.7 OBJECTIVES

The planning framework of the Shire shall:

11. **Protect all remaining areas of poorly represented vegetation and provide opportunities for revegetation where possible.**
12. **Protect property and life by restricting development within the 1:100 year floodway.**
13. **Ensure that coastal management, climatic change and inundation/flooding is taken into account as part of the development approvals process.**
14. **Ensure that that development continues to be subjected to thorough Structure Planning and Development Guide Plan processes that incorporate relevant environmental assessment and management.**
15. **Protect major watercourses and riparian zones.**
16. **Maintain the integrity of wetland systems.**
17. **Ensure that essential infrastructure is protected from incompatible land use.**
18. **Protect important landscapes within and around the town centre and adjoining residential areas.**
19. **Protect and encourage agricultural industries, particularly intensive agricultural enterprises to maximise use of good quality agricultural land.**
20. **Protect the lifestyle opportunities provided for within the Vasse and Commonage areas.**

8.8 RECOMMENDATIONS

The recommendations for the Shire's planning framework are identified in the following table.

NO.	RECOMMENDATION	PRIORITY
MAJ1	**Discourage expansion of the urban footprint**, especially but not only in the area between the coast and the wetland chain, to improve environmental outcomes, by: i. in the development of the Local Planning Strategy, seeking to identify opportunities for the redevelopment and consolidation of existing urban areas to reduce the pressure for expansion of the urban footprint; ii. in the development of the Local Planning Strategy, not supporting the rezoning of land that would result in an expansion of the urban footprint into areas identified as having medium or high environmental constraints *(as depicted on Figures 8.4, 8.9, 8.14 and 8.17)* unless there is a clear strategic case for doing so, and following the consideration and assessment of alternatives and the environmental impacts of urban development; iii. in the development of the Local Planning Strategy, considering alternative zonings for areas of land currently zoned for urban or rural residential development, but which contain Conservation Category Wetlands *(as depicted on Figure 8.5)* and/or other significant environmental constraints that would make approval of the development unlikely; and iv. in the development of the Local Planning Strategy, and/or subsequently, identifying means, in consultation with affected landowners, of providing for the long-term protection, enhancement and management of the wetland chain (and adjoining areas of remnant vegetation and significant environmental constraints) between Busselton and Dunsborough (and outside the area subject of the Busselton Wetlands Conservation Strategy).	O
MAJ2	In Busselton and Dunsborough, consider introducing **development incentives** and/or transferrable development rights to facilitate the protection and enhancement of urban biodiversity and character.	M
MAJ3	**Provide buffers around key infrastructure** by: i. liaising with the Water Corporation to identify and protect appropriate buffers around the Busselton and Dunsborough Wastewater Treatment Plants; ii. reviewing the identified buffer around the Busselton Regional Airport and seeking to ensure the identification of an appropriate buffer; and iii. considering the creation of differentiated industrial zones to ensure that industrial development that may be incompatible with residential development is not proposed in areas in proximity to existing or proposed residential development.	M
MAJ4	Include areas of remnant vegetation in public ownership and currently in Recreation reserves pursuant to the town planning scheme in a new Conservation reserve.	O

9. MINOR SETTLEMENTS

minor settlements

9.1 BACKGROUND

This chapter of the document presents the key features and constraints analysis for all minor settlements in the Shire. These are as follows:

- Jarrahwood
- Yallingup
- Eagle Bay
- Carbunup River
- Metricup

Figures 9.1 and 9.2 show the key environmental features and constraints of the entire Shire, while *Figures 9.3 to 9.19* show key environmental features and the constraints plans for each of the abovementioned settlements.

9.2 JARRAHWOOD

CURRENT LAND USE AND DESCRIPTION

The Jarrahwood settlement is currently zoned Agriculture and surrounded by land reserved as Recreation. Current environmental data indicates that Jarrahwood and surrounds consist of few significant environmental features apart from the high level of remnant vegetation cover.

KEY FEATURES SUMMARY

REMNANT VEGETATION

The Jalbaragup vegetation complex exists throughout the settlement and surrounds.

THREATENED FAUNA

Threatened fauna classified as Vulnerable and Priority 3 have been recorded by the DEC within, or near, the Jarrahwood townsite.

THREATENED ECOLOGICAL COMMUNITIES

No TECs have been identified within or near the Jarrahwood townsite.

WATERBODIES AND WATERCOURSES

No waterbodies or watercourses are identified within or near the Jarrahwood townsite.

1 IN 100 YEAR FLOOD BOUNDARY

The Jarrahwood townsite is located on high elevation on the Whicher Scarp. As such, the 1 in 100 year flood level does not affect this settlement.

ACID SULPHATE SOILS

No acid sulphate soil information is currently available for this area.

FIRE HAZARD

The areas surrounding the Jarrahwood townsite are identified as having an extreme fire hazard risk. This is due to the presence of State Forest and the slope of the land. Cleared areas such as within the townsite itself has a lower fire hazard risk.

PRIORITY AGRICULTURAL AREAS

The townsite and its surrounding cleared areas are identified as a Priority Agricultural Area.

BRM

No BRM are identified within or directly surrounding the town site, however some BRM potential (gravel) is identified further from the town site.

WATERLOGGING

The townsite has a very low waterlogging risk.

9.3 YALLINGUP

CURRENT LAND USE AND DESCRIPTION

The Yallingup settlement is located on the western coastal side of the Leeuwin-Naturaliste Ridge. The settlement is mainly zoned Residential and includes other areas zoned for Public Purposes and Special Purposes (the caravan park). To the south an area is also zoned for Special Purposes (a hotel and camping area). Most of the surrounding area is vegetated and reserved for Recreation.

Aboriginal heritage sites occur within the settlement and surrounding land. The Yallingup Brook Aboriginal heritage site extends halfway across the townsite from the south.

KEY FEATURES SUMMARY

REMNANT VEGETATION

The vegetation complex within and directly surrounding the Yallingup townsite is identified as the Gracetown vegetation complex. The vegetation along the coast to the south is identified as Willyabrup vegetation complex and to the north is Kilcarnup vegetation complex, all of which are identified as poorly represented.

THREATENED FAUNA

No threatened fauna have been identified within the Yallingup townsite, although a few have been recorded by the DEC to the south of the town (classified as Vulnerable, Priority 4 and Endangered). The area is known to contain important habitat for the Western Ringtail Possum and black cockatoos.

THREATENED AND PRIORITY ECOLOGICAL COMMUNITIES

No TECs have been identified within or surrounding the Yallingup townsite. A number of PECs are known to occur in the vicinity of the Yallingup townsite. Mapping for PECs is currently incomplete and therefore are not included on the current environmental features and constraints analysis mapping.

WATERBODIES AND WATERCOURSES

No waterbodies or watercourses are identified within or surrounding the Yallingup townsite.

1 IN 100 YEAR FLOOD BOUNDARY

The 1 in 100 year flood boundary does not affect the Yallingup townsite.

ACID SULPHATE SOILS

There is no known risk of acid sulphate soils occurring within 3 metres of the soil surface.

FIRE HAZARD

The area directly surrounding the Yallingup town site is covered in remnant vegetation and is steeply sloping, therefore making this area an extreme fire hazard risk.

PRIORITY AGRICULTURAL AREAS

The Yallingup town site and surrounds are not located within a Priority Agricultural Area.

BRM

The coastal areas to the west of the town site are identified as having limesand potential and the town site and surrounding area is identified as having sand potential.

WATERLOGGING

The town site and surrounds have a low waterlogging risk.

9.4 EAGLE BAY

CURRENT LAND USE AND DESCRIPTION

The Eagle Bay settlement is located to the north of the Dunsborough townsite and is developed for residential, rural residential, tourism and recreational purposes. The areas directly to the north and south-east of the settlement are identified as European heritage sites.

KEY FEATURES SUMMARY

REMNANT VEGETATION

The settlement consists of patches of remnant vegetation which becomes less fragmented along the coastal areas. The vegetation complexes are identified as *Wilyabrup* and *Cowaramup* which are not identified as being poorly represented.

THREATENED FAUNA

No threatened fauna have been identified within the Eagle Bay settlement area. However, the area is known to contain important habitat for the Western Ringtail Possum and black cockatoos.

THREATENED ECOLOGICAL COMMUNITIES

A number of TECs are located along the coast to the south of the Eagle Bay settlement. The TEC buffers (and associated ESAs) extend close to the boundary of the Eagle Bay settlement.

WATERBODIES AND WATERCOURSES

No waterbodies or watercourses are identified within the Eagle Bay settlement area.

1 IN 100 YEAR FLOOD BOUNDARY

The 1 in 100 year flood data does not extend to the Eagle Bay settlement area.

ACID SULPHATE SOILS

Acid sulphate soil mapping for the area shows that the Eagle Bay settlement predominately has no known risk of acid sulphate soils occurring within 3 metres of the soil surface except for the northern end of the settlement and further inland which has a moderate to low risk.

FIRE HAZARD

Areas of extreme fire hazard risk are identified within and surrounding the Eagle Bay settlement. These areas are largely associated with areas containing remnant vegetation.

PRIORITY AGRICULTURAL AREAS

A majority of the Eagle Bay settlement area and surrounding land is identified as a Priority Agricultural Area.

BRM

Some BRM potential has been identified within the Eagle Bay settlement such as gravel in the southern half, limesand along the coast and sand in the northern section.

WATERLOGGING

The Eagle Bay settlement has a low waterlogging risk.

9.5 CARBUNUP RIVER

CURRENT LAND USE AND DESCRIPTION

The Carbunup River settlement is located to the south-west of the Busselton townsite along the Bussell Highway. Approximately 14 lots within the settlement are zoned Residential and the surrounding land is predominantly zoned Agriculture. An area reserved for Recreation is located to the south-west of the town site.

A majority of the land zoned for agriculture is cleared of vegetation. The areas of remnant vegetation are predominantly located within the recreation reserve and along the Carbunup River. The major environmental features associated with this settlement are located within these areas of remnant vegetation.

KEY FEATURES SUMMARY

REMNANT VEGETATION

The remnant vegetation associated with this settlement is the Abba vegetation complex, which is identified as poorly represented.

THREATENED FAUNA

No threatened fauna have been identified within and surrounding the Carbunup River townsite. However, the area is known to contain important habitat for the Western Ringtail Possum and black cockatoos.

THREATENED AND PRIORITY ECOLOGICAL COMMUNITIES

Three TECs and one PEC are located within the recreation reserve to the west and south of the town site. The TEC and PEC buffers extend over the existing town site and surrounding agricultural land. Mapping for PECs is currently incomplete and therefore are not included on the current environmental features and constraints analysis mapping.

WATERBODIES AND WATERCOURSES

The Carbunup River extends along the eastern side of the townsite and flows north towards Geographe Bay. The river is identified as a Conservation Category Wetland and an ESA.

1 IN 100 YEAR FLOOD BOUNDARY

The eastern portion of the Carbunup River townsite is located within the 1 in 100 year flood boundary for the Carbunup River.

ACID SULPHATE SOILS

Acid sulphate soil mapping for the area shows that the Carbunup River townsite has a moderate to low risk of acid sulphate soils occurring within 3 metres of the soil surface.

FIRE HAZARD

The remnant vegetation located along the Carbunup River and the remnant vegetation to the west and south of the townsite are identified as having an extreme fire hazard risk.

PRIORITY AGRICULTURAL AREAS

The Carbunup River townsite and surrounding area is located within a Priority Agricultural Area.

BRM AND MINERAL RESOURCES

No BRM are identified within or directly surrounding the townsite.

WATERLOGGING

The Carbunup River townsite and surrounding area is not identified as having a waterlogging risk.

9.6 METRICUP

CURRENT LAND USE AND DESCRIPTION

Metricup is located along the Bussell Highway at the southern end of the Shire. It is not currently developed as a townsite or any substantial settlement. A majority of the area is zoned Agriculture with a small area reserved for Recreation along the highway.

A small European heritage site is located within the settlement (within the area reserved as Recreation adjoining the highway).

KEY FEATURES SUMMARY

REMNANT VEGETATION

The Metricup townsite and surrounds are largely cleared of vegetation which is a result of the historical agricultural land uses in the area. The vegetation complexes within the settlement and beyond are predominantly Yelverton and Treeton.

THREATENED FAUNA

No threatened fauna have been identified within and surrounding the Metricup townsite.

THREATENED AND PRIORITY ECOLOGICAL COMMUNITIES

No TECs have been identified within or surrounding the Metricup townsite. PECs are known to occur in the vicinity of the Metricup townsite. Mapping for PECs is currently incomplete and therefore not included on the current environmental features and contraints analysis mapping.

WATERBODIES AND WATERCOURSES

No waterbodies or watercourses have been identified within or surrounding the Metricup townsite.

1 IN 100 YEAR FLOOD BOUNDARY

The 1 in 100 year flood boundary does not affect the Metricup townsite.

ACID SULPHATE SOILS

No acid sulphate soil information is currently available for this area.

FIRE HAZARD

The Metricup townsite and surrounding area has been identified as having an extreme fire risk (i.e. the area associated with remnant vegetation).

PRIORITY AGRICULTURAL AREAS

The Metricup townsite is not located within a Priority Agricultural Area, although surrounding land to the south and east is located within this area.

BRM

Some gravel potential has been identified within the Metricup townsite and extending to the south.

WATERLOGGING

The Metricup townsite has been identified as having a low waterlogging risk.

9.7 OBJECTIVES

The planning framework of the Shire shall:

6. **Protect all areas of remnant vegetation, particularly areas of poorly represented vegetation and TECs and provide opportunities for revegetation where possible.**
7. **Ensure that any proposed development in the area is subjected to thorough Structure Planning and Development Guide Plan processes that incorporate relevant environmental assessment and management.**
8. **Protect important landscapes within and around the townsite.**
9. **Protect the lifestyle opportunities provided for within minor settlements.**
10. **Protect the environmental values of the Carbunup River through the implementation of an appropriate vegetated buffer.**

9.8 RECOMMENDATIONS

The recommendations for the Shire's planning framework are identified in the following table.

NO.	RECOMMENDATION	PRIORITY
MIN1	Do not support further expansion of Yallingup and Eagle Bay outside existing structure plans.	0
MIN2	In considering proposals for the expansion of Carbunup River, Metricup and Jarrahwood, do not support the rezoning of land that would result in an expansion of development into areas identified as having medium or high environmental constraints *(as depicted on Figures 9.4, 9.7, 9.10, 19.13, 9.16 and 12.19)* unless there is a clear strategic case for doing so, and following the consideration and assessment of alternatives and the environmental impacts of urban development.	0
MIN3	In Yallingup, Eagle Bay, Carbunup River and Metricup, promote the enhancement and protection of all remnant vegetation, and consider introduction of clearing controls in the town planning scheme to support that objective.	M

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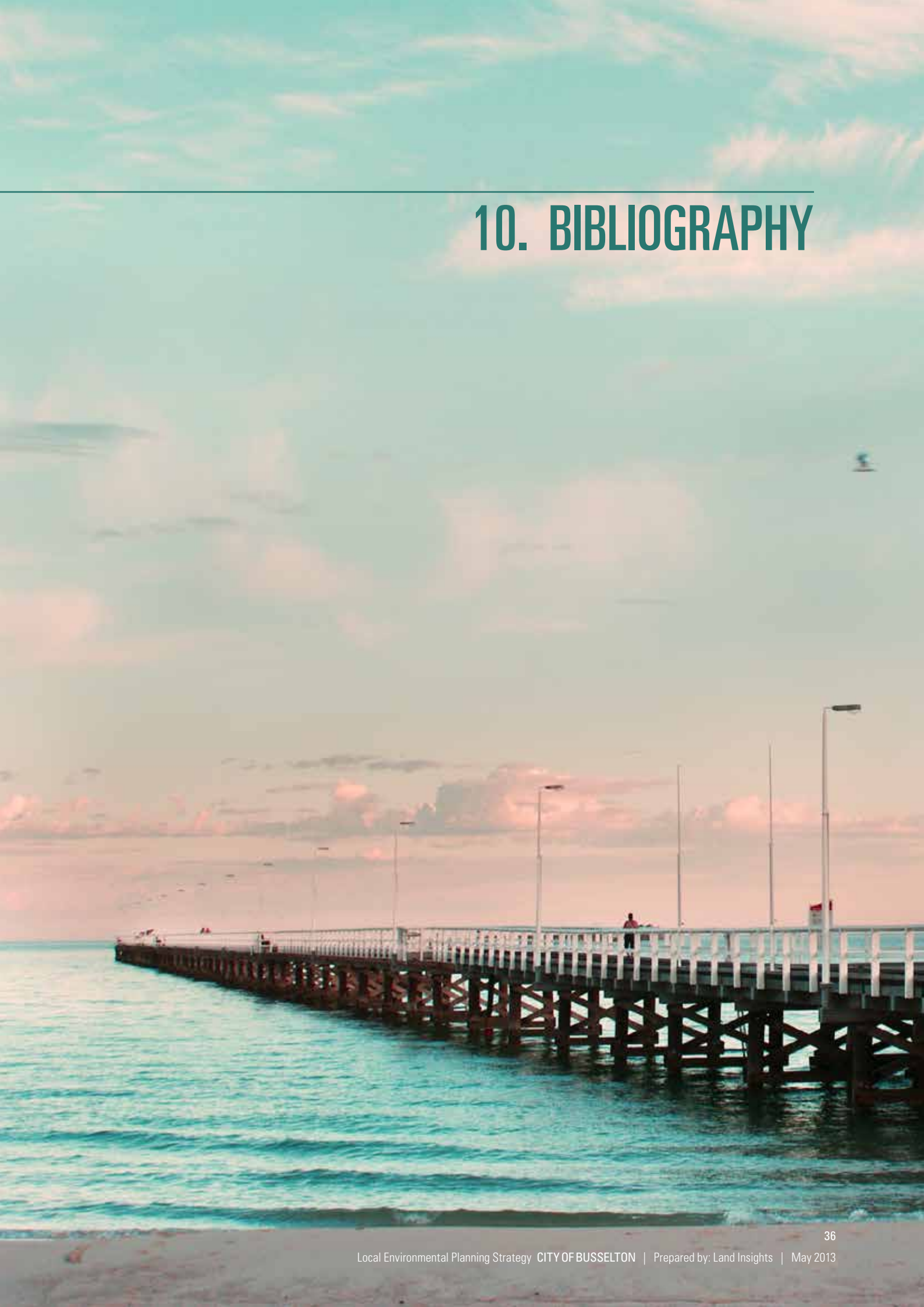

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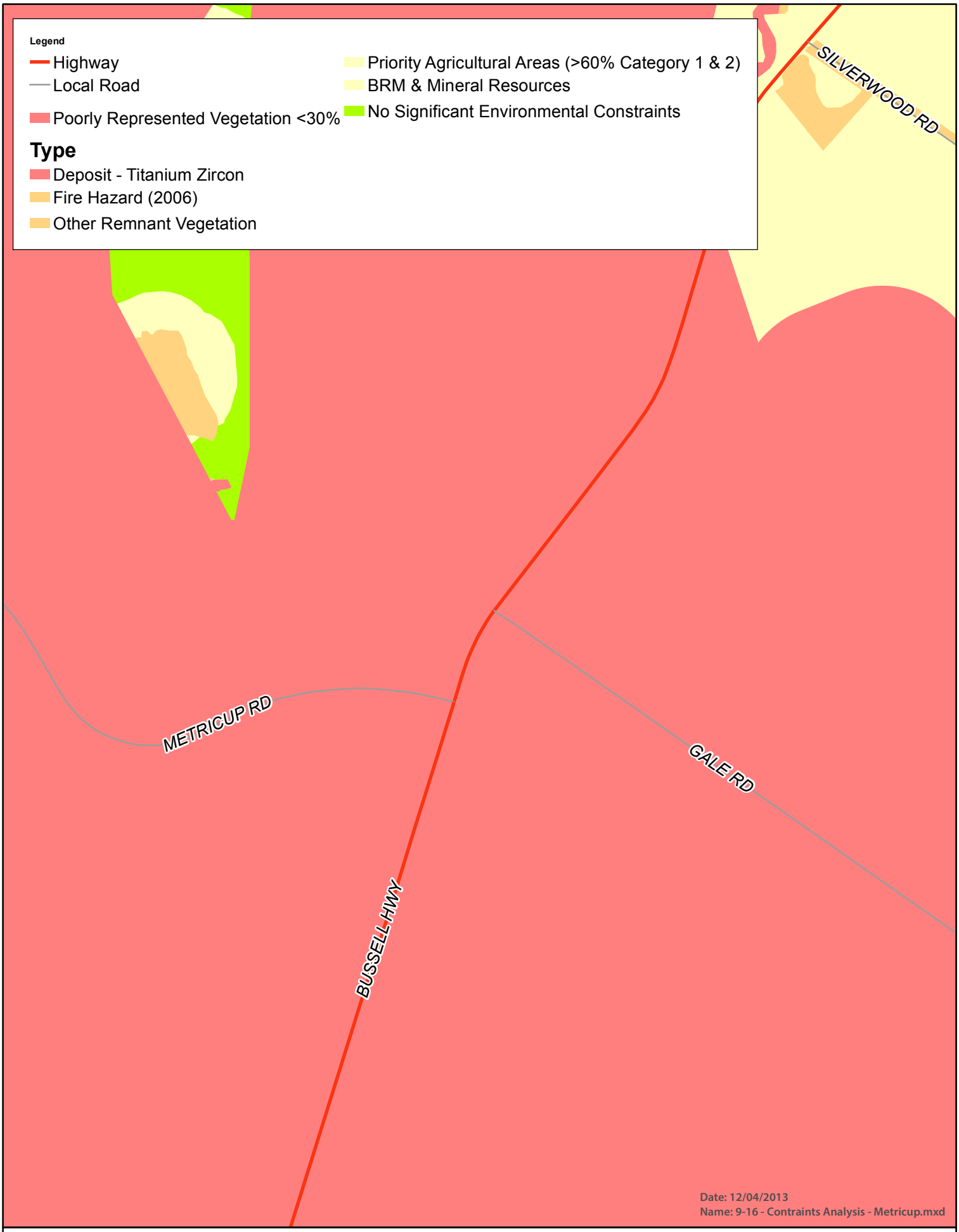

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Figure 9.16

CONSTRAINTS ANALYSIS - METRICUP
LOCAL ENVIRONMENTAL PLANNING STRATEGY

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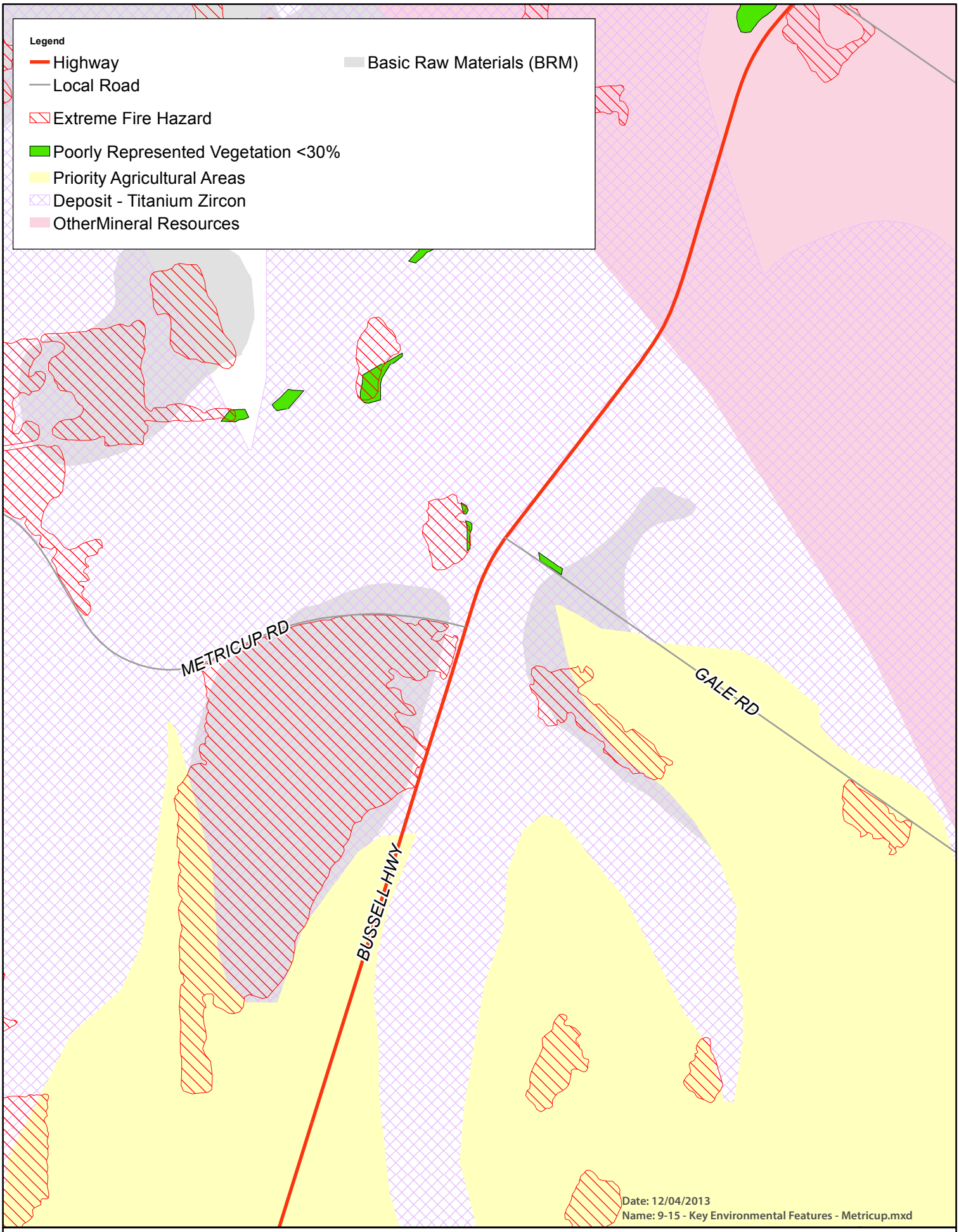

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Figure 9.15

KEY ENVIRONMENTAL FEATURES - METRICUP
LOCAL ENVIRONMENTAL PLANNING STRATEGY

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Figure 9.14

AERIAL PHOTOGRAPHY - METRICUP
LOCAL ENVIRONMENTAL PLANNING STRATEGY

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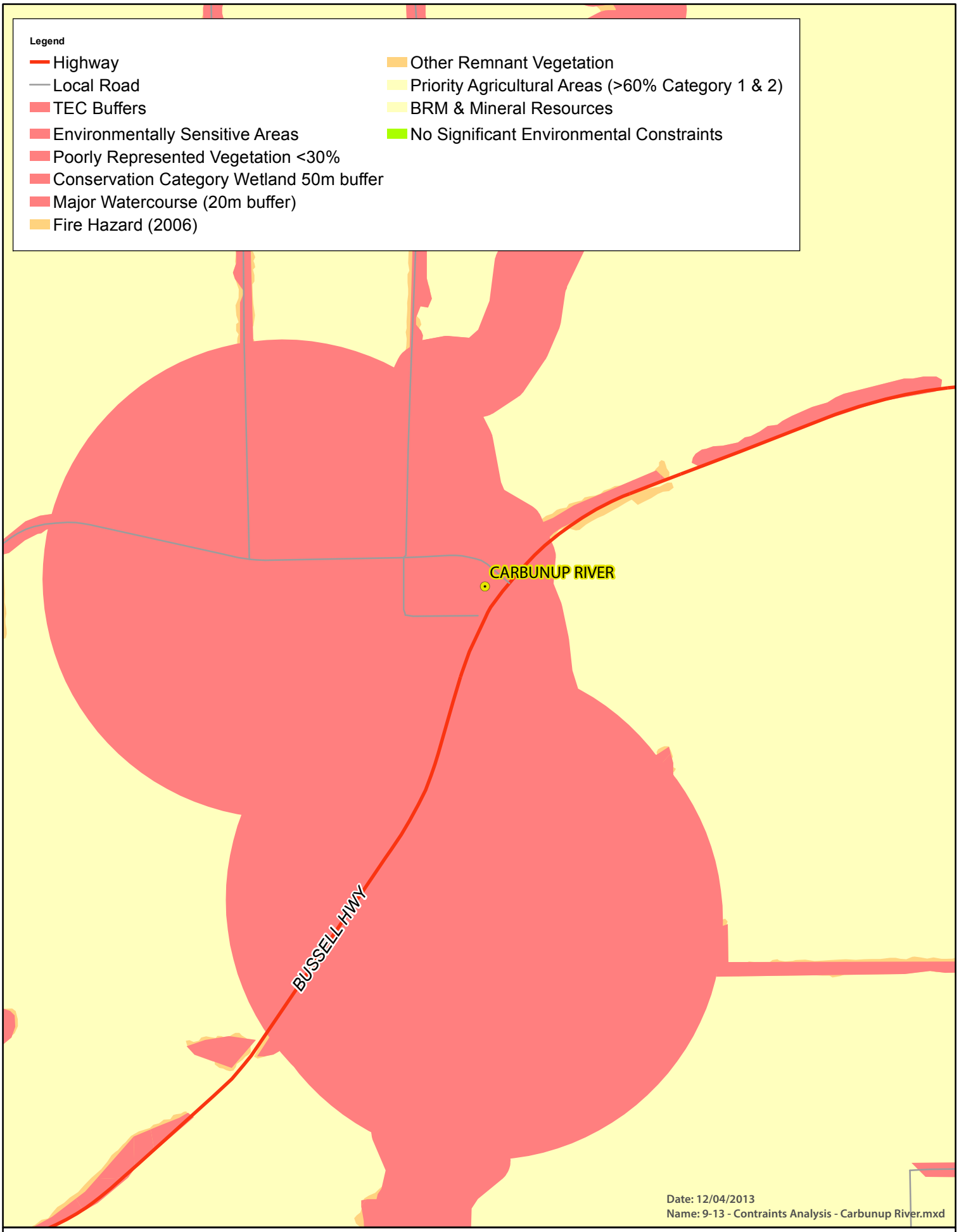

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Figure 9.13

CONSTRAINTS ANALYSIS - CARBUNUP RIVER
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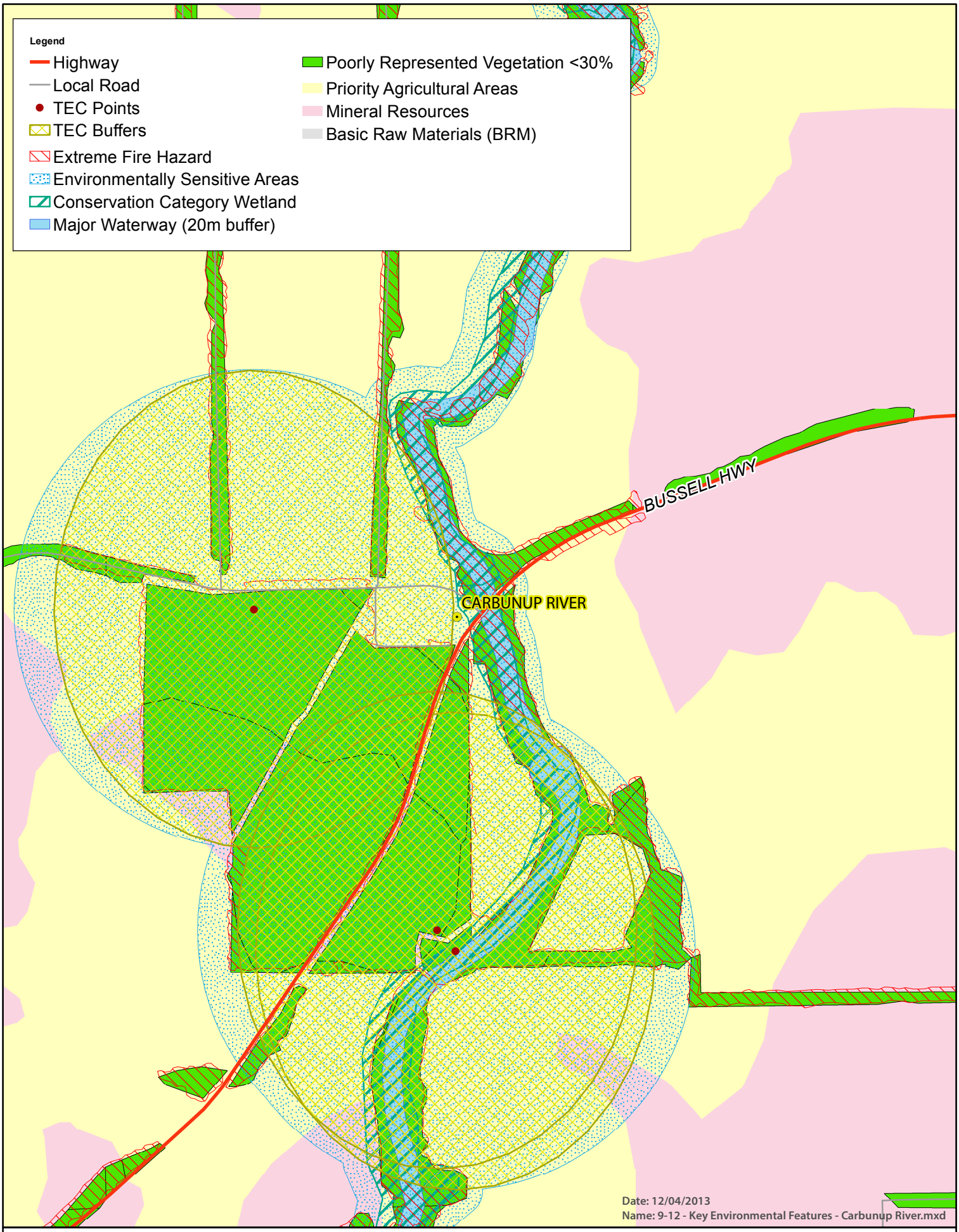

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Figure 9.12

KEY ENVIRONMENTAL FEATURES - CARBUNUP RIVER
LOCAL ENVIRONMENTAL PLANNING STRATEGY

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Figure 9.11

AERIAL PHOTOGRAPHY - CARBUNUP RIVER
LOCAL ENVIRONMENTAL PLANNING STRATEGY

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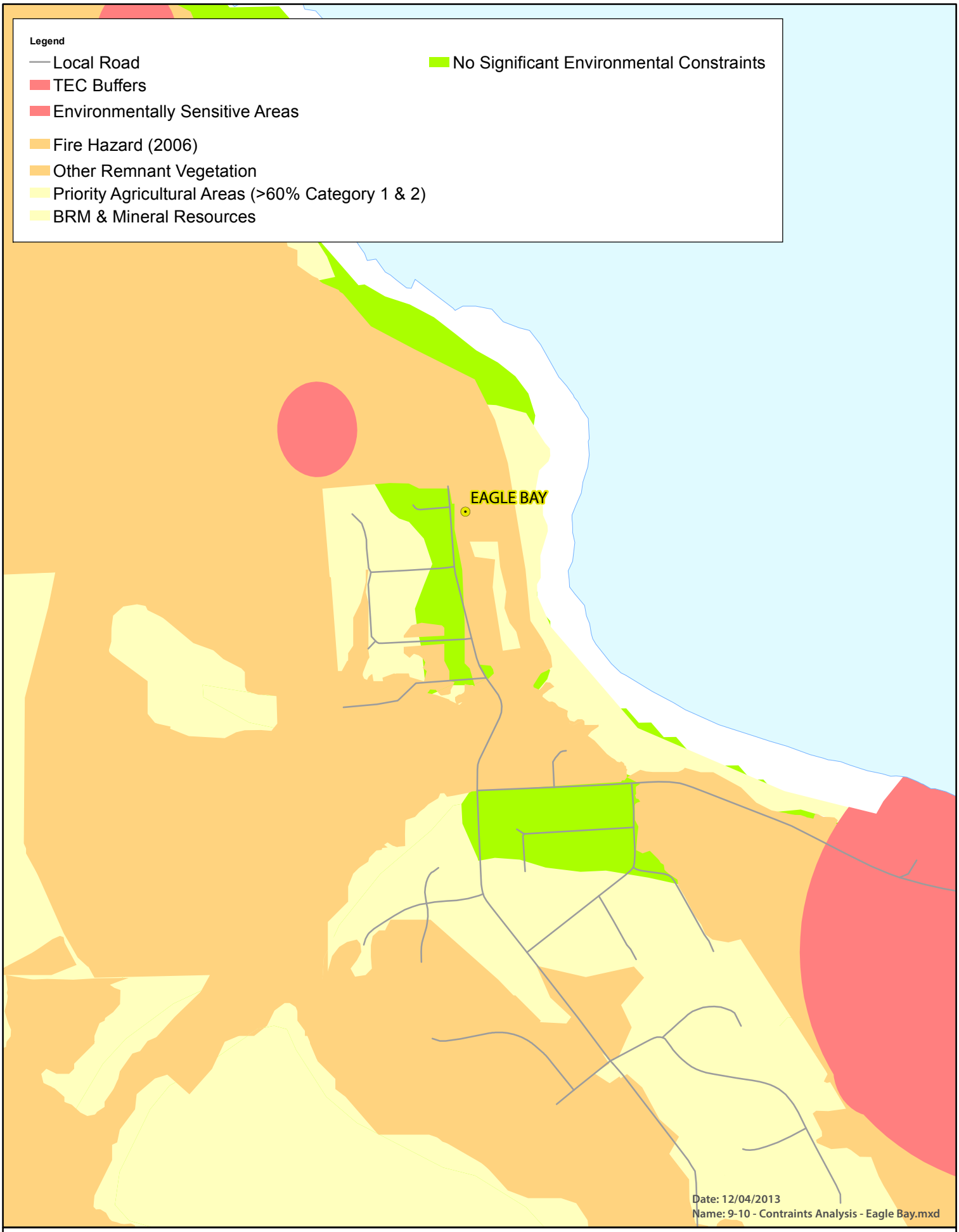

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Figure 9.10

CONSTRAINTS ANALYSIS - EAGLE BAY
LOCAL ENVIRONMENTAL PLANNING STRATEGY

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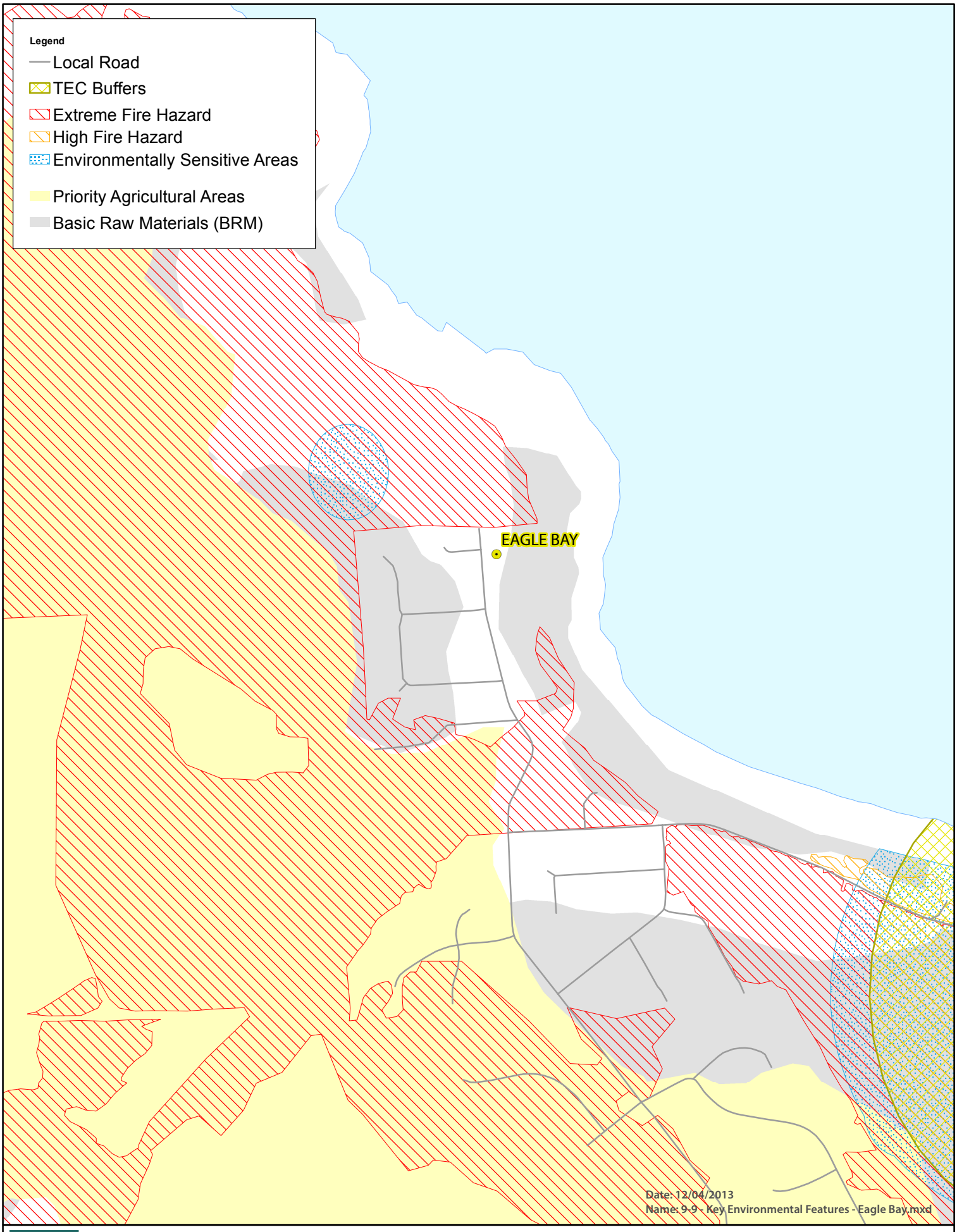

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Figure 9.9

KEY ENVIRONMENTAL FEATURES - EAGLE BAY
LOCAL ENVIRONMENTAL PLANNING STRATEGY

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Figure 9.8

AERIAL PHOTOGRAPHY - EAGLE BAY
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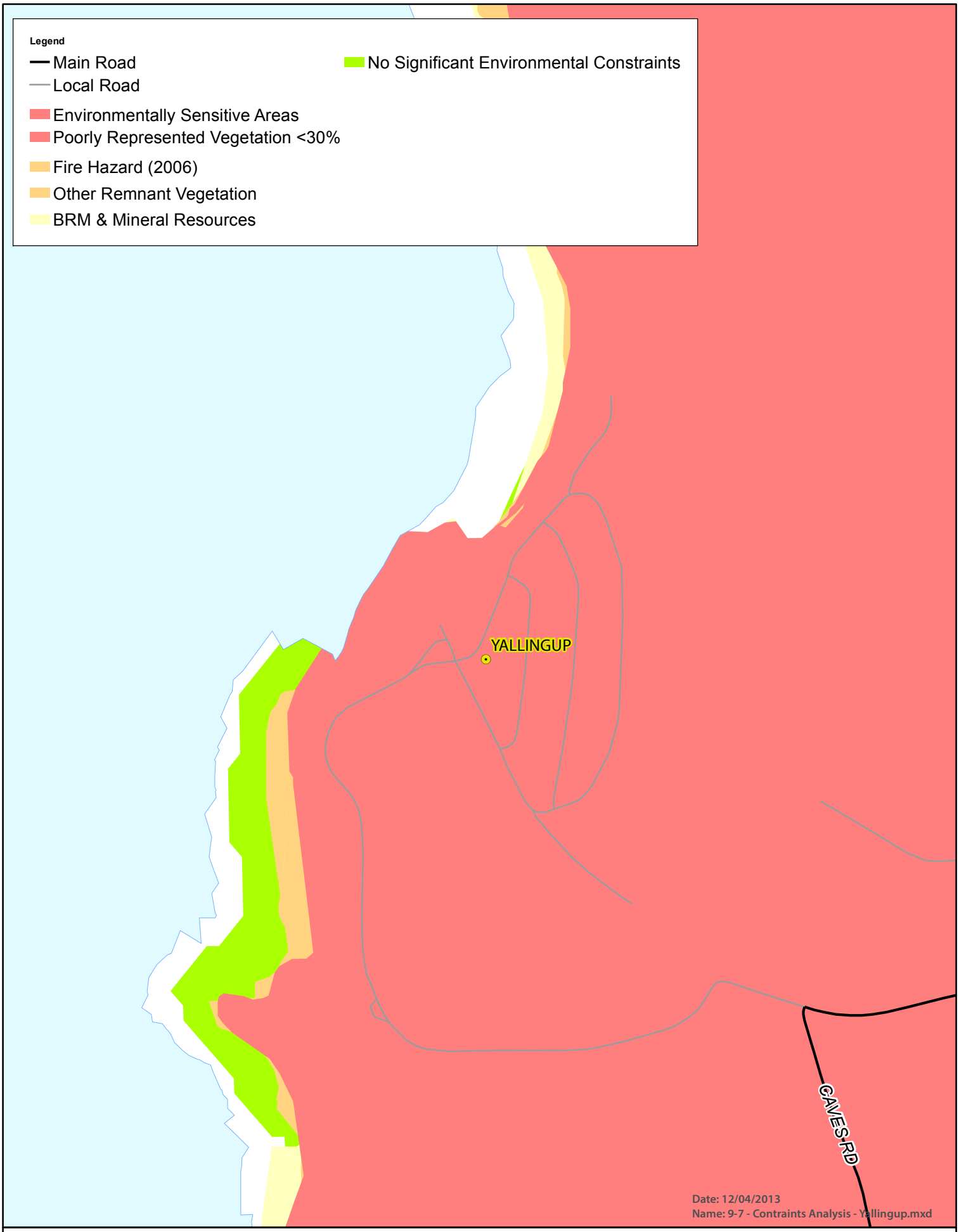

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Figure 9.7

CONSTRAINTS ANALYSIS - YALLINGUP
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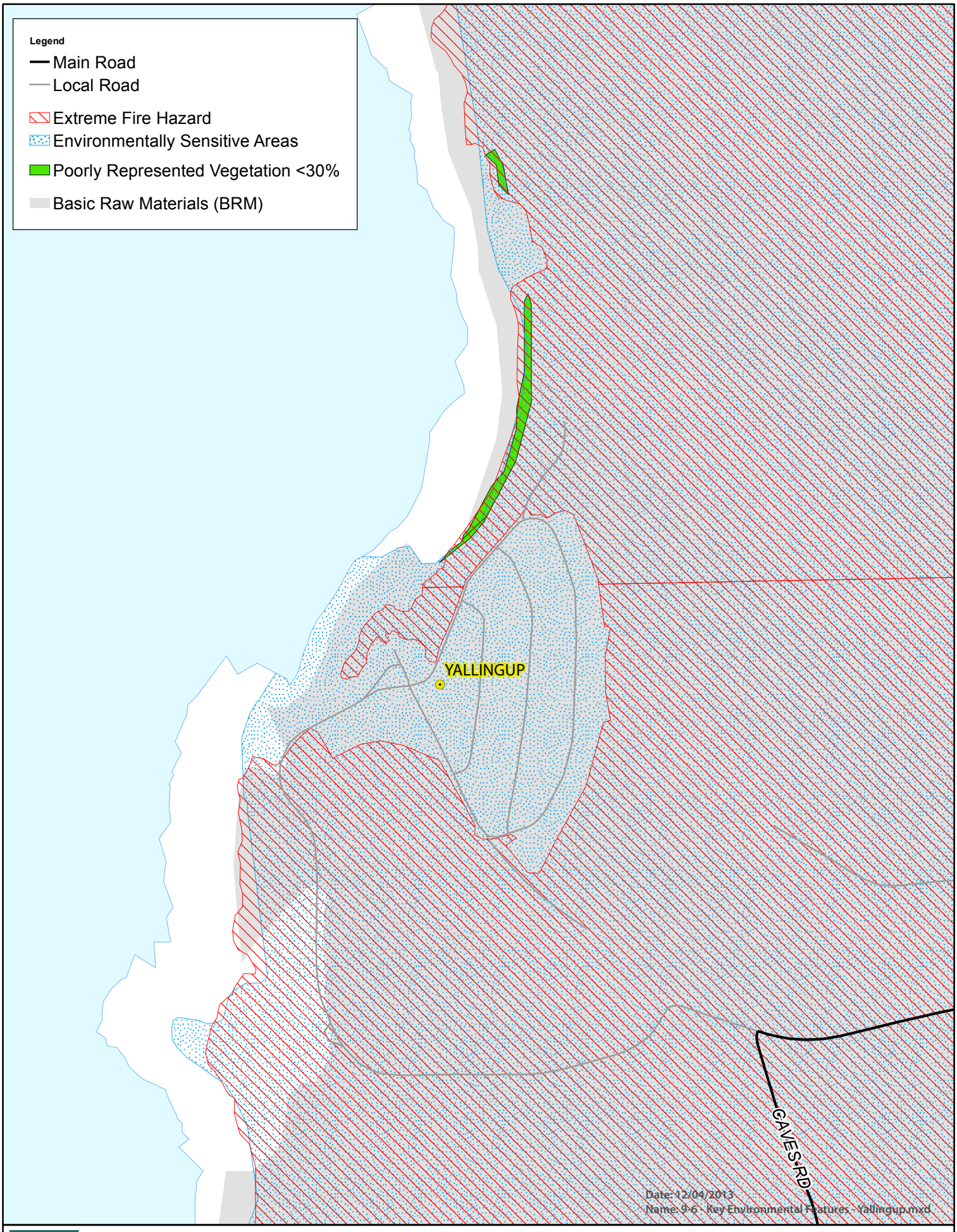

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Figure 9.6

KEY ENVIRONMENTAL FEATURES - YALLINGUP
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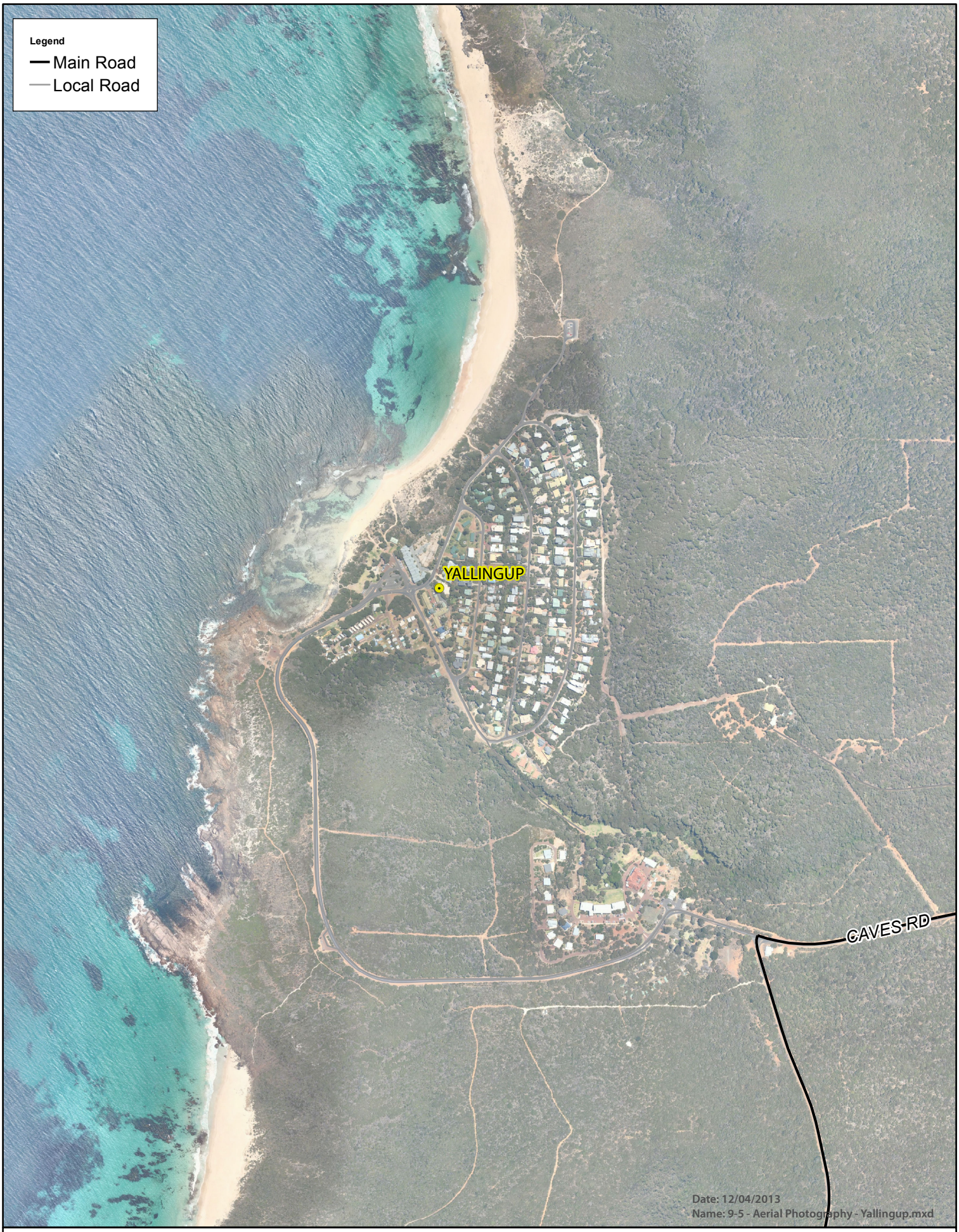

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Figure 9.5

AERIAL PHOTOGRAPHY - YALLINGUP
LOCAL ENVIRONMENTAL PLANNING STRATEGY

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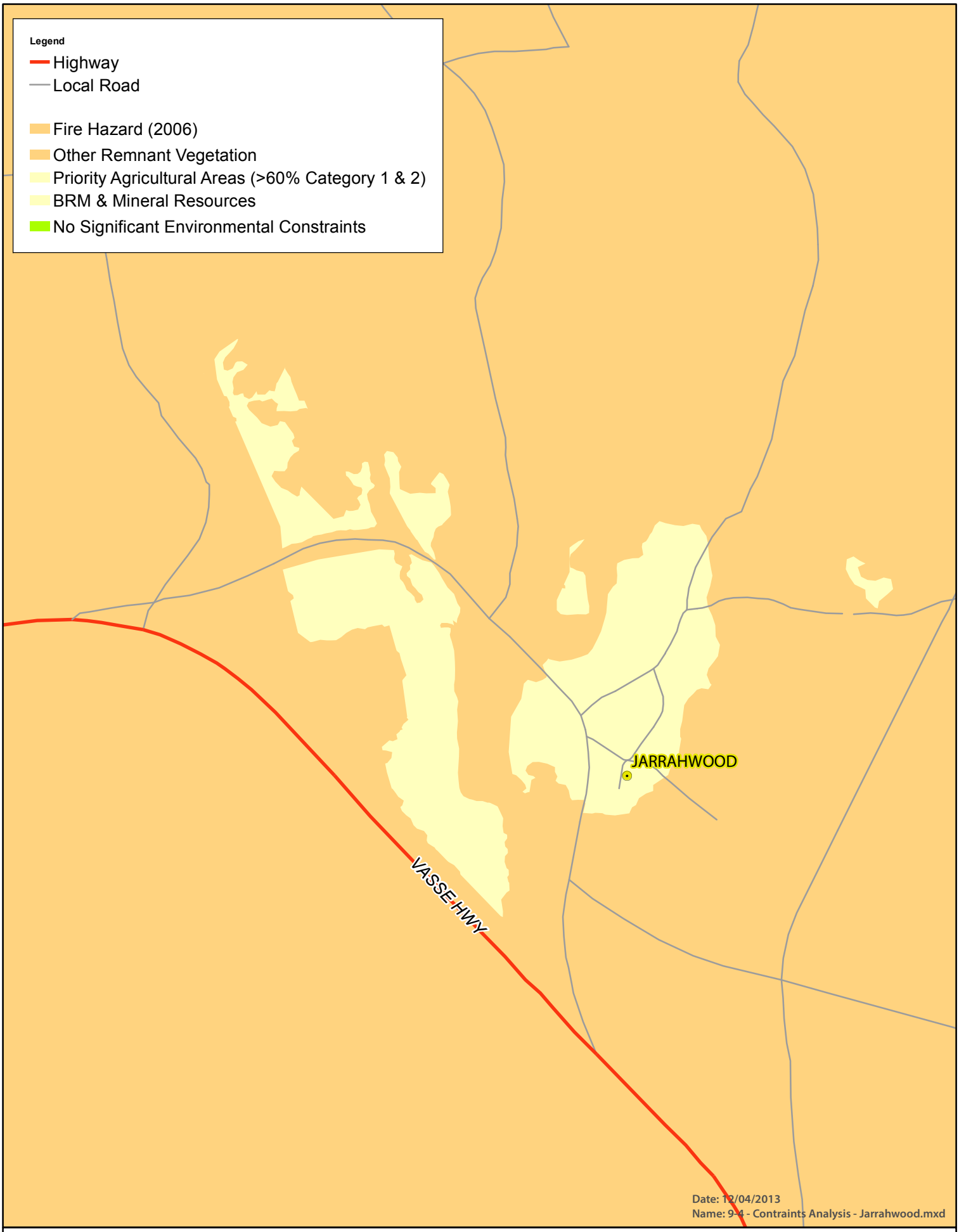

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Figure 9.4

CONSTRAINTS ANALYSIS - JARRAWOOD
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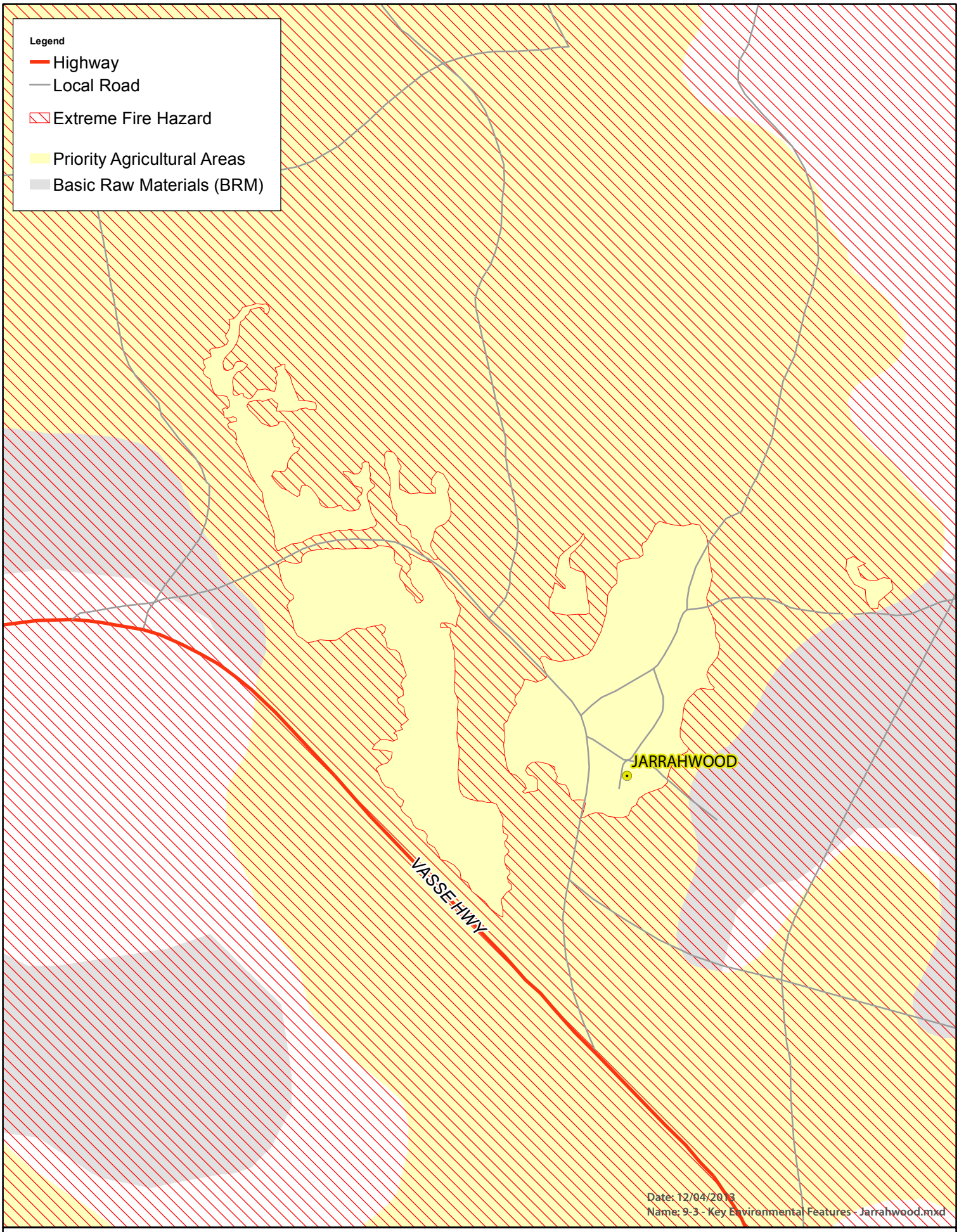

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Figure 9.3

KEY ENVIRONMENTAL FEATURES - JARRAWOOD
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CITY OF BUSSELTON

Legend

- City Boundary
- Highway
- Main Road
- Local Road
- Ocean
- Local Government Boundaries
- Landmass
- Busselton Regional Airport
- TEC Buffers
- 1 in 100 Year Flood Boundary
- Environmentally Sensitive Areas
- Poorly Represented Vegetation <30%
- Conservation Category Wetland 50m buffer
- Deposit - Titanium Zircon
- Major Watercourse (20m buffer)
- Fire Hazard (2006)
- ASS disturbance risk - High to Moderate
- Other Remnant Vegetation
- Priority Agricultural Areas (>60% Category 1 & 2)
- BRM & Mineral Resources
- Waterlogging (>60% High & Very High)
- No Significant Environmental Constraints

CITY OF BUNBURY
SHIRE OF DARDANUP
SHIRE OF CAPEL
SHIRE OF DONNYBROOK-BALINGUP
CAPE NATURALISTE
EAGLE BAY
CAPE NATURALISTE RD
DUNSBOROUGH
YALLINGUP
CAVES RD
SMITHS BEACH
CANAL ROCKS
CAPE CLAIRAULT
BUSSELL HWY
BUSSELTON
BUSSELTON BYPASS
VASSE
CITY OF BUSSELTON
CARBUNUP RIVER
VASSE HWY
SUES RD
JARRAHWOOD
SHIRE OF NANNUP
SHIRE OF AUGUSTA-MARGARET RIVER

Date: 12/04/2013
Name: 9-2 - Contraints Analysis - Shire.mxd

landinsights
PLANNING DESIGN ENVIRONMENT

N W E S

0 5 10 15 20 km

1:200,000

Figure 9.2

CONSTRAINTS ANALYSIS - SHIRE

LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au

Legend

- City Boundary
- Highway
- Main Road
- Ocean
- Local Government Boundaries
- Landmass
- Busselton Regional Airport
- Extreme Fire Hazard
- High Fire Hazard
- Environmentally Sensitive Areas
- Poorly Represented Vegetation <30%
- Other Remnant Vegetation
- ASS disturbance risk - High to Moderate
- Priority Agricultural Areas
- Other Mineral Resources
- Deposit - Titanium Zircon
- Basic Raw Materials (BRM)

CITY OF BUNBURY

SHIRE OF DARDANUP

SHIRE OF CAPEL

SHIRE OF DONNYBROOK-BALINGUP

CAPE NATURALISTE

EAGLE BAY

CAPE NATURALISTE RD

DUNSBOROUGH

YALLINGUP

SMITHS BEACH

CANAL ROCKS

CAPE CLAIRAULT

CAVES RD

BUSSELL HWY

BUSSELTON

BUSSELTON BYPASS

VASSE

CITY OF BUSSELTON

CARBUNUP RIVER

VASSE HWY

SUES RD

JARRAHWOOD

SHIRE OF AUGUSTA-MARGARET RIVER

SHIRE OF NANNUP

Date: 12/04/2013
Name: 9-1 - Key Environmental Features - Shire.mxd

N W E S

0 5 10 15 20 km

1:200,000

Figure 9.1

KEY ENVIRONMENTAL FEATURES - SHIRE

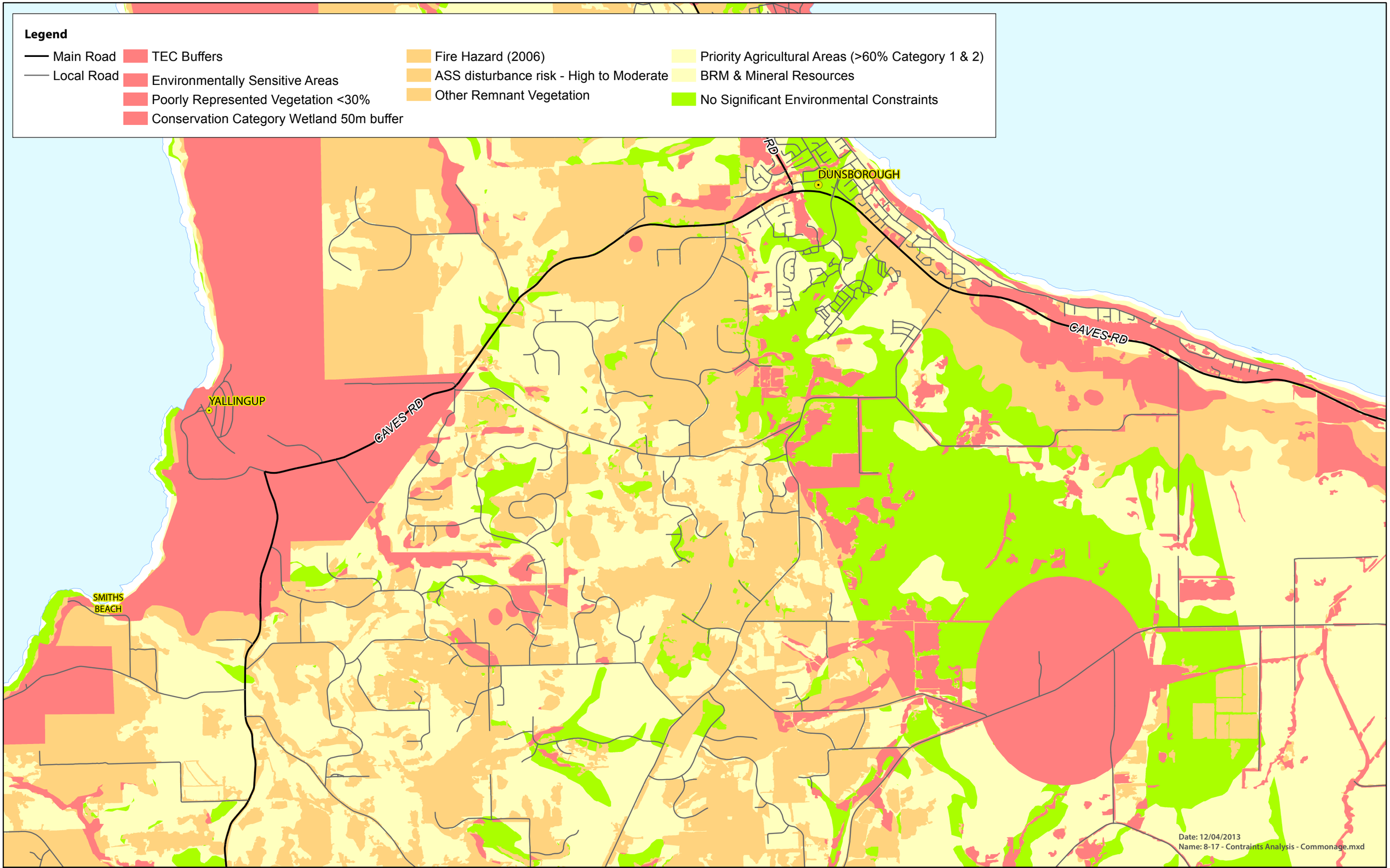
LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

landinsights
PLANNING DESIGN ENVIRONMENT

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au

Legend

- Main Road
- Local Road
- TEC Buffers
- Environmentally Sensitive Areas
- Poorly Represented Vegetation <30%
- Conservation Category Wetland 50m buffer
- Fire Hazard (2006)
- ASS disturbance risk - High to Moderate
- Other Remnant Vegetation
- Priority Agricultural Areas (>60% Category 1 & 2)
- BRM & Mineral Resources
- No Significant Environmental Constraints



landinsights
PLANNING DESIGN ENVIRONMENT

N
W E
S

0 0.5 1 1.5 2 km

1:40,000

Figure 8.17

CONSTRAINTS ANALYSIS - COMMONAGE

LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au

CITY OF BUSSELTON

Legend

- Main Road
- TEC Points
- TEC Buffers
- Extreme Fire Hazard
- High Fire Hazard
- Environmentally Sensitive Areas
- Conservation Category Wetland
- Poorly Represented Vegetation <30%
- ASS disturbance risk - High to Moderate
- Priority Agricultural Areas
- Mineral Resources
- Basic Raw Materials (BRM)

DUNSBOROUGH

YALLINGUP

SMITHS BEACH

CAVES RD

CAVES RD

CAVES RD

Date: 12/04/2013
Name: 8.16 - Key Environmental Features Commonage.mxd

N
W E
S

0 0.5 1 1.5 2 km

1:40,000

Figure 8.16

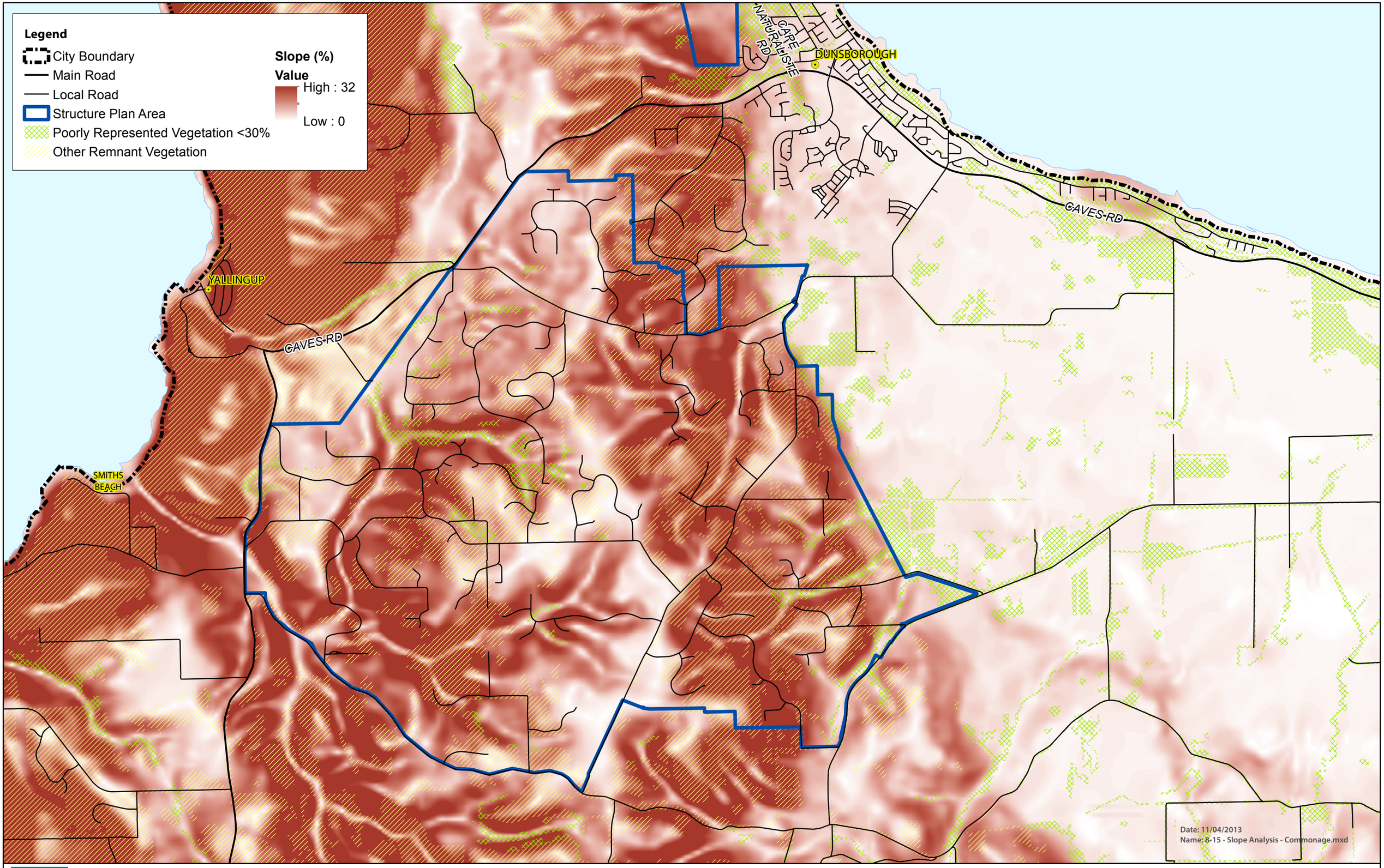
KEY ENVIRONMENTAL FEATURES - COMMONAGE

LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

landinsights
PLANNING DESIGN ENVIRONMENT

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au

CITY OF BUSSELTON



N
W E
S

0 0.5 1 1.5 2 km

1:40,000

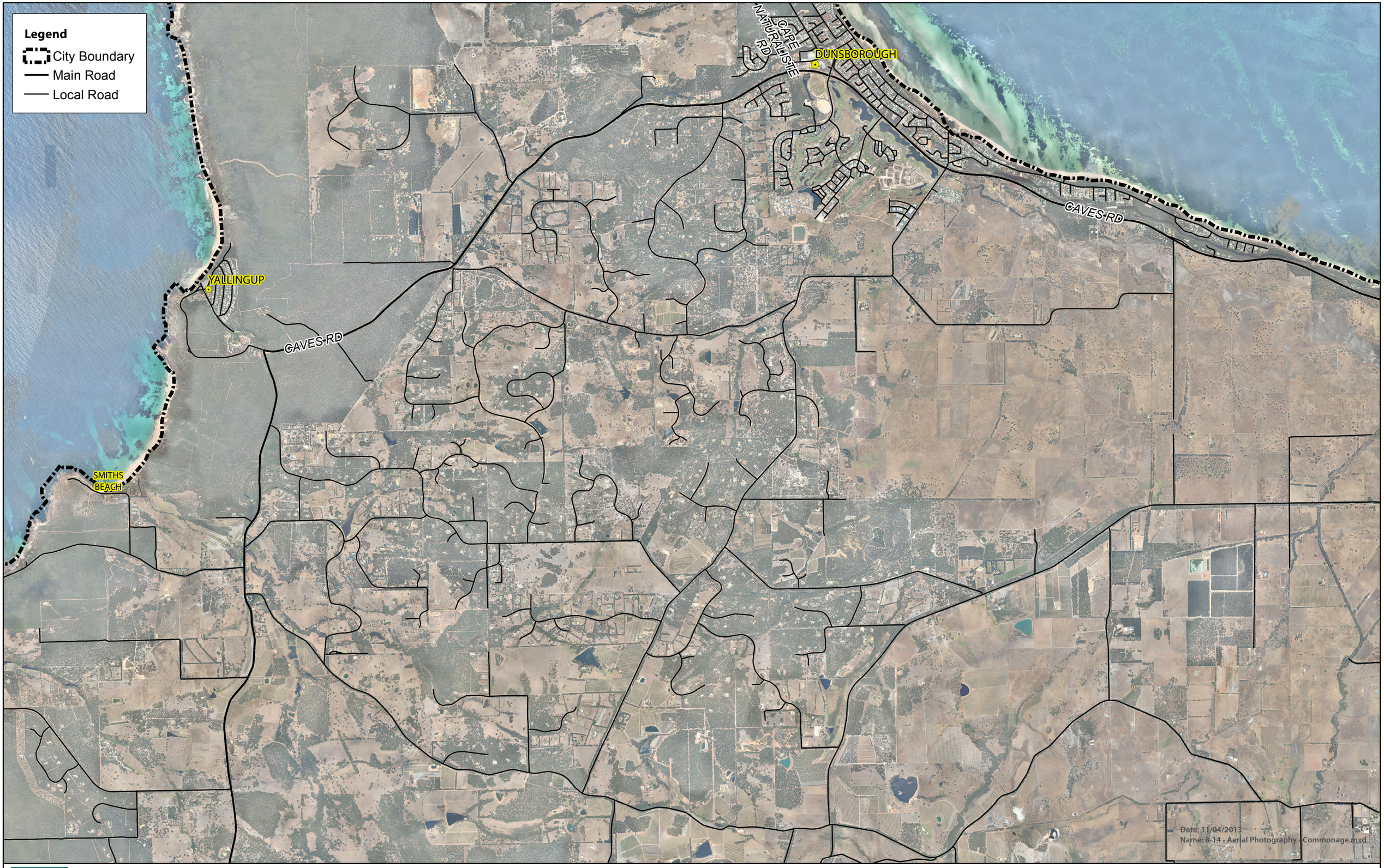
Figure 8.15

SLOPE ANALYSIS - COMMONAGE

LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

landinsights
PLANNING DESIGN ENVIRONMENT

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au



N
W E
S

0 0.5 1 1.5 2 km

1:40,000

Figure 8.14

AERIAL PHOTOGRAPHY - COMMONAGE

LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

landinsights
PLANNING DESIGN ENVIRONMENT

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au

Legend

- City Boundary
- Main Road
- Cadastre
- Proposed Urban Boundary
- Structure Plans
- Unreserved Poorly Represented Native Vegetation
- Conservation Category Wetland

NATURALISTE RD

DUNSBOROUGH

CAVES RD

Provide development incentives (such as density relaxation, multiple dwelling potential) on land indentified as retaining important remnant vegetation

Date: 1/1/04/2013
Name: 8-13 - Actions - Dunsborough.mxd

N
W E
S

0 0.55 1.1 1.65 2.2 km

1:22,347

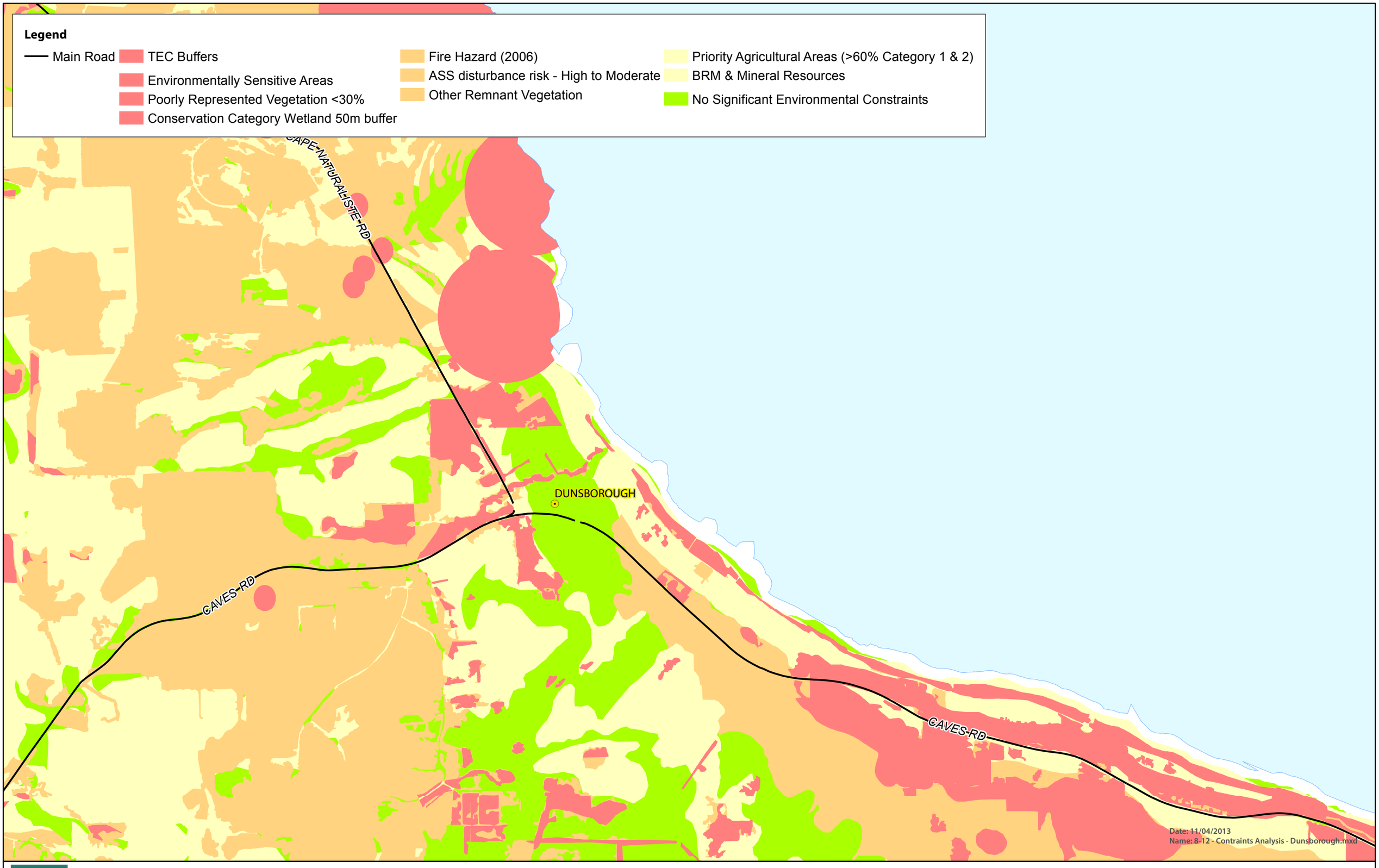
Figure 8.13

ACTIONS - DUNSBOROUGH

LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

landinsights
PLANNING DESIGN ENVIRONMENT

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au



landinsights
PLANNING DESIGN ENVIRONMENT

N
W E
S

0 0.4 0.8 1.2 1.6 km

1:25,000

Figure 8.12

CONSTRAINTS ANALYSIS - DUNSBOROUGH

LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au

Legend

- Main Road
- TEC Points
- TEC Buffers
- Extreme Fire Hazard
- High Fire Hazard
- Environmentally Sensitive Areas
- Conservation Category Wetland
- Poorly Represented Vegetation <30%
- ASS disturbance risk - High to Moderate
- Priority Agricultural Areas
- Mineral Resources
- Basic Raw Materials (BRM)

NATURALISTE RD

DUNSBOROUGH

GAVES RD

GAVES RD

vDate: 11/04/2013
Path: 8.11 - Key Environmental Features - Dunsborough.mxd

landinsights
PLANNING DESIGN ENVIRONMENT

N
W E
S

0 0.45 0.9 1.35 1.8 km

1:25,000

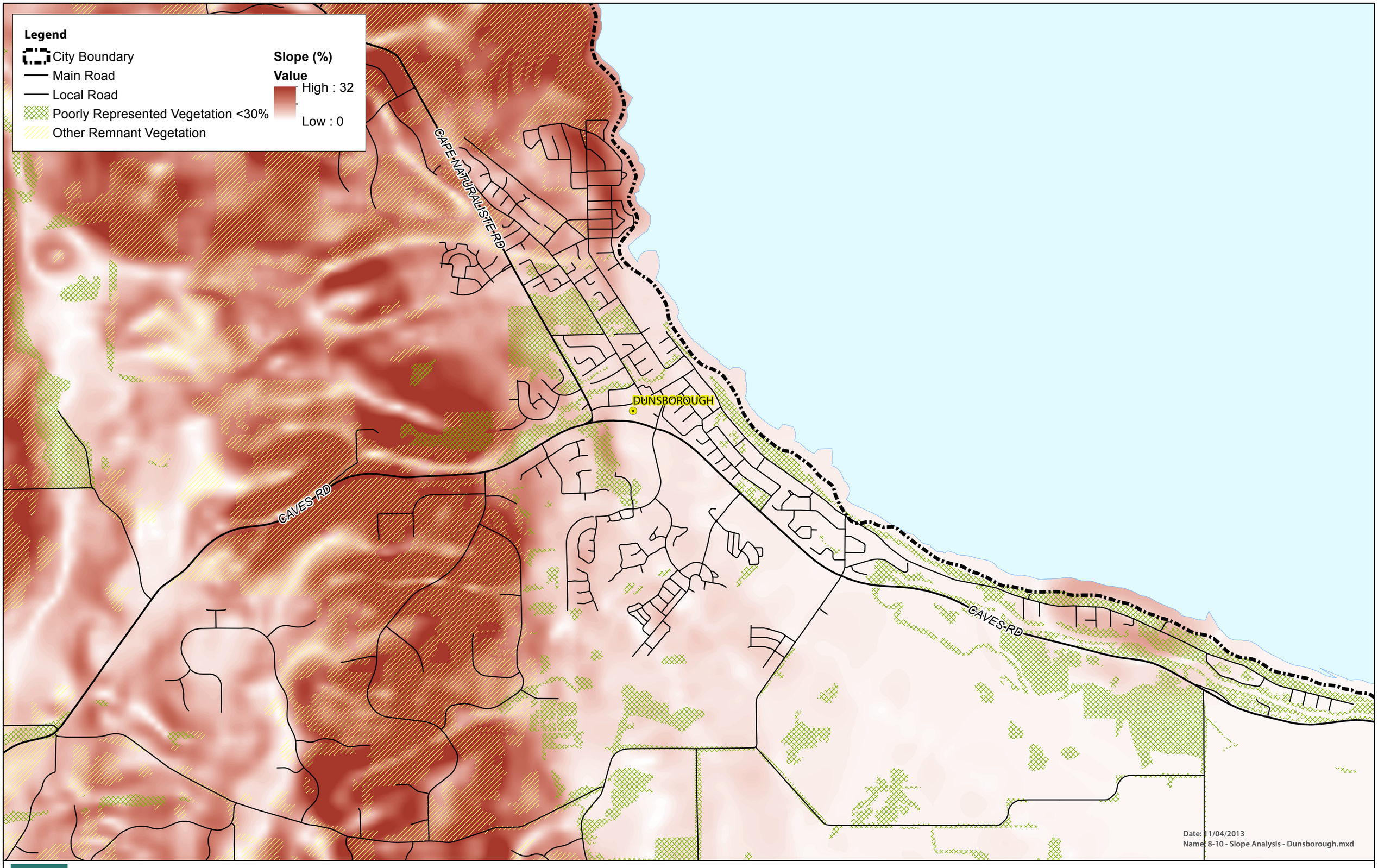
Figure 8.11

KEY ENVIRONMENTAL FEATURES - DUNSBOROUGH

LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au

CITY OF BUSSELTON



N
W E
S

0 0.5 1 1.5 2 km

1:25,000

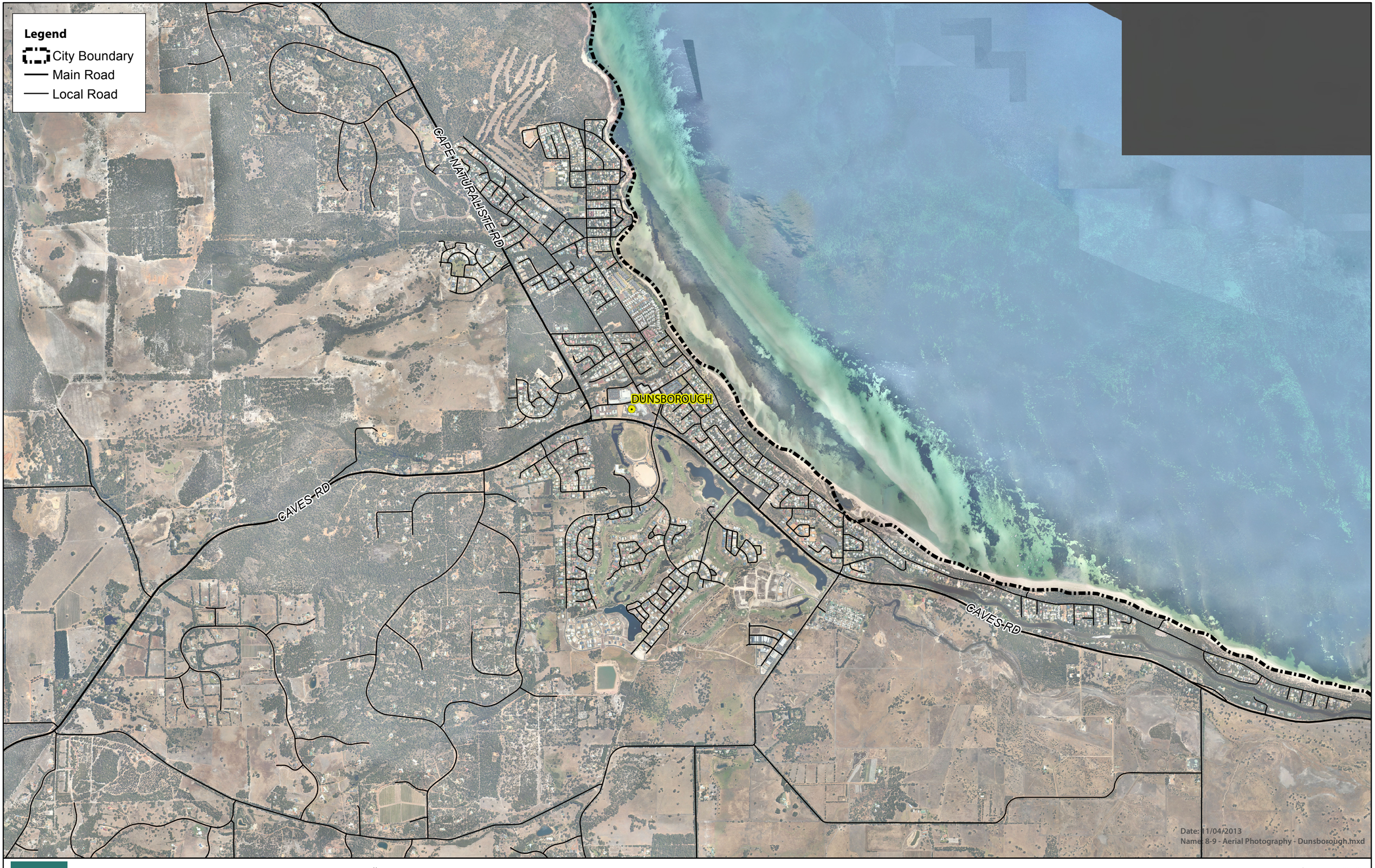
Figure 8.10

SLOPE ANALYSIS - DUNSBOROUGH

LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

landinsights
PLANNING DESIGN ENVIRONMENT

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au



N
W E
S

0 0.5 1 1.5 2 km

1:25,000

Figure 8.9

AERIAL PHOTOGRAPHY - DUNSBOROUGH

LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

landinsights
PLANNING DESIGN ENVIRONMENT

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au

Legend

- Highway
- Main Road
- 1 in 100 Year Flood Boundary
- Environmentally Sensitive Areas
- Poorly Represented Vegetation <30%
- Conservation Category Wetland 50m buffer
- Major Watercourse (20m buffer)
- Fire Hazard (2006)
- ASS disturbance risk - High to Moderate
- Other Remnant Vegetation
- Priority Agricultural Areas (>60% Category 1 & 2)
- BRM & Mineral Resources
- No Significant Environmental Constraints

CAVES-RD

BUSSELL-HWY

VASSE

BUSSELTON-BYPASS

BUSSELTON-BYPASS

Date: 5/04/2013
Name: 8-8 - Contraints Analysis - Vasse.mxd

landinsights
PLANNING DESIGN ENVIRONMENT

N
W E
S

0 0.25 0.5 0.75 1 km

1:15,000

Figure 8.8

CONSTRAINTS ANALYSIS - VASSE

LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au

CITY OF BUSSELTON

Legend

- Highway
- Main Road
- 1 in 100 Year Flood Boundary
- Extreme Fire Hazard
- Environmentally Sensitive Areas
- Conservation Category Wetland
- Major Waterway (20m buffer)
- Poorly Represented Vegetation <30%
- ASS disturbance risk - High to Moderate
- Priority Agricultural Areas
- Mineral Resources
- Basic Raw Materials (BRM)

BUSSELL HWY

VASSE

BUSSELTON BYPASS

BUSSELTON BYPASS

Date: 1/04/2013
Name: 8.7 - Key Environmental Features - Vasse.mxd

N
W E
S

0 0.25 0.5 0.75 1 km

1:15,000

Figure 8.7

KEY ENVIRONMENTAL FEATURES - VASSE

LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

landinsights
PLANNING DESIGN ENVIRONMENT

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au

landinsights
PLANNING DESIGN ENVIRONMENT

N
W E
S

0 0.25 0.5 0.75 1 km

1:15,000

Figure 8.6

AERIAL PHOTOGRAPHY - VASSE

LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au

Legend

- City Boundary
- Highway
- Main Road
- Contours
- Busselton Regional Airport
- Proposed Urban Boundary
- Structure Plans
- Long Term Urban Development
- Mid Term Development
- Short - Mid Term Development
- Short Term Development
- Cadastre
- Waste Water Treatment Buffer (1km)
- Unreserved Poorly Represented Native Vegetation
- Conservation Category Wetland

Provide development incentives (such as density relaxation, multiple dwelling potential) on land indentified as retaining important remnant vegetation

Urban Area Limit

De-zone areas of urban land where affected by Conservation Category Wetlands

Include wetland and remnant vegetation chain currently for *Recreation* in a new reserve for *Conservation*.

Identify means, in conjunction with affected landowners, of providing for the long term protection, enhancement and management of the wetland chain and adjoining areas of remnant vegetation. The focus of this recommendation is in areas not affected by the Busselton Wetlands Management Plan.

Include wetland and remnant vegetation chain currently reserved for *Recreation* in a new reserve for *Conservation*.

Reserve or liase with landowners to progress a conservation rezoning over areas currently zoned Agriculture.

Liase with Water Corporation to establish an appropriate development buffer around the WWTP

Independent studies are being undertaken to determine the future uses and associated buffers around the airport and new industrial area.

BUSSELTON

VASSE

CAVES RD

BUSSELL HWY

ALBERT ST

CAUSEWAY RD

VASSE HWY

BUSSELTON BYPASS

SUES RD

Date: 5/04/2013
Name: 8-5 - Actions - Busselton.mxd

N W E S

0 1 2 3 4 km

1:50,000

Figure 8.5

ACTIONS - BUSSELTON

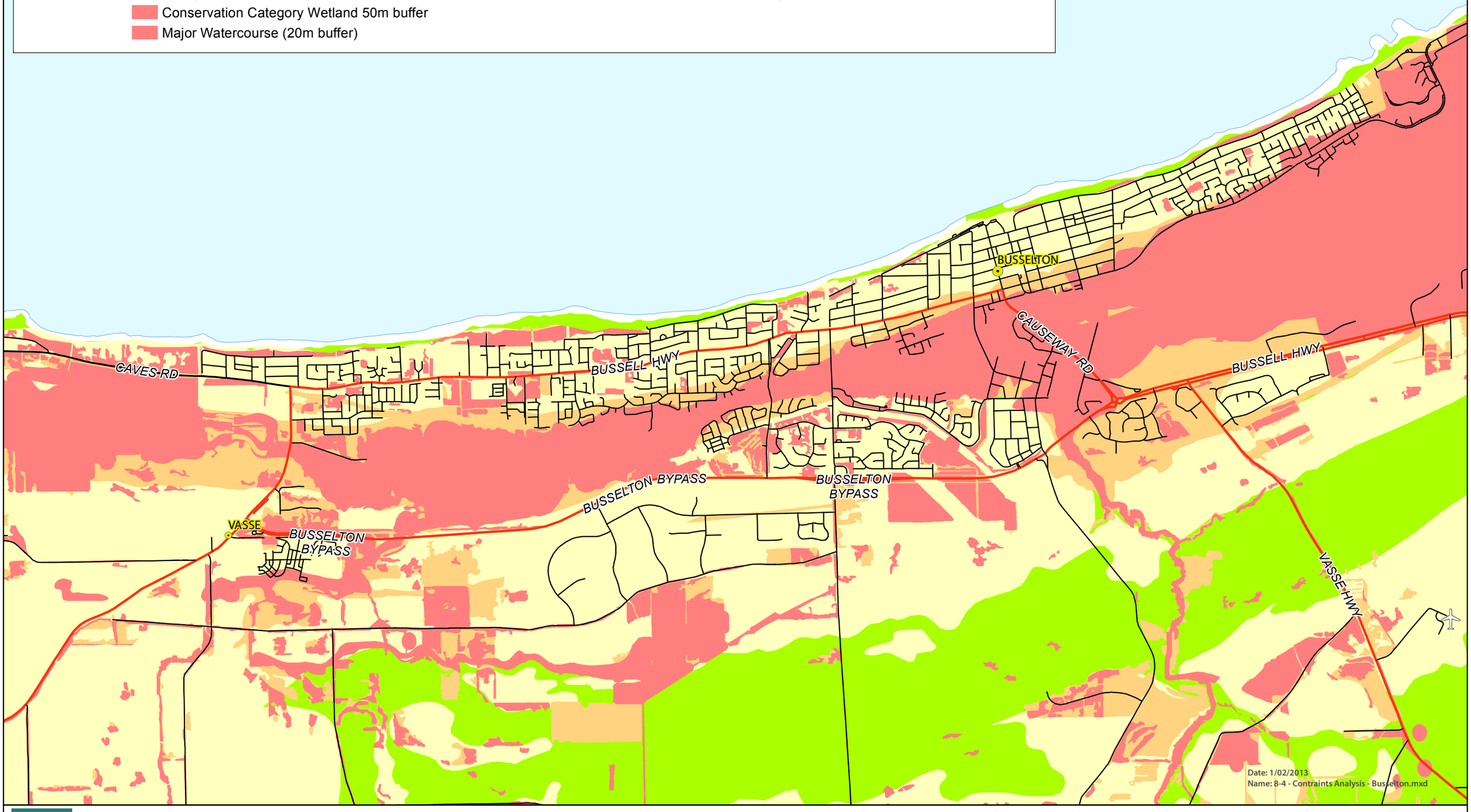
LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

landinsights PLANNING DESIGN ENVIRONMENT

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au

Legend

- Highway
- Main Road
- Other Road
- 1 in 100 Year Flood Boundary
- Environmentally Sensitive Areas
- Poorly Represented Vegetation <30%
- Conservation Category Wetland 50m buffer
- Major Watercourse (20m buffer)
- Fire Hazard (2006)
- ASS disturbance risk - High to Moderate
- Other Remnant Vegetation
- Priority Agricultural Areas (>60% Category 1 & 2)
- BRM & Mineral Resources
- No Significant Environmental Constraints



N W E S

0 1 2 3 4 km

1:40,000

Figure 8.4

CONSTRAINTS ANALYSIS - BUSSELTON

LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

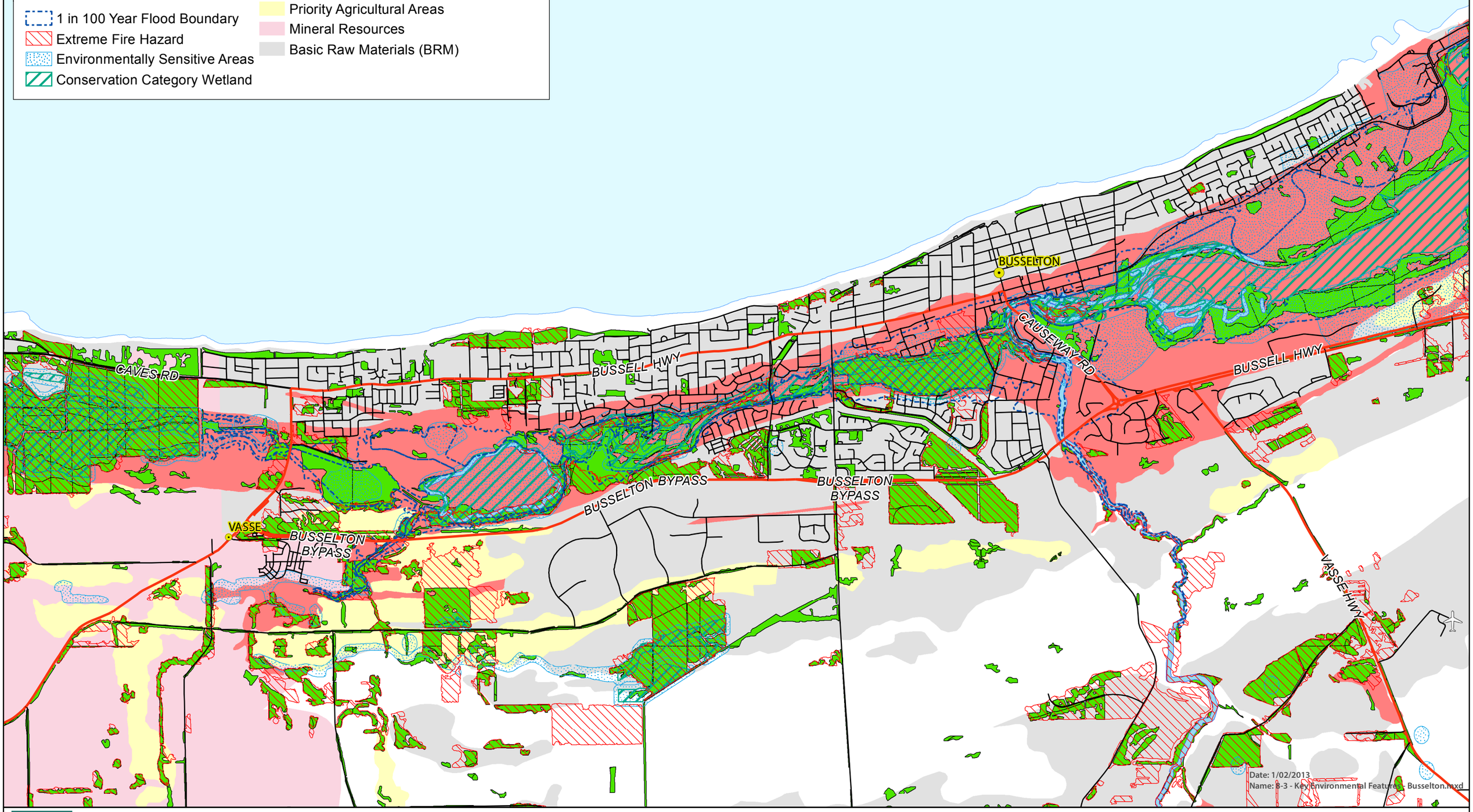
landinsights
PLANNING DESIGN ENVIRONMENT

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au

CITY OF BUSSELTON

Legend

- Highway
- Main Road
- Other Road
- 1 in 100 Year Flood Boundary
- Extreme Fire Hazard
- Environmentally Sensitive Areas
- Conservation Category Wetland
- Major Waterway (20m buffer)
- Poorly Represented Vegetation <30%
- ASS disturbance risk - High to Moderate
- Priority Agricultural Areas
- Mineral Resources
- Basic Raw Materials (BRM)



N
W E
S

0 1 2 3 4 km

1:40,000

Figure 8.3

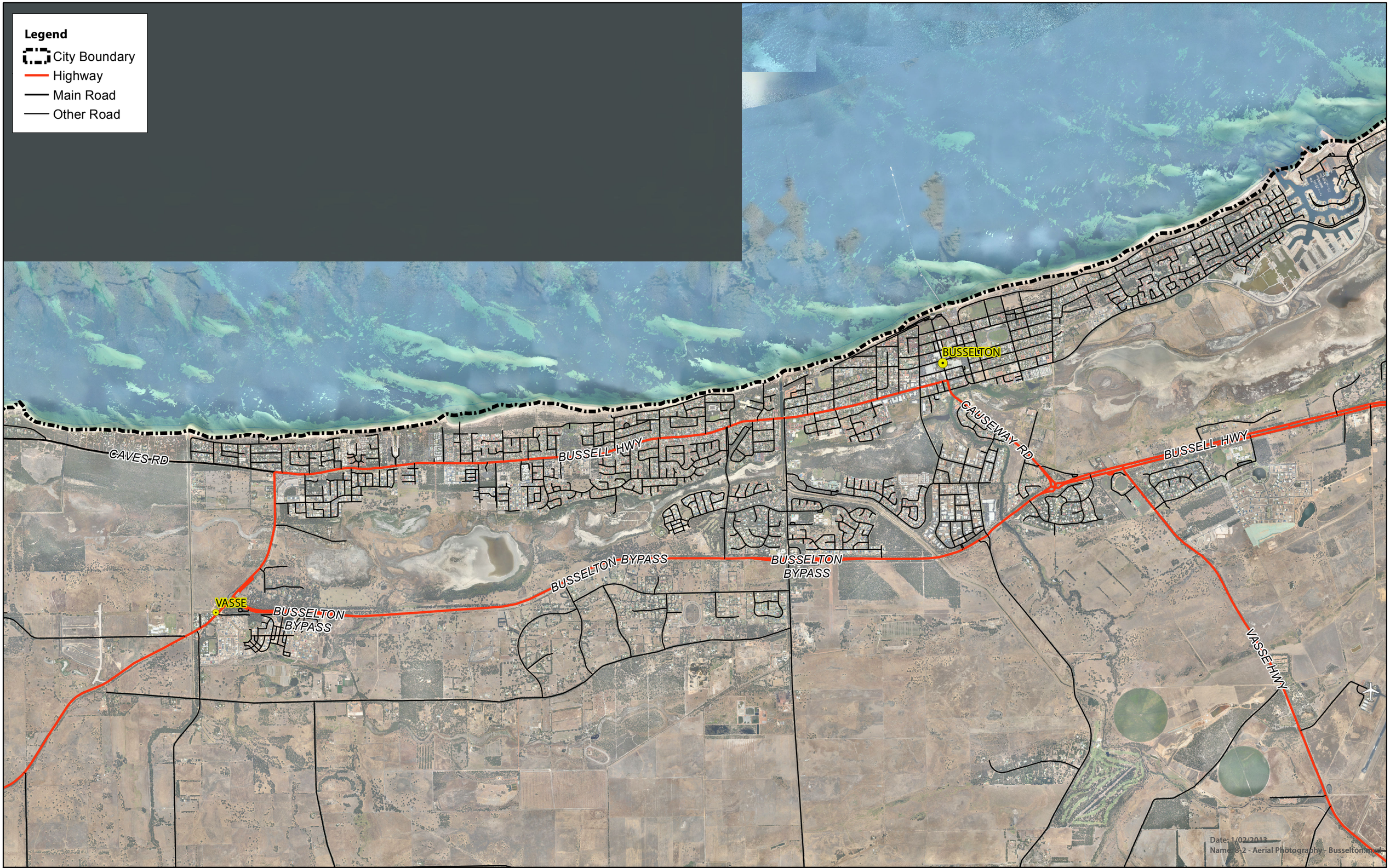
KEY ENVIRONMENTAL FEATURES - BUSSELTON

LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

landinsights
PLANNING DESIGN ENVIRONMENT

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au

CITY OF BUSSELTON



landinsights
PLANNING DESIGN ENVIRONMENT

N
W E
S

0 1 2 3 4 km

1:40,000

Figure 8.2

AERIAL PHOTOGRAPHY - BUSSELTON

LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au

CITY OF BUSSELTON

Legend

City Boundary
Highway
Main Road
Local Road
Local Government Boundaries
Busselton Regional Airport

Land Use Strategy Precincts

Bussleton
Dunsborough
Commonage

CITY OF BUNBURY
SHIRE OF DARDANUP
SHIRE OF CAPEL
SHIRE OF DONNYBROOK-BALINGUP
SHIRE OF AUGUSTA-MARGARET RIVER
SHIRE OF NANNUP
CITY OF BUSSELTON

CAPE NATURALISTE
EAGLE BAY
DUNSBOROUGH
YALLINGUP
SMITHS BEACH
CANAL ROCKS
CAPE CLAIRAULT
BUSSELTON
VASSE
CARBUNUP RIVER
JARRAHWOOD

ABBEY RIVER
VASSE RIVER
SABINA RIVER
ABBA RIVER
IRONSTONE
LUDLOW RIVER
MARY BROOK
SEIN BROOK
ST PAULS BROOK
MILL BROOK
HARRIS MILL BROOK

Date: 1/02/2013
Name: 8-1 - Landuse Strategy Precincts.mxd

N W E S

0 5 10 15 20 km

1:200,000

Figure 8.1

LAND USE STRATEGY PRECINCTS

LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

landinsights
PLANNING DESIGN ENVIRONMENT

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au

Legend

- City Boundary
- Highway
- Main Road
- Local Road
- Other DEC-Managed Reserves
- National Park
- State Forest
- Local Government Boundaries
- Built-Up Area
- Busselton Regional Airport
- Visually Attractive Road
- Dunsborough Visual backdrop

CITY OF BUNBURY

SHIRE OF DARDANUP

SHIRE OF CAPEL

SHIRE OF DONNYBROOK-BALINGUP

Cape Naturaliste Road - Vegetation; undulating topography

EAGLE BAY

Visual backdrop to Dunsborough - Vegetation; sparse development

Caves Road - Entrance to Dunsborough townsite

DUNSBOROUGH

Ford Road - Open farmland; lack of commercial strip/residential land; views to wetlands; vegetation

Queen Street - Town centre; vista to foreshore

BUSSELTON

Tuart Forest remnant; wetlands

Ludlow State Forest

Coolilup State Forest

YALLINGUP

Yallingup & Caves Road - Unique development pattern following topography; dense vegetation

VASSE

CITY OF BUSSELTON

CARBUNUP RIVER

Bussell Highway - Open farmland; weltands; forest

Millbrook State Forest

Leeuwin-Naturaliste National Park

Caves Road - Farmland; vineyards; vegetation

Yelverton National Park

Bussell Highway - Open farmland; rolling hills; vegetation

Jarrahwood State Forest

Whicher National Park

Entrance to Jarrahwood - Forest area

Blackwood State Forest

SHIRE OF AUGUSTA-MARGARET RIVER

SHIRE OF NANNUP

Date: 1/02/2013
Name: 5-1 - Visually Attractive Areas - Shire.mxd

landinsights
PLANNING DESIGN ENVIRONMENT

N W E S

0 5 10 15 20 km

1:200,000

Figure 5.1

VISUALLY ATTRACTIVE AREAS

LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au

CITY OF BUSSELTON

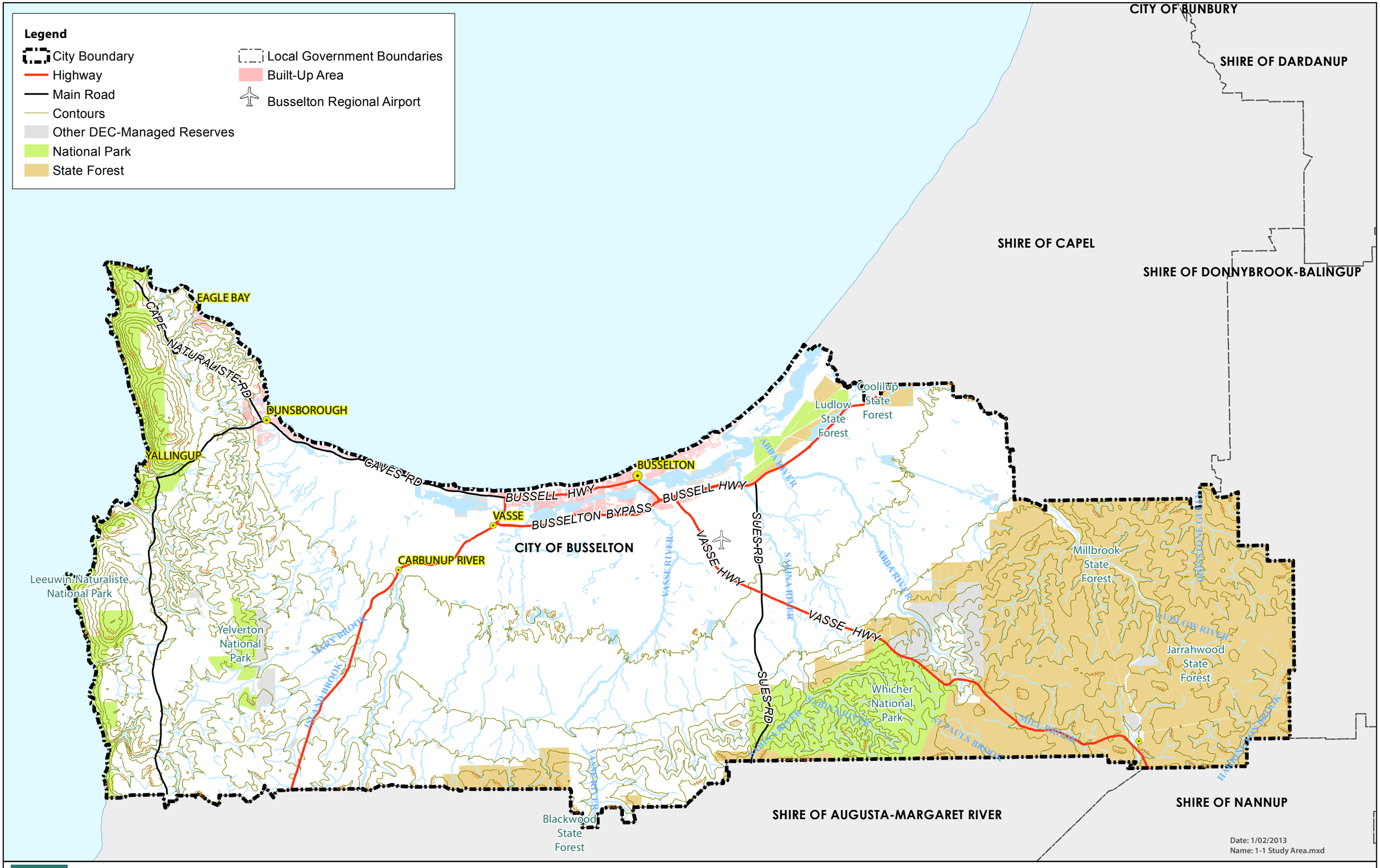


Figure 1.1

STUDY AREA

LOCAL ENVIRONMENTAL PLANNING STRATEGY - REPORT 3

landinsights
PLANNING DESIGN ENVIRONMENT

UNIT 1/1 ALVAN STREET, MT LAWLEY, WA, 6050 PO BOX 289, MT LAWLEY, WA, 6929
PHONE: (08) 9271 8506 FAX: (08) 6161 2597 EMAIL: admin@landinsights.com.au