

## 2. STRATEGIC PLAN

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### 2.1 KEY ISSUES

It is evident that strategic planning for the Kalbarri Townsite has, to date, been largely broad scale and heavily based on the Kalbarri Plan 1992.

Subsequent planning and management studies have sought to build upon the broad framework provided by the 1992 Plan.

A number of the premises upon which the 1992 Plan was based are in need of review. The growth and maturation of the Town has given rise to a greater appreciation by the community of the core values and there is a need to embrace higher levels of sustainability.

The essential purpose of the Townsite Strategy is to provide longer term strategic direction for the planning and development of Kalbarri.

The Strategy will necessitate a review of the current Kalbarri Town Planning Scheme No 9 (TPS 9) and the preparation of a new Local (Town) Planning Scheme for the Kalbarri Townsite.

The Kalbarri Community have a clear "sense of direction" as to how the future form of Kalbarri should evolve. Key principles emanating from the Community Workshops are:

- Significantly and independently of any population projections, a broad consensus of an "Optimum Foreseeable Population" for Kalbarri in the order of 5,000 residents plus visitors;
- Clean, green and environmentally aware Town through sustainable design and development that utilises land, water and natural resources in a responsible manner and accommodates the potential impacts of changing climate;
- Smarter residential planning that maintains the "feel" of Kalbarri and its connectivity to the natural environment; and
- The need to broaden the economic and employment base of the Town to reduce Kalbarri's reliance on the tourist industry.

The Planning Assessment contained in Volume 2 of the Strategy – Technical Appendix – identifies a number of Major Issues to be addressed through the broader Townsite Strategy, a number of which relate to the manner in which development should be undertaken and controlled.

Of those, there are a number of Key Issues of a "spatial" nature having a direct impact on the future layout of Kalbarri and the distribution of land uses to accommodate future growth in the desired manner and specifically:

- A projected resident population of 5,000 persons;
- A requirement for an additional 2,000 to 2,500 additional new permanent residential dwellings;
- A projected peak daily visitor population of some 10,000 persons;
- A requirement for an additional 1,200 to 1,500 tourist accommodation units across all accommodation types and additional land for commercially based visitor activities and attractions;
- Enhancement of the Tourist Precinct immediately north of Wittecarra Creek;
- Substantial “re-planning” of the core area into a clearly defined Town Centre with significant planning incentives and integration with the River Foreshore;
- Potential for the diversion of Grey Street traffic adjacent to the Town Centre;
- A District level retail centre in the range of 7,500m<sup>2</sup>, requiring an overall site area in the order of 3ha;
- An area within which new and more regionally based enterprises may develop to facilitate broadening of Kalbarri’s economic base;
- An “outer” route to Nanda Drive north;
- Enhancement of strong green links and faunal corridors within the existing and expanded Townsite;
- Broadly lineal expansion of tourism opportunities parallel with the River Foreshore;
- Retention and enhancement of the current Sports & Recreation Centre precinct;
- Three dedicated Primary School sites of 4ha each, two within the Townsite and the third in Port Kalbarri and retention of the existing Kalbarri District High School site as a dedicated future Senior High School site;
- Expansion of the Health Centre to include larger emergency consultations department, eight bed Emergency Ward, twelve bed In-patient Ward and Aged Hostel and Nursing care;
- Expansion and upgrading of current community services and facilities including expanded administration and library services; a recreation and cultural facility; relocation of the tennis and basketball / netball courts; a moderate sized “water playground” and new Police Station and Ambulance Depot; and
- Management of short stay tourist accommodation within residential areas.

## **2.2 STRATEGIC VISION & OBJECTIVES**

The Planning Assessment and Community Workshops have identified a number of issues and directions that cumulatively form the basis for the development of a longer term strategic plan for the future development and growth of Kalbarri. From these, the following Strategic Vision and Objectives have been distilled as the foundation for the development and evaluation of the Kalbarri Townsite Strategy.

### ***STRATEGIC VISION***

*To develop a long term Strategy for the future development and enhancement of Kalbarri that recognises, builds upon and promotes the tourism and residential values of the location in an environmentally and economically sustainable manner.*

### ***STRATEGIC OBJECTIVES***

*To enhance Kalbarri's position as a premier family holiday destination within Western Australia while recognising the continuing value and importance of non-family Intrastate, Interstate and International visitors.*

*To broaden Kalbarri's economic and employment base by furthering Kalbarri's position as a desirable alternative residential and employment location within the Mid-West.*

*To protect and enhance Kalbarri's unique urban values and particularly its connectivity to the surrounding natural environment together with its compactness and high level of walkability.*

## **2.3 KALBARRI TOWNSITE STRATEGY**

The Kalbarri Townsite Strategy comprises Plan 1 (attached) and the following Schedule of Proposed Land Use which identifies the Land Use proposals for each Precinct and Planning Area within the Townsite together with relevant implementation and management strategies.

Plan 2 (attached) provides a more detailed overview of the Strategy proposals for the Kalbarri Town Centre including both private and public lands. It is important to note that implementation of the Town Centre proposals should be subject to further and more detailed precinct and site planning to form the basis for future subdivision, amalgamation, re-vesting of public lands and development approvals and should be undertaken with close consultation with landowners, stakeholders and the broader Kalbarri community.

The Strategy proposes a number of key textual and zoning changes as identified in the Schedule. The Strategy also recommends the preparation of specific development control policies under the Scheme. These amendments and policies are discussed further at Section 2.4 together with the need for a new Town Planning Scheme over the Kalbarri Townsite.

## **KALBARRI TOWNSITE STRATEGY – SCHEDULE OF PROPOSED LAND USE**

PRECINCT	ANCHORAGE
<b>Objective</b>	<i>To enhance the visitor experience of the marine environment and provide for the development of a major tourist node based around Kalbarri's traditional industry.</i>
<b>Precinct Planning</b>	<p>Prepare a Local Structure Plan over public lands from Clotworthy Street to Anchorage Lane addressing overall planning and integration of Planning Area proposals A1, A7 &amp; A8, foreshore management requirements and traffic / pedestrian management with the objective of creating a low speed environment and maximising pedestrian comfort and safety.</p> <p>Consider boulevard treatment to river frontage road to facilitate pedestrian movement from tourist sites to the river foreshore. Local Structure Plan to be advertised for public comment for a minimum period of 28 days and adopted by Council and WA Planning Commission.</p>
<b>Planning Area</b>	<b>Use &amp; Development Provisions</b>
<b>A1</b>	<p><b>Fisherman's Wharf :</b></p> <p>Land-backed Wharf with Restaurant / Kiosk / Fish &amp; Chips / Outdoor Seating &amp; Al Fresco Dining.</p> <p>Consider also inclusion of a Marine Interpretive Centre (Physical, European &amp; Aboriginal use, Marine Flora &amp; Fauna, Sea Horse Centre) as part of the Fisherman's Wharf development. Alternatively, include in larger single Interpretive Centre with Visitor Centre incorporating the equivalent Terrestrial aspects.</p> <p>Require cash-in-lieu contributions to construction / upgrading of public car parks in vicinity and particularly POS area and Boat Trailer car parks in lieu of provision of on-site parking.</p> <p>Identify site boundaries in association with Department of Planning (DP) and State Land Services (SLS) and reserve appropriately with power to lease.</p> <p>Following completion of site definition prepare Detailed Local Structure Plan of site as basis for future subdivision, land and seabed leases and development approvals. Advertise Detailed Local Structure Plan for public comment for a minimum 28 days. Assess comments received and finalise for adoption by Council and WA Planning Commission.</p>
	<p>Rezone site under new Kalbarri Planning Scheme to Special Use Zone - Tourist Commercial and related provisions including an Interpretation of Tourist Commercial – minimum 42 day public advertising during rezoning period.</p> <p>Development to be subject to :</p> <ul style="list-style-type: none"> <li>▫ Approval by Council and WA Planning Commission of a Detailed Local Structure Plan of site and minimum 28 day public advertising period; and</li> <li>▫ Approval to Commence Development including condition requiring payment of cash-in-lieu for parking prior to issue of a Building Licence.</li> </ul>
<b>A2</b>	<b>Mixed Use Local Centre :</b>



	<p>Local Centre comprising :</p> <p>Ground Floor : Bistro / Coffee Shop / Outdoor Eating, Liquor Store, Delicatessen; and</p> <p>Upper Floors : Residential Apartments – permanent or short stay – to maximum R80 Density.</p> <p>Allow up to three storeys and reduced street setbacks to encourage “main street” frontage and high public interaction with street and Fisherman’s Wharf and POS area opposite.</p> <p>Require resident parking only on-site. Require cash-in-lieu contributions to construction / upgrading of public carparks and specifically POS area and Boat Trailer Carparks in lieu of provision of on-site parking for commercial uses.</p>
	<p>Following receipt of an acceptable development proposal and <i>prior to initiating re-zoning procedures</i>, undertake 42 day public pre-consultation period to allow Kalbarri community to comment on development proposal. Assess comments received and finalise development proposal with Applicant for initiation of formal re-zoning / Scheme Amendment procedures to Special Use Zone.</p> <p>Rezone site under new Kalbarri Planning Scheme to Special Use Zone – Local Centre including description of permissible uses and reference to Adopted Site Plan – minimum 42 day public advertising during rezoning period.</p> <p>Approval subject to Approval to Commence Development including condition requiring payment of cash-in-lieu for parking prior to issue of a Building Licence.</p>
<p><b>A3</b></p>	<p><b>Caravan &amp; Camping Park :</b></p> <p>Retain existing Caravan and Camping Park through specific zoning.</p> <p>Include the site in new Kalbarri Planning Scheme as Special Use Zone – Caravan &amp; Camping Park.</p>
<p><b>A4</b></p>	<p><b>Tourist Resort :</b></p> <p>Retain site for development of single large or two smaller tourist Resorts to a maximum density of R60. Two storey building height limit.</p> <p>Require on-site management and high level of facilities including adventure playground area, half courts tennis and basketball, pool / water playground and covered BBQ areas.</p> <p>Require 10m wide pedestrian easement (A6) through site from river to Clotworthy Street to provide pedestrian access to Anchorage precinct for residents and tourists in “Old Kalbarri” and GC4 – Budget Tourist Accommodation. Secure northern portion of pedestrian easement from Youth Centre &amp; Campsite (A5).</p>
	<p>Include the site in new Kalbarri Planning Scheme as Tourist Accommodation.</p>

	<p>Development to be subject to :</p> <ul style="list-style-type: none"> <li>▫ Detailed Flora &amp; Fauna assessment;</li> <li>▫ Native Title clearance and Aboriginal Heritage assessment;</li> <li>▫ Approval by Council of a Detailed Local Structure Plan of site and minimum 28 day public advertising period; and</li> <li>▫ Approval to Commence Development.</li> </ul>
<b>A5</b>	<p><b>Youth Centre &amp; Campsite :</b></p> <p>Retain site for future development as a long term Youth Centre and Camp particularly for school and service / community based groups incorporating dormitory style accommodation and communal kitchen / dining facilities in addition to camping areas and outdoor facilities and recreational areas.</p> <p>Require as condition of approval of future development plans the provision of a 10m wide pedestrian easement (A6) over the western portion of the lot to provide pedestrian access from Clotworthy Street and Tourist Resort (A4) to the south to River Frontage.</p>
	<p>Include the site in new Kalbarri Planning Scheme as Special Use Zone – Youth Centre &amp; Campsite.</p> <p>Development to be subject to :</p> <ul style="list-style-type: none"> <li>▫ Approval by Council of a Detailed Local Structure Plan of site and minimum 28 day public advertising period; and</li> <li>▫ Approval to Commence Development.</li> </ul>
<b>A6</b>	<p><b>Access Path :</b></p> <p>Minimum 10m wide landscaped and lit access path from Clotworthy Street through Tourist Resort (A4) and Youth Centre (A5) to River Foreshore and Local Centre. Ensure visual surveillance of path from neighbouring developments.</p>
<b>A7</b>	<p><b>Boat Launching Ramps :</b></p> <p>Two boat launching ramps and retrieval jetty to service boat users along northern River and to absorb any increase in demand for launching facilities at western River Foreshore ramps.</p> <p>In the design and construction of the ramps and adjacent trailer parking area, allow for up to four ramps in the event that longer term demand requires additional launching facilities.</p> <p>Limit western River Foreshore boat ramps to two ramps only and associated parking at western River Foreshore boat launching facility as any increase in ramp numbers at this location and associated trailer parking will severely impinge on the usable foreshore area to the detriment of broader resident and tourist needs as well as present a major eyesore.</p>
<b>A8</b>	<p><b>Boat Trailer Parking :</b></p>

	<p>Amend vesting of site with Council for Community Purposes including parking for Boat Trailer associated with adjacent boat ramps. Identify an area within the eastern portion of the site for sub-leasing for the development of secured and monitored boat parking to encourage visitors to refrain from trailering boats on a daily basis.</p> <p>Develop the water frontage of the boat trailer parking area with a "hard" edge to facilitate line fishing. Consider inclusion of a small grassed area and shade / picnic table adjacent to foreshore fishing area for use by family groups.</p>
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PRECINCT	RIVER RESIDENTIAL
<b>Objective</b>	<i>To develop a quality residential estate of mixed density, capitalising on the general northerly orientation of the site and the extensive views of the Murchison River.</i>
<b>Precinct Planning</b>	Prepare Foreshore Management Plan contiguous with Precinct addressing rehabilitation of degraded areas and providing discreet activity nodes at appropriate locations. Facilitate pedestrian / cyclist movement along foreshore linking with Anchorage Precinct and from adjacent River Residential Precinct to River foreshore.
	<b>Use &amp; Development Provisions</b>
	<p><b>Low Density Mixed Residential Estate :</b></p> <p>Subdivision and development to be subject to :</p> <ul style="list-style-type: none"> <li>▫ Environmental assessment including detailed Flora &amp; Fauna assessment and identification and ceding of an appropriate River Foreshore Reserve;</li> <li>▫ Native Title clearance and Aboriginal Heritage assessment; and</li> <li>▫ Approval by Council and the WA Planning Commission of a Detailed Local Structure Plan of Precinct providing for a range of lot sizes and residential opportunities ranging from R12.5 to R30. Minimum 28 day public advertising period for Local Structure Plan.</li> </ul>
	<p>All lots of 500m<sup>2</sup> or greater shall be subject of a minimum lot width of 17m and a minimum side setback to one side of 3m to facilitate the parking in the rear yard of recreational vehicles.</p> <p>Two storey building height limit.</p> <p>All development to be subject to Climate and Landscape Design Guidelines.</p>
	<p>Include in new Kalbarri Planning Scheme Text provisions for a "Residential Development" Zone and associated Local Area and Detailed Local Structure Plan provisions as a pre-condition to subdivision and development approvals.</p> <p>Ensure that any proposed tourist sites within Precinct are identified on Detailed Local Structure Plan, including type of accommodation and density.</p>

	<p>Following receipt of an acceptable Detailed Local Structure Plan rezone site under new Kalbarri Planning Scheme to include the land east of Anchorage Lane in the Residential Development Zone – minimum 42 day public advertising during rezoning period.</p>
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PRECINCT	GOLF COURSE ESTATE
<b>Objective</b>	<i>To facilitate the subdivision and development of a mixed density residential estate capitalising on the views available into the adjacent Golf Course.</i>
	<b>Use &amp; Development Provisions</b>
	<p><b>Low Density Mixed Residential Estate :</b></p> <p>Subdivision and development to be subject to :</p> <ul style="list-style-type: none"> <li>▫ Environmental assessment including detailed Flora &amp; Fauna assessment;</li> <li>▫ Aboriginal Heritage assessment; and</li> <li>▫ Approval by Council and the WA Planning Commission of a Detailed Local Structure Plan of Precinct providing for a range of lot sizes and residential opportunities ranging from R12.5 to R30. Minimum 28 day public advertising period for Local Structure Plan.</li> </ul> <p>Encourage high level of visual and physical integration between estate and Golf Course.</p>
	<p>All lots of 500m<sup>2</sup> or greater shall be subject of a minimum lot width of 17m and a minimum side setback to one side of 3m to facilitate the parking in the rear yard of recreational vehicles.</p> <p>Two storey building height limit.</p> <p>All development to be subject to Climate and Landscape Design Guidelines.</p>
	<p>Include in new Kalbarri Planning Scheme Text provisions for a "Residential Development" Zone and associated Local Area and Detailed Local Structure Plan provisions as a pre-condition to subdivision and development approvals.</p> <p>Ensure that any proposed tourist sites within Precinct are identified on Local Structure Plan, including type of accommodation and density.</p> <p>Following receipt of an acceptable Detailed Local Structure Plan rezone site under new Kalbarri Planning Scheme to include the land in the Residential Development Zone – minimum 42 day public advertising during rezoning period.</p>

PRECINCT	GOLF & BOWLING CLUB
<b>Objective</b>	<i>To provide limited permanent and short stay residential opportunities adjacent to the golf course.</i>
<b>Precinct Planning</b>	<p>In consultation with EPA, DEC, MRWA , DP and SLS design, reserve and construct an outer route for Nanda Drive.</p> <p>Identify and create freehold lots for Planning Areas GC1 And GC2.</p>
<b>Planning Area</b>	<b>Use &amp; Development Provisions</b>
<b>GC1</b>	<p><b>Medium Density Residential :</b></p> <p>Development to be subject to :</p> <ul style="list-style-type: none"> <li>▫ Resolution and dedication of Nanda Drive Outer Route (GC3);</li> <li>▫ Relocation of Tennis / Basketball Courts to Sports and Recreation Centre;</li> <li>▫ Detailed Flora &amp; Fauna assessment;</li> <li>▫ Native Title clearance and Aboriginal Heritage assessment;</li> <li>▫ Approval by Council of a Detailed Local Structure Plan of site providing for permanent residential opportunities only at an overall density of R40. Minimum 28 day public advertising period for Detailed Local Structure Plan; and</li> <li>▫ Approval to Commence Development.</li> </ul> <p>Retain land comprising existing Tennis and Basketball / Netball courts in Golf Course site for future facility development following provision of new courts in Sports &amp; Recreation Centre Precinct.</p> <p>Cost of relocation of existing Tennis and Basketball / Netball courts to be funded through proceeds of sale / development of site.</p>
	<p>Limit access to site via Haselby Street and portion of former Nanda Drive Reserve – cost of construction of site access to be condition of Approval to Commence Development.</p> <p>Two storey building height limit.</p> <p>All development to be subject to Climate and Landscape Design Guidelines.</p>
	<p>Following site definition and receipt of an acceptable Detailed Local Structure Plan rezone site under new Kalbarri Planning Scheme to Residential R40 – minimum 42 day public advertising during rezoning period.</p>
<b>GC2</b>	<p><b>Mixed Use Medium Density Residential :</b></p> <p>Development to be subject to :</p> <ul style="list-style-type: none"> <li>▫ Resolution and dedication of Nanda Drive Outer Route (GC3);</li> </ul>

	<ul style="list-style-type: none"> <li>▫ Detailed Flora &amp; Fauna Assessment;</li> <li>▫ Native Title clearance and Aboriginal Heritage assessment; and</li> <li>▫ Approval by Council of a Detailed Local Structure Plan of site providing for a mix of permanent and short stay residential opportunities at an overall density of R40. Minimum 28 day public advertising period for Detailed Local Structure Plan; and</li> <li>▫ Approval to Commence Development.</li> </ul> <p>Cost of relocation of existing Tennis and Basketball / Netball courts to be funded through proceeds of sale / development of site.</p>
	<p>Limit access to site via Haselby Street and portion of former Nanda Drive Reserve – cost of construction of site access to be condition of Approval to Commence Development.</p> <p>Two storey building height limit.</p> <p>All development to be subject to Climate and Landscape Design Guidelines.</p>
	<p>Following site definition and receipt of an acceptable Detailed Local Structure Plan rezone site under new Kalbarri Planning Scheme to Residential R40 with Additional Use of Short Stay Accommodation – minimum 42 day public advertising during rezoning period.</p>
<b>GC3</b>	<p><b>Nanda Drive – Outer Route :</b></p> <p>Relocate the northern portion of Nanda Drive to an outer route skirting the western edge of the National Park and turning to the west, then south of the Golf Course on an alignment east of the Western Power solar demonstration site.</p> <p>Initiate processes for dedication of road reserve including :</p> <ul style="list-style-type: none"> <li>▫ Detailed Flora &amp; Fauna Assessment;</li> <li>▫ Native Title clearance and Aboriginal Heritage assessment;</li> <li>▫ Excision of road reserve from A Class Reserve; and</li> </ul> <p>Reservation under new Kalbarri Planning Scheme as Major Road.</p>
<b>GC4</b>	<p><b>Budget Tourist Accommodation :</b></p> <p>Budget family short stay accommodation comprising basic chalet &amp; cabin style accommodation using low cost construction techniques and materials – eg pre-fabricated / transportable / semi-demountable style of construction. R80 Density as guideline but allow higher density to facilitate low cost accommodation. Single storey unless otherwise justified on cost control grounds.</p> <p>Require minimum on-site facilities of covered BBQ area, basic pool and basic recreation room.</p>

	<p>Development to be subject to :</p> <ul style="list-style-type: none"> <li>▫ Detailed Flora &amp; Fauna Assessment;</li> <li>▫ Native Title clearance over former Nanada Drive alignment and Aboriginal Heritage assessment; and</li> <li>▫ Approval by Council of a Detailed Local Structure Plan of site providing for short stay residential opportunities at an overall density of R80. Minimum 28 day public advertising period for Detailed Local Structure Plan; and</li> <li>▫ Approval to Commence Development.</li> </ul>
	<p>Two storey building height limit.</p> <p>Apply Climate and Landscape Design Guidelines as appropriate for site and short stay accommodation.</p>
	<p>Following receipt of an acceptable Detailed Local Structure Plan rezone site under new Kalbarri Planning Scheme to Special Use Zone – Chalet &amp; Cabin Park – minimum 42 day public advertising during rezoning period.</p>

<b>PRECINCT</b>	<b>OLD KALBARRI</b>
<b><i>Objective</i></b>	<i>To facilitate the sensitive, broad scale residential re-development of the older residential portion of Kalbarri while retaining the landscape ambience and protecting the residential amenity of the area from the intrusive impacts of random short stay accommodation.</i>
<b><i>Precinct Planning</i></b>	In consultation with EPA, DEC, MRWA , DP and SLS design, reserve and construct an outer route for Nanda Drive.
<b><i>Planning Area</i></b>	<b><i>Use &amp; Development Provisions</i></b>
	<p><b>Residential Infill :</b></p> <p>The precinct is currently coded R30 and comprises predominantly lots in the range of 800m2 to 850m2 for the most part, of framed construction in average to poor condition. Most lots contain mature trees, which while being predominantly eucalypts also include numerous large Poincianas.</p> <p>The western most edge of the precinct comprises larger lots typically of 1,000m2 currently coded R50.</p> <p>An R12.5 / R30 coding will allow quality redevelopment while facilitating the retention of the mature vegetation which has both high landscape amenity values as well as providing considerable relief from the prevailing on-shore winds.</p> <p>Allowance of the R30 coding is subject to demolition of existing framed construction and the retention of mature vegetation on the site. Where necessary, setback and design concessions should be provided to ensure retention of mature vegetation.</p>

	<p>Two Storey height limit.</p> <p>All development to be subject to Climate and Landscape Design Guidelines.</p>
	<p>Include the lots from Smith Street east to the former Nanda Drive alignment in new Kalbarri Planning Scheme as Residential R12.5 / R30.</p> <p>Include provisions in new Kalbarri Planning Scheme Text to require demolition of the existing fibro residence and retention of mature trees nominated by Council in the granting of the higher R30 coding.</p> <p>In the Zoning Table of the new Kalbarri Planning Scheme, identify short stay accommodation within the precinct as an "SA" Use requiring Council approval and public comment to respect the amenity of surrounding residents.</p> <p>Residential development at greater than R12.5 and / or development for short stay accommodation irrespective of density to be subject to Approval to Commence Development.</p>

PRECINCT	MIXED RESIDENTIAL
<b>Objective</b>	<i>To enable the provision of medium density accommodation for either permanent or short stay occupation in a managed, mixed residential environment within close proximity of the Town Centre and River Foreshore so as to maintain the compactness and walkability of the Kalbarri Townsite.</i>
<b>Planning Area</b>	<b>Use &amp; Development Provisions</b>
<b>MR</b>	<p><b>Mixed Residential :</b></p> <p>Amend density coding to R50 / R60 to encourage re-development of existing sites for short stay accommodation.</p> <p>Residential development for permanent occupation limited to maximum density of R50. Two storey height limit.</p> <p>Allowance of R60 coding for tourist accommodation for short stay only and subject to:</p> <ul style="list-style-type: none"> <li>▫ Amalgamation to a minimum site area of 2,000m<sup>2</sup>.</li> <li>▫ Encouragement of on-site manager through exclusion of manager's residence from density calculation.</li> <li>▫ Minimum on-site facilities of covered BBQ area and pool of all developments.</li> <li>▫ Two storey height limit.</li> </ul> <p>Where necessary, setback and design concessions should be provided to residential and short stay developments to ensure retention of mature vegetation nominated by Council.</p>
	Zone the area Mixed Residential R50 / R60 in new Kalbarri Planning Scheme.



	<p>Include in new Kalbarri Planning Scheme Text provisions in respect of allowance of R60 coding for 2,000+m2 sites, exclusion of Manager's Residence from density calculations, minimum on-site facilities and preservation of mature vegetation.</p> <p>Development to be subject to Approval to Commence Development.</p>
<p><b>C1</b></p>	<p><b>Tourist Commercial :</b></p> <p>As for Mixed Residential (MR); and</p> <ul style="list-style-type: none"> <li>▫ C1 provisions apply only to Tourist Short Stay developments.</li> <li>▫ In addition to short stay accommodation provisions of MR, encourage ground floor tourist commercial activities within short stay developments including tourist retail, tourist services, tourist entertainment, cafés / coffee shops / fast food outlets and family restaurants.</li> <li>▫ Provide plot ratio concessions through exclusion of tourist commercial floorspace from short stay residential plot ratio.</li> <li>▫ Require parking for short stay units only on-site. Require cash-in-lieu contributions to construction / upgrading of public carparks in the vicinity in lieu of provision of on-site parking for commercial uses.</li> <li>▫ Two storey height limit.</li> </ul>
	<p>Zone the area Mixed Residential R50 / R60 in new Kalbarri Planning Scheme.</p> <p>Include in new Kalbarri Planning Scheme Text provisions in respect of allowance of R60 coding for 2,000+m2 sites, exclusion of Manager's Residence from density calculations, exclusion of ground floor commercial from plot ratio calculations, parking concession and cash in lieu, minimum on-site facilities and preservation of mature vegetation.</p> <p>Include in new Kalbarri Planning Scheme an "Additional Use – Tourist Commercial" Zone and related provisions including an Interpretation of Tourist Commercial.</p> <p>Apply Additional Use – Tourist Commercial to the area in new Kalbarri Planning Scheme.</p> <p>Development to be subject to Approval to Commence Development including condition requiring payment of cash-in-lieu for parking prior to issue of a Building Licence.</p>
<p><b>C2</b></p>	<p><b>Local Service Shop :</b></p> <p>As for Mixed Residential (MR); and</p> <ul style="list-style-type: none"> <li>▫ Increase permissible density to R60 contingent upon re-development of site for predominantly short stay accommodation and a Local Service Shop to service the northern portion of the Mixed Residential precinct.</li> <li>▫ Encourage provision of ground floor local convenience facility (Local Service Shop) of 100m2 net of storage and toilets comprising delicatessen, café / coffee shop/ alfresco area through plot ratio concessions by exclusion of</li> </ul>

	<p>Local Service Shop from short stay residential plot ratio calculations.</p> <ul style="list-style-type: none"> <li>▫ Require parking for short stay units only on-site. Require cash-in-lieu contributions to construction / upgrading of public carparks in the vicinity in lieu of provision of on-site parking for commercial uses.</li> <li>▫ Two storey height limit except for frontage to Grey Street which may increase to three storeys over 50% of the frontage but only if a Local Service Shop is included in the development proposal so as to accommodate ground floor convenience facility (Local Service Shop).</li> </ul>
	<p>Zone the site Mixed Residential R50 / R60 in new Kalbarri Planning Scheme.</p> <p>Include in new Kalbarri Planning Scheme Text provisions to require that R60 density and three storey development is contingent on short stay and inclusion of Local Service Shop and public advertising. Exclude Manager’s Residence from density calculations and Local Service Shop from plot ratio calculations. Require minimum on-site facilities as for MR.</p> <p>Include in new Kalbarri Planning Scheme Text provisions to introduce an “Additional Use – Local Service Shop” Zone and related provisions including an Interpretation of Local Service Shop.</p> <p>Apply Additional Use – Local Service Shop to the site in new Kalbarri Planning Scheme.</p> <p>Following receipt of an acceptable short stay development proposal incorporating a Local Service Shop undertake 42 day public consultation period to allow Kalbarri community to comment on development proposal. Assess comments received and finalise development proposal with Applicant.</p> <p>Development to be subject to Approval to Commence Development including condition requiring payment of cash-in-lieu for parking prior to issue of a Building Licence.</p>

<b>PRECINCT</b>	<b>TOWN CENTRE</b>
<b><i>Objective</i></b>	<i>To develop a distinctive Town Centre that provides for the broad range of needs of both residents and visitors in a safe and pedestrian friendly, family oriented environment.</i>
<b><i>Precinct Planning</i></b>	<p>Prepare Detailed Local Structure Plan for Grey Street Mall and Diversion addressing staging scenarios, land requirements and broad landscape / land use concepts for Mall in consultation with landowners and Kalbarri Community.</p> <p>Review existing River Foreshore Management Plan to “upgrade” the level of facilities along Foreshore between Grey and Porter Streets so that the section becomes the principal focal point along the Foreshore.</p> <p>Consider inclusion of BBQ / picnic facilities with shaded tables and seating, small water play features and “natural” amphitheatre for small concerts and community events.</p>

<b><i>Planning Area</i></b>	<b><i>Use &amp; Development Provisions</i></b>
<b>GSM / GSD</b>	<p><b>Grey Street Mall &amp; Diversion :</b></p> <p>The KTS proposes the eventual closure of Grey Street between Porter and Woods Street and its development into a broad pedestrian mall contiguous with the primary tourist and accommodation sites. The mall is proposed to be retained ultimately within a reduced public access reserve thereby ensuring its continued vesting and use as a public area.</p> <p>It is accepted that Grey Street presently provides a most attractive scenic drive.</p> <p>However, developed properly as a vibrant pedestrian precinct integrating with the River foreshore, the concept of a pedestrian mall in this location has the clear potential to be a far greater and more valuable asset and attraction of Kalbarri than the current scenic drive values.</p> <p>Current traffic numbers are in the order of 3,000 vehicles per day (vpd) along this section in off peak periods, increasing to an estimated 5,000 vpd during peak tourist times. There are currently anecdotal references to the difficulty in crossing Grey Street in peak visitor periods. It is only a matter of time under current conditions before a serious injury or fatality occurs.</p> <p>The KTS projects a resident population of 5,000 persons and 10,000 visitors over a 25 year period based on current growth rates. Projected visitor numbers exclude tourists utilising private housing within Kalbarri which on current ratios could add up to a further 5,000 visitors.</p> <p>Under this scenario, traffic volumes along this portion of Grey Street will increase to in excess of 10,000 to 12,000 vehicles per day.</p> <p>Under these traffic conditions, Grey Street will no longer be an "attractive scenic drive", more likely a pedestrian "nightmare" and the risk of serious accidents involving injury or fatality will be acute.</p> <p>This portion of Grey street is currently, and will become increasingly so, the most important portion of Grey Street and River foreshore from a resident and visitor perspective.</p> <p>The KTS proposes that tourist accommodation and tourist and resident services be generally centralised within and adjoining this precinct to the north and south. Moreover, in recognition of the environmental values of Kalbarri and the projected population and visitation increases, the KTS deliberately seeks to discourage unnecessary vehicle use by visitors in particular by concentrating visitor accommodation and activity in and around the Town Centre precinct.</p> <p>Additionally, it is necessary to challenge the legitimacy of the claim that closure of this portion of Grey Street will seriously impact on tourists' decision to come to Kalbarri. Certainly, on arrival, the drive along Grey Street is currently very pleasant and relaxing. Beyond the arrival experience, it is more likely that visitors spend more of their time walking up and down Grey Street and adjacent foreshore to admire the view and access facilities and services</p> <p>Diversion of traffic from this section of Grey Street could result in increased traffic along Mortimer Street but less so Smith Street. Mortimer will in any</p>

	<p>case experience increased traffic through increased tourist accommodation.</p> <p>The KTS does not envisage the need for closure in the near future, nor does the KTS promote such. Consideration of closure should ultimately be driven by traffic, safety and pedestrian / foreshore amenity considerations.</p> <p>It is likely that various traffic calming / pedestrian crossing measures would be progressively required in the interim period as traffic volumes increase. Detail planning and criteria for consideration of the timing of any closure should be addressed as part of detailed planning for the Town Centre precinct.</p> <p>The closure of Grey Street was initially identified as a direction and subsequently discussed at the Public Workshops and supported.</p>
	<p>Plan for possible future closure of Grey Street between Woods and Porter Street to manage future traffic growth and pedestrian safety and amenity within Town Centre Precinct.</p> <p>Plan for replacement of north / south vehicular link along new alignment between Town Centre Precinct and Sports and Recreation Precinct – refer Town Centre Concept Plan.</p> <p>Initially, consider and implement appropriate traffic calming measures including raised pedestrian crossings and partial closure as traffic volumes increase. Assess on on-going basis continuing effectiveness of traffic calming measures implemented prior to consideration of full closure.</p> <p>Closure of Grey Street may have to be staged, depending on TC sites to be developed first, requiring temporary access arrangements. If TC1 and TC2 develop ahead of TC3, provide temporary connection to Woods Street through western portion of TC5a.</p> <p>Retain western 20m of Grey Street reserve and, if closed to general vehicular traffic, amend reservation purpose to PAW to maintain differentiation and delineation between private land and public River Foreshore. Amalgamate eastern portions of road reserve into adjacent lots in exchange for Gabba Gabba Creek Reserve and Smith Street extension (refer GGC).</p> <p>Following partial or full closure, develop entire closed length as pedestrian boulevard / mall with strong links from tourist accommodation and commercial development on the east side of Grey Street across to the River Foreshore area. Develop as major pedestrian precinct with shade structures, seating, ornamental shade trees and public art. Encourage buskers and street entertainers.</p> <p>Allow alfresco dining areas from adjacent eateries in TC1 to TC3 inclusive to encroach into pedestrian boulevard up to a maximum of 5m for no more than the equivalent of 30% of the frontage length of the parent superlot – contain alfresco dining areas associated with adjacent commercial with low height, decorative containment “fencing” and planting.</p> <p>If Grey Street closed to general vehicular traffic, Rezone site under new Kalbarri Planning Scheme to Reserve Grey Street diversion link as Major Road and western 20m of Grey Street reserve as Public Purposes reserves.</p>

<p><b>GGC</b></p>	<p><b>Gabba Gabba Creek :</b></p> <p>Excise Gabba Gabba Creek environs from adjacent private lots to the west free-of-cost as part of conditions of rezoning and development approval of Lots within TC1 to TC3 inclusive. Reserve for Recreation and Conservation following ceding of land.</p> <p>Rehabilitate and re-vegetate creek and limit public access to creek area by construction of boardwalk crossings at appropriate locations. Strong pedestrian link / boardwalk bridge required from Public Car Parks east of Gabba Gabba Creek to Town Square area of TC2 with possibility of minor crossing link required to Resort Hotel at TC1.</p> <p>Excise as separate reserve for Recreation and Conservation from Sports and Recreation Reserve.</p> <p>Include in new Kalbarri Planning Scheme to incorporate Gabba Gabba Creek environs as Conservation Area.</p>
	<p><b>Building Height – Town Centre</b></p> <p>The KTS proposes three and four storey height limits for the following three principal tourist sites on Grey Street between Woods and Porter Streets.</p> <p>The two main resort sites being the current Murchison Caravan Park and Tavern sites are proposed for a maximum four storey height limit and the tourist accommodation / services sites in between for a two to three storey limit.</p> <p>The KTS also proposes that the commercial centre opposite the Fishing boat wharf also be permitted to a maximum of three storeys.</p> <p>The KTS further requires for all the above sites that following receipt of plans acceptable to Council and <u>prior to initiation of rezoning procedures</u>, pre-consultation be undertaken with the Kalbarri community for 42 days to obtain further input to the proposals.</p> <p>The area between Woods and Porter Streets is backed by Gabba Gabba Creek which is to be retained within open space / conservation reserve, beyond which lies the Kalbarri Sports and Recreation Ground.</p> <p>Accordingly, four storey development in this location would not impede views from nor cast shadow on any residential properties to the east. Four storey development would cast early morning shadow to the west. Shadow diagrams should be prepared by the proponent as part of pre-consultation documentation.</p> <p>The KTS proposes the allowance of higher building limits on these sites in order to encourage their redevelopment with quality resort facilities for the benefit not only of visitors but residents also including expanded range of food and beverage facilities, convention and function facilities. The KTS also requires that these developments maintain a "main street" frontage with al fresco food and beverage services and tourist retail facilities which would remain available at all times to the broader public.</p> <p>It is considered that without the "bonuses" provided by the higher building limits proposed, the viability of re-development of these sites would be, at best, questionable as would the ability to provide the range of visitor and</p>

	<p>resident facilities required for the sites.</p> <p>This issue was canvassed at some length during the Community Workshops and examples of buildings of three and four storeys displayed. The Workshops supported the proposed height limits on these sites, recognising that they would not impact on any residential properties to the immediate east and that the incentive provided would encourage the standard of development sought.</p>
<p><b>TC1</b></p>	<p><b>Four Star Resort Hotel :</b></p> <p>Four Star Resort Hotel – Icon Building – No density restriction &amp; no setback specifications.</p> <p>Four Storey building height limit.</p> <p>Require full range of facilities including bistro, quality restaurant, moderate size convention and function facilities, bar, pool, day spa &amp; gymnasium.</p> <p>Encourage “main street” frontage to pedestrian boulevard including food &amp; beverage services and quality tourist retail to Porter Street, integrating with Retail centre on south side.</p> <p>Require parking for short stay units and key staff only on-site. Require cash-in-lieu contributions to construction / upgrading of public carparks in the vicinity in lieu of provision of on-site parking for commercial uses.</p> <p>Allow 25% permanent residential component to encourage re-development and defray development costs.</p> <p>Require provision of rear service access to TC1 site from Porter Street and extension of rear service access to facilitate servicing of TC2.</p>
	<p>Following receipt of an acceptable development proposal/s and <i>prior to initiating re-zoning procedures</i>, undertake 42 day public pre-consultation period to allow Kalbarri community to comment on development proposal. Assess comments received and finalise development proposal with Applicant for initiation of formal re-zoning / Scheme Amendment procedures to Special Use Zone.</p> <p>Rezone site under new Kalbarri Planning Scheme to zone site and eastern portion of Grey Street road reserve to Special Use Zone – Resort Hotel including description of permissible uses and key development criteria – minimum 42 day public advertising during rezoning period.</p>
<p><b>TC2</b></p>	<p><b>Mixed Use Tourist Commercial &amp; Accommodation :</b></p> <p>Mixed development – Ground Floor tourist commercial and tourist services including food &amp; beverage outlets, fast food / food hall, café / bistro / restaurants, wine bar / small tavern, tourist entertainment, tourist retail and tourist services - Upper Floors provide a mix of tourist accommodation from self-contained apartments to more budget, studio styled accommodation.</p> <p>No density restriction &amp; no setback specifications. Design and architecture to visually and physically link sites TC1 and TC3.</p> <p>Two Storey building height limit to pedestrian boulevard along western site frontage – Three Storey building height limit to side and rear of site.</p>

	<p>Development to focus around strong public Town Square with strong pedestrian links to Public Carparks to east of Creek and River Foreshore.</p> <p>Encourage "main street" frontage to pedestrian boulevarde including food &amp; beverage services and tourist retail.</p> <p>Prohibit piecemeal development of individual lots.</p> <p>Require parking for short stay units and key staff only on-site. Require cash-in-lieu contributions to construction / upgrading of public carparks in the vicinity in lieu of provision of on-site parking for commercial uses.</p> <p>Allow up to 25% permanent residential component to encourage re-development and defray development costs.</p> <p>Rear servicing access through TC1 as condition of approval of TC1 development.</p>
	<p>Following receipt of an acceptable development proposal/s and <i>prior to initiating re-zoning procedures</i>, undertake 42 day public pre-consultation period to allow Kalbarri community to comment on development proposal. Assess comments received and finalise development proposal with Applicant for initiation of formal re-zoning / Scheme Amendment procedures to Special Use Zone.</p> <p>Rezone site under new Kalbarri Planning Scheme to zone site and eastern portion of Grey Street road reserve to Special Use Zone – Tourist Development including description of permissible uses and key development criteria – minimum 42 day public advertising during rezoning period.</p>
<p><b>TC3</b></p>	<p><b>Four Star Family Resort Club :</b></p> <p>Four Star Family Resort Club – Icon building. – Moderate cost "Club Med" style of family resort providing a "whole of family" holiday experience with "Kids Club" providing organised activities for children day &amp; evening both on-site and utilising where possible existing tourist attractions, tours and services.</p> <p>No density restriction &amp; no setback specifications to Grey Street. Minimum setback of 3m to Woods Street.</p> <p>Four Storey building height limit.</p> <p>Require granting of 20m road reserve for extension of Mortimer Street to Grey Street diversion free-of-cost as part of conditions of rezoning and development approval of TC3.</p> <p>Require a high level of outdoor recreation facilities including adventure playground area, half courts tennis and basketball, pool / water play area together with on-site wine bar and family based food facilities / eateries, covered BBQ areas.</p> <p>Encourage "main street" frontage to pedestrian boulevarde including food &amp; beverage services and tourist retail.</p> <p>Require parking for short stay units and key staff only on-site. Require cash-in-lieu contributions to construction / upgrading of public carparks in the vicinity in lieu of provision of on-site parking for commercial uses.</p> <p>Allow up to 25% permanent residential component to encourage re-development</p>

	and defray development costs.
	<p>Following receipt of an acceptable development proposal/s and <i>prior to initiating re-zoning procedures</i>, undertake 42 day public pre-consultation period to allow Kalbarri community to comment on development proposal. Assess comments received and finalise development proposal with Applicant for initiation of formal re-zoning / Scheme Amendment procedures to Special Use Zone.</p> <p>Rezone site under new Kalbarri Planning Scheme to zone site and eastern portion of Grey Street road reserve to Special Use Zone – Family Resort Hotel including description of permissible uses and key development criteria – minimum 42 day public advertising during rezoning period.</p>
<b>TC4</b>	<p><b>Tourist Information &amp; Interpretive Centre</b></p> <p>Visitor Centre – Icon Building, located on primary entry road to Kalbarri Townsite.</p> <p>Incorporate Terrestrial Interpretive Centre (physical, flora &amp; fauna, Aboriginal history &amp; heritage, European history of broader Northampton district).</p> <p>If Marine Interpretive Centre not included as part of Fisherman’s Wharf development in Anchorage Precinct, then incorporate as part of expanded Interpretive Centre (Physical, European &amp; Aboriginal use, Marine Flora &amp; Fauna, Sea Horse Centre).</p>
	Rezone site under new Kalbarri Planning Scheme to Public Purpose Reserve – Tourism.
<b>TC5a &amp; 5b</b>	<p><b>Caravan and Chalet / Cabin Park :</b></p> <p>Replacement for existing Grey Street Caravan Park. Tourist Caravan Park (5a) &amp; Chalet / Cabin Park (5b) to be developed and operated by a single entity with on-site operator / manager providing for a range of mobile and lower cost / budget level accommodation needs.</p> <p>No density restriction.</p> <p>Setback requirements of 3m heavily vegetated buffer to surrounding streets, and 5m heavily vegetated buffer to residential on northern boundary of Chalet / Cabin Park.</p> <p>Require minimum on-site facilities of covered BBQ area, pool and recreation room.</p> <p>Maintain public pedestrian access to Sports &amp; Recreation area between Caravan Park and Chalet Park along old Woods Street alignment.</p>
	<p>Include the site in new Kalbarri Planning Scheme as Special Use Zone – Caravan &amp; Camping Park and include description of permissible uses.</p> <p>Development to be subject to :</p> <ul style="list-style-type: none"> <li>▫ Detailed Flora &amp; Fauna Assessment;</li> <li>▫ Aboriginal Heritage assessment and Native Title clearance; and</li> <li>▫ Approval by Council of a Detailed Local Structure Plan for Caravan / Chalet /</li> </ul>



	<p>Cabin Park. Minimum 28 day public advertising period for Detailed Local Structure Plan; and</p> <ul style="list-style-type: none"> <li>▫ Approval to Commence Development.</li> </ul>
<b>TC6</b>	<p><b>Sports &amp; Recreation Precinct :</b></p> <p>Retain Sports and Recreation grounds as primary open space area to Kalbarri.</p> <p>Modify sports oval to accommodate Gabba Gabba Creek Conservation Area and Grey Street diversion – refer Town Centre Concept Plan.</p> <p>Provide sealed parking areas as identified for Sports Ground and general Town Centre use.</p> <p>Rehabilitate and revegetate bushland in east &amp; north-east as flora conservation area and faunal link to National Park.</p>
	<p>Include in new Kalbarri Planning Scheme to modify existing Reserve to reflect new reserve boundaries and requirements. Identify Grey Street Diversion as Major Road.</p> <p>Development to be subject to :</p> <ul style="list-style-type: none"> <li>▫ Detailed Flora &amp; Fauna Assessment; and</li> <li>▫ Native Title clearance and Aboriginal Heritage assessment.</li> </ul>
<b>TC6a</b>	<p><b>Ball Courts :</b></p> <p>Construct new Public Tennis Courts and Basketball / Netball Courts to replace and better locate existing ageing courts adjacent to Golf &amp; Bowling Club.</p> <p>Cost of relocation of Tennis and Basketball / Netball courts to be funded through proceeds of sale / development of sites GC1 and GC2.</p>
<b>TC7a &amp; TC7b</b>	<p><b>Kalbarri Civic Centre &amp; Water Playground :</b></p> <p>New Civic &amp; Cultural Centre including relocated Shire Administration Offices, Library, Recreation &amp; Cultural Centre and outdoor Water Playground (TC7B).</p> <p>Development to be subject to :</p> <ul style="list-style-type: none"> <li>▫ Detailed Flora &amp; Fauna Assessment; and</li> <li>▫ Aboriginal Heritage assessment and Native Title clearance.</li> </ul> <p>Include the site in new Kalbarri Planning Scheme as Civic &amp; Cultural.</p>
<b>TC8</b>	<p><b>Worship Centre :</b></p> <p>Multi-denominational worship centre based on existing facilities.</p>
<b>TC9</b>	<p><b>Fauna Corridor :</b></p> <p>Reserve under Omnibus Amendment the area between Golf Course and Nanda Drive diversion as Reserve for Recreation and Conservation to provide fauna link</p>

	between National Park and Sports and Recreation Precinct.
<b>TC10</b>	<p><b>Budget Tourist Accommodation :</b></p> <p>Budget family short stay accommodation comprising basic chalet &amp; cabin style accommodation using low cost construction techniques and materials – eg pre-fabricated / transportable / semi-demountable style of construction. R80 Density as guideline but allow higher density to facilitate low cost accommodation. Single storey unless otherwise justified on cost control grounds.</p> <p>Require minimum on-site facilities of covered BBQ area, basic pool and basic recreation room.</p>
	<p>Development to be subject to :</p> <ul style="list-style-type: none"> <li>▫ Detailed Flora &amp; Fauna Assessment;</li> <li>▫ Native Title clearance and Aboriginal Heritage assessment; and</li> <li>▫ Approval by Council of a Detailed Local Structure Plan of site. Minimum 28 day public advertising period for Detailed Local Structure Plan; and</li> <li>▫ Approval to Commence Development.</li> </ul> <p>Following receipt of an acceptable Detailed Local Structure Plan rezone site under new Kalbarri Planning Scheme to Special Use Zone – Chalet &amp; Cabin Park – minimum 42 day public advertising during rezoning period.</p>
<b>TC11</b>	<p><b>Service Station / Roadhouse :</b></p> <p>Replacement site for existing BP Service Station on Clotworthy Street.</p> <p>Incorporate as part of service station operation or as separate but integrated service units for mechanical repairs, tyres, exhaust, auto-electrics.</p>
	<p>Development to be subject to :</p> <ul style="list-style-type: none"> <li>▫ Detailed Flora &amp; Fauna Assessment;</li> <li>▫ Native Title clearance and Aboriginal Heritage assessment;</li> <li>▫ Approval to Commence Development.</li> </ul> <p>Include the site in new Kalbarri Planning Scheme as Special Use Zone – Service Station &amp; Motor Vehicle Repairs and include description of permissible uses.</p>
<b>Existing Tourist Accommodation</b>	<p><b>Palm Resort :</b></p> <p>Encourage Palm Resort to progressively re-develop to R60 density.</p> <p>Ensure in any redevelopment, continuing on-site manager and minimum facilities of covered BBQ area, pool / water playground and on-site, lower key recreation facilities including playground.</p> <p>Two storey building height limit.</p> <p>Development to be subject to :</p>

	<ul style="list-style-type: none"> <li>▫ Detailed Local Structure Plan. Minimum 28 day public advertising period for Detailed Local Structure Plan; and</li> <li>▫ Approval to Commence Development.</li> </ul> <p>Include the site in new Kalbarri Planning Scheme as Tourist Accommodation with density of R60 and subject to Detailed Local Structure Plan.</p>
	<p><b>Tudor Caravan Park :</b></p> <p>Retain existing Caravan and Camping Park through specific zoning.</p> <p>Include the site in new Kalbarri Planning Scheme as Special Use Zone – Caravan &amp; Camping Park.</p>
	<p><b>Sun River Chalet Park :</b></p> <p>Assist retention of Sea View Chalet Park through specific zoning.</p> <p>Include the site in new Kalbarri Planning Scheme as Special Use Zone – Chalet &amp; Cabin Park and inclusion of permissible uses.</p>

PRECINCT	RETAIL
<b>Objective</b>	<i>To develop a dedicated &amp; integrated main street styled retail precinct providing for a broad range of convenience and comparison shopping requirements so as to minimise retail leakage while ensuring the centres vibrancy through integration with low cost short stay accommodation and the adjacent retirement village.</i>
<b>Planning Area</b>	<b>Use &amp; Development Provisions</b>
	<p><b>Mixed Use Retail Centre :</b></p> <p>District Level Retail Centre of approximately 7,500m<sup>2</sup> gla including 7 day family supermarket &amp; 7 day fresh, butcher, newsagent, chemist, clothing, hairdresser, comparison goods including white / electronic goods – Offices – Tavern – private Medical Centre. Require normal parking of retail &amp; office areas.</p> <p>Encourage “main street” style centre fronting Porter and Walker Streets and parking to the rear with high public use frontage to Porter Street.</p> <p>Allow studio / backpackers short stay above to encourage re-development and create vibrancy / surveillance of Centre. No density restriction. Allow reciprocal parking for short stay with retail floorspace. Two storey building height limit.</p> <p>Prohibit piecemeal development of individual lots – integrated design and development required.</p> <p>Close Hackney Street contiguous with retail site, incorporating any major underground services into easements as required.</p>
	Include in new Kalbarri Planning Scheme to zone the entire retail centre site to Commercial.

	<p>Development to be subject to :</p> <ul style="list-style-type: none"> <li>▫ Approval by Council of a Detailed Local Structure Plan providing for integration of the overall retail centre zoned land. Advertise for public comment for 28 days; and</li> <li>▫ Approval to Commence Development.</li> </ul>
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PRECINCT	EMERGENCY SERVICES
<b>Objective</b>	<i>To co-locate all emergency services to a location central to the Townsite with a high level of access.</i>
	<b><i>Use &amp; Development Provisions</i></b>
<b>ES1</b>	<p><b>FESA Depot :</b></p> <p>Retain FESA at the present site. Additional Fire Services to be located at Port Kalbarri.</p>
<b>ES2</b>	<p><b>Police Station :</b></p> <p>Construct new Police Station &amp; Courthouse complex on the current Western Power transformer compound. Re-locate Western Power transformer compound to Nanda Drive solar power experimental site with minimum 5m vegetated screening to Nanda Drive and northern and eastern boundaries.</p>
<b>ES3</b>	<p><b>Ambulance Depot :</b></p> <p>Relocate Ambulance Depot from Kaiber Street site as insufficient area for expansion on current site. Progressively construct new Ambulance Depot and associated training, storage. Allow inclusion of basic visitor accommodation facilities for all visiting emergency services officers either on training or in supporting / relieving positions.</p>
	<p>Include all in new Kalbarri Planning Scheme to Reserve all three sites as Public Purposes, notated as specified.</p> <p>Development to be subject to Approval to Commence Development.</p>

PRECINCT	RETIREMENT VILLAGE
<b>Objective</b>	<i>To provide for the accommodation needs of the over 55 population in self contained, self care accommodation in close proximity of all major services and facilities.</i>
	<b>Use &amp; Development Provisions</b>
<b>RV1</b>	<p><b>Self-funded Retirement Village :</b></p> <p>Over 55's self-funded Retirement Village. R60 net density inclusive of density bonuses.</p> <p>5m metre vegetated screen buffer to Nanda Drive. Construct dual-use path from Village site to Retail centre along Gabba Gabba Creek edge – 50% contribution to cost of DUP as condition of development approval.</p>
	<p>Include the site in new Kalbarri Planning Scheme as Civic &amp; Cultural, annotated for the purposes of Aged Persons Accommodation with a net density of R60.</p> <p>Development to be subject to Approval to Commence Development.</p>

PRECINCT	HEALTH & AGED CARE CAMPUS
<b>Objective</b>	<i>To provide for the expansion of the health care needs of the community in an integrated centre that provides for all acute care needs including those of the elderly and infirm.</i>
	<b>Use &amp; Development Provisions</b>
	<p><b>Health and Aged Care Campus :</b></p> <p>Expanded Health Centre, Aged Hostel and Aged Nursing Home. May include specialist consulting rooms.</p> <p>Relocate Ambulance Depot to Emergency Services Precinct. Close Kaiber Street west of existing Health Centre Campus and amalgamate into site – build eastern road adjacent to High School.</p>
	<p>Include in new Kalbarri Planning Scheme to zone the whole of the land bounded by Hackney, Rushton, Glass and Kaiber Streets (both sides) to Civic &amp; Cultural annotated for the purposes of Hospital, Medical Centre and Aged Care.</p> <p>Development to be subject to Approval to Commence Development.</p>

PRECINCT	ENTERPRISE DEVELOPMENT AREA
<b>Objective</b>	<i>To provide an area for the accommodation of a range of non-industrial, commercial emerging new enterprises and service activities that will afford the opportunity for broadening the economic and employment base of Kalbarri.</i>
<b>Planning Area</b>	<b>Use &amp; Development Provisions</b>
	<p><b>New Enterprise Estate :</b></p> <p>Commercial and service area to accommodate non-industrial based emerging new enterprises that will facilitate broadening of Kalbarri's employment opportunities.</p> <p>Two storey building height limit.</p> <p>High level internal landscape and building design guidelines to maintain area as a quality commercial environment.</p> <p>Average 20m (minimum 10m) remnant vegetation buffer to be retained to Nanda Drive.</p> <p>Include small, centrally located convenience facility for office small goods services &amp; café / lunch bar.</p> <p>Prohibit caretaker dwellings.</p> <p>All development to be subject to Climate and Landscape Design Guidelines.</p> <p>Encourage strong pedestrian / cyclist links to Town Centre and residential areas to the north &amp; south.</p>
	<p>Subdivision and development to be subject to :</p> <ul style="list-style-type: none"> <li>▫ Detailed Flora &amp; Fauna assessment;</li> <li>▫ Native Title clearance and Aboriginal Heritage assessment;</li> <li>▫ Approval by Council and the WA Planning Commission of a Local Structure Plan providing for a range of lot sizes. Minimum 28 day public advertising period for Local Structure Plan; and</li> <li>▫ Approval to Commence Development.</li> </ul> <p>Include in new Kalbarri Planning Scheme Text provisions for an "Enterprise Development" Zone and associated Local Area and Detailed Local Structure Plan provisions from the Model Scheme Text as a pre-condition to subdivision and development approvals.</p> <p>Following adoption of an acceptable Local Structure Plan rezone site under new Kalbarri Planning Scheme to include all of the land in the Enterprise Development Zone – minimum 42 day public advertising during rezoning period.</p>

PRECINCT	SERVICE / INDUSTRIAL AREA
<b>Objective</b>	<i>To maintain and maximise the opportunities for service and industrial activities to locate economically and effectively so as to maximise tourist service and alternative employment choices in Kalbarri.</i>
<b>Planning Area</b>	<b>Use &amp; Development Provisions</b>
	<p><b>Service &amp; Industrial Estate :</b></p> <p>Maintain the existing industrial area to accommodate service commercial and industrial based enterprises that will facilitate broadening of Kalbarri's employment opportunities.</p> <p>Two storey building height limit.</p> <p>Implement basic streetscape landscape guidelines recognising maintenance and water requirements.</p> <p>Prohibit caretaker / residential dwellings.</p>
	<p>Review existing TPS9 development and zoning provisions to provide flexibility in lot sizes recognising that most enterprises will be small businesses – consider small lot subdivision with communal access and parking. Incorporate revised provisions into new Kalbarri Planning Scheme.</p> <p>Review existing TPS9 provisions to ensure that development of existing and future lots maximises the achievable floorspace and flexibility of use. Incorporate revised provisions into new Kalbarri Planning Scheme.</p>

PRECINCT	SOUTHERN RESIDENTIAL
<b>Objective</b>	<i>To provide for future housing requirements in a residential estate of mixed density that maintains the ambience of existing residential cells to the immediate north and connectivity to the natural environment.</i>
<b>Planning Area</b>	<b>Use &amp; Development Provisions</b>
<b>SR1</b>	<p><b>Low Density Mixed Residential Estate :</b></p> <p>Subdivision and development to be subject to :</p> <ul style="list-style-type: none"> <li>▫ Detailed Flora &amp; Fauna assessment;</li> <li>▫ Identification of Seasonal Wetland and Fauna Corridor to the east to be vested as recreation and conservation reserve;</li> <li>▫ Native Title clearance and Aboriginal Heritage assessment; and</li> <li>▫ Approval by Council and the WA Planning Commission of a Local Structure Plan providing for a range of lot sizes and residential opportunities ranging from R12.5 to R30. Minimum 28 day public advertising period for Local Structure Plan.</li> </ul>

	<p>All lots of 500m<sup>2</sup> or greater shall be subject of a minimum lot width of 17m and a minimum side setback to one side of 3m to facilitate the parking in the rear yard of recreational vehicles. Two storey building height limit.</p> <p>Average 20m (minimum 10m) remnant vegetation buffer to be retained to all surrounding major road boundaries including major internal distributor.</p> <p>Two storey height limit.</p> <p>All development to be subject to Climate and Landscape Design Guidelines.</p> <p>Provide Local Centre including Primary School, Service Station, Worship Centre and Local Convenience Store with attached fast food / take away facility.</p> <p>Develop pedestrian / dual-use path linkages to key beachfront nodes.</p>
	<p>Include in new Kalbarri Planning Scheme Text provisions for a "Residential Development" Zone and associated Local Area and Detailed Local Structure Plan provisions as a pre-condition to subdivision and development approvals.</p> <p>Following receipt of an acceptable Local Structure Plan rezone site under new Kalbarri Planning Scheme to include the land the subject of the Local Structure Plan in the Residential Development Zone – minimum 42 day public advertising during rezoning period.</p>
<p><b>SR2</b></p>	<p><b>Medium Term Residential :</b></p> <p>Eastern portion to be protected for medium term residential development requirements. Discourage subdivision and development within SR2 until such time as subdivision and development of SR1 is well progressed.</p> <p>Subdivision and development to be subject to:</p> <ul style="list-style-type: none"> <li>▫ Use and Development provisions of SR1; and</li> <li>▫ Maintenance of minimum 50m fauna corridor to National Park/Water Reserve Bushland to the east and Seasonal Wetland Conservation Reserve.</li> </ul>

<b>PRECINCT</b>	<b>TOURIST PARK</b>
<p><b>Objective</b></p>	<p><i>To provide for affordable, family based, future tourist accommodation requirements in the vicinity of Red Bluff, capitalising on available views to the coast and Wittecarra Creek.</i></p>
<p><b>Planning Area</b></p>	<p><b>Use &amp; Development Provisions</b></p>
	<p><b>Family Tourist Park :</b></p> <p>Broad mix of affordable, short stay residential accommodation styles including caravan / camping, budget family cabins, chalets and villas.</p> <p>Open density. Two storey height limit.</p>



	<p>Require minimum on-site facilities of small convenience store, covered BBQ area, pool, recreation room and outdoor recreation facilities including playground.</p> <p>Average 20m (minimum 10m) remnant vegetation buffer to be retained to Nanda Drive / Red Bluff Road.</p>
	<p>Development to be subject to :</p> <ul style="list-style-type: none"> <li>▫ Detailed Flora &amp; Fauna assessment;</li> <li>▫ Native Title clearance and Aboriginal Heritage assessment;</li> <li>▫ Refinement of zone boundaries based on environmental and Aboriginal Heritage considerations; and</li> <li>▫ Approval to Commence Development.</li> </ul> <p>Following receipt of an acceptable development proposal rezone site under new Kalbarri Planning Scheme to include all of the land in the Tourist Accommodation Zone – minimum 42 day public advertising during rezoning period.</p>

<b>PRECINCT</b>	<b>TOURIST ATTRACTIONS</b>
<b>Objective</b>	<i>To provide for future tourist attractions that have larger land requirements and contribute to the overall attraction and activities within the Townsite.</i>
<b>Planning Area</b>	<b>Use &amp; Development Provisions</b>
	<p><b>Tourist Attractions :</b></p> <p>Broad based zoning that provides for the development of a range of tourist attractions and activities, other than tourist accommodation.</p> <p>Single Caretaker / Manager residence only permitted per site.</p> <p>Average 20m (minimum 10m) remnant vegetation buffer to be retained to Nanda Drive.</p>
	<p>Subdivision and development to be subject to :</p> <ul style="list-style-type: none"> <li>▫ Detailed Flora &amp; Fauna assessment;</li> <li>▫ Native Title clearance and Aboriginal Heritage assessment;</li> <li>▫ Refinement of zone boundaries based on environmental and Aboriginal Heritage considerations;</li> <li>▫ Approval by Council and the WA Planning Commission of a Local Structure Plan providing for the subdivision of the land into a range of lot sizes suitable for tourist commercial activities. Minimum 28 day public advertising period for Local Structure Plan; and</li> </ul>

	<ul style="list-style-type: none"> <li>▫ Approval to Commence Development of specific Tourist Attraction proposals.</li> </ul> <p>Following adoption of an acceptable Local Structure Plan rezone site under new Kalbarri Planning Scheme to include all of the land in the Tourist Development Zone – minimum 42 day public advertising during rezoning period.</p>
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PRECINCT	WITTECARRA CREEK & NANDA DRIVE SOUTH
<b>Objective</b>	<i>To conserve and enhance the landscape, environmental and heritage values of Wittecarra Creek and environs while providing a significant flora and fauna corridor between the coast and the National Park.</i>
<b>Planning Area</b>	<b>Use &amp; Development Provisions</b>
<b>WC1</b>	<p><b>Wittecarra Creek Conservation Reserve :</b></p> <p>Wittecarra Creek Conservation Reserve boundaries to be determined from site investigations and environmental and landscape assessments. Final boundaries may allow southward and westward expansion of Tourist Park and Tourist Attractions precincts.</p> <p>Conservation and re-vegetation of existing flora.</p> <p>Walk and heritage trails. Dual-use path linkage to central portion of Port Kalbarri.</p> <p>Land east of extended Nanda Drive to be reserved for flora conservation and groundwater protection to protect the cone of influence of existing groundwater production bores along western edge of National Park from the risk of contamination by urban activities.</p>
	Following resolution of Tourist Park and Tourist Attractions zone boundaries, reserve the land under new Kalbarri Planning Scheme to include the Wittecarra Creek area and the land east of Nanda Drive as Recreation and Conservation Reserve.
<b>WC2</b>	<p><b>Nanda Drive – Southern Route :</b></p> <p>Re-alignment of the southern portion of Nanda Drive to intersect with George Grey Drive immediately north of "Rainbow Jungle" and the tourist attractions area opposite Jacques Point.</p> <p>Delete Nanda Drive extension across Wittecarra Creek and through Port Kalbarri.</p>
	<p>Initiate processes for dedication of road reserve including :</p> <ul style="list-style-type: none"> <li>▫ Detailed Flora &amp; Fauna Assessment;</li> <li>▫ Native Title clearance and Aboriginal Heritage assessment; and</li> <li>▫ Reservation under new Kalbarri Planning Scheme as Major Road.</li> </ul>

PRECINCT	RED BLUFF
<b>Objective</b>	<i>To provide for a range of tourist accommodation opportunities, capitalising on the premium views afforded by this a prime coastal location.</i>
<b>Planning Area</b>	<b>Use &amp; Development Provisions</b>
<b>RB1</b>	<p><b>Tourist Resort :</b></p> <p>Encourage a broad range of short stay residential accommodation styles including caravan / camping, chalets and villas as an integrated resort complex with casual and formal food and beverage facilities.</p> <p>Open density.</p> <p>Two Storey height limit.</p> <p>Require on-site management and high level of facilities including adventure playground area, half courts tennis and basketball, pool / water playground and covered BBQ areas.</p> <p>Allow up to 25% permanent residential component to encourage re-development and defray development costs.</p>
	<p>Include the site in new Kalbarri Planning Scheme as "Tourist Accommodation".</p> <p>Development to be subject to :</p> <ul style="list-style-type: none"> <li>▫ Approval by Council of a Detailed Local Structure Plan of site and minimum 28 day public advertising period; and</li> <li>▫ Approval to Commence Development.</li> </ul>

PRECINCT	BROWE FARM AND SURROUNDS
<b>Objective</b>	<i>To ensure the provision of choice in residential living styles and locations while recognising the need to promote the longer term consolidation of the Kalbarri Townsite while recognising existing subdivision and development potential.</i>
<b>Precinct Planning</b>	<p>Review the approved Port Kalbarri Structure Plan to :</p> <ul style="list-style-type: none"> <li>▫ Modify the Kalbarri Access Road from a through route to Kalbarri Townsite into loop road arcing with Flora Boulevarde.</li> <li>▫ Modify the southern intersection of Kalbarri Access Road into a "T" junction with George Grey Drive.</li> <li>▫ Delete references to Marina / Water based recreation.</li> <li>▫ Restrict retail facilities within Port Kalbarri to local convenience facilities and limited tourist retail only and a maximum supermarket gla of 500m2.</li> <li>▫ Provide site for FESA station within the Western residential Precinct in</li> </ul>

	<p>consultation with FESA Officers.</p> <ul style="list-style-type: none"> <li>▫ Retain Primary School site within Planning Area PK1.</li> <li>▫ Consider providing larger range of lot sizes and particularly larger lifestyle lots in locations of remnant vegetation.</li> </ul>
<b>Planning Area</b>	<b>Use &amp; Development Provisions</b>
<b>BF1</b>	<p><b>Low Density Mixed Residential Estate :</b></p> <p>Balance future subdivision approvals in shorter term with the need to facilitate and encourage additional and more attractive located land releases within main Townsite area.</p> <p>All future lots created within Browne Farm of 500m<sup>2</sup> or greater shall be subject of a minimum lot width of 17m and a minimum side setback to one side of 3m to facilitate the parking in the rear yard of recreational vehicles. Two storey building height limit.</p> <p>Minimum 10m vegetated buffer to be retained and planted where necessary to George Grey Drive in future subdivision.</p> <p>Require as condition of approval of future subdivision, extensive verge planting of appropriate height native vegetation to soften the visual impact of existing retaining walls and development while maintaining resident ocean views.</p> <p>Two storey height limit.</p> <p>All future development to be subject to Climate and Landscape Design Guidelines.</p> <p>Develop pedestrian / dual-use path linkage across Wittecarra Creek Conservation Reserve to connect with Nanda Drive DUP into Kalbarri Town Centre.</p>
	<p>Subdivision and development to be subject to :</p> <ul style="list-style-type: none"> <li>▫ Detailed Flora &amp; Fauna assessment;</li> <li>▫ Aboriginal Heritage assessment; and</li> <li>▫ Approval by Council and the WA Planning Commission of a Local Structure Plan providing for a range of lot sizes and residential opportunities ranging from special rural to R10 residential. Minimum 28 day public advertising period for Local Structure Plan.</li> </ul> <p>Include in new Kalbarri Planning Scheme as "Residential Development" Zone and associated Local Structure Plan provisions from the Model Scheme Text as a pre-condition to subdivision and development approvals.</p>
<b>BF2</b>	<p><b>Medium Term Residential :</b></p> <p>Eastern portion of approved Port Kalbarri Structure Plan to be protected for medium term residential development requirements pending subdivision of an adequate range of housing choices within main Townsite.</p> <p>Subdivision and development to be subject to Use and Development provisions of</p>

	<p>PK1.</p> <p>Minimum 10m vegetated buffer to be retained and planted where necessary in future subdivision to all surrounding major road boundaries including major internal distributor.</p>
<p><b>BF3</b></p>	<p><b>Long Term Residential :</b></p> <p>The balance site area east of the Kalbarri Access Road in Browne Farm Structure Plan to be protected for long term residential requirements following substantial subdivision of Precinct SR1.</p> <p>Subdivision and development to be subject to Use and Development provisions of PK1.</p> <p>Protection and rehabilitation of existing creek lines in Recreation and Conservation Reserves.</p> <p>Minimum 10m vegetated buffer to be retained and planted where necessary in future subdivision to all surrounding major road boundaries including major internal distributor.</p>

## **2.4 IMPLEMENTATION CONSIDERATIONS**

The following matters will need to be addressed in the progression and implementation of the Local Planning Strategy.

### ***2.4.1 Town Centre Concept Plan***

Plan 2 attached presents a more detailed concept for the broad area of the Town Centre Precinct. The Plan addresses :

- The Grey Street diversion and staging considerations;
- Porter Street re-alignment and connections between the Town Centre and Retail Precincts;
- Identification of the land requirements for the northern portion of the Gabba Gabba Creek Reserve and associated land exchanges;
- The Town Centre foreshore pedestrian boulevard and associated land matters;
- Key design considerations for the three primary Town Centre tourist sites;
- The Civic and Cultural Precinct;
- Modifications required to the Sports & Recreation Precinct to accommodate the Grey Street diversion and Gabba Gabba Creek as well as the upgrading of the Precinct as a key recreational node for the Townsite.; and
- Location and design of key Town Centre parking areas.

The Plan is provided for general guidance only in the progressive implementation of the Town Centre proposals. Development of the Town Centre Precinct should be subject to further and more detailed precinct and site planning in consultation with landowners and the broader Kalbarri community..

### ***2.4.2 Town Planning Scheme No 9***

The Local Planning Strategy proposes a number of significant zoning and textual changes to that currently provided under Town Planning Scheme No 9.

Given the extent of changes proposed, it is considered more practical for Council to prepare and adopt a new Local (Town) Planning Scheme over the Kalbarri Townsite rather than seek to amend the current Town Planning Scheme No 9. The adoption of a new Scheme will also facilitate introduction of the Model Scheme Text.

Accordingly, in respect of accommodating specific land use proposals, the Strategy proposes two approaches to the zoning of land and specifically:

- The zoning of identified sites under the new Local Planning Scheme. Typically, the areas of land proposed for inclusion are the subject of additional approval processes requiring public consultation or are of a more general or civic nature; and
- Site specific Zoning Amendments to the new Local Planning Scheme following Gazettal, on application, typically involving major development proposals under the Strategy and / or requiring completion of site specific investigations pertinent to the re-zoning process including Aboriginal Heritage and Environmental assessments.

In respect of textual amendments the Strategy proposals include:

- A broad scale review of the current tourist oriented Zones within Town Planning Scheme No 9 and the introduction of new tourist based zonings and Use Classes based on the State Tourism Strategy;
- Introduction of a "Mixed Residential" Zone;
- Introduction of a "Residential Development Zone" and associated provisions requiring the preparation and approval by Council and / or the WA Planning Commission of a Local Structure Plan prior to subdivision and development;
- Introduction of a "Enterprise Development Zone" and associated provisions requiring the preparation and approval by Council and / or the WA Planning Commission of a Local Structure Plan prior to subdivision and development;
- Introduction of Local Structure Plan and Detailed Local Structure Plan provisions from the Model Scheme Text, including a minimum 28 day public advertising period;
- Introduction of an "Additional Use" Zone and associated provisions;
- Introduction of provisions enabling Council to seek the comment of the public prior on major development proposals notwithstanding the Zoning Table provisions or the requirement for public consultation during other processes such as zoning change;
- Introduction of Building Height provisions;
- Introduction of provisions for adoption of formal Planning Policies such as Climate and Landscape Design Guidelines based on the Model Scheme Text; and
- Introduction of Tree Preservation provisions including provisions for variation of development standards and requirements to facilitate preservation of mature vegetation.

The new Local Planning Scheme would also include the broader textual amendments and new Zones identified above to facilitate later re-zoning proposals and provide guidance in relation to specific key sites and areas.

### ***2.4.3 Sustainability***

A Key Direction identified by the Kalbarri Community is the desire for a "clean, green and environmentally aware Town through sustainable design and development that utilises land, water and natural resources in a responsible manner and accommodates the potential impacts of changing climate".

The Strategy proposes three principal strategies for advancing the overall sustainability of all future development within Kalbarri and specifically criteria in respect of:

- On-Site Power Generation Guidelines;
- Water Balance Guidelines; and
- Climate and Landscape Design Guidelines.

It is envisaged that the Guidelines would be established and implemented as a formal Policy under the new Kalbarri Local planning Scheme and apply to the whole of the Townsite, including the Port Kalbarri locality. The Guidelines should be developed in close consultation with the Kalbarri community and relevant service agencies.

### **On-site Power Generation :**

Kalbarri is reliant upon electricity for its energy requirements as there is no natural gas feed to the Town. The reliability of power supply to Kalbarri has been a matter of considerable concern within the community until recent extensions of supply from Port Gregory and line upgrades by Western Power.

Notwithstanding recent improvements, the provision of adequate power to meet Kalbarri's present and future needs is a matter of considerable concern as Kalbarri is, for all intent and purposes located at the "end of the line" for power supply from Geraldton. As a consequence, power drop in transmission lines and consumer requirements in between severely limit current capacity.

While the extent of upgrading currently proposed by Western Power will increase the overall power supply within the system, the requirements of intervening customers and particularly the garnet mine and beta-carotene plant on the Port Gregory Road and system draw arising from any expansion of the Horrocks Townsite, even though on a separate line, will significantly reduce the net power available for the further growth and expansion of Kalbarri. Accordingly, it is likely that Kalbarri would experience only a "moderate" improvement in power supply capacity. Under the above scenario, it is unlikely that the upgraded power supply would be adequate for target growth in population and visitors, necessitating additional future longer term upgrading of supply.

In the longer term, adequate and reliable longer term supply can only be achieved by an "express feeder" line between Geraldton and Northampton, and only after connection of the Mid-West Grid to the Perth Grid. A previously proposed "express feeder" to Northampton has now been diverted to feed the Oakajee development and there is no current proposal for that feeder to extend or be duplicated to Northampton.

Clearly, from a "supply" perspective alone there is a need for all future development within Kalbarri to be subject of minimum, domestic on-site power generation requirements to supplement incoming supply and advance the overall sustainability of the Townsite.

The Draft Horrocks Townsite Expansion Strategy prepared by the Shire of Northampton seeks to identify minimum criteria for on-site power generation and reduction of overall demand. It is proposed that similar criteria be adopted for all future development in the Kalbarri Townsite Strategy area and specifically:

- Minimum 1KW, grid-connected, expandable solar panel or alternative to each new dwelling (single or grouped) of 150m<sup>2</sup> or less gross living area (excluding garages / carports & verandahs under the main roof);
- Minimum 2KW, grid-connected, expandable solar panel or alternative to each new dwelling (single or grouped) in excess of 150m<sup>2</sup> gross living area (excluding garages / carports & verandahs under the main roof);
- Solar hot water system to each dwelling (single or grouped). Provision of comparable capacity shared solar water systems for multiple dwellings;
- In the case of multiple residential, commercial and tourist developments the provision of solar powered initiatives equivalent to a saving of not less than 25% of total estimated power requirement;
- Energy efficient lighting of all new streets and public spaces;
- Progressive retro-fitting of energy efficient lighting of existing streets and public spaces; and
- Development of a network of naturally shaded walk and Dual Use Paths including retro-planting of existing paths where practical.

It is anticipated that the above measures will reduce overall power demand of new development by in the order of 25% while adding supply to the grid in lower consumption periods.

### **Water Balance Measures :**

The Water Corporation is currently reviewing longer term wastewater treatment options for Kalbarri and it seems probable that a major upgrade of the plant will be required. The review clearly presents an opportunity for Council to engage with the Water Corporation to secure a strong commitment from the Corporation to broad scale reuse and re-cycling of wastewater for reticulation of major open spaces and public areas, in addition to the current re-use of wastewater on the Golf Course.



Potable water supply is drawn from the Tumblagooda aquifer which is a large aquifer covering nearly 97,000km<sup>2</sup> and extending approximately 500 km to the north, 65km to the east and 150km to the south. Broad scale estimates of the sustainable yield from the Tumblagooda aquifer vary from 29 GL/annum to 41 GL/annum; the latter being based on relatively high recharge rates which are unlikely to be reflective of more recent rainfall patterns. The Water Corporation presently is currently licensed to draw 500,000 kilolitres per annum with historical production ranging between 400 & 500,000 kilolitres. The quality of the water extracted from the aquifer is very high.

Excluding savings from future water sustainability measures, the projected population of 5,000 persons plus 10,000 visitors will effectively require a doubling of present production rates which appears to be well within the sustainable yield of the aquifer.

Given Kalbarri's low annual rainfall (355mm per annum), the concentration of rainfall during May to August and the adequacy of potable water supply, there is little to be achieved in promoting domestic on-site rainfall collection and storage.

Total water consumption per capita in Kalbarri is approximately 360KI per annum suggesting a domestic per capita consumption, excluding commercial and industrial users, of in the order of 240KI per annum or nearly 500KI per annum per household compared to 300KI per household per annum in Perth. Given Kalbarri's higher temperatures, it is probable that the higher water consumption is primarily associated with garden and bathroom usage. While the preparation of climate specific Landscaping Guidelines as further discussed will help in reducing garden water consumption, there is clearly an opportunity to achieve considerable water savings through grey water re-cycling of up to 100KI per annum per household.

Accordingly, it is proposed that the following water balance criteria be adopted for all future development in the Kalbarri Townsite Strategy area and specifically:

- Installation of a grey water re-cycling system connected to the bathroom and laundry of each new single dwelling;
- In the case of group and multiple dwellings, the installation of a grey water re-cycling system of sufficient capacity to provide not less than 75% of estimated garden water requirements; and
- Installation of appropriate grey-water delivery faucets to enable connection to water efficient irrigation systems.

### **Climate & Landscape Design Guidelines :**

The preparation and implementation of Climate and Landscape Design Guidelines are considered critical to the retention and enhancement with development of the unique character of Kalbarri.

There may be a need for some variation between the Guidelines applying to the main Townsite and those applying to Port Kalbarri, particularly from a visual character aspect.

From a Buildings perspective the Guidelines need to address as a minimum, the following issues:

- Building styles appropriate and inappropriate to the location;
- A palette of materials appropriate to and reflective of the location;
- Building orientation and design to reflect the micro-climate and particularly maximising the beneficial effects of summer cooling breezes and minimising exposure to the summer sun;
- Provision, as a minimum, of street frontage verandahs and external living areas to facilitate street level community interaction and passive security;
- Encouragement of passive and active solar technologies for cooling; and

- Provision for the storing of recreational vehicles and boats behind the buildings or, on smaller blocks, behind the street setback.

In respect of Landscape, the Guidelines need to address:

- Outdoor landscaping design based heavily on adopting Xeriscape principles that reflects the Kalbarri lifestyle and minimises external water requirements;
- Preservation of mature vegetation in established areas;
- Preservation and continuation of the current and unique blend of exotic and native vegetation and particularly larger exotic trees;
- Guidance on exotic species reflective of and appropriate to the location with an emphasis on those with lower water requirements;
- Guidance on native species suitable to the location with emphasis on those having low volatility characteristics;
- Guidance on limitation of lawn areas and suitable, drought tolerant grass species;
- Guidance on water efficient irrigation technologies; and
- Guidance on low cost, low water and low care landscaping solutions of street verges.

The Guidelines should be developed in close consultation with the community so as to achieve a shared vision of the future visual landscape of Kalbarri and drawing wherever possible on local knowledge.

#### ***2.4.4 "Whole of Plan Approach"***

To date, the approach to significant Environmental values, Native Title and Aboriginal Heritage has been generally dealt piecemeal. This approach is counter productive as it is time consuming, discourages coordinated planning and development and unnecessarily delays subdivision and development processes.

It is strongly recommended that Council and the relevant Government Agencies seek a "whole of plan" approach to the identification of key Environmental Values and the resolution of Aboriginal Heritage and Native Title.

There is a pressing need to also apply this approach to the identification and resolution of major Environmental considerations, particularly within and adjacent to the main Townsite, through a Whole of Townsite audit process involving all key players and agencies.

#### ***2.4.5 Funding Tourist Infrastructure***

Many of the proposed improvements to the River Foreshore and broader Townsite currently proposed by Council and required in the future both by the proposed Kalbarri Townsite Strategy and other future planning initiatives come at a significant cost to Council, both in their construction and their maintenance.

Works yet to be undertaken on the River Foreshore, improvements to traffic management on Grey Street and the proposed management plan for the southern River Foreshore east of Anchorage Lane alone are likely to total in the order of \$3-4million. The Kalbarri Townsite Strategy proposes a number of further works to improve the overall attractiveness of Kalbarri as a premier holiday destination within WA, particularly for the West Australian family market.

Cumulatively, currently planned and future proposed improvements will significantly increase overall visitation to Kalbarri, resulting in increased visitor numbers and increased investment for the mutual benefit of visitors, residents and businesses, both current and future.

However, the rate and income base of the Shire is limited, particularly in the context of the constructional cost for many of the proposed improvements; a situation that is unlikely to improve markedly given the high rural base of the Shire and the impact of changing rainfall patterns on the continuing viability of much of the rural areas of the Shire.

Council currently applies a Special Area Rate (SAR) to all properties in Kalbarri with the principal object of raising funds for specific Townsite improvements; particularly from absentee owners who benefit directly and indirectly from the improvements whilst contributing little to the Town. The SAR rating approach has resulted in some considerable improvements to date including a significant contribution to the recently completed major extension of the Kalbarri Sports and Recreation premises. The SAR is clearly a valuable initiative but severely limited by:

- The need to maintain fairness and equity in the rating system; and
- The funds available relative to the costs of the work and the desirable timeframe for such works.

Currently, the SAR raises approximately \$30,000 per annum. Council is also able to attract some money for improvements through Government Grants, such as the sealing of the western and northern boat ramps car park.

To undertake the works currently "in the pipeline" alone within a desirable timeframe, there is a clear and pressing need for an additional mechanism to increase the level of funding available for Townsite improvements if Kalbarri is to meet its potential as a significant tourist icon and particularly as a major tourist destination for WA families. Such a mechanism needs to be additional to and not an alternative to Council's current practice of Special Area rating which must be maintained.

Preliminary discussions have been held with members of the Kalbarri business community with the objective of establishing a "*Kalbarri Townsite Improvement Fund*" to raise additional funds through a voluntary levy on business establishments in Kalbarri with the specific objective of undertaking major improvements within the Kalbarri Townsite that would significantly improve the attraction of Kalbarri as a tourist destination, while also benefiting residents. The Fund effectively seeks to significantly expedite important improvements rather than rely wholly on funding from Council rates and other income.

Discussions to date have been encouraging and are continuing.

All contributions would be deposited with Council in a Special Purpose Reserve Fund for Kalbarri Townsite Improvements to be expended only for the specified purpose - Townsite Improvements.

There are a number of formulae by which participants could raise money for donation to the Fund. It is proposed that each establishment select the methodology of raising funds that best suits its circumstances. Further, the dollar amount or percentage of the levy, as the case may be, should be agreed between all operators for the reasons of equity and fairness. It is proposed that these values be established by consultation with all participants.

The amount that could be raised is obviously subject to the number of businesses that agree to support the Fund. Assuming participation by at least 50% of business operators within Kalbarri, it would not be unreasonable to anticipate the Fund to have the capacity to raise at least \$500,000 per annum under normal economic conditions.

It is proposed that the Fund be managed by a formal Advisory Committee under Council comprising two Kalbarri Ward Councillors and representatives of the Kalbarri Business and general community.

If there is a "reasonable" level of support for the concept of the Fund within the Kalbarri business community, a formal proposal for the establishment of the Fund should be prepared and presented to Council for consideration.

### **2.4.6 Funding Community Infrastructure**

It is clear that the Strategy proposals also include significant upgrading of broader community infrastructure including:

- Nanda Drive outer route and construction of the balance route;
- Grey Street diversion and foreshore pedestrian boulevard
- Re-alignment and upgrading of Porter Street;
- New civic and cultural precinct incorporating new library and recreation centre as well as new Shire Administration facilities;
- Extensive public parking facilities; and
- Upgrading of existing local roads and upgrading / expansion of paths and community facilities to accommodate additional demand.

As with tourist infrastructure and facilities, Council's ability to fund the required works is limited.

In considering and approving subdivision and development proposals within the Townsite, Council should require a moderate per lot or per unit contribution to assist with the development and upgrading of community infrastructure within the Townsite.

Additionally, in the context of specific development proposals such as the three primary Tourist Sites within the Town Centre Precinct (TC1, TC2 & TC3), there are specific infrastructure proposals which are of significant benefit to and value add to those sites; in particular the diversion of Grey Street and the development of the pedestrian boulevard.

It is not unreasonable that these specific development proposals also contribute directly in part to the costs of the diversion and development of the boulevard as conditions of Development Approval.

At a more general level, elements of the Strategy propose concessions in respect of on-site parking, to be offset by cash-in-lieu contributions to the construction of public parking facilities provided and maintained by Council.

Planning Bulletins 18 and 41 deal with the issue of Developer Contributions to local infrastructure. More recently, the WA Planning Commission has prepared a Statement of Planning Policy addressing the incorporation of Developer Contribution provisions into Town Planning Schemes.

It is recommended that Council investigate further and develop provisions for Developer Contributions for inclusion in the new Kalbarri Local Planning Scheme with proceeds being held in a Special Purpose Reserve Fund for Kalbarri Infrastructure Improvements.

### **2.4.7 Land Supply & Development Priorities**

Notwithstanding the need to resolve Environmental, Heritage and Native Title issues on a "whole of plan" basis, the following table identifies the preferred priority for development of future residential cells currently wholly or partly comprising Unallocated Crown Land or Reserves.

The table also provides estimates of the total dwelling / lot yield of residential development proposals under the Strategy.

The estimates indicate a total yield in the range of 2240 to 2400 units, which is wholly consistent with projected dwelling needs of an additional 2,000 to 2,500 additional new dwellings.

**Residential Development Priorities:**

Residential Cell	Priority	Area	Density	Est. Yield (Dwellings)
<b>Kalbarri Townsite :</b>				
River Residential	<b>High</b>	40ha	R12 / R30	350 to 400
Southern Residential – North	Medium	30ha	R12 / R30	270 to 300
Southern Residential – South	Low	20ha	R12 / R30	180 to 200
Retirement Village – RV1	<b>High</b>	2.5ha	R60	120 to 150
Golf Course Estate	<b>High</b>	17ha	R12 / R30	120 to 150
Golf Course – GC1 (*1)	Low	3.0ha	R40	120
Golf Course – GC2 (*2)	Medium	2.0ha	R40	80
<i>Sub - Total</i>				<i>1240 to 1400</i>
<b>Browne Farm :</b>				
BF1 – Western Residential	Medium	101.4ha	(*3)	200
<b>Total</b>				<b>2240 to 2400 units</b>

\*1 : Subject to Resolution and dedication of Nanda Drive Outer Route & relocation of Tennis / Basketball Courts to Sports and Recreation Centre.

\*2 : Subject to Resolution and dedication of Nanda Drive Outer Route.

\*3 : Refer Approved Browne Farm Structure Plan.

The following table identifies the preferred priority for development of future commercial, tourist and other development initiatives currently wholly or partly comprising Unallocated Crown Land or Reserves.

**Commercial & Other Development Priorities:**

Development	Priority
Fisherman's Wharf – A1	<b>High</b>
Tourist Resort – A4	Low
Boat Trailer Parking – A8	Low
Nanda Drive Outer Route – GC3	<b>High</b>
Budget Tourist Accommodation – GC4 (*1)	Medium
Caravan & Cabin / Chalet Park – TC5a & TC5b	<b>High</b>

Civic Centre & Water Playground – TC7a & TC7b	Medium
Gabba Gabba Creek	Medium
Retail – Hackney St & south to Magee Cres	<b>High</b>
Police Station & Courthouse – ES2	Low
Ambulance Depot – ES3 – Reserve Amendment	<b>High</b>
Health & Aged Care	Low
Enterprise Development Area	Medium
Service Station / Roadhouse – North – TC8	Medium
Nanda Drive Southern Alignment	Medium
Family Tourist Park – TP1	Low
Tourist Attractions – TA1	Low
Wittecarra Creek	Medium

\*1 : Subject to Resolution and dedication of Nanda Drive Outer Route.

Shire of Northampton

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# KALBARRI TOWNSITE STRATEGY

Volume 2 : Technical Appendix

Final – January 2015

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## 1. INTRODUCTION

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Kalbarri is located in the Mid-West Region of Western Australia approximately 600 km north of Perth and 150km north of Geraldton, at the northern extent of the Shire of Northampton. The Townsite is situated on the southern banks of the Murchison River and is substantially north facing, a favoured orientation along the Western Australian coast as a consequence of the degree of protection afforded from on-shore breezes.

Primary access to Kalbarri is via road, approximately six hours from Perth and 90 minutes from Geraldton. Kalbarri is also serviced by an airport situated within the National Park.

The Shire of Northampton has identified a need for the preparation of a Local Planning Strategy to guide the future planning, development and management of the Kalbarri Townsite. The need for the Plan has arisen as consequence of developing pressures on the Townsite from expanding tourism to the Town and region, an increasing population of "seachangers" and the fact that the current strategy is 15 years old, having been prepared in 1992. Existing and planned major resource projects in the Mid-West Region combined with increasing tourism, will likely result in further significant population movement to mid-western Townsite locations and will result in further pressures and increases in demand for residential, employment, tourist and recreational choices in the short to medium term.

*Larry Smith Planning*, in association with *GHD Environmental*, was appointed by the Shire of Northampton to undertake the preparation of the LPS for the Kalbarri Townsite. The Strategy Area is broadly bounded by:

- the Kalbarri National Park in the east and to the south;
- the Murchison River in the north; and
- Gantheaume Bay and the Indian Ocean to the west.

The Strategy has been prepared under the guidance of a Project Steering Group, comprising representatives of the:

- Shire of Northampton;
- Department of Planning;
- Department of Environment and Conservation;
- LandCorp;
- Kalbarri Community; and
- Nanda Working Group.

Preparation of the Strategy has also involved extensive community consultation through a series of Public Workshops undertaken at key phases of the Strategy development process in addition to meetings with key stakeholders from government, business, service agencies and the community. This document provides the supporting data to and should be read in conjunction with the *Kalbarri Townsite Strategy*.

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## 2. REGIONAL ENVIRONMENT

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### 2.1 LOCATION

[Figure 2.1 – Location Plan]

Kalbarri is located in the Mid-West Region of Western Australia approximately 600 km north of Perth and 150km north of Geraldton, at the northern extent of the Shire of Northampton.

The Townsite is situated on the southern banks of the Murchison River and is substantially north facing, a favoured orientation along the Western Australian coast as a consequence of the degree of protection afforded from on-shore breezes.

Primary access to Kalbarri is via road; the North West Coastal Highway, approximately six hours from Perth and 90 minutes from Geraldton by either of two routes:

- Ajana / Kalbarri Road which traverses the Kalbarri National Park; and
- Port Gregory Road and George Grey Drive which provides a more attractive route for tourists from and to the south.

Kalbarri is also serviced by an airport situated within the National Park and currently serviced by Fokker F50 aircraft with the capacity for larger aircraft to BAe146.

### 2.2 STATE PLANNING STRATEGY

The State Planning Strategy provides a strategic guide for land use planning within the State through to the year 2029. The Strategy identifies five key objective areas and specifically:

- **Environment:** To protect and enhance the key natural and cultural assets of the State and deliver to all West Australians a high quality of life which is based on environmentally sustainable principles.
- **Community:** To respond to social changes and facilitate the creation of vibrant, safe and self-reliant communities.
- **Economy:** To actively assist in the creation of regional wealth, support the development of new industries and encourage economic activity in accordance with sustainable development principles.
- **Infrastructure:** To facilitate strategic development by ensuring land use, transport and public utilities are mutually supportive.
- **Regional Development:** To assist the development of regional Western Australia by taking into account the region's special assets and accommodating the individual requirements of each region.

In the context of the Mid-West Region, of which Kalbarri is a part, the Strategy envisages that the Region will continue to diversify its economic base in the areas of agriculture, minerals development, downstream processing of commodities and tourism. Further the Strategy notes that Geraldton will develop as the largest regional centre north of Perth, offering a wide range of facilities and attractions.

Specific regional strategies to the Mid-West and particularly the Kalbarri Region are primarily aimed at protection of the marine and terrestrial environments and the protection of water resources.

### 2.3 GERALDTON REGION PLAN 1999

The Geraldton Region Plan seeks to provide a framework for the future management, protection and coordination of regional planning in the broader Geraldton Region. The purpose of the Plan is to identify planning objectives and actions necessary to achieve those objectives. A key objective is to provide a link between State and local planning and a balance between environmental, social and economic factors. The Region Plan addresses the principles outlined by the State Planning Strategy and the guidelines and recommendations continuing to be relevant to Kalbarri are:

PRINCIPLE	GUIDELINES & RECOMMENDATIONS
<b>Environment</b>	<p><u>Coastal and Marine Environment</u></p> <p>Protect and manage significant conservation areas such as the Murchison River.</p> <p>Recognise the environmental and visual importance of the coastal foredune areas.</p> <p>Promote the provision and development of green spines and river corridors around all major creeks and the Murchison River.</p>
<b>Community</b>	<p><u>Kalbarri</u></p> <p>Promote choice and variety in lot sizes and housing choices to meet the full range of residential lifestyles needs including:</p> <ul style="list-style-type: none"> <li>– single residential housing;</li> <li>– medium density housing (R30 – R60); and</li> <li>– aged persons' accommodation.</li> </ul> <p>Encourage opportunities through the preparation of new local planning schemes for urban consolidation within the older residential areas subject to:</p> <ul style="list-style-type: none"> <li>– compatibility with existing character;</li> <li>– protection/enhancement of residential amenity; and</li> <li>– protection of important views throughout Town.</li> </ul> <p>(Town Planning Scheme No. 9 rezoned residential land in the northern part of Town</p>

	from R15 to R30).
<b>Economy</b>	<p>Ensure that all development of tourist services resulting from the re-alignment of the North West Coastal Highway around Northampton and the coastal route from Horrocks to Kalbarri is focused on the Towns and within the community.</p> <p>Complete planning for the coastal road between Kalbarri and Shark Bay.</p>
<b>Infrastructure</b>	<p>Encourage electricity providers to improve the continuity of supply to Kalbarri.</p> <p>Ensure that boating facilities are adequate to meet the needs of:</p> <ul style="list-style-type: none"> <li>– the local fishing industry in Horrocks, Kalbarri and Port Gregory,</li> <li>– recreational fisherman in Horrocks and Kalbarri; and</li> <li>– tourist operators in Kalbarri.</li> </ul>

## 2.4 BATAVIA COAST STRATEGY 2001

The Batavia Coast Strategy provides for an integrated approach to the planning and management of the coast and proposes a consistent regional response to land use change, subdivision and development. It is intended to compliment other regional initiatives and guide local decision-making and actions undertaken within local planning and management frameworks.

The primary objective of the Batavia Coast Strategy is:

*"to ensure that all reasonable demands along the coast for housing, tourism, recreation, commercial, industrial and other activities are provided for, while sustaining or enhancing existing coastal resources and environmental quality at an acceptable community cost."*

The Strategy recommends a hierarchy of settlement and recognised recreation sites. Kalbarri is identified as a district centre. Overnight accommodation sites are identified at Lucky Bay and Little Bay, to the south of Kalbarri. Day use precincts are identified south of Kalbarri.

The Strategy divides the Batavia Coast into nine local areas:

- Oakajee – Oakabella;
- Horrocks – Port Gregory;
- Sandalwood – Kalbarri National Park;
- Kalbarri; and
- Zuytdorp Cliffs.



In respect of Kalbarri, Strategy responses of continuing relevance are:

- The need for integration of the Port Kalbarri development into the broader Townsite.;
- The limited capacity of the Murchison River to accommodate significant increases in boating traffic and the potential for the Port Kalbarri Marina to alleviate pressure on the River. The Strategy further recognises the difficulties with this facility and specifically the high energy nature of this section of coast;
- Involvement of local indigenous groups in furthering tourism opportunities within the area; and
- Potential of the Kalbarri / Shark Bay Road to improve tourism to the location.

## **2.5 SHIRE OF NORTHAMPTON LOCAL PLANNING STRATEGY 2007**

The Local Planning Strategy provides a critical link between State and Regional objectives and provides Council with the framework to set out its vision for the Shire, and progressively implement this vision through the Local Planning Schemes, rezoning proposals, subdivision assessments and development control mechanisms.

Kalbarri is specifically excluded from the Local Planning Strategy. Accordingly the relevance of the Local Planning Strategy is limited to recognition of the regional positioning of Kalbarri as identified in broader regional planning strategies.

## **2.6 KALBARRI PLAN 1992**

The Kalbarri Plan was prepared by the DPI in 1992 to provide guidance in the overall planning of the Kalbarri Townsite as a consequence of increasing land use pressures and conflicts arising from the increasing popularity of the Town as a tourist destination.

The Plan provides a broad land use framework for the future expansion of the Kalbarri Townsite supported by a number of strategies addressing residential, tourism and industrial expansion and the provision of public services and infrastructure. The Plan provided for a total permanent and visitor population in the order of 10,000 persons and its recommendations have largely been implemented, particularly in the overall land use distribution of the Townsite and the provision of support public infrastructure.

## **2.7 KALBARRI TOWN IMPROVEMENT PLAN 1995**

The Kalbarri Town Improvement Plan 1995 in many respects sought to build on the Kalbarri Plan 1992 in providing depth to the broader design and management of key public areas of the Town and particularly the river foreshore, foreshore frontage development areas and entries with the object of enhancing the overall ambience of the Town.

The Plan dealt with a broad range of issues and sites including the Porter Street shopping precinct, upgrading of the river foreshore, coastal management and access together with guidelines for building theme and colour and building standards.

## **2.8 KALBARRI FORESHORE & COASTAL MANAGEMENT PLAN 2003**

The Kalbarri Foreshore and Coastal Management Plan 2003 provides a comprehensive management plan for both the River and Ocean foreshores extending from Red Bluff to north of Oyster Reef and along the Murchison River to Murchison Homestead.

Funding limitations have restricted the extent to which the recommendations of the Plan have been implemented. Notwithstanding, the coastal foreshores of Kalbarri are well provided with both parking and shade / picnic facilities together with an extensive path network extending from Town to Red Bluff.

Similarly, works undertaken to date along the River foreshore within the main Townsite area have resulted in an expansive and pleasant riverine environment with detail design development scheduled for commencement for the River areas to the east of Town.

While the recommendations of the Plan are a continuing work in progress, the outcomes to date have significantly improved the attractiveness and broader ambience of both foreshore environments.

## **2.9 REGIONAL GROWTH**

The broader Mid-West Region is experiencing considerable growth, generated largely by the resources sector. The location has a historical background in mining but major mining activity ceased in the 1970's with the completion of existing contracts for iron ore, more particularly, the development and rapid expansion of major ore bodies in the Pilbara.

Recent years has seen a major re-birth in the iron ore industry within the broader Mid-West with a number of major mines having been established with on-going exploration revealing considerable high grade long term resources. The expansion of mining in the region is projected to require an additional direct workforce in excess of 2,500 persons. Indirectly, the resource industry has far more significant economic and employment impacts including, ultimately, the construction of a new major deep water port at Oakajee.

As a consequence of Kalbarri's proximity to Geraldton there is an increasing trend for fly in / fly out workers to reside in Kalbarri and commute to Geraldton airport. No FIFO services currently operate from the Kalbarri Airport.

Additionally, tourism to the Mid-West has been growing steadily with visitor nights now exceeding 500,000 per annum. Intrastate tourists represent 80% of the tourist market with Interstate and International visitors representing a further 10% each. Domestic tourism has been growing in recent years at 1% per annum while

international tourism has been growing at around 5% per annum. Tourism expenditure in the Mid-West now exceeds \$230 million per annum and accounts directly for 5% of employed persons.

### **2.10 Browne Farm**

Situated approximately three kilometres south of the existing Kalbarri Townsite, Brown Farm comprises an area formally known as Port Kalbarri.

Browne Farm is the subject of an approved Structure Plan covering, in essence, the western half of the property. The Structure Plan provides for predominantly low density, single housing with a projected yield of up to 1,900 lots, of which approximately 600 have been developed. However, to date, there has been only limited housing construction on the lots created.

The Structure Plan also provides for two Commercial areas comprising a Retirement Village, medical centre and service station. Only local, immediate convenience needs will be provided so as to maintain the primacy of the existing Townsite as the main shopping and retail location.

Browne Farm originally proposed the development of a major marina facility in the vicinity of Wittecarra Creek. It is increasingly doubtful that a marina will be developed at Browne Farm as a consequence of:

- the extraordinary expense associated with marinas generally and particularly in a high wave energy location;
- the likely visual impacts of breakwater structures on the Red Bluff area, a key tourist location;
- the environmental and heritage impacts on Wittecarra Creek; and
- the increasing difficulty in securing environmental and development approvals for a marina.

The balance eastern portion of the site comprises a major conservation reserve incorporating Wittecarra Creek and its environs with the most immediate development of this area having the capacity for an additional 200 lots.

### **2.11 OBJECTIVES OF KALBARRI TOWNSITE STRATEGY**

It is evident that strategic planning for the Kalbarri Townsite has, to date, been largely broad scale and heavily based on the Kalbarri Plan 1992, as was its function.

Subsequent planning and management studies have sought to build upon the broad framework provided by the 1992 Plan in the provision of greater detail for the design, development and management of specific key areas of the Townsite.

While the 1992 Plan sought to provide for a long term permanent and visitor population in the order of 10,000 persons, it is clear that a number of the premises upon which the 1992 Plan was based are in need of review.

Equally, the growth and maturation of the Town has given rise to a greater appreciation of the core values and directions of the Town together with the need for a review of the basic land use strategies having regard for the need to embrace higher levels of sustainability.

Accordingly, the objectives of this Strategy are defined as:

- *To review the broad land use structure and networks having regard for the core values and desired directions of the community while ensuring a high level of on-going sustainability;*
- *To provide a high level of planning and development control guidance within relevant planning areas;  
and*
- *As appropriate, develop urban design responses within specific precincts to ensure achievement of the desired outcome.*

It is envisaged that the outcomes of the Kalbarri Townsite Strategy will lead to a major review and amendment of Town Planning Scheme No 9 over the broader Kalbarri Region.

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### 3. PHYSICAL ENVIRONMENT

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#### 3.1 CLIMATE

[Appendix A : Temperature, Rainfall and Wind Averages]

Kalbarri experiences a warm Mediterranean style climate, characterised by hot, dry summers and mild, wet winters.

Meteorological records from the Kalbarri recording station for the period 1970 and 2007 indicate:

- average maximum temperature range of 21.6°C in July to 34.2°C in February;
- average minimum temperature range from 9.7°C in July to 20.5°C in February; and
- rainfall average at approximately 355mm per year, with, on average, 75% of rainfall being recorded from May to August.

As with much of the Mid-West coast, on-shore breezes can be unpleasantly strong and particularly:

- south to south-easterly morning breezes common during summer and autumn, with north to north-easterly winds prevalent during spring and winter. The mean 9am windspeed records indicate a range of 10.9km/hr in July and 16.8km/hr in January; and
- generally south-westerly tending afternoon breezes over much of the year with variable lighter winds in winter, with a mean 3pm wind speed range of 12.5km/hr in June and 24.8km/hr in January.

The on-shore / sea breezes particularly during Spring and Summer, while providing for relief from Summer temperatures, impact on enjoyment of outdoor activities. Appropriate landscape techniques can significantly reduce the negative impacts of summer sea breezes as is evident in the older northern areas of Kalbarri. Additionally, high summer temperatures dictate the need to ensure appropriate housing design to reduce the requirement for air-conditioning with associated power demands and impacts on longer term sustainability.

#### 3.2 EXTREME EVENTS

##### **3.2.1 Flood & Storm Surge**

[Appendix B : 2006 Flood Levels]

The highest risk period for floods and storm surges in northern Australia occurs in summer or early autumn in association with tropical cyclones or intense monsoonal depressions.

In the average cyclone season, 10 tropical cyclones develop over Australian waters, of which six cross the coast, mostly over northwest Australia between Exmouth and Broome. Kalbarri is located approximately 800km

south of the high-risk area in Western Australia, however, the low-pressure systems associated with cyclones can result in significant rainfall totals increasing the risk of flooding and storms surges within the surrounding areas.

In February / March 2006 tropical cyclone *Emma*, a weak monsoonal-type system of Category 1 intensity, caused extensive flooding through the Pilbara and of the Murchison River. The heavy rain in the headwaters of the Murchison catchment, resulting from *Emma*, caused the highest recorded flood along the river (the previous highest level was recorded in 1960). Floodwaters peaked at Kalbarri at about midnight on 15 March 2006, causing the river-mouth sandbar to be washed away. Residents and State Emergency Services volunteers, constructed two sandbag levees to protect the Town, one 400m by 1m high and a second 500m long by 2m high. The levees held as the flood peaked in Kalbarri, with only low-lying areas adjacent to the river flooding. No flooding within built up areas of the Town occurred.

Further discussions on the potential impacts of climate change on extreme events have been included below.

### **3.2.2 Fire**

Kalbarri is surrounded on its landward sides by native bush both within the Kalbarri National Park and within the Townsite boundaries. Additionally, much of the older northern portion of Kalbarri is characterised by fibro and timber frame construction which present a fire risk of equal if not greater proportions to the bush and National Park where controlled burning practices manage the total fire load. Fortunately, in this respect, the Kalbarri Golf Course provides a significant fire break to the bushland areas to the east.

The Townsite has been seriously threatened by bushfire only once in recent history when extreme temperature and wind conditions in 1990 resulted in the fire front approaching the eastern edge of the Townsite in the vicinity of the industrial area. A late wind change turned the fire back eastward and averted any further danger to the Townsite.

The continuing risk of bushfire combined with prevailing high wind conditions reinforces the need for maintenance of a substantive, strategic fire break between the Townsite and bushland providing both a break to the movement of fire and, more importantly, a major front from which FESA can actively prevent fire from entering Town.

## **3.3 CLIMATE CHANGE**

The Intergovernmental Panel on Climate Change (IPCC), have produced estimates (in the third assessment) on global sea level rise by modelling a 100 year period (2000 to 2100), the study highlighted a 0.38 m rise. The IPCC fourth assessment has recently been released which re-evaluated the sea level rise at a rate of 0.34 m over a 100-year period (IPCC, 2007a).

The Australian Greenhouse Office, through the Australian Climate Change Science Programme, engaged CSIRO and the Bureau of Meteorology to develop climate change projections for Australia.

Table 1 below shows the annual 50<sup>th</sup> percentile projected temperature and rainfall change projections for the Kalbarri region for the years 2030, 2050 and 2070.

**Table 1 Kalbarri Temperature and Rainfall change (Annual 50<sup>th</sup> percentile<sup>1</sup>)**

Emissions Scenarios <sup>2</sup>	Projected Temperature Change			Projected Rainfall Change		
	Low emissions (°C)	Medium emissions (°C)	High emissions (°C)	Low emissions (%)	Medium emissions (%)	High emissions (%)
2030 <sup>3</sup>	0.6 to 1.0	0.6 to 1.0	0.6 to 1.0	-5 to -10	-5 to -10	-5 to -10
2050 <sup>3</sup>	1.0 to 1.5	1.0 to 1.5	1.5 to 2.0	-5 to -10	-10 to -20	-10 to -20
2070 <sup>3</sup>	1.5 to 2.0	2.0 to 2.5	2.5 to 4.0	-10 to -20	-10 to -20	-10 to -40

*Notes to table:*

*The 50th percentile (the mid-point of the spread of model results) provides a best estimate result.*

*Emissions scenarios are from the IPCC Special Report on Emission Scenarios (IPCC, 2007b).*

*Projections are given relative to the period 1980-1999. The projections give an estimate of the average climate around 2030, 2050 and 2070, taking into account consistency among climate models. Individual years will show variation from this average.*

Climate Change in Australia (2007) state that data on extreme events is limited and based upon many unknown variables, and that therefore, future prediction scenarios vary widely. However, present indications for Western Australia are that:

- The number of tropical cyclones may fall under warmer conditions;
- The intensity of the cyclones will increase;
- There will likely be a poleward extension of tropical cyclone tracks. One study quoted has predicted a poleward shift of 2 degrees latitude (approximately 200km) in the average tropical cyclone location of origin; and
- future changes in frequency will be modulated by changes in the El Niño Southern Oscillation.

Should the frequency, intensity and extent of tropical cyclones increase, so will associated extreme events such as oceanic storm surges, gales and flooding rains. Projected rises in average sea-level will also contribute to more extreme storm surges.

From an impact management perspective, three issues arise and specifically:

- Based on a medium emissions scenario, it is projected that average rainfall will decrease by in the order of 20% over the longer term. A decrease in average rainfall will impact on recharge rates of the aquifer from which Kalbarri draws all of its freshwater supplies. There is a need therefore to ensure that future development and its form and management is consistent with long term sustainable use of groundwater resources requiring both responsible use of the resource and maximisation of re-use opportunities; and
- While it seems unlikely that Kalbarri would be directly affected by a southward shift in cyclone tracking, it is reasonable to assume that flood events may increase in both frequency and severity and there is a need therefore to ensure that all new development is set at an appropriate level above likely future flood levels.

It is understood that major drainage infrastructure installed subsequent to local flooding following heavy rains in 1999 have been set at a level that would adequately compensate for projected sea level rise. Outlet structures have also been fitted with flood control gates to prevent back-flooding within the Townsite in the event of future flooding of the Murchison River.

### **3.4 GEOLOGY AND SOILS**

The Study Area is located in the Geraldton Hills sub-region which incorporates the southern end of the Carnarvon Basin and northern end of the Perth Basin, with exposed areas of Permian/Silurian siltstone and Jurassic sandstones, mostly overlain by sandplains, alluvial plains, and coastal limestones.

The Geological Survey of Western Australia (1982), describes the regional geology of the Study Area as predominately aeolian and residual sand – red brown and yellow quartz sand and Tumblagooda Sandstone – red-bed sequence, sandstone, siltstone, minor conglomerate, fluvialite, and marginal marine.

Along the coastline (western) boundary of the Study Area are beaches and mobile coastal dunes – quartzose calcarenite and Tamala Limestone – calcarenite with calcrete soils, eolian. Soils along the river plain area of the Murchison River comprise of alluvium – clay, silt, sand and gravel, in places calcreted.

A number of popular geological tourist attractions are located within close vicinity to the Study Area; being the coastal cliffs and the Murchison River gorges.

### **3.5 HYDROLOGY**

#### ***3.5.1 Wetlands & Surface Waters***

The Murchison River is located at the northern boundary of the Study Area, with the Study Area located within the Murchison River surface water catchment area. This surface water catchment area is not identified as a Proclaimed Surface Water Area under the *Rights in the Water and Irrigation Act 1914*.



As discussed previously, a flood event caused by Tropical Cyclone Emma in February / March 2006 caused extensive flooding through the Pilbara and also on the Murchison River.

An area of 625ha of the lower reaches of the Murchison River has been listed in the Directory of Important Wetlands in Australia. The area has been listed based on the following criteria:

- It is a good example of a wetland type occurring within a biogeographic region in Australia; and
- The wetland is of outstanding historical or cultural significance.

In the southern portion of the Townsite there is an area of land subject to inundation. This area is located approximately 2 km south of the Murchison River mouth and covers an estimated area of 60 ha.

Other wetlands occur in the vicinity of the Townsite, including the Wittecarra Gully and an adjoining perennial lake to the south of the Townsite.

### **3.5.2 Protected Groundwater Areas**

[Fig 3.1 – Groundwater Protection Area & Appendix C]

Kalbarri is located within the Gascoyne Proclaimed Groundwater Area protected under the *Rights in the Water and Irrigation Act 1914*.

A gazetted Public Drinking Water Supply Area (Kalbarri Water Reserve) protected under the *Country Areas Water Supply Act 1947*, is located to the immediate east and south-east of the Townsite. The majority of this reserve is classified as a Priority 1 Reserve with a minor localised areas classified as Priority 2 and Priority 3. The former and current Kalbarri Water Reserve location boundaries are presented in Appendix C.

Activities and risks to water quality within the Kalbarri Water Reserve and recommended management strategies are detailed in the *Kalbarri Water Reserve Drinking Water Source Protection Plan*.

### **3.5.3 Groundwater Depth**

[Appendix D – Groundwater Bores Location & Quality]

A Department of Water registered bore search was conducted for the Project and identified 112 registered bores within a 5km radius of the Project Sites. Once-off static groundwater levels recorded for the bores ranged from 0.00m to 24.38m below ground level.

These groundwater depth indicators should be viewed with some caution as the bores are widely spaced and provided from a once-off reading, which would vary seasonally and with climate over time.

### **3.5.4 Groundwater Quality**

[Appendix D – Groundwater Bores Location & Quality]

The area has been identified by the Department of Water (DoW) as having, on average, groundwater salinity levels of between 500 and 1,000 mg/L total dissolved solids (TDS).

The DoW bore search, discussed above, also provided limited salinity data, which indicated that samples taken for these bores recorded salinity levels from 230 mg/L to 2,860 mg/L TDS. The limitations of this data should be noted.

Groundwater salinity measurements taken in 2004 indicated that groundwater salinity in Kalbarri was generally less than 400 mg/L Total Dissolved Solids (TDS) and that a thin lens of brackish groundwater may locally occur at or near the water table. Measurements show that groundwater salinity usually increases with depth near the coast due to the presence of a wedge shape of salt water underlying fresh water.

### **3.5.5 Groundwater Recharge**

Recharge to the Tumblagooda aquifer is mainly via direct percolation from rainfall where the aquifer outcrops and by leakage from the overlying sediments where the confining Kockatea Shale is absent. Most of the recharge occurs south east of Kalbarri on the sandplain, with episodic recharge from the Murchison River in the east and from streams originating on the dissected plateau during periods of flow. The DoW suggests that the extent of recharge from streams draining the outcrop area is minor since there is little marked effect on the watertable contours.

The Department of Water has advised that in general aquifer recharge information is very limited, and that no specific recharge statistics are available for the Tumblagooda aquifer at Kalbarri.

However, monitoring of the production bores for Kalbarri indicate that water levels have remained relatively stable, notwithstanding an extended period of below average rainfall; suggesting that the present rate of extraction from each bore is within recharge rates and more importantly sustainable limits.

The Tumblagooda aquifer is a large aquifer covering nearly 97,000km<sup>2</sup> and extending approximately 500 km to the north, 65km to the east and 150km to the south. Broad scale estimates of the sustainable yield from the Tumblagooda aquifer vary from 29 GL/annum to 41GL/annum; the latter being based on relatively high recharge rates which are unlikely to be reflective of more recent or projected rainfall patterns.

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## 4. TERRESTRIAL ENVIRONMENT

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### 4.1 FLORA AND VEGETATION

#### 4.1.1 *Vegetation Description*

The Interim Biogeographic Regionalisation for Australia (IBRA) categorises the Australian continent into regions of like geology, landform, vegetation, fauna and climate. There are 80 such regions throughout Australia, and 26 occur in Western Australia.

Kalbarri is located within the Geraldton Sandplains IBRA bioregion. The Geraldton Sandplains bioregion comprises mainly proteaceous scrub-heaths, rich in endemics. Extensive York Gum and Jam woodlands occur on outwash plains associated drainage.

Beard (1976) has mapped the vegetation of the general area at a scale of 1:250,000. The vegetation of the area is within the Ajana Botanical District, in the Zuytdorp sub-district of the South Western Botanical Province, as recognised by Beard.

Beard identified the area as containing two vegetation types:

- Shrublands, *Acacia rostellifera* thicket; and
- Shrublands, *Acacia rostellifera* scrub-heath

The vegetation has been mapped as a mosaic controlled by topography. The area has been mapped as follows:

- Scrub and heath on slopes facing the sea;
- *Acacia rostellifera* thicket, or patchy mixtures of the *Acacia rostellifera* thicket and scrub-heath, in more sheltered areas; and
- *Acacia* thicket bordering the Murchison River.

#### 4.1.2 *Vegetation in a Regional Context*

A vegetation type is considered to be underrepresented if there is less than 30% of its original extent remaining. From a biodiversity perspective, and taking no account of any other land degradation issues, there are several key criteria applied to vegetation where clearing is still occurring (EPA Position Statement No. 2, December 2000):

- The “threshold level” below which species loss appears to accelerate exponentially at an ecosystem level is regarded as being at a level of 30% of the pre-European extent of the vegetation type.

Vegetation communities where less than 30% of the original vegetation extent remain are referred to as "Vulnerable"; and

- A level of 10% of the original vegetation extent is regarded as being a level representing an "Endangered" vegetation community. Clearing which would put a vegetation type into this category should be avoided.

Such vegetation community status can be delineated into five (5) classes, where:

- *Presumed extinct*: Probably no longer present in the bioregion
- *Endangered\**: <10% of pre-European extent remains
- *Vulnerable\**: 10-30% of pre-European extent exists
- *Depleted\**: >30% and up to 50% of pre-European extent exists
- *Least concern*: >50% pre-European extent exists and subject to little or no degradation over a majority of this area.

\* or a combination of depletion, loss of quality, current threats and rarity gives a comparable status

The vegetation types presented in Table 2 are those recorded by Beard (1976), with existing extents in the Geraldton Sandplains IBRA region.

**Table 2 Regional Assessment of Vegetation Extent (Shepherd *et al*, 2005)**

Vegetation Association	Description	Pre-European Extent (Ha)	Current Extent (Ha)	% Remaining (2005)	Status
17	Shrublands, <i>Acacia rostellifera</i> thicket	54,070	44,772	82.8	Least Concern
383	Shrublands, <i>Acacia rostellifera</i> scrub-heath	5,299	5,285	99.7	Least Concern

The Vegetation Associations detailed in Table 2 above record 82.8% and 99.7% of the original regional vegetation extent remaining intact as at 2005. These are above 30% which means they are above the 'threshold level'. Clearing of this vegetation is not considered contradictory to the EPA's recommendations stated in Position Statement No. 2.

### **4.1.3 Threatened Ecological Communities**

[Appendix E – Threatened Ecological Communities – Flora & Fauna]

[Appendix F – EPBC Act Protected Species]

Ecological communities are defined as 'naturally occurring biological assemblages that occur in a particular type of habitat. Threatened Ecological Communities (TECs) are ecological communities that have been assessed and assigned to one of four categories related to the status of the threat to the community, that is, Presumed Totally Destroyed, Critically Endangered, Endangered, and Vulnerable. Some TECs are protected under the Commonwealth *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*. Although TECs are not formally protected under the WA *Wildlife Conservation Act 1950*, the Environmental Protection Authority's position on TECs states that proposals that result in the direct loss of TECs are likely to require formal assessment.

A search of the Department of Environment and Conservation (DEC) TEC Database was undertaken. No TECs are known to be located within the Kalbarri Townsite area. The *EPBC Act* Protected Matters Search Tool also does not identify any TEC's within the Shire of Northampton municipality.

### **4.1.4 Environmentally Sensitive Areas**

Environmentally Sensitive Area's (ESA's) are subject to definition under Section 51B of the *Environmental Protection Act 1986* and may include areas such those requiring special management attention to protect important scenic values, fish and wildlife resources, historical and cultural values, and other natural systems or processes.

The DEC (2007a) identifies the Murchison River, and a buffer to the river, on the northern boundary of the Study Area, as an ESA.

No other ESA's are identified in the Study Area (DEC, 2007a).

### **4.1.5 Significant Flora**

[Appendix G – Flora & Fauna Conservation Codes]

Kalbarri is one of a number of areas in the Wheatbelt that are significant for rare species, due to widespread clearing in the surrounding landscape, and to the high diversity and level of local endemism (DEWHA, 2007a).

Flora species that are considered to be significant are listed under the Western Australian *Wildlife Conservation Act 1950* and the *EPBC Act 1999*. Additionally, the DEC keeps a list of Priority Flora species, that are not listed under legislation but for which the DEC feels there is cause for concern, or for which not enough information is known.

A search was undertaken through the Department of Environment and Conservation (DEC) Threatened (*Declared Rare*) Flora Database (TFD) and the *Western Australian Herbarium Specimen* (WAHERB) database for species of rare and priority flora located within the vicinity of the Study Area. The DEC also provided results from a search of their *Declared Rare and Priority Flora* (DR&PF) list. The species in this list are those known to exist in the general surrounds, and not to the Study Area specifically.

The TFD and WAHERB database searches indicated that there are three Declared Rare Flora species (gazetted under the *Wildlife Conservation Act 1950*) known to occur within the Kalbarri area, in the vicinity of the Townsite, being *Caladenia wanosa*, *Lechenaultia chlorantha* and *Stachystemon nematophorus*. These species are considered to be nationally significant and as such are also afforded protection under the *EPBC Act*.

A large number of Priority Flora species are also known to exist in the vicinity of the area, with some recorded within the Townsite.

Other flora species of national significance have been historically recorded within the Shire of Northampton municipality. Some species that appear in the Commonwealth *Environment Protection and Biodiversity Act 1999* Protected Matters Search Tool and the DR&PF database are often not likely to occur within the specified area, rather the search provides an approximate guidance to matters of national significance that may require further investigation.

#### **4.1.6 Diseases or Pathogens**

*Phytophthora cinnamomi* ("Dieback") disease is generally restricted to areas in the south west of the State, south of the 26<sup>th</sup> parallel of latitude, in areas receiving an average annual rainfall of greater than 400mm.

As the Study area is south of this latitude, and pockets of Dieback have been recorded in Kalbarri (Northern Agricultural Catchment Council, 2007) the location can be considered to be susceptible to the development of the *Phytophthora cinnamomi* pathogen.

#### **4.1.7 Weeds**

The Department of Agriculture and Food (2007) have recorded 80 Declared Plants as occurring within the Shire of Northampton.

Two Declared Plants are known to be common in the vicinity of the Townsite, being:

- Saffron Thistle (*Carthamus lanatus*) (Paxman, *pers comm.*, 2007); and
- Paterson's Curse (*Echium plantagineum*) (Fabo, *pers comm.*, 2007).

These plants are classified as P1 Declared Plants in the Shire of Northampton. This means that the movement of plants or their seeds is prohibited.

Other common weeds in the area include Cape Weed (*Arctotheca calendula*), Maltese Cockspur (*Centaurea melitensis*), Wild radish (*Raphanus raphanistrum*), Double gee (*Emex australis*) and Ruby Dock (*Acetosa vesicaria*).

## 4.2 FAUNA AND HABITAT

### 4.2.1 *Regional Fauna Habitat*

Kalbarri National Park, with an area of approximately 186,000 ha, is a significant habitat area to the north-east of the Study Area. This area is identified as maintaining existing processes at a regional scale and providing an important refuge for many species, including invertebrates and smaller vertebrates (DEWHA, 2007a). The area is known to host a wide variety of fauna, including 44 species recognised as endemic to the area; including 4 frogs, 25 reptiles, and 13 bird species.

The habitat provided in the broader region of the Townsite includes:

- Murchison River estuary;
- Coastline;
- Acacia scrub heath and thicket communities; and
- Heath on coastal limestone.

The area would provide a linkage for animals moving from the Kalbarri National Park to the Murchison River or the coast.

### 4.2.2 *Significant Fauna*

[Appendix G – Flora & Fauna Conservation Codes]

The conservation status of fauna species is assessed under State and Commonwealth Acts; in particular the Western Australian *Wildlife Conservation Act 1950*; *Wildlife Conservation (Specially Protected Fauna) Notice 2006*, and the Commonwealth *EPBC Act*.

The significance levels for fauna used in the *EPBC Act* are those recommended by the International Union for the Conservation of Nature and Natural Resources (IUCN).

The EPBC Act also has lists of migratory species that are recognised under international treaties such as the China Australia Migratory Bird Agreement (CAMBA), the Japan Australia Migratory Bird Agreement (JAMBA) and the Bonn Convention (The Convention on the Conservation of Migratory Species of Wild Animals).

Listed migratory species also include any native species identified in an international agreement approved by the Commonwealth Environment Minister. The Minister may approve an international agreement for this purpose if satisfied that it is an agreement relevant to the conservation of migratory species.



In Western Australia, the *Wildlife Conservation (Specially Protected Fauna) Notice 2006* has classified Threatened Fauna in a series of Schedules. The DEC also produces a supplementary list of Priority Fauna, being species that are not considered "threatened" under the Western Australian *Wildlife Conservation Act 1950* but for which the Department feels there is a cause for concern. These species have no special protection, but their presence would normally be considered to determine any potential impacts on these species.

A search for species potentially existing in the Study Area was undertaken through DEC Threatened Fauna database, which includes species declared as '*Rare or likely to become extinct* (Schedule 1)', '*Birds protected under an international agreement* (Schedule 3)', and '*Other specially protected fauna* (Schedule 4)'.

Table 3 lists the DEC search results for significant fauna historically known from the Townsite and surrounding area.

**Table 3 Threatened Fauna**

Scientific Name	Common Name	Record No / Date	Other information
<i>Ardeotis australis</i>	Australian Bustard	2 in 2000 and 2001	This species is uncommon and may occur in open or lightly wooded grasslands.  Sightings occurred in Kalbarri National Park.
<i>Burhinus grallarius</i>	Bush Stonecurlew	1 in 2000	A well camouflaged, ground-nesting bird which prefers to 'freeze' rather than fly when disturbed. It inhabits lightly timbered open woodlands.  Sighting occurred in Kalbarri National Park.
<i>Cacatua leadbeateri</i>	Major Mitchell's Cockatoo	1 in 1983	This species is sporadically distributed through arid and semi-arid Australia and may occur in sparsely timbered grasslands and shrublands and rocky outcrops.
<i>Dasyurus geoffroii</i> <sup>1</sup>	Chuditch	1 in 2000	This carnivorous marsupial occupies large home ranges, is highly mobile and appears able to utilise bush remnants and corridors.  Sighting occurred in Kalbarri National Park.

<i>Falco peregrinus</i>	Peregrine Falcon	1 in 1974	This species is uncommon and prefers areas with rocky ledges, cliffs, watercourses, open woodland or margins with cleared land.  Sighting occurred in Kalbarri National Park.
<i>Hypseleotris aurea</i>	Golden Gudgeon	1 in 1948	<i>Hypseleotris aurea</i> is a freshwater fish and is known from the Gascoyne and Murchison rivers in the southern Pilbara.  Sighting occurred in Kalbarri National Park.
<i>Idiosoma nigrum</i>	Shield-backed Trapdoor Spider	1 in 1989	This species is in decline in its patchy distribution through the northern and central wheatbelt and coastal plain. It is a long-lived species that is very sensitive to disturbance.
<i>Isodon obesulus fusciventer</i>	Quenda	1 in 2000	This species prefers areas with dense understorey vegetation, particularly around swamps and along watercourses, that provides ample protection from predators.  Sighting occurred in Kalbarri National Park.
<i>Leipoa ocellata</i> <sup>1</sup>	Malleefowl	8 from 1983 to 2001	This species was once widely distributed across southern Australia. It prefers woodland or shrubland with an abundant litter layer that provides essential material for the construction of its nest mound.  The majority of the sightings occurred in Kalbarri National Park.
<i>Lerista axillaris</i>	A Lerista lizard	1 in 1987	Only known from one locality on the Midwest coast (21 km S of Kalbarri). Confined to WA (Western Australian Museum, 2007).
<i>Macropus eugenii derbianus</i>	Tammar Wallaby	1 in 1979	This species prefers thickets of Melaleuca, Sheoak or other large shrubs associated with grassland.  Sighting occurred in Kalbarri National Park.

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<i>Pletholax edelensis</i>	<i>gracilis</i>	A legless lizard	1 (date not recorded)	This long-tailed pygopod is endemic to the west coast of Western Australia between Shark Bay and the lower Murchison. It is mainly found in dense <i>Triodia</i> .
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Note:

1. These species are protected under the Commonwealth *Environmental Protection and Biodiversity Act (1999)*, as well as the State *Wildlife Conservation Act (1950)* and have been categorised as 'vulnerable'.

In addition to the DEC database search, an *EPBC Act* Protected Matters Search was undertaken for the Shire of Northampton, including species additional to that recorded in the DEC Search results for the Study Area and surrounds.

Some species that appear in the *EPBC Act* Protected Matters Search Tool are often not likely to occur within the specified area, rather the search provides an approximate guidance to matters of national significance that may require further investigation. The records from the DEC searches of Threatened Fauna are considered to provide more accurate information for the general area, however, some of these records can also be out-dated and often misrepresent the current range of threatened species.

#### **4.2.3 Introduced Fauna**

The Kalbarri National Park is known to host a number of Declared Pest species under the *Agriculture and Related Resources Protection Act 1976* including;

- Rabbit (*Oryctolagus cuniculus*);
- Feral Goat (*Capra hircus*);
- Feral Pig (*Sus scrofa*); and
- Fox (*Vulpes vulpes*);

Feral Cats (*Felis catus*) are known to be present in the area, particularly along the riverbanks. Feral rabbits are also located within the area particularly along the foreshore areas.

### **4.3 RESERVES AND CONSERVATION AREAS**

The Kalbarri National Park, which is listed on the Register of the National Estate, covers an area of approximately 186,000 ha and is located on the eastern boundary of the Study Area. Kalbarri National Park includes the Murchison River Gorge, and Shell House Cliffs, both of which are also listed on the Register of the National Estate.

The "Blue Holes", a series of inter-tidal pools within the reef formation along portion of the Townsite coast, has recently been proclaimed a "Fish Habitat Protection Area". The "Blue Holes" are a popular location for observing marine life and all fishing is prohibited within the Protection Area.

The Shire of Northampton Town Planning Scheme No. 9 (2006) identifies areas of parks and recreation located next to the coast to the north and south of the Murchison River, along the length of the Murchison River and to the southeast of Ajana- Kalbarri Road.

#### **4.4 CONTAMINATED SITES**

A search for Potentially Contaminated Sites through the DEC online database was conducted (DEC, 2007). This search concluded that no previously recorded contaminated sites occur within the Townsite.

The site lies well outside any known or suspected Unexploded Ordinance (UXO) contamination sites.

Potentially contaminated sites may exist in the Townsite, often being associated with industrial premises or service stations.

Other potential sources of contamination, particularly relevant to the Kalbarri Water Reserve have been identified by the DoW (2006); being the wastewater treatment plant, the existing and decommissioned landfill and the industrial area.

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## **5. SOCIAL ENVIRONMENT**

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### **5.1 POPULATION**

#### ***5.1.1 Residents***

The resident population of Kalbarri at the 2006 Census was approximately 1400 persons, inclusive of Browne Farm comprising 52% males and 48% females. On an annual basis, population growth between 1996 and 2006 has averaged at approximately 5% per annum.

The period 2001 and 2006 witnessed a major shift in the population dynamics of Kalbarri with the influx of a younger, family based population and corresponding "exodus" of the older age cohorts as evidenced in a decrease in the median age from 48 years to 41 years. Infant and school age children increased from some 15% of the population in 2001 to approximately 25% by 2006. Similarly, the 30 to 50 age groups have likewise increased from some 22% in 2001 to 32% in 2006.

Conversely, there has been a significant decrease in the over 65 age groups from some 20% of the population in 2001 to 13% in 2006.

There has been little change, either proportionally or in person numbers, in the 50 to 60 age groups, indicating that the "sea-change" being experienced in Kalbarri is predominantly driven by family groups settling into business and employment opportunities within the Town.

#### ***5.1.2 Families***

The shift in the resident age structure is similarly reflected in family structure with a decrease in childless families from 52% in 2001 to 48% in 2006 and a converse increase in families with children from 34% in 2001 to 40% in 2006 with the majority being families with children under 15.

Single parent families have remained relatively constant between 2001 and 2006 at around 11% of all families with families of children under 15 also being the predominant group.

Household size has decreased noticeably between the Census from 2.9 persons in 2001 to 2.3 persons in 2006 due largely to an increase in single person households and the smaller family sizes moving into Kalbarri between the Census.

#### ***5.1.3 Future Population & Housing***

Population projections prepared by the WA Planning Commission indicate that the population of the Shire will remain constant over the next 15 years. The projections were prepared in 2004/05, prior to the 2006 Census and explosion of the mining sector within the State, including the Mid-West. Accordingly, and given recent

population growth within Kalbarri, the projections are considered to be of little use in the context of the Strategy.

Recent years has seen an influx of families seeking business and lifestyle opportunities within the Town which combined with continuing growth in tourism in the Kalbarri area will generate further employment and growth.

More importantly, the broader Mid-West is experiencing significant growth generated largely by the resources sector. Existing and proposed resource developments will generate significant employment within the Region both directly and indirectly over the medium to longer term. Kalbarri's geographical positioning and range of attractions places it well as a recreational destination for Mid-West residents as well as an ideal residential location for fly-in / fly-out workers. Additionally, creative marketing and promotion of Kalbarri has the potential to generate new and different employment opportunities within the Town, further expanding its employment and population base.

The period 1996 to 2006 witnessed an increase in population in Kalbarri from approximately 900 persons to 1,400 persons, representing an average annual growth rate for Kalbarri approaching 5% per annum. It is not unreasonable therefore to assume, at least for the purposes of the Strategy, that Kalbarri has the potential to maintain recent growth rates which will generate a resident population in the order of 5,000 persons within 25 years.

Significantly, and as discussed further in this section, a population in the order of 5,000 persons is generally regarded by the local community as being a desirable optimum population at which the Townsite could retain its core values and qualities.

Accordingly, the Strategy adopts a target population of 5,000 residents over 25 years as the basis for the overall future planning and management of Kalbarri.

#### ***5.1.4 Housing the Future Population***

A target population of 5,000 persons will require in the order of an additional 2,000 to 2,500 additional new dwellings ranging from conventional single housing through to group, town housing and retirement accommodation.

There are five major locations within and adjacent to the Townsite for accommodating future residential demand and specifically:

- South Kalbarri to Wittecarra Creek : The whole of the land south of the existing Townsite to Wittecarra Creek and west of the National Park totals approximately 290ha. Significant portions of the area are constrained by seasonal wetlands, buffer requirements to existing drinking water production bores and the Wittecarra Creek environs. Nanda Drive also extends through this area. Assuming that half of the area is developable, at conventional densities it could accommodate in the range of 1,500 lots. The Land also requires approval under Native Title provisions;

- Browne Farm : The previous Structure Planning within and around Browne Farm provided for approximately 500 lots, of which some have currently been developed, most of which remain vacant; the latest structure plan for Browne farm allows for an extra 200 with a large proportion of these being lifestyle and special rural lots. In addition, there is capacity for future higher density residential subdivision of the Lifestyle lots.
- Old Kalbarri : Old Kalbarri comprises primarily fibro housing of average to poor condition and is ripe for re-development group and town housing. Densities provisions within Old Kalbarri should seek to provide viable single housing alternatives to conventional lot subdivision. Opportunities also present for innovative small lot subdivision, particularly in the larger lot, western portion;
- East Anchorage : East of Anchorage Road lies a large tract of elevated, river frontage land with extensive River views. Excluding a reasonable foreshore reserve, the developable area approximates 40ha and could accommodate at conventional densities in the order of 350 to 400 lots. The Land also requires approval under Native Title provisions; and
- East Golf Course : The land to the east of the Golf Course and currently occupied by the Wildflower Centre presents opportunities for a residential estate integrated with and affording views into and over the Golf Course. The land has an area of approximately 17ha and at conventional residential densities could accommodate in the order of 150 lots.

While Browne Farm clearly has the capacity to accommodate the greater portion of projected housing requirements, it is not practical, nor desirable, to direct all new residential accommodation to the Browne Farm area as it limits both locational and housing choice. More importantly, it presents a less sustainable option in that the majority of primary services and facilities required by the residential population will continue to be focussed on the existing Townsite, placing an excessive reliance on the use of motor vehicles.

Nor is it practical to direct all new residential accommodation to the existing Townsite to the exclusion of Port Kalbarri as it impinges on locational choice and in this respect Browne Farm does offer an alternative location and views not available in the Townsite environs, at least at present. However, it is also noted that there are what could reasonably be regarded as an extraordinarily high number of vacant lots in PBrown Farm at present, representing something in the order of a quarter to a third of projected demand.

It could also be argued that the extent of subdivision at Browne Farm is adversely impacting on residential development and re-development within the Townsite. For this reason the current structure plan is focussing on achieving larger lots at a lower density than was previously envisaged. It is clearly more desirable from a sustainability perspective for new residential development to be developed in and around the Townsite and there is a clear and obvious preference for locations closer to water. It is noted in this respect that LandCorp are proposing subdivision of the former Primary School site in South Kalbarri and still hold a small number of lots in an earlier adjacent subdivision. Interest in the remaining lots has been low, most probably because they

are in the least desirable location within the context of locational preferences in Kalbarri as reflected in the positioning of the Primary School at that location.

In the end analysis, market forces will largely determine locational choices but it would be desirable from a long term sustainability perspective for preparatory tasks including Native Title approvals and Local Area Planning to be undertaken for the subdivision and development of better located and more leading edge residential estates adjacent to the main Townsite.

## **5.2 ECONOMY & EMPLOYMENT**

The total labour force within Kalbarri has remained relatively constant between 2001 and 2006 at approximately 800 persons with the primary employment sectors being tourism (25%), State and Local Government services (16%) and fishing (14%).

The static nature of the labour force in this period appears to reflect the movement of younger families moving into business and employment opportunities within Kalbarri.

The following discusses the key economic and employment centres of Kalbarri and examines longer term economic and employment needs of the Townsite.

### **5.2.1 Tourism**

#### *5.2.1.1 Overview*

Unsurprisingly, tourism provides the largest source of employment at approximately 25% of the workforce. It is estimated that indirectly, tourism would be responsible for at least a further 25% of employment within Kalbarri in the retail, support services, light industries and community facilities management sectors.

Kalbarri forms part of the broader Coral Coast Tourism region which in 2006 experienced 650,000 visitors and 4.5million visitor nights with the vast majority (78%) being from within WA (Intrastate). The Northampton sub-region, and predominantly Kalbarri, accounts for 17% of the region visits with 165,000 visitors staying some 650,000 nights or an average of 4 nights per visit.

Overall visitor numbers to Kalbarri have been steadily increasing from around 90,000 visitors in 1996 to approximately 125,000 visitors in 2006 (Kalbarri Visitor Centre People Monitor). Kalbarri is a destination to which people have to make a conscious decision to visit as it is not on the "main road" and, partly as a consequence, is particularly popular with family groups. The adjoining Kalbarri National Park adds a unique outback experience for all visitors and particularly International visitors who comprised a high 27% of all visitors with Interstate visitors comprising a further 10%. Visitation to Kalbarri National Park has increased significantly from some 100,000 visits in 2002/03 to almost 200,000 visits in 2005/06, inclusive of multiple visits. Since 2002, overall visitation to Kalbarri has remained relatively constant at around 120,000 visitors.



While visitor numbers to the broader Coral Coast Region during this period have also remained relatively constant, it is conceivable that the static level of visitor numbers to Kalbarri is also reflective of limited accommodation in the commercial sector, particularly of a reasonable or good standard. This possibility is supported by comments from local operators who advise 100% occupancy during peak periods and 70% occupancy during mid-season.

Visitor numbers peak in the period July to October at around 15,000 visitors per month comprising Intrastate, Interstate and International visitors. At an average stay in the order of 3 to 4 nights, there is a demand for some 1,750 to 2,000 "beds" per day of commercial standard in villas, resorts or caravan parks. While there are no definitive details of accommodation numbers in Kalbarri, the general perception of visitor numbers at any one time and "beds" in Town is up to 5,000. However, the greater proportion of these comprise old homes, predominantly in north Kalbarri, typically of asbestos framed construction and of varying quality from, at best, average to poor. Additionally, a number of the villa / motel developments in Kalbarri are from the 1980's, or earlier. While some have been maintained well, others are not particularly attractive.

The other busy periods are during the school holidays with Christmas holidays at around 10,000 visitors per month and April at around 12,500 visitors per month. The only relatively quiet periods are February / March when monthly visitor numbers fall to 5,000 and 7,500 persons per month respectively and November / December when monthly visitor numbers average around 7,500 persons per month. The period of May and June sees monthly visitors also around 7,500 persons.

The principal means of access to Kalbarri is by road, predominantly by car or by tour group. Four flights a week service Kalbarri as part of the Perth / Geraldton / Carnarvon route. Accordingly, because of through bookings in both directions, seats for travel to and from Kalbarri are limited. The introduction of a second air service to Geraldton is likely to ease seat availability and, more importantly, open up the fly drive market from Perth to Geraldton as a consequence of probable airfare discounting and reductions.

In addition to the National Park, Kalbarri offers a range of tours and attractions including river cruises, boat / canoe / surfcat hire, quad bike and canoe safaris and sand boarding. The beaches, River and National Park provide for a range of recreational experiences either at an organised or commercial level or for private recreation. The River is particularly popular for swimming, fishing and a range of water based activities as it provides a haven from the strong sea breeze which makes coastal beaches largely unusable. Boating in both the River and Ocean is particularly popular with Intrastate visitors with launching ramps and associated parking areas provided in the western portion of the River and at the Anchorage in north Kalbarri.

As visitor numbers increase, it is inevitable that land use and recreational conflicts will occur. Quad bikes are becoming increasingly popular and apart from the increasing levels of damage being done to environmentally fragile areas along the river and coast, there are reports emerging of conflicts and accidents between private off road vehicles and tour groups.

Kalbarri is a particularly attractive destination for family groups from within WA attracting family groups from all over the State. During the period July to October, Intrastate caravanners and International tourists tend to predominate. While the opportunity exists for further expansion of Intrastate and International visitation, these opportunities are ultimately reliant upon tourist movement within the broader Coral Coast Region and the promotion of that market; by others.

It is considered that Kalbarri's long term security of visitors lies heavily in expanding and promoting the Intrastate family tourist market and, in particular, heightening the range of experiences and services available to families. This requires not only the provision of accommodation, attractions, and entertainment but, more importantly, the "packaging" of these into a "whole of family" (eg Club Med) experience where the parents have the opportunity to enjoy their holiday as much as the children.

From a longer term regional perspective, Kalbarri is considered to be well positioned as a highly marketable, iconic destination within WA. Key considerations for tourism in Kalbarri are:

- Expanded and improved accommodation reflecting the Kalbarri experience and family orientation;
- Increased activities, particularly for children;
- Increased evening and night activities / entertainment;
- Development of Indigenous Tourism opportunities;
- Expanded eating facilities, particularly mid-priced family establishments;
- Improved convenience retail and particularly supermarket facilities; and
- Improved and cheaper air services.

Plans presently in place for the River Foreshore areas and proposed development of the River Foreshores east of the Anchorage will significantly improve activities available to visitors within the Townsite, as well as improve the overall attractiveness of Kalbarri as a tourist destination. Additionally, long term planning for the Townsite needs to address a number of structural modifications that will encourage and enable commercial interests to undertake significant additional development, including the often well needed re-development of key sites.

One market sector in which Kalbarri is not well represented is the provision of Eco-tourism accommodation. This can be attributed to the lack of suitable and desirable sites that display the locational qualities for such development. The Gantheaume Bay coast is not suitable, largely because of the impacts of the on-shore breezes and limited recreational opportunities along the coast. Clearly, the opportunities for Eco-Tourist accommodation within the Kalbarri hinterland are limited to possible sites within the National Park or along the River.

### *5.2.1.2 Present and Projected Tourist Population*

From a facility planning perspective, there is a need to establish a peak daily visitor. The process is difficult as there is no definitive data on available accommodation and there are a large number of private residences that are rented to holiday makers. Additionally, there are a large number of private residences that are retained primarily as holiday homes and occupied infrequently and particularly during peak holiday periods.

Anecdotal evidence suggests some 5,000 "visitor" beds across all sectors, inclusive of private residences. Allowing a peak occupancy of around 90% would provide a total visitor population at any one time of around 4,500 persons, a ratio of around 3:1 to the "base" population. Available accommodation data suggests approximately one-third of beds are within private homes, reducing visitor numbers to commercial accommodation to around 3,000 persons or a 2:1 ratio to the base population.

Given a projected population of 5,000 persons within 25 years would suggest, on a continued 2:1 ratio, a peak daily visitor population of some 10,000 persons across all sectors, including private holiday homes; essentially a doubling from present estimates.

A doubling to 10,000 "visitors" in Town at any one time is not out of the realms of possibility given that:

- Overall visitor numbers to Kalbarri have increased by 35% in the last 10 years;
- Population growth projections both for the broader Mid-West and the more distant visitor markets of Perth and the North-West;
- The likelihood of substantially improved air services and seat availability to Kalbarri by that time, generated in part, at least, by the probable entry of a second airline.

An increase in daily visitor population by up to an additional 5,000 persons will require a substantial expansion and upgrading of tourist accommodation and the provision of some additional 1500 accommodation units across all accommodation types from caravan chalet parks to resort and quality hotel accommodation. Growth in overall visitation will also require additional land for commercially based visitor activities and attractions.

### *5.2.1.3 Financing Public Tourist Facilities*

Many of the proposed improvements to the foreshores and broader Townsite currently proposed and required in the future both by this Townsite Strategy and other future planning initiatives come at a significant cost to Council, both in their construction and their maintenance.

The rate and income base of the Shire is limited, particularly in the context of the constructional cost of many of the proposed improvements; a situation that is unlikely to improve markedly given the high rural base of the Shire and the impact of changing rainfall patterns on the continuing viability of much of the rural areas of the Shire.

Council applies Specified Area Rating (SAR) to all properties in Kalbarri with the principal object of raising funds for specific Townsite improvements; particularly from absentee owners who benefit directly and indirectly from the improvements whilst contributing little to the Town. The rating approach has resulted in some considerable improvements to date including a significant contribution to the recently completed major extension of the Kalbarri Sports and Recreation premises.

The SAR approach is applauded but limited by:

- The need to maintain fairness and equity in the rating system; and
- The funds available relative to the costs of the work and the desirable timeframe for such works.

A mechanism additional to Specified Area rating is required to generate increased funding for public improvements if Kalbarri is to meet its potential as a significant tourist icon and particularly as a major Intrastate tourist destination for families. Such a mechanism is clearly additional to and not an alternative to current practice of Specified Area rating which should be maintained.

### **5.2.2 Fishing**

The fishing industry is the third largest employer with 14% of the workforce.

Typically, twelve crayfishing boats are based at and operate out of Kalbarri. During the season, boats based in Geraldton also harbour at Kalbarri and frequently up to 20 boats may be moored in the River prior to opening of the Abrolhos Island season in March which extends to June.

Periodically, the number of boats in the River may reach anywhere between 50 and 100 comprising boats seeking to fish the edge of the continental shelf, the "big bank", also harbouring at Kalbarri before heading out to sea.

There are five wet line fishing boats currently based at and operating out of Kalbarri. Restrictions on wet line fishing now limit commercial fishing to specific days of the week.

The fleet is anchored at two sets of pens at the northern end of the Townsite with a combined capacity for 34 boats together with a separate fuelling and unloading jetty. Additional swing moorings are also available in the River.. Annual dredging of the River mouth and navigation channel is required. General maintenance and mechanical repairs are undertaken at the pens. More substantial maintenance or repairs are undertaken at Geraldton. Given the size and likely future of the resident fleet, it is unlikely that more substantial maintenance facilities would be viable or serviceable given the skills base in Kalbarri.

It seems likely that resource management restrictions are likely to be extended over time with the effect of further reducing the number of cray pot licences together with further restrictions on wet line fishing. Accordingly, the fishing industry in Kalbarri could be expected to decline over time.

### **5.2.3 Retail**

Kalbarri is serviced by two relatively small 7 day supermarkets and a range of smaller convenience stores including butcher, newsagent, pharmacy, boutiques, liquor store, post office, fast food and limited tourist retail. Comparison style goods are very limited and as a consequence there is considerable retail leakage to Geraldton. Retail within Kalbarri is fragmented between four principal locations. Floorspace data is not available but is estimated to be in the order of 2,000m<sup>2</sup>. Retailing in Kalbarri employs approximately 10% of the workforce.

A small convenience centre is proposed at Port Kalbarri and will be limited to local, daily convenience needs and take away food so as to retain the primacy of the Townsite as the main retail centre.

There is a clear need within Kalbarri to provide for a primary dedicated retail precinct to service the convenience and comparison retail needs of the resident and visiting population. Kalbarri's isolation combined with a target population of 5,000 residents plus visitors should support a smaller district level retail centre in the range of 7,500m<sup>2</sup> gross leasable area (gla), requiring an overall site area in the order of 3ha. A centre of this size would enable a broad range of convenience stores as well as provide for a greater level of comparison stores including clothing, footwear and electrical / white goods. Tourist retail should be provided separately and there will continue to be a need for local convenience centres at Port Kalbarri and the Anchorage area.

### **5.2.4 Light Industry**

A Light Industrial Area (LIA) is located to the east of the Townsite. The LIA accommodates a limited range of service and light industrial activities related primarily to mechanical and building services required and supportable by the Townsite.

Most lots within the LIA are in the order of 2,000m<sup>2</sup>. Significant portions of the LIA remain to be subdivided and the intensity of development on existing lots is low with the majority of sites seeming to achieve floorspace levels approaching only half of that permissible under the Town Planning Scheme.

There is however, from a longer term perspective, limited opportunity for activities such as constructional and building materials storage, transport depots that require a much larger site area. It is not practical nor desirable that large land area uses be located within the LIA as the cost of land is higher and the presence of such uses in the LIA will place pressure on land accessibility in the LIA as well as present a potential dust / noise nuisance to lighter service industries. There also exists a range of other uses which either require substantial land areas or are not suitable for close town locations that may require to be accommodated.

The land to the immediate east of the LIA comprises a reserve vested with Council for waste disposal and other purposes. Should a need for such activities become evident in the future, consideration may need to be given to excising a portion of the Reserve and providing basic services and infrastructure for accommodating such activities east of the LIA.

### **5.2.5 Future Employment**

The high dependency on tourism for employment is undesirable, if not perilous, for the long term economic sustainability of Kalbarri. Additionally, it carries with it a high social cost in that there is limited training and limited employment for youth of the district, necessitating them to move to elsewhere for training and employment. While tourism to Kalbarri has survived a range of impacts on the tourist industry including terrorism and fuel price rises, the tourism market is notoriously fickle and, in the context of regional locations such as Kalbarri, heavily dependent on the largesse of external agencies and promoters including Government, tourism operators and airlines.

There is a clear and pressing need for Kalbarri to engage in the growth occurring in the broader Mid- West and position itself as a viable, if not desirable, alternative residential and commercial location to Geraldton.

It is not inconceivable for Kalbarri to offer itself as an alternative office location for Mid-West based resource companies or educational / research establishments that can benefit from the resources of the location or the access to a quality lifestyle for their employees. At a lower scale, there is the opportunity for Kalbarri to investigate and develop a range of enterprises that not only reduce the need for "importation" of goods and produce such as vegetables and fresh produce, but also develop small but sustainable markets within the narrower region.

The expansion of Kalbarri's economic base will require an innovative marketing and promotional strategy that:

- should be driven by key stakeholders in Kalbarri with assistance from State and Local Government;
- provides a suitable area for emerging enterprises with approvals obtained to enable land to be "rolled out" with minimal delay; and
- provides comparatively low cost land, including consideration of alternative approaches such as lease / buy, to reduce initial establishment costs and provide Kalbarri with a financial edge over alternative mainstream locations.

## **5.3 BUILT FORM AND LAND TENURE**

[Fig 5.1 – Aerial Photo] [Fig 5.2 – Approved Port Kalbarri Structure Plan]

The existing Kalbarri Townsite essentially comprises four main built precincts which, for the most part, are within comfortable, if not easy, walking or cycling distance of the river and ocean foreshores which are central to the overall attraction and ambience of Kalbarri.

The principal urban precincts are :

- The Anchorage : Situated at the northern extremity of the Townsite, the Anchorage comprises a predominantly tourist and convenience retail precinct focussed on the eastern stretches of the River

and fishing boat pens and service areas. The precinct includes a major tourist resort, large caravan and camping park, a youth camp and local commercial facilities including Post Office, Hardware, Liquor Store, Fast Food and Café. The foreshore lands include a developed open space area with picnic / bbq facilities, boat launching ramps and a large vacant area adjacent to the ramps originally set aside for boat servicing and maintenance purposes but never used for that purpose, nor likely to be. East of the current built area is a significant area of essentially north facing, vacant land with an extensive river outlook. The foreshore forward of this land, though "rocky" is particularly attractive and coming under increasing recreational pressure.

- Old Kalbarri : Comprising the old northern residential portion of Kalbarri, this area comprises two main sub-areas being the western portions of typically 1,000m<sup>2</sup> lots and the balance eastern half being typically lots of 800m<sup>2</sup> to 850m<sup>2</sup>. The majority of housing in the area is old, typically of fibro construction and generally of average to poor condition. Many of the houses through this area are either holiday homes or rented to tourists and, as a consequence, there are a high number of vacant homes. The letting of homes for short stay purposes is starting to generate amenity impacts between residents and visitors.

Commercial tourist accommodation within Old Kalbarri is largely located within the southern, western edges of the precinct and adjoining the foreshore. The majority of the tourist accommodation appears to date from the 80's and, while in generally good condition, is in need of major refurbishment and, in some cases, re-development. The southern most foreshore frontage also includes some limited tourist commercial facilities notably restaurant and retail.

- Core Tourist & Commercial : Broadly located central to the overall Townsite area, the Core could probably be best described as an aggregation of tourist, commercial, community and recreation land uses with little cohesion and much of it in need of re-development with some sites, such as the hotel / motel in dire need of demolition. The fragmentation of the area is largely a product of the lack of more detailed planning direction in and subsequent to the Kalbarri Plan 1992.

The precinct comprises a range of tourist uses including hotel / motel, caravan parks, resort style villas, tourist information centre, two separate shopping areas, food establishments, community facilities and core education, medical and health facilities.

The precinct fronts the river foreshore, a key resident and visitor resource but remains separated from it by Grey Street.

The precinct, which could be very loosely defined as Kalbarri's Town Centre, is backed by a major recreation and sportsground area that is frequented daily by native fauna and provides a strong visual and physical link between the Townsite and the bushland areas to the west. It is an important area in the context of Kalbarri's ambience and visual environment and retains the potential as a major focus for

visitor and community activities and interaction. In many respects it should be afforded the status of Kalbarri's "Kings Park".

There is an overwhelming need for substantial "re-planning" of the Precinct with the provision of significant planning incentives to achieve early re-development, particularly of key sites and integration with the river foreshore.

- South Kalbarri : Situated in the south western portion of the Townsite, the area primarily comprises later residential development and subdivision with mixed commercial tourist accommodation towards the central Core precinct. Residential development in the area dates predominantly from the late 80s onwards with some better located properties having been redeveloped more recently with substantial homes. The older northern portion comprises lots typically in the 1,000m<sup>2</sup> range while lots in the relatively newer southern areas are typically in the range of 800m<sup>2</sup>+

Commercial tourist accommodation within South Kalbarri is largely located within the eastern, northern edges of the precinct and adjoining the foreshore. Similarly, the majority of the tourist accommodation appears to date from the 80's onwards and, while in generally good condition, is need of major refurbishment and, in some cases, re-development. The eastern most foreshore frontage also includes some limited tourist commercial facilities notably retail.

Additional to these is Browne Farm, located approximately 3km to the south of the main Townsite and separated from the main Townsite by Wittecarra Creek, a significant landscape and environmental feature of the broader location. The area was formerly a farm and is the subject of an previous Structure Plan which provided for a range of housing but predominantly single housing at conventional densities. The approved Structure Plan provides for approximately 500 lots and the construction of a new access road to the main Townsite crossing Wittecarra Creek approximately 1km east of George Grey Drive. Approximately 600 lots from this area are currently being subdivided and mostly lie vacant. The new structure plan provides for an extra 200 lots of lower density and special rural. These are envisaged as lifestyle. The Structure Plan also provides for two Tourist sites, of which the primary site overlooking the Ocean is the subject of a current Development Approval. Previous structure planning around Browne Farm provided for Community and Retail sites are also proposed but not currently developed. Kalbarri is also serviced by a Golf Course and a small Services / Light industrial area to the east of the main Townsite.

#### **5.4 RIVERINE ENVIRONMENT**

The Murchison River is the core of Kalbarri Townsite's attraction as a tourist and holiday destination. The existence of a major and relatively "deepwater" river system is, in itself, unusual along the western seaboard and, other than for Perth, provides a setting unique to west coastal settlements. Additionally, the alignment of the River provides the Townsite with the effect of a north facing bay, a most valued orientation on what is an attractive but regularly, wind swept coastline.



The River mouth and adjacent reef systems provide a dangerous access to the high energy marine environment of Gantheaume Bay for the fishing fleet and pleasure craft. The traditional use of the River as safe harbour for the resident and visiting fishing fleet continues, and will continue notwithstanding likely future reductions in the fleet, to influence the management of the River and channel which requires annual dredging. Additionally, the River is subject to periodic flooding, the most recent and severe in March, 2006.

The River and foreshore have historically been an important recreation resource for the Nanda Aboriginal group and the River environs include areas of significant heritage value to the Aboriginal community.

Both the northern and southern River foreshores comprise Crown Reserves. The southern foreshore from the River mouth to immediately east of the fishing fleet pens at the Anchorage has been grassed and provided with a range of facilities including shade structures, bbq / picnic facilities, seating, parking areas and two boat launching ramps with a large associated parking area. The southern foreshore east of the Anchorage is coming under increasing pressure. Though "rocky", the area is particularly attractive and in need of institution of appropriate management to reduce the impacts of indiscriminate use and off-road vehicle activities. The area is becoming highly degraded and its condition is worsening.

A foreshore development and management plan has been prepared and is being progressively implemented for the main foreshore adjacent to the Townsite east to the Anchorage and a foreshore development and management plan is to be prepared in the near future for the southern foreshore east of the Anchorage.

The mouth of the River and the waters adjacent to the Townsite are subject to intense competition for use by recreational swimmers and boaters, recreational and commercial fishing vessels accessing the ocean and tourism activities which is continuing to increase. As a consequence, existing conflicts and issues can be expected to intensify including:

- Ensuring the safety of swimmers from boating traffic and the need to ensure clear demarcation of boating channels for swimmers;
- Conflicts between swimmers and other recreational users of non-powered craft, including commercially hired craft;
- The need for emergency response measures in the event of fuel spills or other localised contamination; and
- The impacts of the adjacent urban development on maintenance of water quality.

Additionally, the River supports a number of commercial tourist operations including river cruise boats, powered and non-powered hire craft and water based tours such as canoeing tours. The approval and Licensing of all River based activities is under the care and management of the Department of Planning and Infrastructure, often operating in isolation of Council.

Given the increasing pressures on the River and adjacent foreshore together with :

- Council's role and responsibilities and its objectives in developing and managing the Townsite foreshore;
- Council's role and responsibilities in planning and managing the broader Townsite; and
- amenity considerations of residents and visitors relative to activities on the River and particularly noise;

it is important that DPI, as a matter of course, seeks the comment and recommendation of Council on all applications pertaining to the use of the River.

## **5.5 HERITAGE**

### ***5.5.1 Aboriginal Heritage***

[Appendix I – Aboriginal Heritage]

A search of the Department of Indigenous Affairs (DIA, 2007) Register of Aboriginal Sites was conducted for the Study Area.

A total of 37 registered sites of Aboriginal heritage were located within close vicinity of the Kalbarri Townsite, with five sites identified as intersecting the Townsite.

It may also be possible that there are unregistered sites in the project area and it is recommended that the proponent liaise with the DIA and potentially the Native Title Claimants concerning any potential unregistered sites.

### ***5.5.2 Native Title***

The National Native Titles Tribunal (2007) recognise one active registered native title claim over the area. The registered claim is under the Nanda People – WC00/13.

Expansion of the Townsite will, for the most part, occur within land that is currently Unallocated Crown Land. It will be necessary for such areas to be subject to resolution of Native Title procedures and the establishment of an appropriate Indigenous Land Use Agreement with the Nanda People.

### ***5.5.3 European Heritage***

[Appendix J – European Heritage]

A search of the Australian Heritage database (DEWHA, 2007b) was conducted to determine the likelihood of the project impacting upon a listed World Heritage Site, National Heritage Site, Commonwealth Heritage Site or site listed on the Register of the National Estate.

A search of the Heritage Council of Western Australia's (2007) Heritage Places database was also conducted to determine the likelihood of the project impacting upon a Western Australian listed heritage site inclusive of those listed on the local council Municipal register.

In addition to those sites listed in Appendix J, Chinaman's Point is also considered to be of local cultural significance (Shire of Northampton, 2003).

## **5.6 COMMUNITY SERVICES**

[Fig 5.1 – Aerial Photo]

### ***5.6.1 Education***

Kalbarri is serviced by a District High School providing the full spectrum of education levels from Pre-School to Year 12. The Kalbarri District High School was originally constructed as a Primary School only and in 2001 was expanded to a District High School to include Years 8 to 10. Total enrollments at that time were in the order of 90 children.

Further substantial expansion of the school was undertaken in 2007 so as to provide Year 11 and 12 students with a fuller range of educational choices for which most students previously had to travel and board either in Geraldton or Perth. Sixteen Year 11 and 12 students were enrolled for 2007 and in 2008 total year 11/12 numbers are expected to be in the order of 30 students with total enrollments in 2008 of some 270 students. The school has a current student capacity of 400 students comprising 260 Pre and Primary and 140 High School. The KDHS has a total site area of approximately 6ha.

The KDHS encourages community access to all its facilities. The site is unfenced and the sports field is used by community sporting groups.

A target population of 5,000 residents will require substantial expansion of education facilities within the Townsite and specifically three Primary Schools. At this level, it is conceivable that the District High will need to convert to a full Senior High School in order to accommodate the number of Year 8 to 12 students within the system. Accordingly, the Strategy needs to provide for:

- Two dedicated Primary School sites of 4ha each distributed between the core Townsite and southern extension of the Townsite; and
- Retention of the existing KDHS site as a dedicated future Senior High School site. The existing site area at 6ha is below the minimum recommended of 10ha. However it adjoins land reserved for but not vested as Public Open Space area which could be developed if required to accommodate future sporting fields with joint community / school access.

### **5.6.2 Health & Medical**

Medical services within Kalbarri are well catered for by both a private General Practitioner and a substantial Health Centre located within the main Townsite area.

A GP operates between Kalbarri and Mullewa providing two days per week general consulting in Kalbarri. In the absence of the GP, the Health Centre provides general consultation services. A Physiotherapist also operates within the Town.

The Kalbarri Health Centre was constructed in 1998, prior to which only Nursing Post services provided by Silver Chain were available to the Town. The Health Centre is on a site of approximately 5,000m<sup>2</sup>, adjoining the GP Clinic, and comprises a four bed Emergency Ward and four Bed In-patient Ward and is fully staffed with Registered and Enrolled Nurses and Assistants but does not have a resident Doctor; relying instead on the services of the local GP. The Health Centre also has limited X-Ray facilities and provides in-home Home and Community Care (HACC) services to elderly residents of Kalbarri, including Meals-on-Wheels. Visiting specialist services are also operated from the Centre including Dental, Physiotherapy, Podiatry, Speech, Occupational Therapy, Dietician and Child / Antenatal Care.

The Emergency Department receives all cases, including road trauma, within a service area from the North West Coastal Highway south to approximately Port Gregory. The primary objective of emergency services is to stabilise the patient to enable ambulance transfer to Geraldton Regional Hospital for treatment. Lesser cases including minor fractures can be managed directly within the Health Centre, utilising the services of the local GP as necessary. During 2007, the Health Centre dealt with an average of 250 -300 patients per month in peak periods and 200 to 250 patients in non-peak periods. In-patient stay is generally limited to cases where no more than a three to four day stay is required, although the Centre has discretion and has also accommodated local palliative patients, respite and minor acute care requiring longer periods of stay. Typically, cases requiring extended stay and higher levels of acute care are transferred to Northampton where more substantial in-patient facilities are available.

The capacity of the Health Centre to handle a major emergency or outbreak is extremely limited and would necessitate assistance being brought in from Northampton and Geraldton to manage cases that could not be transferred to Northampton or Geraldton Hospitals.

Based on a target population of 5,000 residents plus tourists, the Health Centre site will require expansion in order to cater for a substantial upgrading providing for:

- Resident Medical Officer / Doctor;
- Expanded emergency consultations department;
- Eight bed Emergency Ward and twelve bed In-patient Ward with attenuate nursing and support staff;  
and

- Expanded support and ambulance services.

Additionally, there is a critical lack of aged care services within Kalbarri and particularly hostel and nursing care which logically should be provided as an adjunct to the Health Centre. In this respect, Council has secured a site for an Aged Care Hospice opposite the Health Centre, on the corner of Glass and Kaiber Streets. Construction of the facility is dependent upon Federal Government funding. A retirement village is also envisaged to be located at the northern area of the existing Browne Farm area.

The Health Centre is supported by two ambulances with a new ambulance to be delivered in 2008 and a further ambulance proposed for 2009. The ambulance service is operated entirely by volunteers and also provides first aid and advanced training for various other groups and organisations within the broader region. The requirement for patient transfers to Northampton or Geraldton frequently places a strain on services. The depot is situated on a single lot located adjacent to the Health Centre and comprises administration, training and supplies storage areas in addition to garaging for the ambulances. The site is becoming too small for the services needs with no room for expansion on the current site. The Ambulance service will require re-location to a new site with improved accessibility to the broader Kalbarri area and regional road links.

### ***5.6.3 Fire and Emergency Services***

Kalbarri Fire and Emergency Services are located on a joint site of approximately 3,500m<sup>2</sup> within the centre of Kalbarri. Fire services comprise light and heavy tankers together with road trauma and hazardous materials equipment. The Kalbarri Fire Service provides back-up services to fire services within the National Park. Additionally, in the event of a bushfire; the Fire Service is able to call on a range of earthmoving equipment and water tankers from businesses within the Townsite and the Shire. The local air charter service can also be seconded as required for spotter purposes. Fire services equipment is limited to two storey development.

State Emergency Services comprise light truck and rescue services in addition to a trailable light boat for flood rescue and management.

A projected Townsite population of 5,000 persons and visitors will require expansion of current services to provide for an additional light and medium tanker. It is preferable that the additional equipment be stationed at Browne Farm, within which provision has previously been made for a fire services site. The exact location will require further investigation.

A Volunteer Sea Search & Rescue service operates from a control centre adjacent to the Town boat ramps.

### ***5.6.4 Police & Judicial***

The Kalbarri Police Station is located within the Town retail precinct on a site of approximately 4,000m<sup>2</sup>, including the Station Officers residence. The Station is manned by only three officers and because of shift

limitations and the need for all officers to travel in pairs, duty hours are limited to four main shifts per week, including Friday and Saturday afternoon and evenings. The Station district extends from Lucky Bay to the south to the North West Coastal Highway in the east and approximately mid-way to the Billabong Roadhouse to the north.

Crime and misdemeanor rates within Kalbarri are relatively low with total infringements and cautions for 2007 totaling 152. The positioning of the Station in the retail precinct and with a clear view of the foreshore has a positive effect on overall policing with the Townsite in that it presents a visible police presence as well as providing Officers surveillance of events outside. It is the preferred position of the Police that the Station be retained in its present location with the Officers residence retained as part of the overall Station complex as it facilitates improved response times in the event of call out or an emergency.

In addition to normal duties, Officers of the Station also co-ordinate the Kalbarri Volunteer Sea Search & Rescue service.

Judicial services are provided by a monthly JP Court and a quarterly Magistrates Court, both of which are held within the main Station building.

A target Townsite population of 5,000 persons plus visitors will require the Station, which is scheduled for replacement in 2017, to be redeveloped as a Full Time Day station with up to eight Officers and associated administrative and judicial services. It is questionable whether the current site would be large enough to accommodate an expanded Station and Court facilities.

### ***5.6.5 Civic & Cultural***

Civic and Cultural services within the Townsite are provided by the Shire at a regional office facility – the Allen Centre – located centrally to the Townsite and shared with the Kalbarri Visitor Information Centre. The Centre includes basic administrative services including office facilities for key Shire professional officers who are located at Kalbarri during specified days of the week. The Centre also provides a base for local engineering and works staff as well as a meeting facility both for local residents / community groups and Council events. The Centre also contains a Library which is managed and maintained by Shire Staff.

Larger community gatherings are catered for at the Kalbarri Sport and Recreation Centre, also located central to the main Townsite area, which is managed by the Kalbarri Sport and Recreation Club under lease from Council.

Growth of the Townsite to 5,000 persons plus visitors will require a significant upgrade of current facilities to include expanded administration and library services. Other cultural services within the Town are limited and there is no general recreation and cultural facility. The existing Allen Centre site is small and expansion of broader civic and cultural facilities will require either expansion of the current site or identification of a new civic and cultural precinct.

### **5.6.6 Cemetery**

A cemetery site has been developed at the eastern extremity of the Townsite adjacent to the National Park. The cemetery was established in 1983 but has only been used for burials in more recent times. No cremation facilities are available and the cemetery has an area of approximately two hectares with the opportunity for considerable expansion to the north.

## **5.7 RECREATION & OPEN SPACE**

The primary open space areas within Kalbarri are the River Foreshore and the Sports and Recreation Ground located centrally to the Townsite.

The River Foreshore, which is grassed, reticulated and provides a range of facilities, substantially compensates for the lack of open spaces within Kalbarri, other than for within the newer subdivision of South Kalbarri. The foreshore is within 500m of the eastern most section of Old Kalbarri and for most residences within a 5 minute walk.

The Sports and Recreation Ground is also a key feature of Kalbarri, although access to it is largely limited to the southern approaches as a consequence of remnant bushland to the north. It is a significant component of Kalbarri's open spaces and in many respects it can be regarded as Kalbarri's "Kings Park". The facility comprises a large grassed field capable of a range of sports, including football. The field requires re-levelling and the adjacent clubroom facilities have been the subject of a major extension. The area provides a strong link to bushland areas to the east and is regularly frequented by native fauna. The overall facility is under-utilised at present but has significant potential as a major recreational focus for Kalbarri residents and visitors. The facility provides the opportunity for greater recreational interaction between residents and visitors through semi-organised sporting and social activities, heightening the attractiveness of Kalbarri as a holiday destination, particularly for families.

The District High School sports field is also used by community sporting groups.

To the east of the Townsite is the Kalbarri Golf and Bowling Club, an 18 hole reticulated course with a new and substantial clubhouse and two bowling greens. The course has only recently been expanded with the second nine and the course is reticulated with waste water from the Water Corporation Wastewater Treatment Plant to the near south-east. Stringent health requirements apply to the use of water from the Treatment Plant due to its low level of treatment including the need for the water to be mixed with bore water. The Golf And Bowling Club is open to visitors and would, in terms of the standard of facilities available, would have few comparisons within country locations. Similarly, it represents a significant recreational asset to Kalbarri, both for residents and visitors with the potential to become a major "country club" style facility for all.

To the immediate north of the Golf and Bowling Club are public tennis and basketball / netball courts. The courts are lit for night sports and include four tennis courts and two basketball / netball courts. Access to the

courts is convoluted and through residential streets. It would be better if the courts had been located closer to the Town core and primary tourist areas so that they afford another stream of recreational activities for visitors and particularly families and younger people.

As an older subdivision, there are fewer parks or open spaces within Old Kalbarri. Residents within the western most portion have no open space but are within only a short distance of extensive foreshore open space areas. The "newer" eastern portion contains two, large grassed open space areas in the central (5,400m<sup>2</sup>) and southern portions (6,000m<sup>2</sup>), providing good accessibility to open space for residents. Many of these homes also remain within reasonable proximity of the foreshore open spaces, access to which is, at most times, relatively safe from traffic.

South Kalbarri, having been planned and subdivided in relatively more recent times, has been screened from Red Bluff Road by a buffer strip comprising native vegetation and provided with the normal 10% public open space requirement. The open space areas have, for the most part, been left as remnant vegetation. The combination of the vegetated buffer and un-developed open spaces has, by default, created an attractive residential environment that compliments the proximity and connectivity of Kalbarri to surrounding bushland areas. There is a need however to review and evaluate the longer term role and management of these areas of open space to enhance and ensure the survival and protection of the remnant vegetation and to improve broader utilisation and security issues in the context of other available open space areas in the location and primarily the High School sports grounds.

Kalbarri does not have a public swimming facility. Public pools are typically expensive to build and maintain and entry fees rarely cover operating costs. Moreover, conventional pools appeal to only a limited sector of the population and a combined pool / water playground facility is a higher cost option and, to a degree, a duplication of facilities.

The likely eventual upgrading of the High School to full Senior High School status will typically include construction of a swimming pool. There are opportunities in this respect for Council to engage with the Education Ministry to secure joint use of the facility with the community.

It is considered that greater value would be achieved from development of water play facilities and specifically the construction of a moderate sized "water playground" in association with a recreation and cultural centre. Construction of water play facilities within the River, though an attractive option, is not practical on safety grounds as a consequence of variability of water depth and limited visibility to the River bottom.



## 5.8 CONSULTATION AND COMMUNITY OUTCOMES

### *5.8.1 Consultation Programme*

Extensive stakeholder and community consultation has been an integral component of the preparation of the Kalbarri Townsite Strategy with the objective of ensuring that:

- All viewpoints, related issues and community values and aspirations in respect of the Townsite are identified early in and addressed through the planning process; and
- The Townsite Strategy enjoys the broadest, practical and achievable support within the “community of interest”.

The principles underlying the approach to the consultation process have been:

- A clearly defined and transparent consultation process;
- A process that provides opportunities for all stakeholders to participate and obtain feedback; and
- Respect for all viewpoints expressed.

Three Phases of consultation were undertaken.

### *5.8.2 Phase 1 Consultation*

Phase 1 Consultation comprised the following principle steps:

- Press releases to community based newspapers and specifically the Kalbarri Town Talk, Geraldton Guardian and interview on ABC Radio to announce the Strategy Review to landowners and the broader community and invite submissions and registrations for future Workshops;
- Key Agency and Community Stakeholder identification and interview; and
- Invitations to all stakeholders and the Kalbarri Community through the Kalbarri Town Talk to the Phase 1 Community Workshop.

The Phase 1 Community Workshops (Workshops #1 & #2) were held on the evenings of the 10<sup>th</sup> & 11<sup>th</sup> December at the Kalbarri Sports & Recreation Centre and proved to be particularly valuable in respect of the gaining an appreciation of the community issues and views that need to be addressed in the preparation of the Kalbarri Townsite Strategy.

Workshop#1 on the Monday evening was attended by approximately 40 community members and sought to address three primary questions and specifically:

- What is unique about Kalbarri and what does the community value about Kalbarri and the way it has developed?
- What does the community dislike about Kalbarri and the way it has developed?
- How does the community wish to see Kalbarri develop?

The Values, Issues and Directions of a "spatial" nature directly impacting on the planning and distribution of land use within the Townsite are discussed further in this section.

Unfortunately, Workshop#2 clashed with the High School Graduation Evening and some Xmas functions which prevented a number of Monday night participants returning. However, some residents who were unable to make Monday night attended the Tuesday Workshop, providing a total attendance of approximately 20 residents.

Workshop#2 required participants to plan Kalbarri as they would like to see it based on a future population of 5,000 persons and a "shopping list" of key land use requirements. Each table was facilitated by a Planner and provided with base mapping of the Townsite. The key features of the resulting plans are discussed further in this section.

### ***5.8.3 Phase 1 Outcomes - Community Values***

The Key Values identified by the community are:

- Tourism is the economic mainstay of Kalbarri and the basis for which Kalbarri enjoys a very high level of services and facilities well beyond that of comparable sized Towns.
- Kalbarri enjoys a unique setting on the River and adjoining extensive natural bushland giving it a strong sense of close connectivity with nature visually from the ever-present views of the National Park, bushland, the River and the Coast; and physically through the large areas of bushland within Town and the presence of both avian and terrestrial native fauna.
- Kalbarri's isolation makes Kalbarri a destination to which people choose to come and has protected it from conventional urban sprawl and the lack of character of suburban Perth.
- As a residential and tourist location, Kalbarri has a year round holiday atmosphere or "holiday at home".
- The compactness of Kalbarri, particularly in respect of the location of resident and visitor services and facilities, facilitates a high level of walkability / cyclability.
- Kalbarri enjoys a strong sense of community identified by a high level of acceptiveness and inclusiveness between residents and towards visitors and care for other members of the community.
- Kalbarri has progressed to now attract and maintain a diverse age and family structure.

#### ***5.8.4 Phase 1 Outcomes - Community Issues***

The following are the principal Issues to be addressed as identified by the community:

- The lack of any structure to the Town and seemingly haphazard planning has resulted in a number of deficiencies including:
  - no Town Centre
  - no office or business space
  - no aged hostel / nursing home
  - inadequate retirement accommodation
  - lack of rental housing and staff accommodation
  - residential amenity impacts of dispersed holiday housing
  - limited activities for youth.
- The lack of employment for school leavers and the young and limited post-Secondary training opportunities.
- The need to maintain larger lot sizes to facilitate and encourage good climatic design, accommodate recreational vehicles off the front lawns and verges and to retain Kalbarri's difference in urban form.
- Ensuring the long term quality and security of the Towns water supply through more sustainable practices in the use of water and its re-use / re-cycling.
- Ensuring the long term adequacy and reliability of power supplies.
- The need to re-consider the alignment of Nanda Drive north to reduce amenity impacts on the existing residential area.
- The need to ensure that traffic management and parking provision keeps pace with growth and development.
- Increasing conflict between users of the River Foreshore including increasing parking of 4WD vehicles on the River beaches.

#### ***5.8.5 Phase 1 Outcomes - Community Directions***

The Kalbarri Community have a clear "sense of direction" as to how the future form of Kalbarri should evolve. The Values identified by the community are held very deeply and clearly help distinguish Kalbarri from many other rural

and coastal locations. Their preservation and enhancement where possible is critical to broad acceptance and ownership of the Townsite Strategy.

Key Principles emanating from the Workshop discussion are:

- Significantly and independently of any population projections, a broad consensus of an "Optimum Foreseeable Population" for Kalbarri in the order of 5,000 residents plus visitors.
- Clean, green and environmentally aware Town through sustainable design and development that utilises land, water and natural resources in a responsible manner and accommodates the potential impacts of changing climate.
- Smarter residential planning that maintains the "feel" of Kalbarri and its connectivity to the natural environment.
- The need to broaden the economic and employment base of the Town to reduce Kalbarri's reliance on the tourist industry.

The three plans generated at Workshop#2, though different in many respects, contained a number of elements of commonality. Key Principles emanating as broadly common concepts are:

- An "outer" route to Nanda Drive north;
- Connection of the existing Townsite with Kalbarri Vision;
- Enhancement of strong green links and faunal corridors within the existing and expanded Townsite;
- Broadly lineal expansion of tourism opportunities parallel with the River Foreshore;
- Retention and enhancement of the current Sports & Recreation Centre precinct;
- Establishment of the Town Centre based around the Allen Centre / existing shopping precincts, including retirement accommodation;
- Expansion of residential and foreshore recreation north-east of Anchorage Lane;
- Increased residential opportunities around the Golf Course;
- Traffic calming / closure of Grey St between Porter and Woods Streets;
- Extension of future Townsite residential south along Red Bluff Road to Wittecarra Creek; and
- Enhancement of the Tourist Precinct north of Wittecarra Creek.

The Values, Issues and Directions identified by the community provide a deep insight into the aspirations of the community and a strong and sound basis for the development of the Townsite Strategy.

#### **5.8.6 Phase 2 Consultation**

The Phase 2 Community Workshops (Workshops #3 & #4) were held on the evenings of the 10<sup>th</sup> & 12<sup>th</sup> March, 2008, again at the Kalbarri Sports & Recreation Centre.

Workshop#3 on the Monday evening was attended by approximately 30 community members and presented:

- A Draft Statement of Key Issues impacting on the longer term planning of Kalbarri for community discussion and confirmation; and
- A Preliminary Draft Townsite Strategy for questions of clarification to enable more closer discussion and confirmation at the Workshop#4.

The outcomes of discussion on the Draft Key Issues are reflected, as appropriate, in the Key Issues identified in Section 8.1. Additionally, attendees were provided with an overview of the Key Issues and Draft Strategy to take away to discuss and consider in preparation for Workshop#4.

Workshop#4 on the Wednesday evening was also attended by approximately 30 community members and, in working groups, discussed and evaluated the Preliminary Draft Strategy. Table outcomes were presented in the context of likes, dislikes, alternatives and missed opportunities.

#### **5.8.7 Phase 2 Outcomes**

With some minor modifications, Workshop #4 resulted in broad support for the concepts and proposals presented in the Preliminary Draft Townsite Strategy and in particular:

- The Outer Route to Nanda Drive;
- Closure and diversion of Grey Street from Woods to Porter Streets; and
- Three and Four Storey building heights in the specified locations only.

The modifications suggested are addressed in the Draft Strategy.

#### **5.8.8 Phase 3 Consultation**

Phase 3 Consultation comprised the formal advertising of the Draft Strategy from January to March 2010 under the Local Planning Strategy processes of the WA Planning Commission. Copies of the draft were placed in the Shires Libraries at Northampton and Kalbarri, on the Shire's website and forwarded also to various State Agencies and Key Stakeholders for formal comment.

The outcomes of Phase 3 consultation, and submissions from State Agencies, Key Stakeholders and the community are presented at Appendix K to the Strategy, together with staff recommendations and Council's resolution in respect of each submission.

The outcomes of the Phase 3 Consultation are reflected in the Final of the Kalbarri Townsite Strategy – December 2010.

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## 6. UTILITIES & INFRASTRUCTURE

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### 6.1 ROADS & TRANSPORT

#### *6.1.1 Roads, Paths & Parking*

Regional road access to Kalbarri is by sealed road from the North west Coastal Highway either:

- Directly from the East via the Ajana - Kalbarri Road; or
- From the south from Northampton via Port Gregory;

All roads within the Townsite are bitumen sealed, varying from average to good condition. Within Old Kalbarri, road condition tends to be lower and there is a need to review pavement widths and design to reduce overall re-construction costs and improve pedestrian safety through traffic speed reduction initiatives. Additionally, reserve widths in Old Kalbarri are typically 20m and verges largely unkempt as a consequence of number of factors including water and the higher than normal level of absentee owners; while in South Kalbarri a range of narrower reserve widths are employed and verges typically are better maintained.

From an overall aesthetic viewpoint, there is a need to investigate practical and low cost, low maintenance approaches to verge development and maintenance so as to improve the overall presentation of the Town to incoming visitors and tourists.

The only "cross-Town" access within Kalbarri is via Grey Street which skirts the River Foreshore and connects with the principal access into the Townsite from the North (Kalbarri – Ajana Road) and the South (Red Bluff Road & George Grey Drive).

During peak holiday periods, Grey Street constitutes a significant barrier to pedestrian movement between the River and Town centre and adjacent areas. Traffic counts undertaken in Grey Street during June 2004 forward of the Visitor Centre indicate an average daily traffic flow on Grey Street of approximately 3,000 vehicles per day. Typically, tourist numbers in Kalbarri in June are half of that of the peak season. Given that the majority of visitors access Kalbarri by car, peak season traffic flow on Grey Street is likely to be in the order of 5,000 vehicles per day.

Given a target population of 5,000 residents plus 10,000 visitors, traffic flows on Grey Street forward of the Visitor Centre during peak months will increase significantly to between 10,000 and 12,000 vehicles per day. Traffic volumes of this order will impact severely on the ability of pedestrians to cross Grey Street comfortably and safely. The continuing need for Grey Street to remain as a traffic route within the Town Core precinct is highly questionable.

Planning for Kalbarri has provided for an "outer" distributor – Nanda Drive – which connects with the Ajana Road immediately west of the Golf Course and adjoining the eastern edge of Old Kalbarri. Nanda Drive continues in a general southerly direction east of the main Townsite, through the central portion of Port Kalbarri and linking with Red Bluff / Port Gregory Road. While the alignment is currently provided for in TPS9, the final alignment of Nanda Drive remains to be determined as part of this Townsite Strategy. In this respect, the community have expressed a desire for the northern portion, which lies adjacent to the eastern edge of Old Kalbarri, to be relocated to an "outer" route to reduce the amenity impacts of future traffic noise. Construction of Nanda Drive will ease some traffic pressures on Grey Street and facilitate better integration of the Town Core precinct with the River Foreshore.

Public parking areas are generally well distributed within Kalbarri, providing ready access to most facilities and locations with a number of foreshore carparks providing ready access to the River and Coastal areas. The principal tourist areas of Kalbarri are situated within relatively close proximity of each other and of major accommodation locations and connected by pleasant walks, primarily along the River. As a consequence, Kalbarri is a relatively compact and very walkable urban area, a feature noted and valued by the local community.

Retention of Kalbarri's compact nature is considered a key objective of future planning for the Townsite supported by restricted additional parking so as to encourage walking as the principal means of access around Town, particularly for visitors.

The path network within Kalbarri is being progressively developed and of a good standard. Key locations are typically serviced with paths and a pathway system extends all the way south to Red Bluff.

As a consequence of generally low traffic volumes, most locations within Kalbarri do not require formal footpaths as the streets are safe to walk along.

### **6.1.2 Air**

Kalbarri Airport is located approximately 8km East of Town. Completed in 2002, the Airport replaced a gravel strip to the south of Town adjacent to Port Kalbarri.

The runway is sealed and is designed and constructed to take aircraft up to the size of the BAe 146 or equivalent. Currently, there is a basic terminal building.

As a consequence of the distance from the Airport to Town, overall noise exposure forecasts indicate that noise from aircraft operations will not impact the Town. Additionally, single event noise forecasts, such as on take-off, indicate minimal impact on the Town. Similarly, Obstacle Limits for the Airport do not impact the Town.



Kalbarri is presently serviced by four flights a week by Fokker F50 on the Perth to Geraldton / Carnarvon route. The aircraft has a seating capacity of 40 persons but because of through flight bookings, seat availability to Kalbarri is frequently limited and sometimes not available.

## 6.2 WATER

Kalbarri's water supply is drawn from the underground resources of the Tumblagooda aquifer with four extraction bores located 2km to the south-east of Town within the National Park. Browne Farm draws its water requirements from a separate, temporary small bore field immediately south of the development. The Water Corporation also maintains two former production bores closer to Town for monitoring purposes.

The Water Corporation presently is currently licensed to draw 500,000 kilolitres per annum with historical production ranging between 400 & 500,000 kilolitres, below, license allowances. The quality of the water extracted from the aquifer is very high and requires only aeration to remove iron content and chlorination before distribution into the Town. The Treatment Plant is located within the bore field south-east of Town.

The Department of Water has advised that in general aquifer recharge information is very limited, and that no specific recharge statistics are available for the Tumblagooda aquifer at Kalbarri.

However, monitoring of the production bores for Kalbarri indicate that water levels have remained relatively stable, notwithstanding an extended period of below average rainfall; suggesting that the present rate of extraction from each bore is within recharge rates and more importantly sustainable limits; notwithstanding reduced rainfall patterns.

Recharge to the Tumblagooda aquifer is mainly via direct percolation from rainfall where the aquifer outcrops and by leakage from the overlying sediments where the confining Kockatea Shale is absent. Most of the recharge occurs south east of Kalbarri on the sandplain, with episodic recharge from the Murchison River in the east and from streams originating on the dissected plateau during periods of flow. The DoW suggests that the extent of recharge from streams draining the outcrop area is minor since there is little marked effect on the watertable contours.

The Tumblagooda aquifer is a large aquifer covering nearly 97,000km<sup>2</sup> and extending approximately 500 km to the north, 65km to the east and 150km to the south. Broad scale estimates of the sustainable yield from the Tumblagooda aquifer vary from 29 GL/annum to 41 GL/annum; the latter being based on relatively high recharge rates which are unlikely to be reflective of more recent rainfall patterns.

Excluding savings from future water sustainability measures, the projected population of 5,000 persons plus 10,000 visitors will effectively require a doubling of present production rates.

Assuming current production rates, up to an additional five production bores will be required to provide for increased demand including the connection of Browne Farm to the main supply system. The additional bores will be located north-east and / or south-east of Town and subject to adequate spacing to maintain

groundwater levels, could be expected to provide for additional demand within sustainable levels; based on current monitoring outcomes. Notwithstanding, a more detailed analysis of the sustainable limits of the Tumblagooda aquifer at Kalbarri is required.

### **6.3 WASTEWATER**

With the exception of the Services / Industrial Area, the existing Townsite is mostly fully sewerred with the last of infill sewers being completed in 2002/03. The Wastewater Treatment, which requires a 500m buffer, is located approximately 1km east of Town, behind the Light Industrial Area. The treatment site is approximately 6ha in area and is estimated to be about 25% utilised.

Treatment is currently by open lagoon with waste water currently being distributed to the Golf Course for reticulation. Given that the waste water is currently largely untreated, strict health restrictions apply to the use of the wastewater and because of the risk of infection, cannot be used on sporting, playing fields or areas of general public recreation. Restrictions also apply to the use of wastewater on the Golf Course including the need for mixing / dilution with bore water, application times and clear times after application before the course is allowed to be used. The Golf Course currently utilises most of the treated wastewater, with the balance being disposed of through soakage ponds within the existing Treatment Plant.

Population and visitor growth will require expansion of treatment facilities and the Water Corporation is currently undertaking a major review of wastewater treatment options for Kalbarri. The review, which will also examine reuse and re-cycling opportunities, is expected to be completed in late 2008. It seems probable that the Corporation will upgrade the method of treatment of wastewater and as a consequence, there is unlikely to be any requirements for expansion of the Treatment Plant site. Given the extent of existing infrastructure and the limitations imposed by the National Park, re-location of the Treatment Plant is not considered by the Corporation to be a viable option.

Disposal of future additional treated wastewater is a matter of increasing concern for the Water Corporation, particularly in light of the potential risk of increased soakage impacting on groundwater quality and ultimately, seepage into the River. Given the likelihood of an upgrade in treatment systems, it is probable that wastewater from an upgraded plant would, or could be made to, be suitable for re-use on general public open spaces and sporting fields.

The current review clearly presents an opportunity for Council to engage with the Water Corporation to secure a strong commitment from the Corporation to broad scale reuse and re-cycling of wastewater for reticulation of major open spaces and public areas including the Kalbarri Sportsground and River Foreshore, subject in the case of the latter to a suitable level of treatment to ensure no impacts on River water quality from nutrient contamination.

## 6.4 ENERGY

Kalbarri is reliant upon electricity for its energy requirements as there is no natural gas feed to the Town. The reliability of power supply to Kalbarri has been a matter of considerable concern within the community until recent extensions of supply from Port Gregory and line upgrades by Western Power.

Notwithstanding recent improvements, the provision of adequate power to meet Kalbarri's present and future needs is a matter of considerable concern as Kalbarri is, for all intent and purposes located at the "end of the line" for power supply from Geraldton. As a consequence, power drop in transmission lines and consumer requirements in between severely limit current capacity and it is understood that Western Power are unable to supply any new major users, including the proposed Resort within Kalbarri which is currently under construction. Low to moderate residential growth can still be supplied but total available capacity is becoming increasingly limited.

Western Power has commenced a series of major upgrades to overall power supply and generation within the Mid-West including supply to Kalbarri which are proposed for completion by 2011 / 2012.

The proposed improvements to the system include:

- Connection of the Mid-West Grid to the Perth Grid by 2012;
- Additional generating capacity in the northern Perth Grid;
- Upgrading of supply to Northampton including a new sub-station and additional generating power within Oakajee when commenced; and
- Further line upgrades to Kalbarri along the Port Gregory line.

Two wind turbines have been constructed on the Coast south of the National Park to supplement existing supply, however Western Power do not consider current renewable energy technologies to be sufficiently reliable in terms of output to be able to replace base load generation by other than gas or coal.

While the extent of upgrading will considerably increase the overall power supply within the system, the requirements of intervening customers, particularly the garnet mine and beta-carotene plant on the Port Gregory Road and future residential growth at Horrocks, will significantly reduce the net power available for the further growth and expansion of Kalbarri. Accordingly, it is likely that Kalbarri would experience only a "moderate" improvement in power supply capacity. It is not known, but seemingly unlikely, that the upgraded power supply would be adequate for target growth in population and visitors, necessitating additional future longer term upgrading of supply.

There is a pressing need for Council to engage with Western Power / Verve to secure longer term reliable power supply to Kalbarri within the context of this Townsite Strategy, including expanded use of renewable energy sources to supplement the incoming supply to Kalbarri.

## 6.5 WASTE DISPOSAL

Domestic and commercial solid waste, including liquid septage, is disposed of to landfill at a new site approximately 4km east of Town. The site has an area of approximately 10ha and accepts in excess of 1,000 tonnes of wastes per week. Because of limited volumes and transport distances to markets, re-cycling is not currently a viable option within Kalbarri, other than for cardboard which is transported to Geraldton by road. A monitoring bore is maintained at the landfill site and is sampled on a regular basis for contamination of groundwater.

The existing landfill has a projected life in the order of 10 years and the site the potential for up to 30 years, depending on disposal rates.

A projected resident population of 5,000 persons can be expected to generate in the order of 0.4 tonnes per person per annum of waste across all sectors. Combined with an average daily visitor population through the year of 5,000 persons, total waste generation within Kalbarri is projected in the order of 5,000 tonnes per annum, which is broadly consistent with current patterns. Properly compacted, a tonne of general waste occupies approximately 0.8m<sup>3</sup> indicating an annual minimum requirement of around 3,500m<sup>3</sup> tipping volume.

It is evident that the existing landfill site could not accommodate long term waste disposal requirements, without further expansion. The current location of the landfill is not desirable from a longer term perspective as a consequence of increasing risks of contamination of groundwater and resulting impacts on drinking water quality and potentially, the River.

As a consequence, Council is acquiring a site south of the National Park as a long term disposal location for putrescible and hazardous wastes. The current landfill site will be retained for inert and green waste as well as acting as a transfer station to the new landfill which will not be accessible to the public. Development of the new facility is contingent upon funding availability as significant road infrastructure is required to gain vehicle access to the site.

There is also a need for Council to address reduction of the waste stream within practical limits. For the most part, re-cycling is not currently viable nor seemingly likely to be without significant change in re-cycling markets and technologies. Even with these, the distance factor may continue to be a disincentive. It would seem the most effective option would be to reduce the waste stream at point of generation, the home, through such options as the provision, free of cost, of composting technologies to each household and the installation of central composting for commercial waste.

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## 7. SUMMARY OF MAJOR ISSUES

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### 7.1 REGIONAL ENVIRONMENT

#### ***7.1.1 Townsite Strategy Objectives***

It is evident that strategic planning for the Kalbarri Townsite has, to date, been largely broad scale and heavily based on the Kalbarri Plan 1992. Subsequent planning and management studies have sought to build upon the broad framework provided by the 1992 Plan. A number of the premises upon which the 1992 Plan was based are in need of review. The growth and maturation of the Town has given rise to a greater appreciation of the core values and there is a need to embrace higher levels of sustainability.

The objectives of this Strategy, which will likely lead to major review and amendment of Town Planning Scheme No 9, are therefore defined as:

- *To review the broad land use structure and networks having regard for the core values and desired directions of the community while ensuring a high level of on-going sustainability;*
- *To provide a high level of planning and development control guidance within relevant planning areas; and*
- *As appropriate, develop urban design responses within specific precincts to ensure achievement of the desired outcome.*

### 7.2 PHYSICAL ENVIRONMENT

#### ***7.2.1 Climate***

Appropriate landscape techniques can significantly reduce the negative impacts of summer sea breezes as is evident in the older northern areas of Kalbarri. Additionally, high summer temperatures dictate the need to ensure appropriate housing design to reduce the requirement for air-conditioning with associated power demands and impacts on longer term sustainability.

#### ***7.2.2 Extreme Events - Fire***

The continuing risk of bushfire combined with prevailing high wind conditions reinforces the need for a provision and maintenance of a strategic fire break between the Townsite and bushland providing both a break to the movement of fire and a major operating front from which the fire can be prevented from entering Town.

#### ***7.2.3 Climate Change***

It is projected that average rainfall will decrease by in the order of 20% over the longer term impacting on recharge rates of the aquifer from which Kalbarri draws all of its freshwater supplies. There is a need therefore

to ensure the long term sustainable use of groundwater resources requiring both responsible use of the resource and maximisation of re-use opportunities.

While it seems unlikely that Kalbarri would be directly affected by a southward shift in cyclone tracking, it is reasonable to assume that flood events may increase in both frequency and severity and there is a need therefore to ensure that all new development is set at an appropriate level above likely future flood levels.

#### ***7.2.4 Flora & Fauna***

Although the Townsite area is not currently identified as hosting Declared Rare Flora (DRF), it is known to host several Priority Flora species and may host DRF in areas where detailed field surveys have not yet taken place. Any proposed development in the area will require an appropriate level of assessment.

While Threatened Fauna have been identified in the Townsite Area, some of these records are out-dated and potentially mis-represent the range of Threatened Fauna. Any proposed development in the area will require an appropriate level of assessment. Important habitats should be buffered from conflicting forms of development; including the Murchison Coast, Kalbarri National Park and local fauna corridor reserves.

### **7.3 SOCIAL ENVIRONMENT**

#### ***7.3.1 Population***

The resident population of Kalbarri at the 2006 Census was approximately 1400 persons; representing an annual growth rate between 1996 and 2006 of approximately 5% per annum, with a significant movement of younger families into the Town.

Given the significant economic growth being experienced in the Mid-West and continuing strong growth in tourism to the Town and local Region, it is not unreasonable to assume that Kalbarri has the potential to maintain recent growth rates which will generate a resident population in the order of 5,000 persons within 25 years.

A target population of 5,000 persons will require in the order of an additional 2,000 to 2,500 additional new dwellings ranging from conventional single housing through to group, town housing and retirement accommodation.

There are five major locations within and adjacent to the Townsite for accommodating future residential demand and specifically:

- South Kalbarri to Wittecarra Creek;
- Browne Farm;
- Old Kalbarri ;

- East Anchorage; and
- East Golf Course.

It would be desirable from a long term sustainability perspective for preparatory tasks including Native Title approvals and Local Area Planning to be undertaken for the subdivision and development of more leading edge residential estates adjacent to the Townsite so as to reduce "reliance" on Browne Farm as the principal growth area within Kalbarri.

### ***7.3.2 Tourism***

Unsurprisingly, tourism provides the largest source of employment at approximately 25% of the workforce and indirectly, for at least a further 25% of employment within Kalbarri in the retail, support services, light industries and community facilities management sectors.

Overall visitor numbers to Kalbarri have been steadily increasing from around 90,000 visitors in 1996 to approximately 125,000 visitors in 2006. Since 2002, overall visitation to Kalbarri has remained relatively constant at around 120,000 visitors and is likely to be reflective of limited accommodation in the commercial sector, particularly of a reasonable or good standard.

From a longer term regional perspective, Kalbarri is considered to be well positioned as a highly marketable, iconic destination within WA. Key considerations for tourism in Kalbarri are:

- Expanded and improved accommodation reflecting the Kalbarri experience and family orientation;
- Increased activities, particularly for children;
- Increased evening and night activities / entertainment;
- Development of Indigenous Tourism opportunities;
- Expanded eating facilities, particularly mid-priced family establishments;
- Improved convenience retail and particularly supermarket facilities; and
- Improved and cheaper air services.

Anecdotal evidence suggests some 5,000 "visitor" beds across all sectors, inclusive of private residences. Excluding private residences, the total daily visitor population at any one time is estimated at 3,000 persons, a ratio of around 2:1 to the "base" population in commercial accommodation. Given a projected population of 5,000 persons within 25 years would suggest, on a continued 2: 1 ratio, a peak daily visitor population of some 10,000 persons across all sectors, including private holiday homes; essentially a doubling from present estimates.

An increase in daily visitor population of up to 5,000 persons will require a substantial expansion and upgrading of tourist accommodation and the provision of some additional 1500 accommodation units across all accommodation types from caravan chalet parks to resort and quality hotel accommodation. Growth in overall visitation will also require additional land for commercially based visitor activities and attractions.

Many of the proposed improvements to the foreshores and broader Townsite currently proposed come at a significant cost to Council, both in their construction and their maintenance. The rate and income base of the Shire is limited. A mechanism additional to Specified Area rating for raising greater funding for public improvements is required if Kalbarri is to meet its potential as a significant tourist icon and particularly as a major Intrastate tourist destination for families.

### ***7.3.3 Fishing***

It seems likely that resource management restrictions are likely to be extended over time with the effect of further reducing the number of cray pot licences together with further restrictions on wet line fishing. Accordingly, the fishing industry in Kalbarri could be expected to decline over time.

Given the size and likely future of the resident fleet, it is unlikely that more substantial maintenance facilities would be viable or serviceable given the skills base in Kalbarri.

### ***7.3.4 Retail***

Kalbarri is serviced by two relatively small 7 day supermarkets and a range of smaller convenience stores with an estimated current retail floorspace in the order of 2,000m<sup>2</sup>. There is a clear need within Kalbarri to provide for a primary dedicated retail precinct to service the convenience and comparison retail needs of the resident and visiting population. Kalbarri's isolation combined with a target population of 5,000 residents plus visitors should support a smaller district level retail centre in the range of 7,500m<sup>2</sup> gross leaseable area, requiring an overall site area in the order of 3ha. A centre of this size would enable a broad range of convenience stores as well as provide for a greater level of comparison stores including clothing, footwear and electrical / white goods. Tourist retail should be provided separately and there will continue to be a need for local convenience centres at Browne Farm and the Anchorage area.

### ***7.3.5 Light Industry***

A Light Industrial Area (LIA) is located to the east of the Townsite significant portions of which remain to be subdivided. The intensity of development on existing lots is low with the majority of sites seeming to achieve floorspace levels approaching only half of that permissible under the Town Planning Scheme.

Consideration may need to be given in the longer term to development of portion of Council's reserve east of the LIA for large lot uses which should not be located in the LIA for reasons of impacts of land availability and pricing as well as the potential for interference with other light industrial activities.



### **7.3.6 Future Employment**

The high dependency rate on tourism for employment is undesirable, if not perilous, for the long term economic sustainability of Kalbarri as it is notoriously fickle. Additionally, it carries with it a high social cost in that there is limited training and limited employment for youth of the district, necessitating them to move to elsewhere.

There is a clear and pressing need for Kalbarri to engage in the growth occurring in the broader Mid - West and position itself as a viable, if not desirable, alternative residential and commercial location to Geraldton.

The expansion of Kalbarri's economic base will require an innovative marketing and promotional strategy that:

- should be driven by key stakeholders in Kalbarri with assistance from State and Local Government;
- provides a suitable area for emerging enterprises with approvals obtained to enable land to be "rolled out" with minimal delay; and
- provides comparatively low cost land, including through alternative approaches such as lease / buy, to reduce initial establishment costs and provide Kalbarri with a financial edge over alternative mainstream locations.

### **7.3.7 Built Form & Land Tenure**

The letting of homes for short stay purposes is starting to generate amenity impacts between residents and visitors.

There is an overwhelming need for substantial "re-planning" of the Town Core area with the provision of significant planning incentives to achieve early re-development, particularly of key sites and integration with the river foreshore.

### **7.3.8 Riverine Environment**

The Murchison River is the core of Kalbarri Townsite's attraction as a tourist and holiday destination. The mouth of the River and the waters adjacent to the Townsite are subject to intense competition for use by recreational swimmers and boaters, recreational and commercial fishing vessels accessing the ocean and tourism activities which is continuing to increase. As a consequence, existing conflicts and issues can be expected to intensify.

The River supports a number of commercial tourist operations including river cruise boats, powered and non-powered hire craft and water based tours such as canoeing tours. The approval and Licensing of all River based activities is under the care and management of the Department of Planning and Infrastructure, typically operating in isolation of Council. It is illogical that DPI does not, as a matter of course, seek the comment and recommendation of Council on all applications pertaining to the use of the River.

### **7.3.9 Aboriginal & European Heritage**

There are a number of sites of both Aboriginal and European heritage located within, or in close vicinity of the Kalbarri Townsite.

#### **7.3.10 Education**

Kalbarri is serviced by a District High School providing the full spectrum of education levels from Pre-School to Year 12. A target population of 5,000 residents will require substantial expansion of education facilities within the Townsite and specifically:

- Three dedicated Primary School sites of 4ha each distributed between the core Townsite, southern extension of the Townsite and Port Kalbarri, provision for which has been made in the Port Kalbarri Structure Plan; and
- Retention of the existing KDHS site as a dedicated future Senior High School site. The existing site area at 6ha is below the minimum recommended of 10ha. However it adjoins Crown Land designated for Open Space which could be developed if required to accommodate future sporting fields with joint community / school access.

#### **7.3.11 Health & Medical**

Medical services within Kalbarri are well catered for by both a private General Practitioner and a substantial Health Centre located within the main Townsite area.

Based on a target population of 5,000 residents plus tourists, the Health Centre site will require expansion in order to cater for a substantial upgrading providing for:

- Resident Medical Officer / Doctor;
- Expanded emergency consultations department;
- Eight bed Emergency Ward and twelve bed In-patient Ward with attenuate nursing and support staff; and
- Expanded support and ambulance services.

Additionally, there is a critical lack of aged care services within Kalbarri and particularly hostel and nursing care which logically should be provided as an adjunct to the Health Centre.

The site of the existing Ambulance Service is too small for current and future requirements. The Ambulance Service will require re-location to a new, much larger site capable of accommodating an increased fleet, as well as a training area, administration and storage requirements of the service.

### ***7.3.12 Fire and Emergency Services***

A projected Townsite population of 5,000 persons and visitors will require expansion of current services to provide for an additional light and medium tanker. It is preferable that the additional equipment be stationed at around Browne Farm, within which provision has previously been made for a fire services site. The exact location will require further investigation.

### ***7.3.13 Police & Judicial***

The Kalbarri Police Station is located within the Town retail precinct on a site of approximately 4,000m<sup>2</sup>, including the Station Officers residence. The positioning of the Station in the retail precinct and with a clear view of the foreshore has a positive effect on overall policing within the Townsite.

A target Townsite population of 5,000 persons plus visitors will require the Station, which is scheduled for replacement in 2017, to be redeveloped as a Full Time Day station with up to eight Officers and associated administrative and judicial services.

### ***7.3.14 Civic & Cultural***

Civic and Cultural services within the Townsite are provided by the Shire at a regional office facility shared with the Kalbarri Visitor Information Centre. The centre includes basic administrative services, Library and a meeting facility both for local residents / community groups and Council events.

Growth of the Townsite to 5,000 persons plus visitors will require a significant upgrade of current facilities to include expanded administration and library services. The existing site is small and expansion of broader civic and cultural facilities will require either expansion of the current site or identification of a new civic and cultural precinct.

### ***7.3.15 Recreation & Open Space***

The primary open space areas within Kalbarri are the River Foreshore and the Sports and Recreation Ground located centrally to the Townsite. The proximity of the River Foreshore to much of Kalbarri substantially compensates for the lack of open spaces.

The Sports and Recreation Ground is a key feature of Kalbarri and is under-utilised at present but has significant potential as a major recreational focus for Kalbarri residents and visitors. It is a significant

component of Kalbarri's open spaces and in many respects it can be regarded as Kalbarri's "Kings Park". The facility provides the opportunity for greater recreational interaction between residents.

The Kalbarri Golf and Bowling Club is of a standard with few comparisons in country WA. It represents a significant recreational asset to Kalbarri, both for residents and visitors with the potential to become a major, "country club" style facility.

The existing public tennis and basketball / netball courts adjacent to the Golf and Bowling Club should be re-located closer to the Town Core and primary tourist areas so that they afford another stream of recreational activities for visitors and particularly families and younger people.

There is a need to review and evaluate the longer term role and management of open space areas within South Kalbarri to enhance and ensure the survival and protection of the remnant vegetation and to improve broader utilisation and security issues in the context of other available open space areas in the location and primarily the High School sports grounds.

Kalbarri does not have a public swimming facility. Public pools are typically expensive to build and maintain and conventional pools appeal to only a limited sector of the population. The likely eventual upgrading of the High School to full Senior High School status will typically include construction of a swimming pool. There are opportunities in this respect for Council to engage with the Education Ministry to secure joint use of the facility with the community. It is considered that greater value would be achieved from development of a moderate sized, outdoor "water playground" in association with a recreation and cultural centre.

### ***7.3.16 Community Directions***

The Kalbarri Community have a clear "sense of direction" as to how the future form of Kalbarri should evolve. Key Principles emanating from the Workshop discussion are:

- Significantly and independently of any population projections, a broad consensus of an "Optimum Foreseeable Population" for Kalbarri in the order of 5,000 residents plus visitors.
- Clean, green and environmentally aware Town through sustainable design and development that utilises land, water and natural resources in a responsible manner and accommodates the potential impacts of changing climate.
- Smarter residential planning that maintains the "feel" of Kalbarri and its connectivity to the natural environment.
- The need to broaden the economic and employment base of the Town to reduce Kalbarri's reliance on the tourist industry.
- An "outer" route to Nanda Drive north;

- Connection of the existing Townsite with Kalbarri Vision;
- Enhancement of strong green links and faunal corridors within the existing and expanded Townsite;
- Broadly lineal expansion of tourism opportunities parallel with the River Foreshore;
- Retention and enhancement of the current Sports & Recreation Centre precinct;
- Establishment of the Town Centre based around the Allen Centre / existing shopping precincts, including retirement accommodation;
- Expansion of residential and foreshore recreation north-east of Anchorage Lane;
- Increased residential opportunities around the Golf Course;
- Traffic calming / closure of Grey St between Porter and Woods Streets;
- Extension of future Townsite residential south along Red Bluff Road to Wittecarra Creek; and
- Enhancement of the Tourist Precinct north of Wittecarra Creek.

## **7.4 UTILITIES & INFRASTRUCTURE**

### ***7.4.1 Roads, Paths & Parking***

From an overall aesthetic viewpoint, there is a need to investigate practical and low cost, low maintenance approaches to verge development and maintenance so as to improve the overall presentation of the Town to incoming visitors and tourists.

During peak holiday periods, Grey Street constitutes a significant barrier to pedestrian movement between the River and Town centre and adjacent areas. Given a target population of 5,000 residents plus 10,000 visitors, it is likely that traffic flows on Grey Street forward of the Visitor Centre during peak months would quadruple from 3,000 to between 10,000 and 12,000 vehicles per day, significantly increasing the dangers to pedestrians. The continuing need for Grey Street to remain as traffic route within the Town Core precinct is highly questionable.

Planning for Kalbarri has provided for an "outer" distributor – Nanda Drive – which connects with the Ajana – Kalbarri Road immediately west of the Golf Course and adjoining the eastern edge of Old Kalbarri. Construction of Nanda Drive will ease traffic pressures on Grey Street and facilitate better integration of the Town Core precinct with the River Foreshore.

The community have expressed a desire for the northern portion of Nanda Drive, which lies adjacent to the eastern edge of Old Kalbarri, to be relocated to an "outer" route to reduce the amenity impacts of future traffic noise.

Public parking areas are generally well distributed within Kalbarri, providing ready access to most facilities and locations with a number of foreshore carparks providing ready access to the River and Coastal areas. As a consequence, Kalbarri is a relatively compact and very walkable urban area, a feature noted and valued by the local community.

Retention of Kalbarri's compact nature is considered a key objective of future planning for the Townsite supported by restricted additional parking so as to encourage walking as the principal means of access around Town, particularly for visitors.

The path network within Kalbarri is being progressively developed and of a good standard. Key locations are typically serviced with paths and a pathway system extends all the way south to Red Bluff. As a consequence of generally low traffic volumes, most locations within Kalbarri do not require formal paths as the streets are safe to walk along.

As a consequence of the distance from the Airport to Town, noise from aircraft operations will not impact the Town. Similarly, Obstacle Limits for the Airport do not impact the Town.

#### **7.4.2 Water**

Kalbarri's water supply is drawn from underground resources of the Tumblagooda aquifer with four extraction bores located 2km to the south-east of Town within the National Park. The Water Corporation presently is currently licensed to draw 500,000 kilolitres per annum. The quality of the water extracted from the aquifer is very high.

Monitoring of the production bores for Kalbarri indicate that water levels have remained relatively stable, notwithstanding an extended period of below average rainfall; suggesting that the present rate of extraction from each bore is within recharge rates and more importantly sustainable limits; notwithstanding reduced rainfall patterns.

Excluding savings from future water sustainability measures, the projected population of 5,000 persons plus 10,000 visitors will effectively require a doubling of present production rates. The additional bores will be located north-east and / or south-east of Town and could be expected to provide for additional demand within sustainable levels.

The Tumblagooda aquifer is a large aquifer covering nearly 97,000km<sup>2</sup> and extending approximately 500 km to the north, 65km to the east and 150km to the south. Broad scale estimates of the sustainable yield from the Tumblagooda aquifer vary from 29 GL/annum to 41GL/annum; the latter being based on relatively high recharge rates which are unlikely to be reflective of more recent rainfall patterns.

Notwithstanding, a more detailed analysis of the sustainable limits of the Tumblagooda aquifer is required.

### ***7.4.3 Wastewater***

With the exception of the Services / Industrial Area, the existing Townsite is fully sewerred. The Wastewater Treatment, which requires a 500m buffer, is located approximately 1km east of Town.

Population and visitor growth will require expansion of treatment facilities and the Water Corporation is currently undertaking a major review of wastewater treatment options for Kalbarri. It seems probable that the Corporation will upgrade the method of treatment of wastewater and as a consequence, there is unlikely to be any requirements for expansion of the Treatment Plant site. Given the extent of existing infrastructure and the limitations imposed by the National Park, re-location of the Treatment Plant is not considered by the Corporation to be a viable option.

Disposal of future additional treated wastewater is a matter of increasing concern for the Water Corporation. Council should engage with the Water Corporation to secure a strong commitment from the Corporation to broad scale reuse and re-cycling of wastewater for reticulation of major open spaces and public areas.

### ***7.4.4 Energy***

Kalbarri is reliant upon electricity for its energy requirements as there is no natural gas feed to the Town. The reliability of power supply to Kalbarri has been a matter of considerable concern within the community until recent extensions of supply from Port Gregory and line upgrades by Western Power.

Notwithstanding recent improvements, the provision of adequate power to meet Kalbarri's present and future needs is a matter of considerable concern.

There is a pressing need for Council to engage with Western Power / Verve to secure longer term reliable power supply to Kalbarri within the context of this Townsite Strategy, including expanded use of renewable energy sources to supplement the incoming supply to Kalbarri.

### ***7.4.5 Waste Disposal***

Domestic and commercial solid waste, including liquid septage, is disposed of to landfill at a new site approximately 4km east of Town with a projected life in the order of 10 years.

The projected resident and visitor population can be expected to cumulatively generate in the order of 5,000 tonnes per annum, which is broadly consistent with current patterns. It is evident that the existing landfill site could not accommodate long term waste disposal requirements, without further expansion. The current location of the landfill is not desirable from a longer term perspective as a consequence of increasing risks of contamination of groundwater and resulting impacts on drinking water quality and potentially, the River.

Council is acquiring a long term waste disposal site south of Kalbarri. There is also a need for Council to address reduction of the waste stream at source.



Lot 9502 & 9505 George Grey Drive, Kalbarri  
Infrastructure Servicing Report



Whelans  
Rev C - December 2014



## Project Brief

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## 1 INTRODUCTION

### 1.1 Background

Wave International has been commissioned by Whelans to prepare an infrastructure servicing report for Lots 9502 & 9505 George Grey Drive in Kalbarri, known colloquially as Browne Farm. The site is located approximately 5km south of the Kalbarri townsite within the Port Kalbarri Project Structure Plan area and the subsequent Lot 903 and Superlot 2 George Grey Drive, Kalbarri Structure Plan area (referred to as the Superlot 2 Structure Plan).

Lots 9502 & 9505 are bounded by George Grey Drive and existing residential subdivision to the west, undeveloped rural land to the east, Wittecarra Gully to the north and an existing special rural development to the south. The previously developed parts of the site are delineated into four distinct precincts from north to south - the Eco Flora estate, the existing R5 development, Capital Hill Stage 1, and the existing Stiles Road special rural development.

This infrastructure servicing report has been prepared to support an amendment to the Superlot 2 Structure Plan, which has been prepared by Whelans to reduce the density of the undeveloped parts of the LSP area to R2.5-R10 (1000-4000m<sup>2</sup> lot size), special rural (1ha) and rural (10-20ha). This amended structure plan (referred to as the Lot 9502 & 9505 Structure Plan) also encompasses an area to the north of the previous LSP boundary, which is proposed to be zoned as a “special use” site and could potentially be developed as a caravan park.

Figure 1.1 shows the site’s location, and the previously-developed precincts.

### 1.2 Proposed land use

Lots 9502 and 9505 George Grey Drive have a combined area of approximately 260ha and are currently zoned for predominantly residential development, with densities between R20 and R40. The structure plan that is currently in place over Lots 9502 and 9505 is the Superlot 2 Structure Plan, which has an estimated residential lot yield of 2400 lots with supporting landuses including primary school, tourist development, neighbourhood & village centres, commercial development and public open space also included in the structure plan area.

Approximately 500 lots of the Superlot 2 Structure Plan area adjacent to George Grey Drive have previously been developed. The remaining undeveloped land surrounding the constructed area has an estimated lot yield of 1900 lots, based on the densities in the Superlot 2 Structure Plan.

This infrastructure servicing report has been prepared to support a revised structure plan for Lots 9502 and 9505, which proposes to reduce the density of the LSP area and therefore reduce the estimated lot yield of the undeveloped area from 1900 lots to approximately 250 lots. Proposed densities and lot sizes vary from R10 (1000m<sup>2</sup>) to special rural (1ha) in the western part of the site; while the eastern part of the site is currently proposed to be developed as large (10-20ha) rural lots with the possibility of subdividing these further into special rural lots in the future. The proposed LSP is included as Figure 1.2.

An estimated lot yield for the revised LSP is as follows:

- R10 - 126 lots with an average lot size of 1000m<sup>2</sup>
- R5 - 65 lots with an average lot size of 2000m<sup>2</sup>

- R2.5 - 19 lots with an average lot size of 4000m<sup>2</sup>
- Special rural - 20 lots with an average lot size of 1ha
- Rural - 8 lots of various size ranging between 10ha and 20ha.

The concept plan also makes provision for the following land uses:

- A 6.7ha Special Use (development) site, which could potentially be developed as a caravan park.
- 36.4ha of public open space.

### 1.3 Existing site conditions

The site's natural topography generally falls from south to north at an average grade of approximately 4%, with levels falling from 114m AHD at the site's highest point on the southern boundary to 4m AHD at the lowest point of the Special Use site in the northern corner. An area in the site's south-western corner, between Stiles Road and the previously-developed R20 lots, falls to the west towards George Grey Drive, with the remainder of the site falling towards the north and north-east.

A geotechnical investigation was carried out in 2007 over the southern part of the site - Capital Hill, Kalbarri, Geotechnical Investigation Report (Maunsell/Aecom, February 2007) - which established that geotechnical conditions in this area consisted of sand of varying depths, overlying rock or well-cemented sand. The depth of the rock/cemented material varied from 0.5m below natural surface in several locations near George Grey Drive, to >8m below natural surface in the area surrounding a ridge at the southern end of the site.

Additional geotechnical investigations will be required prior to subdivision for the central and northern parts of the LSP area, to verify the geotechnical conditions of the remainder of the site. There is exposed at-surface rock at the northern end of the site, where the natural topography drops away towards Wittecarra Gully.

Figure 1.3 shows the natural topography of the site, and the geotechnical test pit locations.

## 2 ROADS AND TRAFFIC

The site is located adjacent to George Grey Drive, which is a rural-standard road that connects the Kalbarri and Northampton townships. The existing development is serviced by four access roads that have been constructed off George Grey Drive - Flora Blvd, Jacques Blvd, Browne Blvd and Coral Blvd.

The amended structure plan does not propose any additional access points onto George Grey Drive to service the proposed residential lots, and access will be via the four existing boulevards noted above. Given that the estimated lot yield of the development is being reduced when compared with the current structure plan, there will be a corresponding reduction in forecast traffic demand on the existing subdivision roads and George Grey Drive and accordingly no additional road improvements on George Grey Drive or the existing internal road network are proposed.

A new access point onto George Grey Drive will be required for the Special Use (development) Site in the northern corner of the LSP area. A traffic review by Riley Consulting has confirmed that safe access to this site (which may potentially be developed as a caravan park) can be achieved from George Grey Drive with consideration to intersection sight distances, space for right-turn lanes, and forecast traffic demands.

Internal subdivision roads will be constructed to service the proposed new development, along the approximate alignments shown in Figure 1.2. The previous stages of the development have experienced pavement cracking issues, and the design and construction of future stages of the subdivision works will need to carefully monitor pavement material selection and construction methodology to ensure that the pavement cracking issues do not continue in the future stages.

## 3 SEWER

### 3.1 Existing infrastructure

There is an existing Water Corporation sewer reticulation network that services the previous Capital Hill Stage 1 and Eco Flora developments.

This sewer network includes gravity sewer reticulation that takes wastewater from the two development areas to a DN225-DN300 gravity sewer main which runs along George Grey Drive, before discharging into the existing Kalbarri Sewer Pump Station K4. This pump station then discharges via a pressure main along George Grey Drive to a discharge manhole in Nanda Drive, approximately 2.5km to the north.

### 3.2 Water Corporation sewer planning

The Water Corporation has advised that Pump Station K4 was sized for the much higher lot densities as proposed in the Superlot 2 Structure Plan, and therefore has sufficient capacity to service the lots in the amended LSP.

Lots larger than 2,000 m<sup>2</sup> will dispose of wastewater onsite in accordance with the Country Sewerage Policy (draft), with only the 126 proposed R10 lots requiring reticulated sewer connections.

The Water Corporation has also advised that their current wastewater planning (based on the higher densities of the Superlot 2 Structure Plan) shows a 5m deep sewer being required along the extension of Amber Vista, which was previously required to service the R20 lots that were previously proposed in the south-western corner of the site. The increase in lot sizes to over 2,000m<sup>2</sup> in this area removes the need for the deep sewer along Amber Vista, and a shallower sewer can be installed to service the proposed R10 lots that form an extension of the Capital Hill area.

There is also an area of R10 lots proposed in the north-eastern corner of the site. These lots are located on a ridge, and the levels of the existing sewer along the northern boundary of the Eco Flora estate are not deep enough to allow the sewer for these lots to discharge to the nearest existing sewer manhole. A separate sewer line through the POS surrounding these northern lots will be required, which will discharge to an existing sewer manhole in George Grey Drive, upstream of the pump station. The Water Corporation will require an easement over the sewer, and the location of this sewer line will be determined during detailed design stage to determine the best alignment, taking into consideration geotechnical conditions, topography, existing vegetation etc. Should it not be feasible to construct this sewer line, an alternative solution for this area is to construct a small wastewater pump station at the northern end of these R10 lots, with a pressure main discharging into the existing sewer reticulation off Flora Blvd. Further geotechnical and environmental investigations will be required to determine which option is the most appropriate to service these lots.

The Special Use site in the northern corner of the LSP area can only be partially serviced by Pump Station K4. The majority of this site will either need to be filled, or be serviced by a separate private pump station to allow wastewater to discharge to the Water Corporation's sewer network. If the site is eventually developed as a caravan park, a private pump station that is maintained by the park owners would be the most economically feasible option.

Figure 3.1 shows the existing sewer infrastructure at the site, along with an indicative sewer layout to service the proposed R10 lots.



### 3.3 Sewer construction issues in previous development stages

The Water Corporation has provided comment on the issues with subsidence that were experienced near the sewer alignment in Amber Vista as part of the Capital Hill Stage 1 development.

The Water Corporation understands that the subsidence and subsequent investigations were not finalised before the previous developer went into administration, and the cause of the subsidence may not have been clearly established by the investigations that were undertaken in 2009-2010. The Water Corporation has advised that they may require a copy of the outcomes of the investigation and causes of the subsidence before accepting any further wastewater reticulation design submissions for the development.

## 4 WATER

### 4.1 Existing infrastructure

The existing Water Corporation infrastructure in the LSP include an elevated tank located on Stiles Road, and a ground-level tank located to the east of the Capital Hill Stage 1 development area. The ground level tank is filled from the elevated tank via a DN110 main that crosses Lot 9502. The elevated tank is supplied by the existing borefield and treatment plant approximately 2km east of the site.

The Water Corporation has advised that there are pressure issues in the existing developed areas that are higher than the ground-level tank near Capital Hill, and this may affect the ability to service some of the higher elevation lots in the proposed first development stage of the amended LSP. The Water Corporation is currently in the process of determining the highest elevation that can be serviced from the existing tanks.

### 4.2 Water Corporation water planning

The current water supply infrastructure is intended as a temporary/interim measure, and does not have the capacity to service the entire proposed development.

The Water Corporation's long-term planning for the area includes the decommissioning of the existing ground-level tank and DN110 main east of the Capital Hill Stage 1 development, and constructing new permanent ground level tanks at the existing site on Stiles Road. A DN300 main will be required to service the future development from the new tanks on Stiles Road.

The Water Corporation are currently in the process of determining the trigger points in the staging of the development that will trigger the requirement to construct the permanent ground-level tanks on Stiles Road. The Water Corporation's capital investment program currently shows these works being funded in 2025.

All lots in the LSP area - except for the large rural lots on the eastern side of the LSP area - will require a potable water service. If these large rural lots are further subdivided into special rural lots in the future, they will require a potable water service from the existing elevated tank on Stiles Road if the subdivided lots are <2ha in area. If the future lot size is >2ha, a potable water supply will not be required.

Figure 4.1 shows the existing water infrastructure, along with the location of the future ground level tanks on Stiles Road and the approximate alignment of the future DN300 water main.

### 4.3 Non-potable water for irrigation

There are a series of groundwater bores located across the LSP area which are used to source water for irrigation of the public open space.

The Shire of Northampton has advised that the groundwater bores are to be protected through the design of the subdivision layout and during construction works.



## 5 STORMWATER MANAGEMENT

### 5.1 Existing infrastructure

The drainage infrastructure for the existing developments generally follows the site's natural topography. The existing stormwater drainage network is a piped network which discharges towards the west, into a series of detention basins, before discharging into an existing open drain on the eastern verge of George Grey Drive, which follows the natural fall of the land towards Wittecarra Gully to the north.

### 5.2 Subdivision drainage strategy

Stormwater runoff from within the subdivision will be similarly managed via a pit and pipe network which will follow the natural topography where possible. Stormwater detention areas will be located in strategic locations in low points in the natural topography.

In areas where there is sufficient depth of sand above the underlying rock, roof runoff will be retained on-site within each lot via soakwells. For areas with shallow rock where on-site disposal is not possible, roof runoff will discharge to the road drainage network and be retained in the detention areas across the site.

To ensure that downstream areas are not impacted by development within areas further upstream in the catchment, the stormwater detention areas will be sized to ensure that post-development flow rates remain within pre-development levels. This will ensure that the flow rates generated by runoff from the current undeveloped land are not increased as a result of the development and there is no impact on the downstream environment.

Previous infrastructure reports for the Port Kalbarri area proposed to size stormwater drainage basins to retain the 2-year or 5-year ARI storm event. Since these previous reports were completed, the Department of Water and WAPC have released the Better Urban Water Management framework, which provides a basis for implementing water sensitive urban design in new developments. One of the requirements under the BUWM framework is to attenuate post-development runoff to within pre-development levels in new developments, rather than providing storage for a particular storm event.

The BUWM framework also sets out the requirements for various water management reports that should be completed at each level of planning during the land development process. A separate Local Water Management Strategy has been prepared to support the Lot 9502 & 9505 Local Structure Plan, which will set out the design objectives and criteria for water management within the development.

### 5.3 Flood management strategy

To ensure that developed areas are not subjected to flooding, detention areas will be provided with an overflow location to the downstream environment that will allow stormwater to exit the site in major flood events.

The roads within the subdivision will be designed to eliminate trapped low points wherever possible, and to ensure that finished lot levels are above the 100-year flood level to protect houses from flooding in major storm events.

## 6 POWER

### 6.1 Existing high voltage infrastructure

Existing overhead Western Power HV distribution lines run along Stiles Road and the eastern boundary of the LSP area, from which the existing subdivision areas are serviced. The alignment of the existing power is shown in Figure 6.1.

### 6.2 Estimated load

The estimated yield of the structure plan area is for approximately 250 additional residential lots and a “special use” site which could potentially be developed as a caravan park. The residential lots will require an estimated total load of 1.2 MVA based upon a load allowance of 4.7kVA/lot (excluding the “special use” site).

Western Power’s network capacity mapping tool (NCMT) shows that the network has a remaining capacity of <5MVA to service new connections to the network.

The Western Power NCMT does not indicate the need for a new feeder or other HV network upgrades, which can only be determined at detail design stage. The allocation of remaining capacity to service new developments is determined on a first-come first-served basis when a subdivision application is lodged..

### 6.3 Funding

The extension of any HV infrastructure to the subject site will likely be a developer funded project as the initial stages of the project will most likely not meet the economic test of the Western Power HV Pool. Developers may be entitled to a capital contribution from Western Power if capacity provided in the main extension is in excess of that required for the specific project.

Project feasibility studies should be conducted by Western Power to determine optimum infrastructure requirements on a project by project basis and to provide an estimate of any developer contributions that may be required.

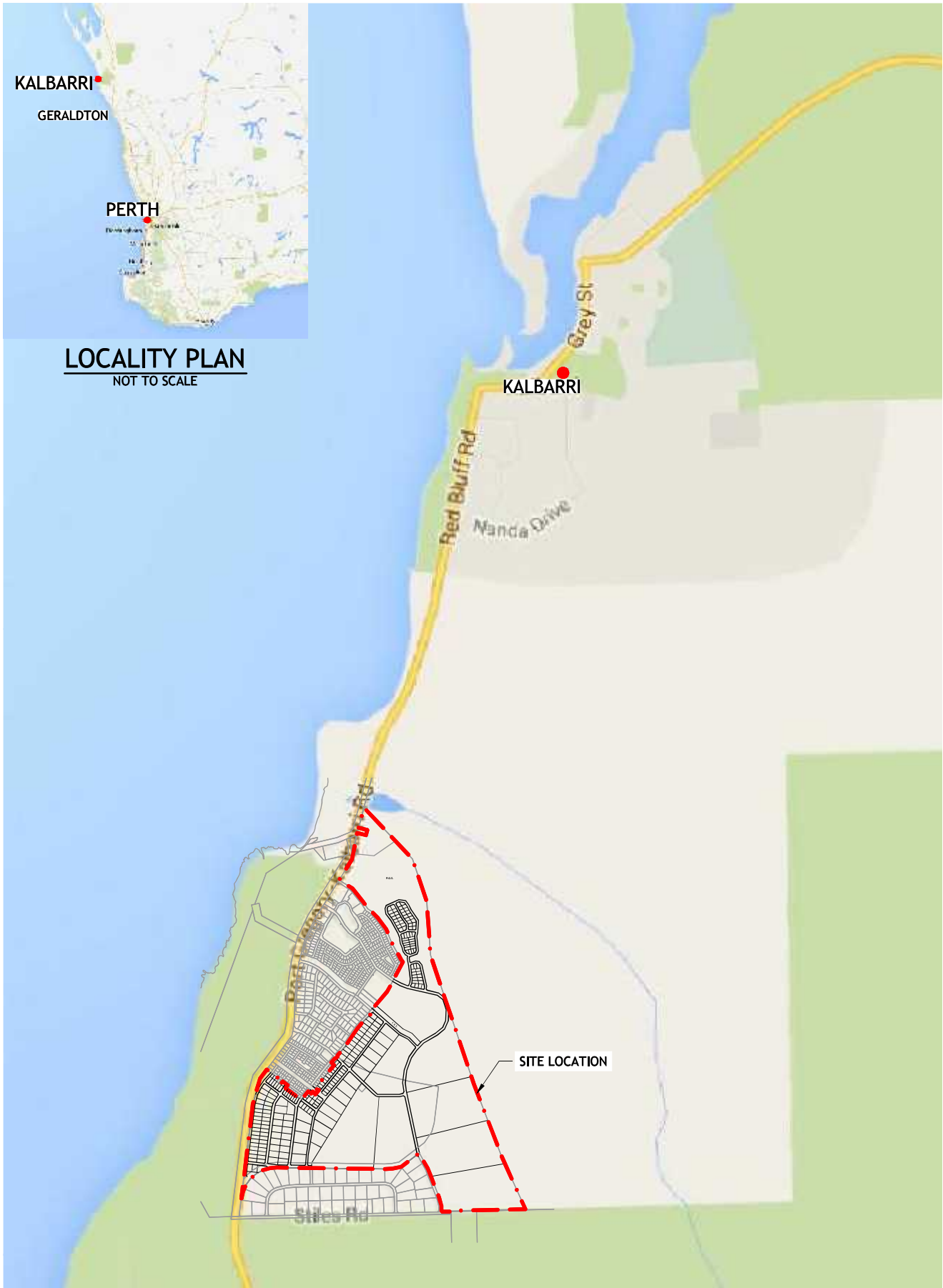
## 7 GAS

There is no reticulated gas network in Kalbarri, and therefore there will not be a reticulated gas supply for this development.

## 8 COMMUNICATIONS

It is envisaged that telecommunications and broadband infrastructure in this development would be supplied via the National Broadband Network (NBN) which requires developers to install an approved pit and pipe system as part of the development. The NBN rollout has not yet commenced in this area and initially the service will have to be supplied via existing Telstra fixed line or wireless service.

Subsequent to the installation of the NBN pit and pipe system by the developer, the network infrastructure will be installed by NBN appointed contractors.



**LOCALITY PLAN**  
NOT TO SCALE

**SITE LOCATION**  
NOT TO SCALE

SOURCE: GOOGLE



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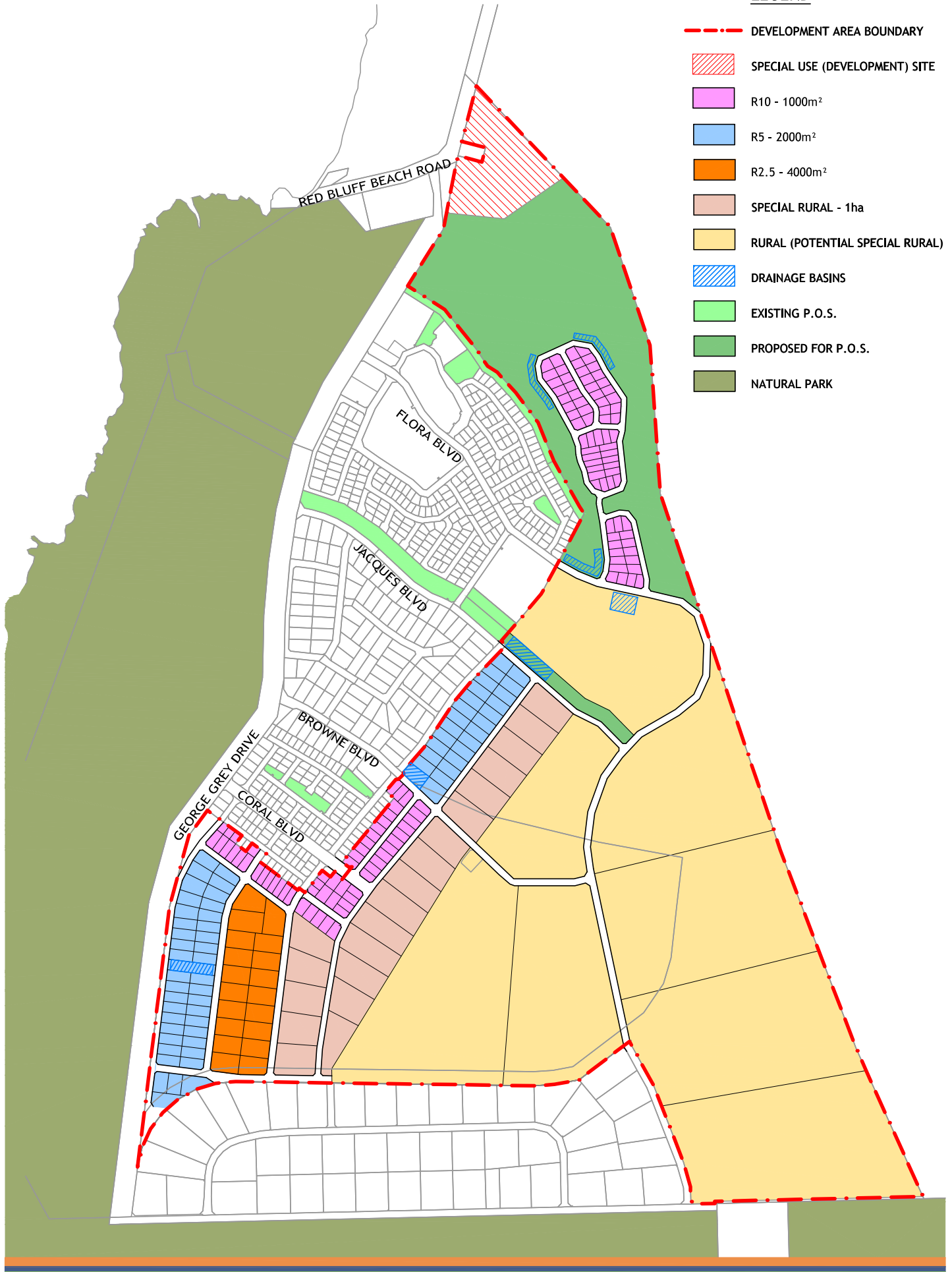
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GEORGE GREY DRIVE  
INFRASTRUCTURE PLAN  
SITE LOCALITY PLAN

Job Number	3844
Revision	A
Date	OCTOBER 2014

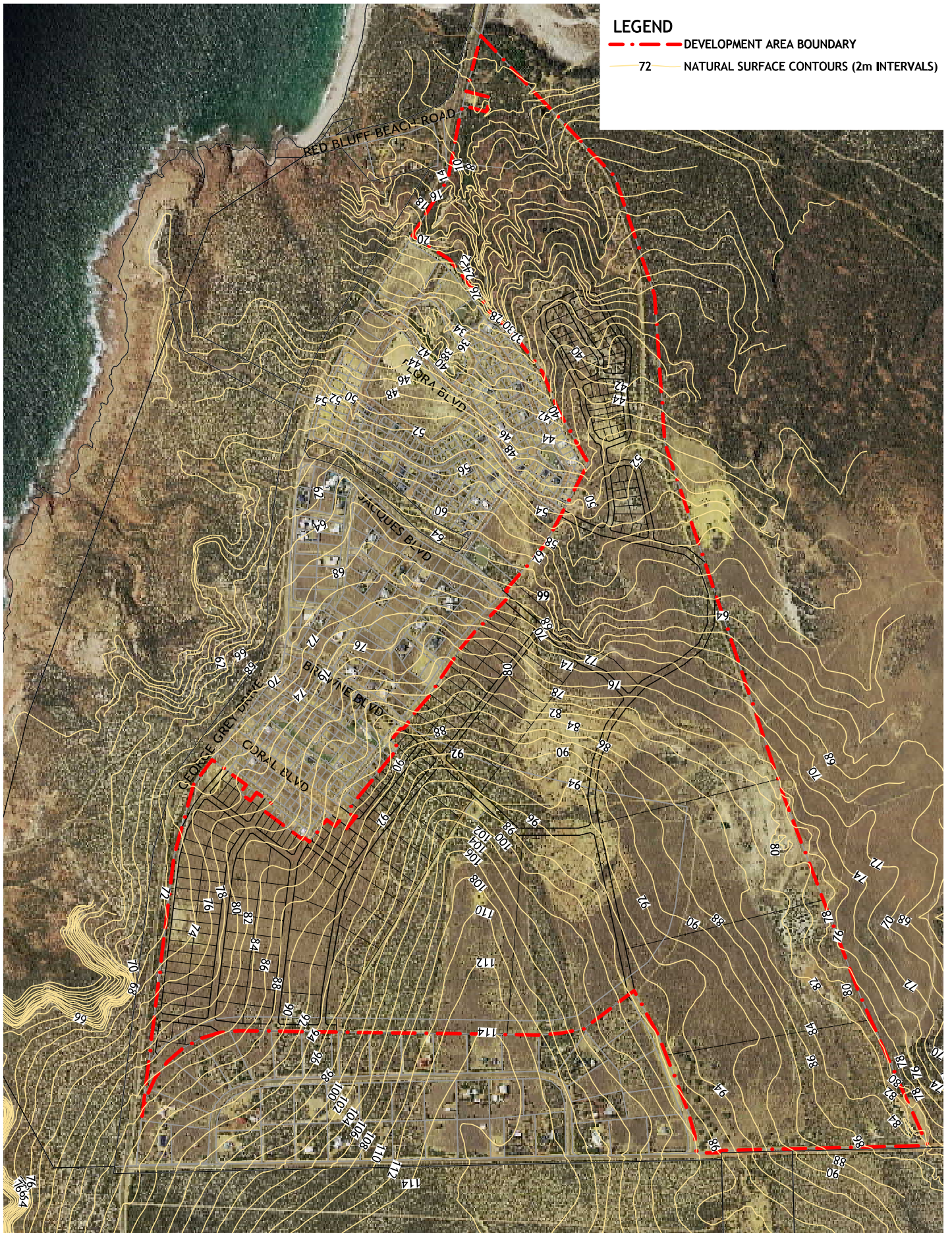
**FIGURE 1.1**

## LEGEND

- - - DEVELOPMENT AREA BOUNDARY
- SPECIAL USE (DEVELOPMENT) SITE
- R10 - 1000m<sup>2</sup>
- R5 - 2000m<sup>2</sup>
- R2.5 - 4000m<sup>2</sup>
- SPECIAL RURAL - 1ha
- RURAL (POTENTIAL SPECIAL RURAL)
- DRAINAGE BASINS
- EXISTING P.O.S.
- PROPOSED FOR P.O.S.
- NATURAL PARK

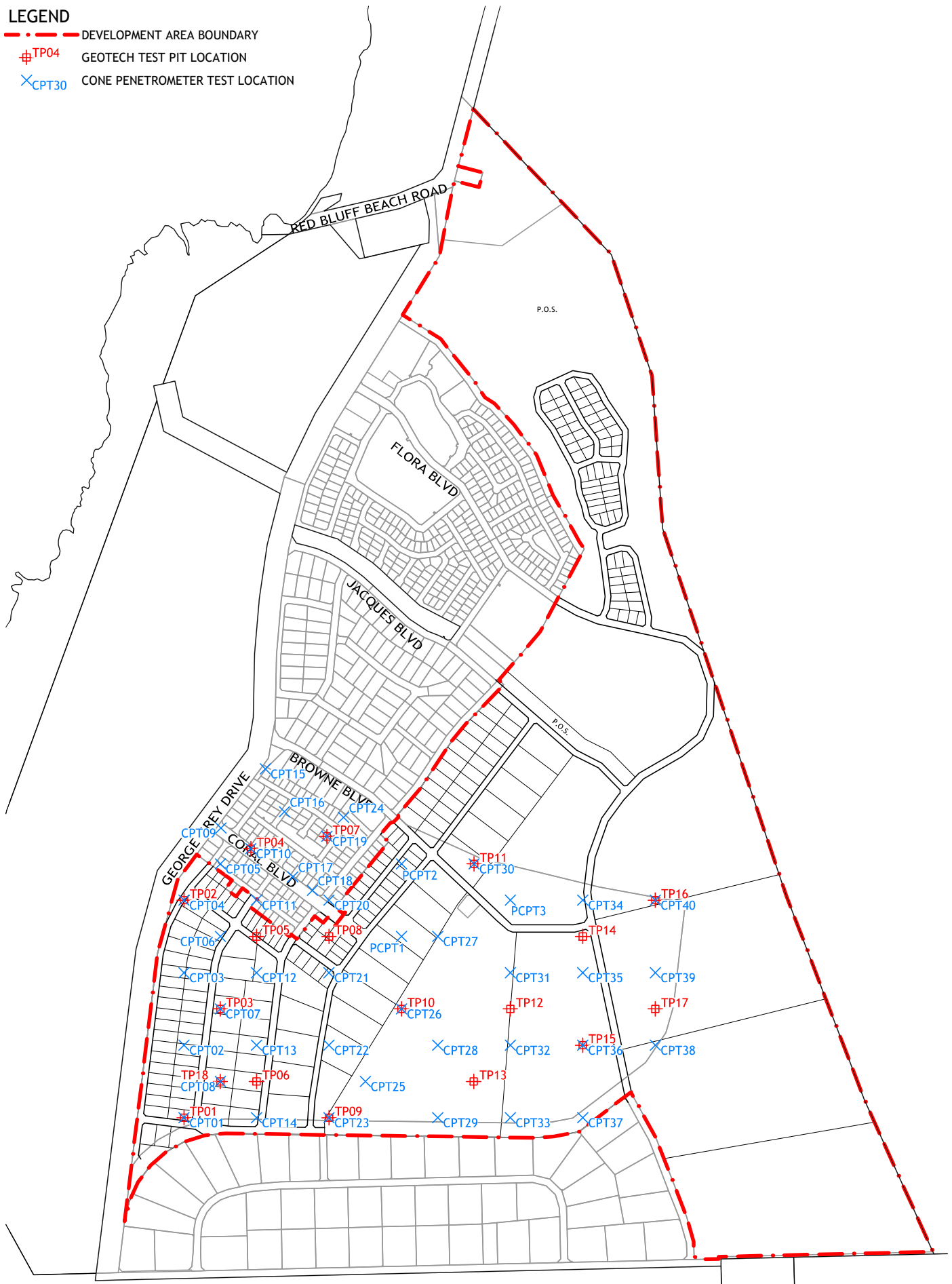






**LEGEND**

- · - · - DEVELOPMENT AREA BOUNDARY
- ⊕ TP04 GEOTECH TEST PIT LOCATION
- × CPT30 CONE PENETROMETER TEST LOCATION



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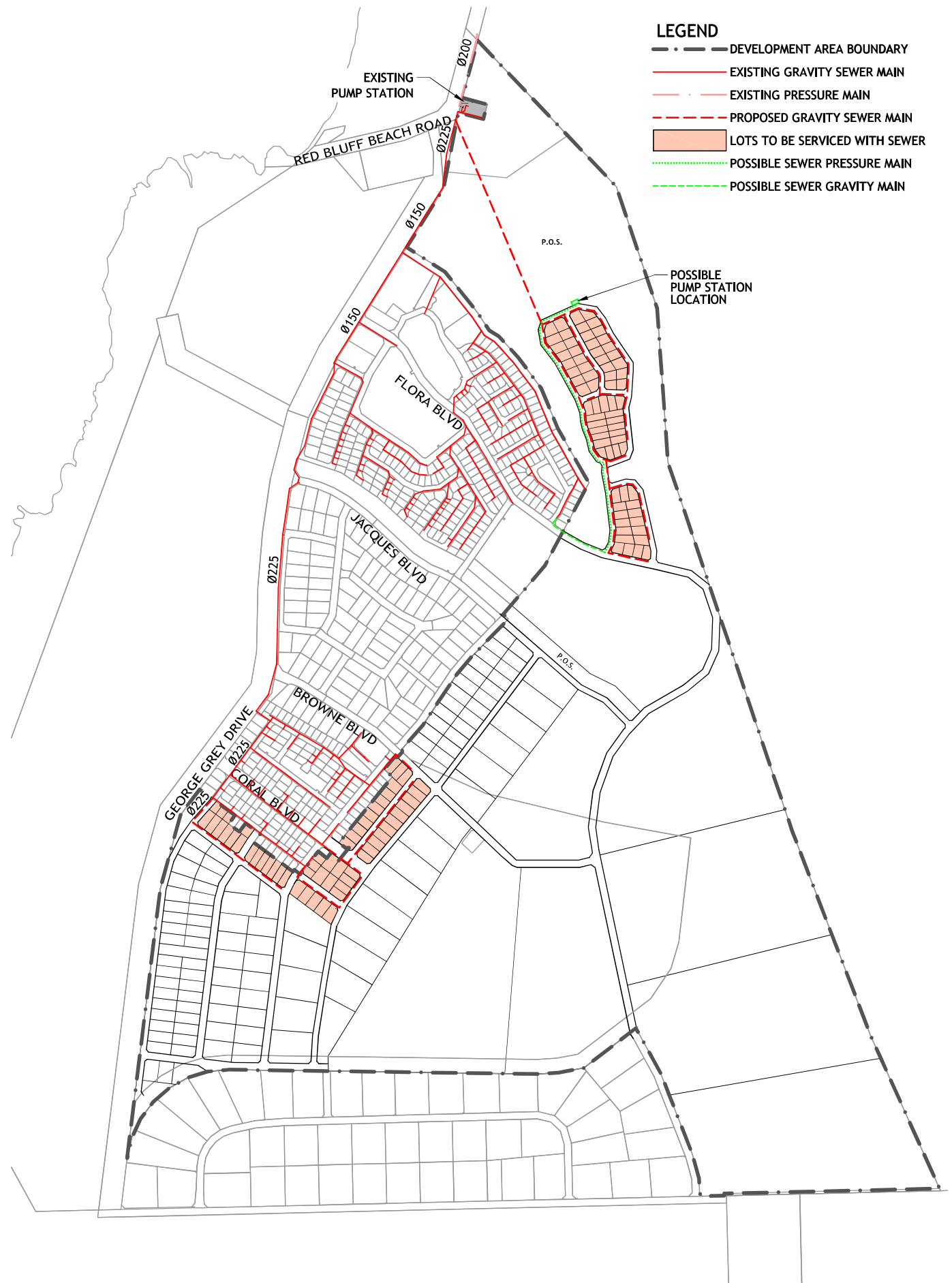
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 GEORGE GREY DRIVE  
 INFRASTRUCTURE PLAN  
 GEOTECHNICAL TEST PIT LOCATIONS

Job Number | 3844  
 Revision | A  
 Date | OCTOBER 2014





**FIGURE 1.4**

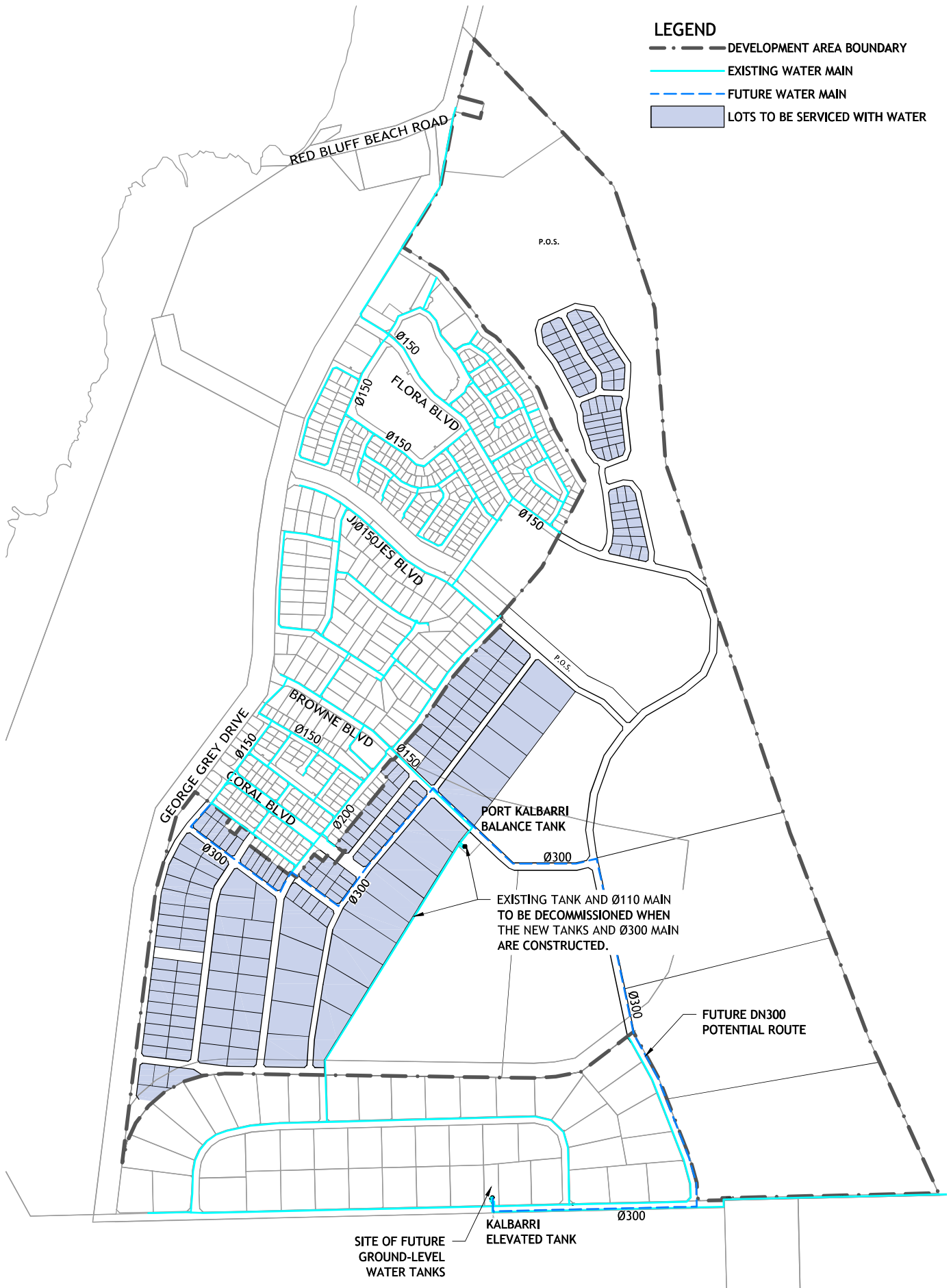
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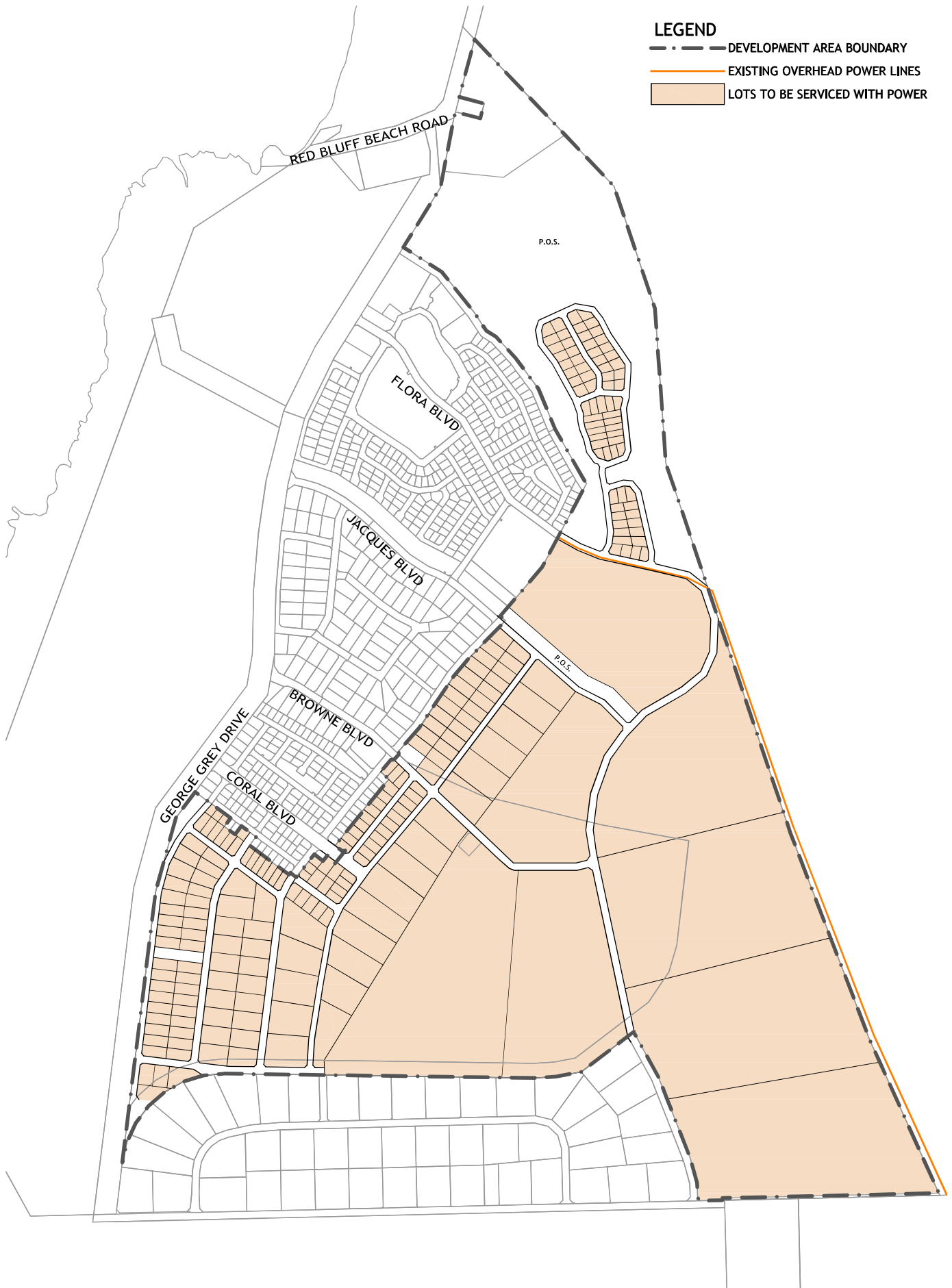
**LEGEND**

-  DEVELOPMENT AREA BOUNDARY
-  EXISTING WATER MAIN
-  FUTURE WATER MAIN
-  LOTS TO BE SERVICED WITH WATER



**LEGEND**

-  DEVELOPMENT AREA BOUNDARY
-  EXISTING OVERHEAD POWER LINES
-  LOTS TO BE SERVICED WITH POWER





Lot 9502 & 9505 George Grey Drive Kalbarri  
Local Water Management Strategy

Whelans  
Rev C - December 2014



## Project Brief

<b>Job Number</b>	3844
<b>Project</b>	Lot 9502 & 9505 George Grey Drive, Kalbarri Local Water Management Strategy
<b>Client</b>	Whelans
<b>Client Contact</b>	Greg Comiskey
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## Document Status

Rev	Date	Description	By	Signed
A	October 2014	Draft for client review	KW	
B	December 2014	Lodged for review by SoN/DoW	KW	
C	December 2014	Drainage basin locations amended	KW	

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## 1 INTRODUCTION

### 1.1 Background

Wave International has been commissioned by Whelans to prepare a local water management strategy (LWMS) for Lots 9502 & 9505 George Grey Drive in Kalbarri, known colloquially as Browne Farm. The site is located approximately 5km south of the Kalbarri townsite within the Port Kalbarri Project Structure Plan area and the subsequent Lot 903 and Superlot 2 George Grey Drive, Kalbarri Structure Plan area (referred to as the Superlot 2 Structure Plan).

Lots 9502 & 9505 are bounded by George Grey Drive and existing residential subdivision to the west, undeveloped rural land to the east, Wittecarra Gully to the north and an existing special rural development to the south. The previously developed parts of the site are delineated into four distinct precincts from north to south - the Eco Flora estate, the existing R5 development, Capital Hill Stage 1, and the existing Stiles Road special rural development.

This LWMS has been prepared to support an amendment to the Superlot 2 Structure Plan, which has been prepared by Whelans to reduce the density of the undeveloped parts of the LSP area to R2.5-R10 (1000-4000m<sup>2</sup> lot size), special rural (1ha) and rural (10-20ha). This amended structure plan (referred to as the Lot 9502 & 9505 Structure Plan) also encompasses an area to the north of the previous LSP boundary, which is proposed to be zoned as a “special use” site and could potentially be developed as a caravan park.

Figure 1.1 shows the site’s location, and the previously-developed precincts.

### 1.2 Proposed development

Lots 9502 and 9505 George Grey Drive have a combined area of approximately 260ha and are currently zoned for predominantly residential development, with densities between R20 and R40. The structure plan that is currently in place over Lots 9502 and 9505 is the Superlot 2 Structure Plan, which has an estimated residential lot yield of 2400 lots with supporting landuses including primary school, tourist development, neighbourhood & village centres, commercial development and public open space also included in the structure plan area.

Approximately 500 lots of the Superlot 2 Structure Plan area adjacent to George Grey Drive have been developed. The remaining undeveloped land surrounding the constructed area has an estimated lot yield of 1900 lots, based on the densities in the Superlot 2 Structure Plan.

This LWMS has been prepared to support a revised structure plan for Lots 9502 and 9505, which proposes to reduce the density of the LSP area and therefore reduce the estimated lot yield of the undeveloped area from 1900 lots to approximately 200 lots. Proposed densities and lot sizes vary from R10 (1000m<sup>2</sup>) to special rural (1ha) in the western part of the site; while the eastern part of the site is currently proposed to be developed as large (10-20ha) rural lots with the possibility of subdividing these further into special rural lots in the future. The proposed LSP is included as Figure 1.2.

An estimated lot yield for the revised LSP is as follows:



- R10 - 126 lots with an average lot size of 1000m<sup>2</sup>
- R5 - 65 lots with an average lot size of 2000m<sup>2</sup>
- R2.5 - 19 lots with an average lot size of 4000m<sup>2</sup>
- Special rural - 20 lots with an average lot size of 1ha
- Rural - 8 lots of various size ranging between 10ha and 20ha.

The concept plan also makes provision for the following land uses:

- A 6.7ha Special Use (development) site, which could potentially be developed as a caravan park.
- 36.4ha of public open space.

### 1.3 Design principles and objectives

There is no over-arching district water management strategy that sets out the design principles and objectives for this site; however Lots 9502 & 9505 are within an approved local structure plan area. This LWMS has been prepared to support an amended LSP which seeks to reduce the density of the existing approved structure plan, which will reduce the impact of the development on the natural environment.

The drainage strategy for the overall previously-approved LSP was to size stormwater drainage basins to retain the 2-year or 5-year ARI storm event. Since these previous reports were completed, the Department of Water and WAPC have released the Better Urban Water Management framework, which provides a basis for implementing water sensitive urban design in new developments. This framework, along with the Department of Water’s guidelines for developing a Local Water Management Strategy, have been used to establish a set of design principles and objectives that should be used as the basis of water sensitive urban design during the development of the remainder of the LSP area.

*Table 1.1 - Design principles and objectives*

Category	Design objectives	Design criteria
Water conservation - potable and non-potable	Where alternative water sources are available, no potable water should be used outside of homes and building. Achieve efficient use of scheme water.	Consumption target for water of 100 kL/person/day, with an aspirational target of not more than 40-60 kL/person/day of scheme water.

Category	Design objectives	Design criteria
Water quantity management	Maintain post-development peak flows relative to pre-development conditions, unless otherwise established through determination of ecological water requirements for sensitive environments.	<p>Ecological protection - for the critical 1-year ARI event, the post-development discharge volume and peak flow rates shall be maintained relative to pre-development conditions in all parts of the catchment.</p> <p>Flood management - manage the catchment runoff for up to the 100-year ARI event within the development area to pre-development peak flows.</p>
Water quality management	Maintain surface water and groundwater quality at pre-development levels (winter concentrations) and, if possible, improve the quality of water leaving the development area to maintain and restore ecological systems in the (sub)catchment in which the development is located.	<p>If the pollutant outputs of the development (measured or modelled concentrations) exceed catchment ambient conditions, the proponent shall achieve water quality improvements within the development area or, alternatively, arrange equivalent water quality improvement offsets within the catchment.</p> <p>Drainage - ensure that all runoff contained within the drainage infrastructure network received treatment prior to discharge to a receiving environment consistent with the Stormwater Management Manual for Western Australia (2004-07). Swales/vegetation bioretention systems are to be sized at 2% of the construction impervious area from which they receive runoff.</p>
Disease vector and nuisance insect management	Reduce the health risk from mosquitoes	Retention and detention treatments should be designed to ensure that between the months of November and May, detained immobile stormwater is fully infiltrated within a time period not exceeding 96 hours.

## 2 PRE-DEVELOPMENT ENVIRONMENT

### 2.1 Topography

The site's natural topography generally falls from south to north at an average grade of approximately 4%, with levels falling from 114mAHD at the site's highest point on the southern boundary to 4mAHD at the lowest point of the Special Use site in the northern corner. An area in the site's south-western corner, between Stiles Road and the previously-developed R20 lots, falls to the west towards George Grey Drive, with the remainder of the site falling towards the north and north-east.

An aerial photo showing the existing topography is included as Figure 2.1.

### 2.2 Geotechnical conditions

A geotechnical investigation was carried out in 2007 over the southern part of the site - Capital Hill, Kalbarri, Geotechnical Investigation Report (Maunsell/Aecom, February 2007) - which established that geotechnical conditions in this area consisted of sand of varying depths, overlying rock or well-cemented sand. The depth of the rock/cemented material varied from 0.5m below natural surface in several locations near George Grey Drive, to >8m below natural surface in the area surrounding a ridge at the southern end of the site.

Prior to subdivision, additional geotechnical investigations will be required for the central and northern parts of the LSP area, to verify the geotechnical conditions of the remainder of the site. There is exposed at-surface rock at the northern end of the site, where the natural topography drops away towards Wittecarra Gully.

The geotechnical test pit locations are shown on Figure 2.2.

### 2.3 Groundwater

An assessment of the hydrogeological conditions at the site was carried out by Coffey Geotechnics in 2005. This assessment found that an overall gradient of groundwater flow exists from east of the LSP area, discharging along the coast line to the west of the development area. A local groundwater mound exists between Wittecarra Creek and the coast, with some north-easterly "back" flow towards the creek.

#### 2.3.1 Groundwater levels

Groundwater levels at the site were measured during construction of the previous stage of the development as a condition of the groundwater licence. Five production/irrigation bores and three monitoring bores were monitored between December 2006 and January 2008.

Groundwater levels in December 2006 were between -2mAHD and 19mAHD (5m - 72 m below natural surface level). The lowest level was at bore 'Charlie 2', which is located in the Wittecarra Gully immediately to the north of the LSP area. The highest groundwater level was measured at bore MB2, located approximately 1.5km to the east of the LSP area.

Groundwater levels have also been measured by the Water Corporation at their production and monitoring bores on Stiles Road, approximately 1km east of the LSP area. Groundwater levels were last measured at the Water Corporation bores in 2005, which showed groundwater to be between 39 and 41mAHD at this location (9m - 11 m below natural surface level).

The locations of the production and monitoring bores in the LSP area are shown in Figure 2.3, along with groundwater contours as provided by Coffey Geotechnics.

The groundwater level data collected at the site is included in Table 2.1 below.

Table 2.1 - Pre-development groundwater level data

Monitoring date		8 Dec 06	19 Dec 06	29 Aug 07	29 Oct 07	9 Nov 07	19 Nov 07	29 Nov 07	10 Dec 07	23 Jan 08
Groundwater level (mAHD)	MB1		5.8	6.7		6.3			6.8	5.7
	MB2		18.5	20.7		20.6			20.6	20.5
	Charlie 2		-2.4	-10.7		-8.1			-12.4	-2.9
	P1	7.1								7.6
	P2	13.2								
	P3	13.1			12.9	12.6	11.7	11.8	12	
	P4	13								12.3
	P5	17.3			18.7	18.7	15.7	16.6	16.4	16

Groundwater level over the monitoring period ranged from 2m to 72m below natural surface level across the LSP area, and will not be a constraint to development.

### 2.3.2 Groundwater quality

The groundwater monitoring that was done by Coffey Geotechnics also measured water quality, predominantly Electrical Conductivity and pH.

A snapshot monitoring event at production bores P1, P2 and P5 was undertaken in January 2007, which measured a range of nutrients.

The groundwater quality data collected at the site is included in Table 2.2 and Table 2.3 below.

Table 2.2 - Groundwater EC and pH data

Monitoring date		8 Dec 06	19 Dec 07	29 Aug 07	9 Nov 07	10 Dec 07	23 Jan 08
MB1	pH						6.6
	EC (mS/cm)		0.47				8.4
MB2	pH			5.5			5.9
	EC (mS/cm)		0.32	0.89			0.79
Charlie 2	pH			6.4			5.6
	EC (mS/cm)		0.71	0.66			0.77
P1	pH						5.9
	EC (mS/cm)	0.67					0.68
P2	pH						
	EC (mS/cm)	0.52					
P3	pH				6.3	6.3	
	EC (mS/cm)	0.8			1.41	1.43	
P4	pH						
	EC (mS/cm)	0.93					
P5	pH				6.5	6.4	
	EC (mS/cm)	0.62			1.96	2.06	

Table 2.3 - Groundwater nutrient data

Parameter	Units	Detection limit	P1	P2	P5
pH		n/a	7.9	7.9	8
EC	µS/cm	<2	720	930	1800
TDS	mg/L	<10	520	530	900
Ca	mg/L	<0.2	5.8	5.2	12
Mg	mg/L	<0.1	10	15	35
K	mg/L	<0.1	5.5	6.8	12
Na	mg/L	<0.5	130	150	270
Cl	mg/L	<1	200	260	520
SO4	mg/L	<1	21	26	54
CO3	mg/L	<1	<1	<1	<1
HCO3	mg/L	<5	25	25	30
CaCO3	mg/L	n/a	19	20	26
Fe	mg/L	<0.02	0.02	<0.02	<0.02
TN	mg/L	<0.2	1.6	1.3	1.9
TKN	mg/L	<0.1	1	0.6	0.5
NO3	mg/L	<0.2	2.4	2.8	6.2
NO2-N	mg/L	<0.05	<0.05	<0.05	<0.05
TP	mg/L	<0.05	0.35	<0.05	<0.05

The above snapshot of groundwater quality data will be used as the baseline pre-development groundwater quality, and ongoing groundwater monitoring will be measured against this data.



## 2.4 Surface water

Stormwater runoff from the majority of the site discharges to Wittecarra Creek, which is located to the east of the LSP area and flows from south-east to north-west to the coast. A series of smaller flow paths and tributaries to Wittecarra Creek are located around the LSP area, one of which runs along with northern edge of the existing Eco Flora estate. An area in the south-western corner of the LSP area is located on the western side of a natural ridge, and runoff from this area discharges towards George Grey Drive to the west rather than to Wittecarra Creek. In major storm events, runoff from this catchment discharges via overland flow across George Grey Drive to the coast.

Figure 2.4 shows the natural catchment boundaries and flow paths in the LSP area.

An estimate of surface water flows from the undeveloped parts of the LSP has been made based on the rational method, using the methods outlined in Australian Rainfall and Runoff for small to medium sized rural catchments. The methods used in AR&R apply a frequency factor to the runoff coefficient for various average recurrence interval (ARI) storms. For the Kalbarri region, these frequency factors apply to storms with an ARI between 2 years and 50 years. For this reason, the pre-development flows outlined below are shown for the 2 year, 5 year and 50 year storm events, rather than the typically-reported 1 year, 5 year and 100 year storms.

Section 5 outlines the post-development flows generated by the LSP area and includes 1 year ARI allowable flow rates for the development, based on a comparison of the relative rainfall intensities between the 1yr and 2yr storm events (refer to Section 5 for more information).

The estimated pre-development flow rates for stormwater runoff from the undeveloped areas of the LSP area are shown in Table 2.4 below.

Table 2.4 - Estimated surface water flow rates

	Catchment area	Estimated flow rate		
		2yr ARI	5yr ARI	50 yr ARI
Catchment 1	30 ha	0.3 m <sup>3</sup> /s	0.5 m <sup>3</sup> /s	2.5 m <sup>3</sup> /s
Catchment 2	30 ha	0.2 m <sup>3</sup> /s	0.4 m <sup>3</sup> /s	2.0 m <sup>3</sup> /s
Catchment 3	160 ha	0.6 m <sup>3</sup> /s	1.2 m <sup>3</sup> /s	5.7 m <sup>3</sup> /s
Catchment 4	40 ha	0.4 m <sup>3</sup> /s	0.8 m <sup>3</sup> /s	3.9 m <sup>3</sup> /s

## 3 WATER CONSERVATION

The State Water Plan (WA Government, 2007) sets a target for total water use of no more than 100 kL/person/year. This water consumption target is reflected in the Department of Water's interim guidelines for developing an LWMS, which also sets an aspirational target of no more than 40-60 kL/person/year of potable (scheme) water use.

### 3.1 Potable water supply

Potable water will be supplied from the Water Corporation's reticulated water supply.

The total water consumption target of 100kL/person/year is generally achieved through the use of waterwise fittings and appliances inside the house, along with planting water efficient gardens with minimal lawn areas and native, low-water-use plants. Future UWMPs will include a detailed water consumption estimate to show that the development can achieve the State Water Plan consumption target.

To achieve the potable water consumption target of 40-60kL/person/year, all water use outside the house (i.e. outdoor taps and irrigation) would need to be from non-potable sources like groundwater, rainwater or recycled water.

Future urban water management plans (UWMPs) will need to include an estimate of potable water consumption to demonstrate how these water consumption targets will be met.

### 3.2 Non-potable water supply

An important part of water sustainability is fit-for-purpose water use, or the use of alternative water sources for applications where drinking-quality water is not necessary (e.g. toilet flushing, garden watering).

Public open space is expected to be irrigated using groundwater. The site falls within the Gascoyne Groundwater Area, and the Kalbarri/Eurardy Groundwater Subarea. There is an existing groundwater licence over the site, for the purpose of POS irrigation for the existing POS in previously-developed areas and for proposed POS in the future subdivision. This existing licence is for 22,000 kL/year (GWL 161829), and the allocation is from the Carnarvon-Tumblagooda aquifer.

A series of production and monitoring bores are already in place across the LSP area for irrigation and monitoring purposes, as discussed in more detail in Section 2.3 above. This existing bore network will be used to irrigate the areas of future POS that require irrigation.



## 4 GROUNDWATER MANAGEMENT

As discussed in Section 2.3.1 above, groundwater levels across the LSP area are deep (2m to 72m below natural surface level), and will not be an influence on the future development of the LSP area.

Groundwater quality will primarily be managed through the landscaping design guidelines, with the landscape design of POS areas making use of plants that require low fertiliser use, to minimise the amount of nutrients leaching into the groundwater.

## 5 SURFACE WATER MANAGEMENT

The key design objectives for stormwater management as per the DoW's LWMS guidelines are as follows:

- For the critical 1yr ARI event, the post-development discharge volume and peak flow rates shall be maintained relative to pre-development conditions in all parts of the catchment.
- The catchment runoff shall be managed for all ARI events up to and including the 100yr ARI event within the development area to pre-development peak flow rates.
- All runoff contained within the drainage infrastructure network is to receive treatment prior to discharge. Bioretention systems are to be sized at 2% of the impervious area from which they receive runoff.

### 5.1 Minor storm management (up to 5yr ARI)

Runoff from the LSP area will be managed by collecting road runoff in a piped drainage network which will discharge to the basins in the approximate locations shown in Figure 5.1.

Stormwater modelling has been completed using the XP-Storm software package to size the basins to ensure that peak discharge rates from the development to the surrounding environment are within the pre-development levels outlined in Section 2.4. Appendix A includes details of the parameters used in the modelling. Table 5.1 and Note 1 - Lots 2,000m<sup>2</sup> and smaller have been excluded from the catchment calculations on the basis that they will retain runoff within the lot.

Table 5.2 below shows the estimated post-development flow rates for each catchment in the LSP area, along with the required basin volumes to achieve these flow rates, for the critical 1yr and 5yr ARI storm events.

Pre-development flow rates are not available for the 1yr ARI storm event. In order to calculate 1 year peak flow rates, to achieve the DoW's design objectives for stormwater management (maintaining post-development flows relative to pre-development conditions for the critical 1yr ARI event), a comparison of the intensity of 1yr vs 2yr ARI storm events was undertaken, which showed that 1yr ARI storms typically have 75% of the intensity of a 2yr ARI storm event. This multiplier was applied to the 2yr ARI pre-development flow rates to establish an allowable flow rate under post-development conditions for a 1yr ARI storm.

Table 5.1 - 1yr ARI storage areas and peak flows

Catchment number	1	2	3a	3b	3c	3d	3e
Allowable flow rate (per hectare) (75% of the 2yr ARI pre-development flow rate)	6.7 L/s/ha	5.5 L/s/ha	2.8 L/s/ha	2.8 L/s/ha	2.8 L/s/ha	2.8 L/s/ha	2.8 L/s/ha
Catchment area	32 ha	22 ha	52 ha	13 ha	4 ha	5 ha	5 ha
Allowable post-development flow rate	0.1 m <sup>3</sup> /s	0.1 m <sup>3</sup> /s	0.1 m <sup>3</sup> /s	0.03 m <sup>3</sup> /s	0.01 m <sup>3</sup> /s	0.01 m <sup>3</sup> /s	0.01 m <sup>3</sup> /s

Catchment number	1	2	3a	3b	3c	3d	3e
Required basin volume	1550 m <sup>3</sup>	1100 m <sup>3</sup>	4080 m <sup>3</sup>	1150 m <sup>3</sup>	420 m <sup>3</sup>	290 m <sup>3</sup>	260 m <sup>3</sup>
Approximate basin depth	0.6 m	0.6 m	0.7 m	0.4 m	0.5 m	0.4 m	0.3 m
Modelled outflow from stormwater basin	0.1 m <sup>3</sup> /s	0.1 m <sup>3</sup> /s	0.1 m <sup>3</sup> /s	0.05 m <sup>3</sup> /s	0.02 m <sup>3</sup> /s	0.01 m <sup>3</sup> /s	0.01 m <sup>3</sup> /s

Note 1 - Lots 2,000m<sup>2</sup> and smaller have been excluded from the catchment calculations on the basis that they will retain runoff within the lot.

Table 5.2 - 5yr ARI storage areas and peak flows

Catchment number	1	2	3a	3b	3c	3d	3e
Pre-development flow rate (per hectare)	17.8 L/s/ha	14.7 L/s/ha	7.4 L/s/ha	7.4 L/s/ha	7.4 L/s/ha	7.4 L/s/ha	7.4 L/s/ha
Catchment area	32 ha	22 ha	52 ha	13 ha	4 ha	5 ha	5 ha
Allowable post-development flow rate	0.4 m <sup>3</sup> /s	0.3 m <sup>3</sup> /s	0.3 m <sup>3</sup> /s	0.1 m <sup>3</sup> /s	0.03 m <sup>3</sup> /s	0.01 m <sup>3</sup> /s	0.01 m <sup>3</sup> /s
Required basin volume	2330 m <sup>3</sup>	1800 m <sup>3</sup>	6250 m <sup>3</sup>	1550 m <sup>3</sup>	690 m <sup>3</sup>	420 m <sup>3</sup>	350 m <sup>3</sup>
Approximate basin depth	0.8 m	0.9 m	1.1 m	0.6 m	0.7 m	0.5 m	0.5 m
Modelled outflow from stormwater basin	0.3 m <sup>3</sup> /s	0.3 m <sup>3</sup> /s	0.4 m <sup>3</sup> /s	0.1 m <sup>3</sup> /s	0.03 m <sup>3</sup> /s	0.02 m <sup>3</sup> /s	0.02 m <sup>3</sup> /s

Note 1 - Lots 2,000m<sup>2</sup> and smaller have been excluded from the catchment calculations on the basis that they will retain runoff within the lot.

Basin 1 is located in a trapped low point, where the natural flow path is to the west via overland flow in major storm events across George Grey Drive. When the subdivision is constructed, this existing flow path over the road will be replaced with a culvert under George Grey Drive.

The large rural lots on the eastern boundary of the site naturally fall to the east, and therefore runoff from these lots will not be captured in the stormwater basins within the LSP area. Should these lots be subdivided in the future, these lots will need to manage their own runoff (i.e. attenuate flows to pre-development levels) in accordance with the general design objectives outlined in Section 1.3.

The Special Use development site in the northern corner will also be required to provide its own stormwater detention measures to ensure that post-development flow rates to Wittecarra Creek remain within pre-development levels. The sizing of the required detention storage will depend on the ultimate landuse and layout of this development site, and will be designed as part of a future DA for this site.

## 5.2 Major flood management (up to 100yr ARI)

Surface runoff from roads and lots in major storm events will be conveyed via overland flow within road reserves towards the basins, which are located in the low points of each catchment. The earthworks design through the LSP area will ensure that an overland flow path is available through the catchment to a basin and/or POS area, and that there is also an overland flow path from each basin to the downstream environment.

Finished lot levels are required to be at least 0.3m above the 100 year flood level in the subdivision roads and basins, or 0.5m above the 100 year flood level in Wittecarra Creek.

Table 5.3 shows the peak flow rates that were calculated for the critical 100yr ARI storm event. These flow rates are well within the 50-year ARI pre-development flow rates.

Table 5.3 - 100yr ARI storage areas and peak flows

Catchment number	1	2	3a	3b	3c	3d	3e
Pre-development flow rate (per hectare)	83.8 L/s/ha	69.1 L/s/ha	34.8 L/s/ha	34.8 L/s/ha	34.8 L/s/ha	34.8 L/s/ha	34.8 L/s/ha
Catchment area <sup>1</sup>	32 ha	22 ha	52 ha	13 ha	7 ha	4 ha	5 ha
Allowable post-development flow rate	1.9 m <sup>3</sup> /s	1.3 m <sup>3</sup> /s	1.6 m <sup>3</sup> /s	0.4 m <sup>3</sup> /s	0.1 m <sup>3</sup> /s	0.1m <sup>3</sup> /s	0.1 m <sup>3</sup> /s
Required basin volume	2670 m <sup>3</sup>	1950 m <sup>3</sup>	6590 m <sup>3</sup>	1790 m <sup>3</sup>	740 m <sup>3</sup>	460 m <sup>3</sup>	410 m <sup>3</sup>
Approximate basin depth	0.9 m	1.0 m	1.1 m	0.6 m	0.8 m	0.6 m	0.5 m
Modelled outflow from stormwater basin	0.9 m <sup>3</sup> /s	0.8 m <sup>3</sup> /s	1.3 m <sup>3</sup> /s	0.3 m <sup>3</sup> /s	0.2 m <sup>3</sup> /s	0.1 m <sup>3</sup> /s	0.1 m <sup>3</sup> /s

Note 1 - Lots 2,000m<sup>2</sup> and smaller have been excluded from the catchment calculations on the basis that they will retain runoff within the lot.

### 5.3 Surface water quality

An area at the inlet of each basin will be designed as a shallow bioretention swale, with planting to be designed to promote the uptake of nutrients from the stormwater runoff. In accordance with the Stormwater Management Manual for Western Australia (DoW, 2004-2007), bioretention areas will be sized with a surface area that is 2% of the connected impervious (road reserve) area for each catchment. Table 5.4 below shows the required size of the bioretention areas that will be required.

Table 5.4 - Required bioretention areas

Catchment number	1	2	3a	3b	3c	3d	3e
Bioretention area 2% of connected impervious (road) area	1,100 m <sup>2</sup>	400 m <sup>2</sup>	1,000 m <sup>2</sup>	100 m <sup>2</sup>	300 m <sup>2</sup>	400 m <sup>2</sup>	300 m <sup>2</sup>

If geotechnical conditions are suitable, all residential lots will be expected to retain runoff from roof and hardstand areas in soakwells and/or rainwater tanks within the lot.

### 5.4 Wetlands & waterways

The site is located adjacent to Wittecarra Creek, and stormwater runoff from the majority of the site naturally discharges via overland flow to the creek. To ensure that the creek is not adversely affected by the development, stormwater runoff will be attenuated to pre-development levels in the detention basins across the site, and bioretention areas will be planted out in the base of each basin to treat runoff from frequent, first-flush storm events.

## 6 SUBDIVISION AND URBAN WATER MANAGEMENT PLANS

The preparation of more detailed water management plans to support subdivision is a requirement of the Better Urban Water Management framework. While strategies have been provided in this LWMS that address planning for water management within the LSP area, it is a logical progression that future subdivision designs and supporting urban water management plans will further develop these water management strategies and will outline details of the designs that are not able to be determined at this stage of the planning process. Future UWMPs for development of Lots 9502 & 9505 George Grey Drive will include more detailed information on the design of the following infrastructure:

- Stormwater retention/detention basin sizes, depths & configurations.
- Confirmation that the final stormwater drainage design achieves the objectives of this LWMS - particularly that post-development flow rates remain within allowable levels.
- Details of the specific water-conservation measures that will be applied at the site and an estimate of water consumption based on the final lot mix and layout.

## 7 MONITORING AND IMPLEMENTATION

Post-development groundwater monitoring is already required as part of the irrigation licence and additional monitoring is not considered to be necessary. Groundwater monitoring reports should include a comparison with the baseline data outlined in Section 2.3.

Post-development surface water monitoring should be undertaken at the outlets from each of the stormwater detention basins for a period of 2 years following the completion of the subdivision works surrounding each basin. The Urban Water Management Plan for the site should outline the proposed frequency and monitoring parameters.



## 8 REFERENCES

Coffey, *Kalbarri Vision - constraints on development due to public drinking water issues (May 2005)*

Coffey Geotechnics, *Kalbarri Vision - application to draw water from borefield (December 2006)*

Coffey Geotechnics, *Monitoring Report No 1 for GWL 161829(1) - Kalbarri Vision development (February 2008)*

Department of Water, *Interim: Developing a local water management strategy (December 2008)*

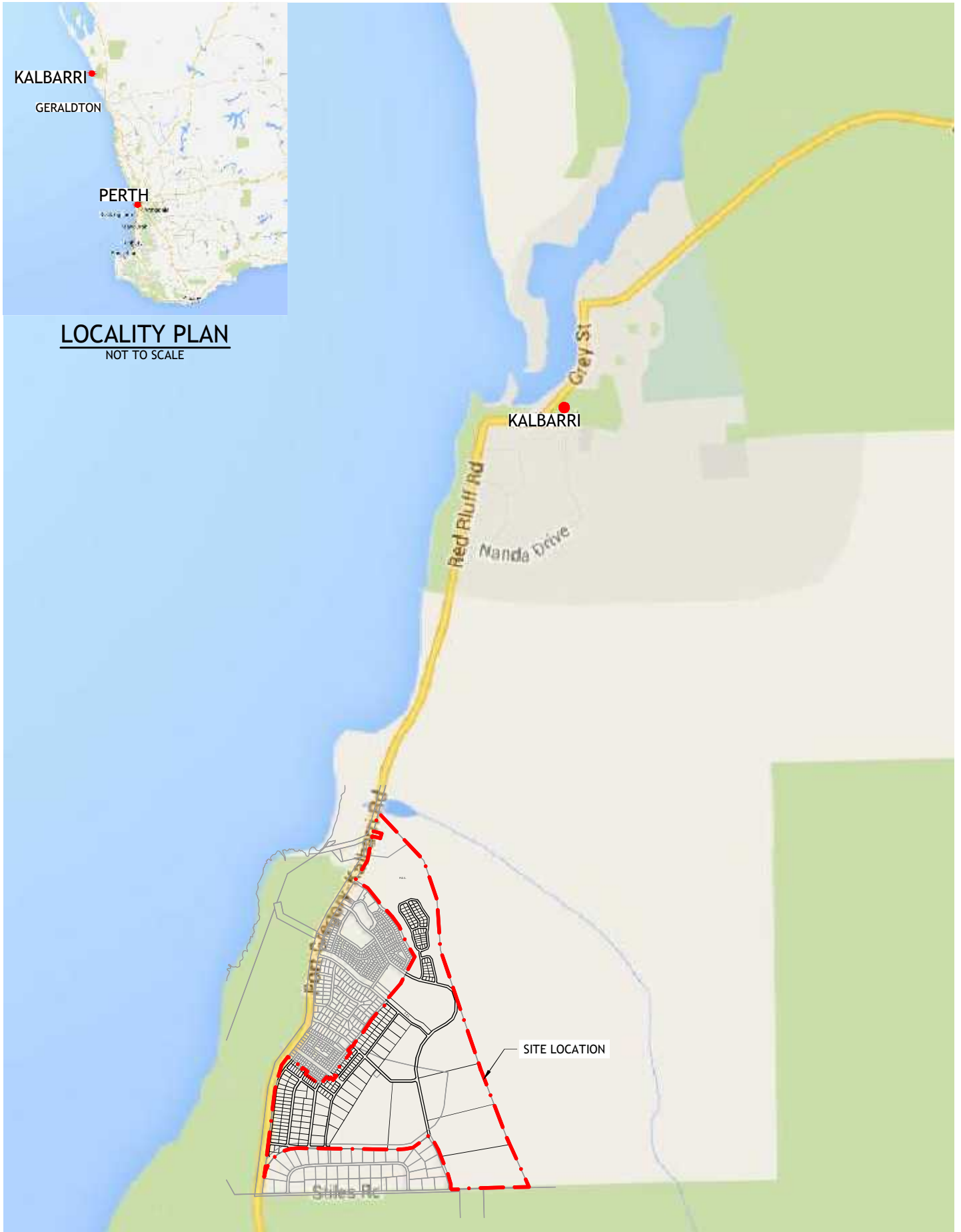
Maunsell | Aecom, *Capital Hill Kalbarri - Geotechnical Investigation Report (February 2007)*

Maunsell, *Strategic Management Plan for Port Kalbarri Estates (June 2004)*

Western Australian Planning Commission, *Better Urban Water Management (October 2008)*

Whelans, *Kalbarri Vision - Lot 903 & Superlot 2 George Grey Drive, Kalbarri - Structure Plan (September 2007)*





**LOCALITY PLAN**  
NOT TO SCALE

**SITE LOCATION**  
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SOURCE: GOOGLE



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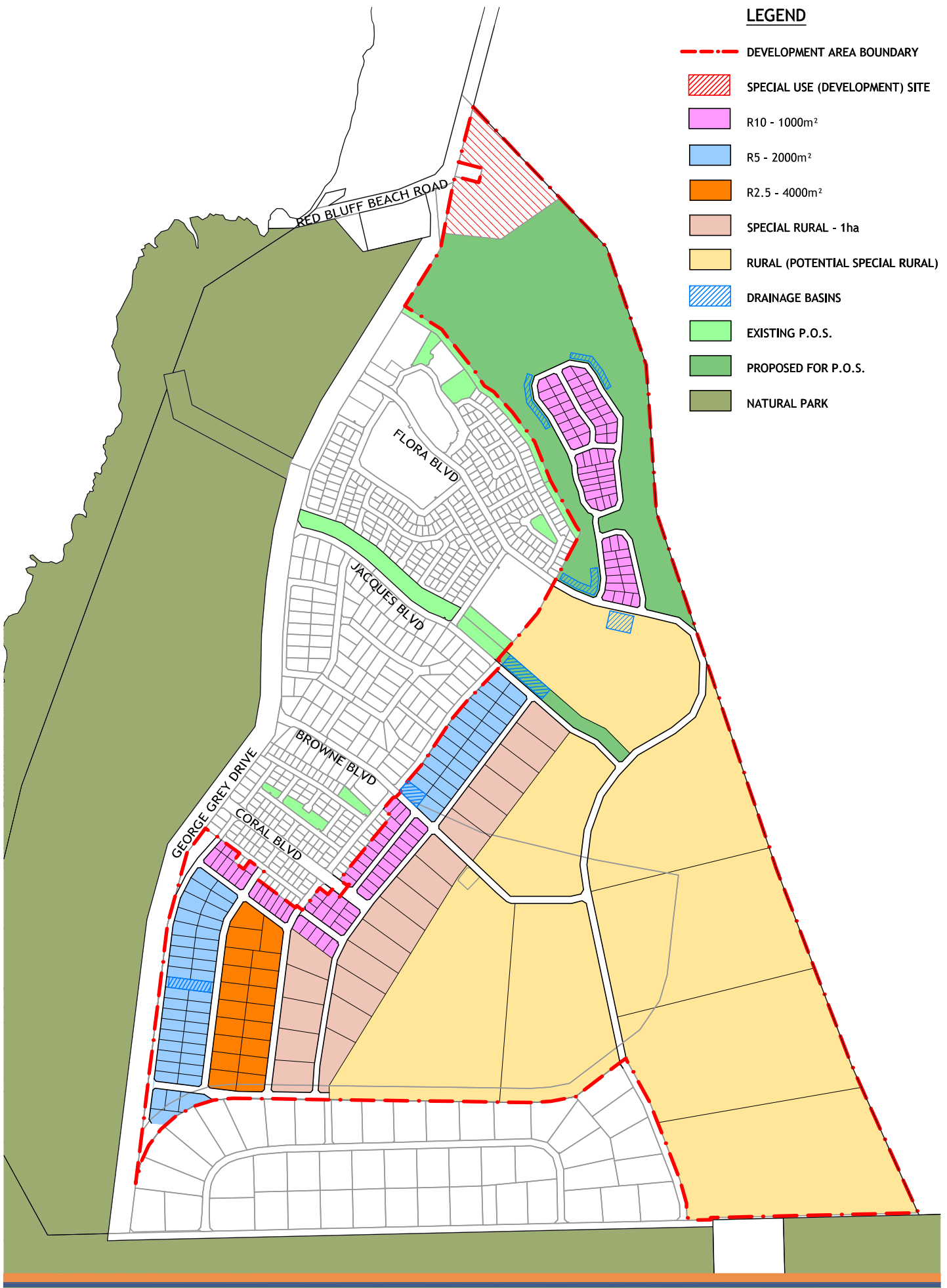
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GEORGE GREY DRIVE  
LWMS  
SITE LOCALITY PLAN

Job Number	3844
Revision	A
Date	OCTOBER 2014

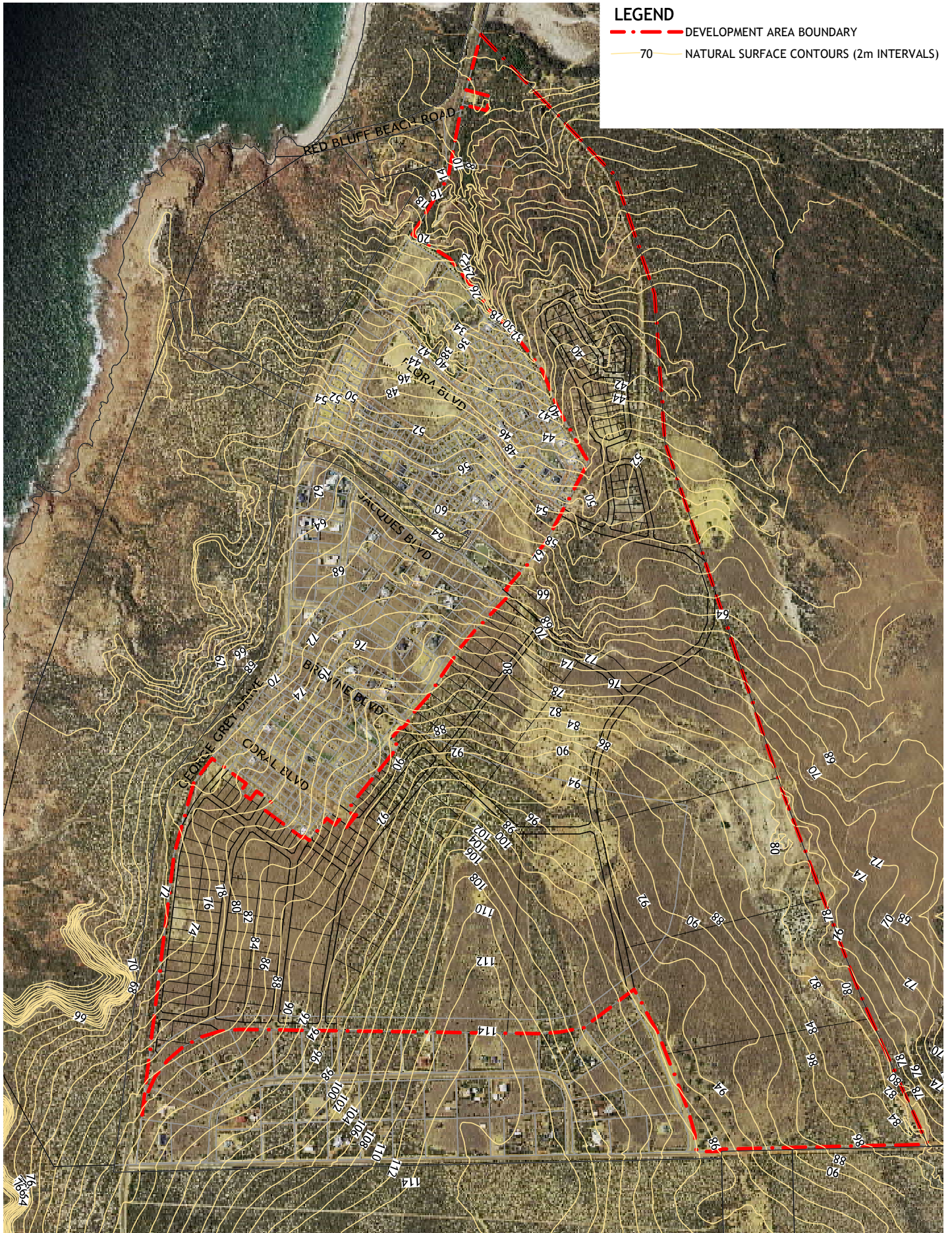
**FIGURE 1.1**

## LEGEND

- DEVELOPMENT AREA BOUNDARY
- SPECIAL USE (DEVELOPMENT) SITE
- R10 - 1000m<sup>2</sup>
- R5 - 2000m<sup>2</sup>
- R2.5 - 4000m<sup>2</sup>
- SPECIAL RURAL - 1ha
- RURAL (POTENTIAL SPECIAL RURAL)
- DRAINAGE BASINS
- EXISTING P.O.S.
- PROPOSED FOR P.O.S.
- NATURAL PARK







**LEGEND**

- - - DEVELOPMENT AREA BOUNDARY
- 70 NATURAL SURFACE CONTOURS (2m INTERVALS)



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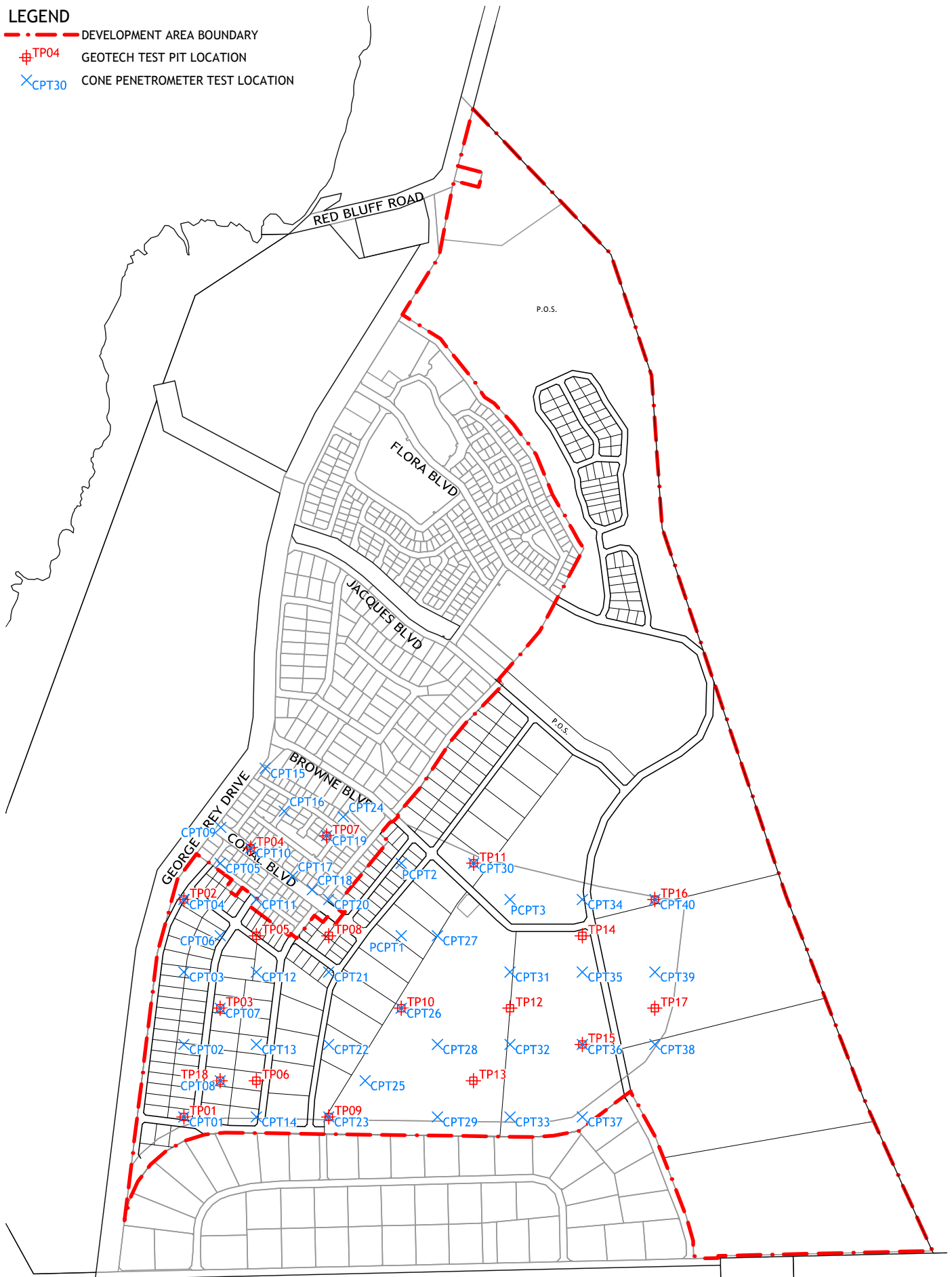
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**EXISTING CONTOURS AND  
 AERIAL PHOTO**

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**FIGURE 2.1**

**LEGEND**

- · - DEVELOPMENT AREA BOUNDARY
- # TP04 GEOTECH TEST PIT LOCATION
- X CPT30 CONE PENETROMETER TEST LOCATION



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**GEOTECHNICAL TEST PIT LOCATIONS**

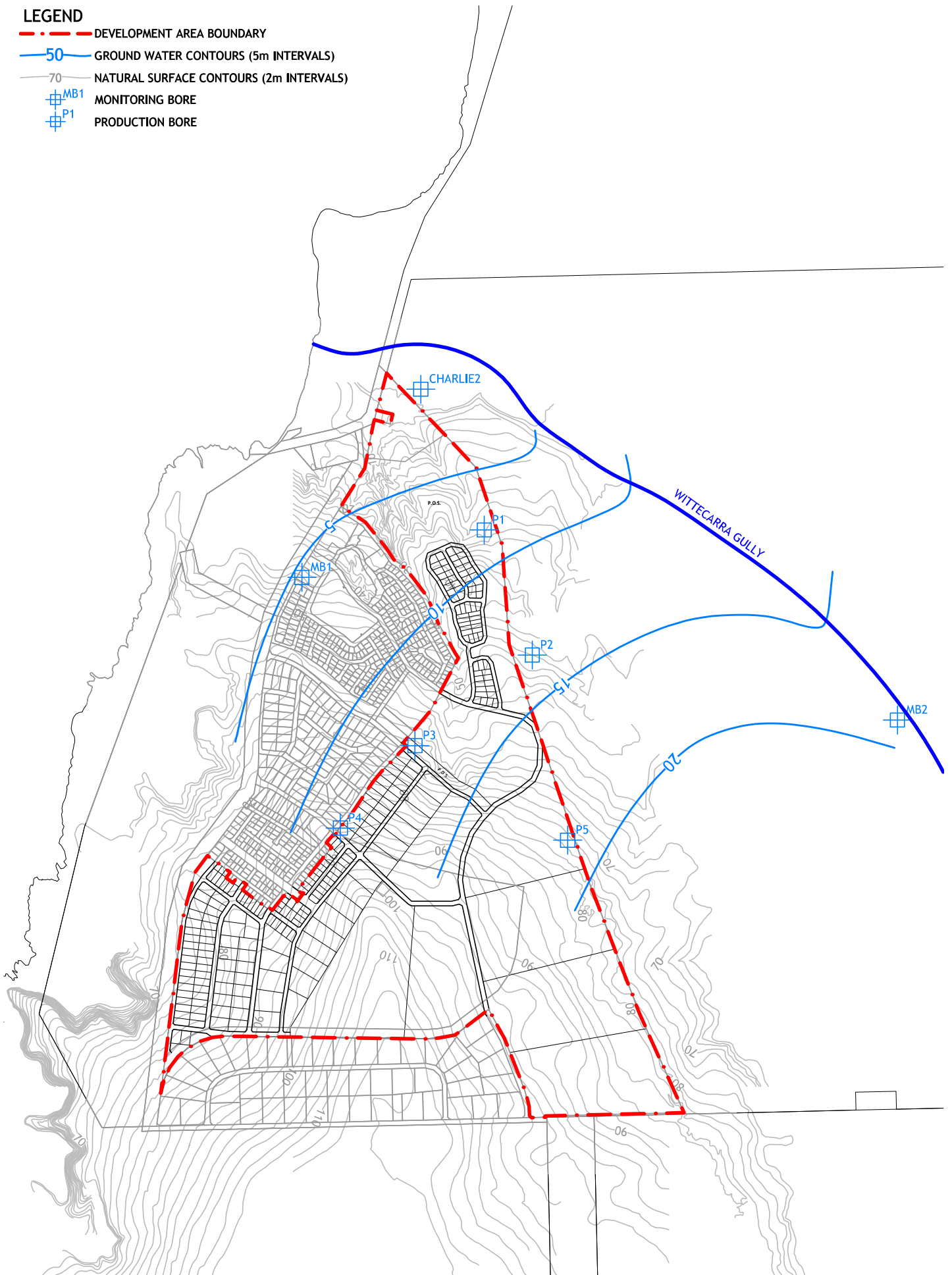
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**FIGURE 2.2**



**LEGEND**

- · - DEVELOPMENT AREA BOUNDARY
- 50 GROUND WATER CONTOURS (5m INTERVALS)
- 70 NATURAL SURFACE CONTOURS (2m INTERVALS)
- ⊠ MB1 MONITORING BORE
- ⊠ P1 PRODUCTION BORE



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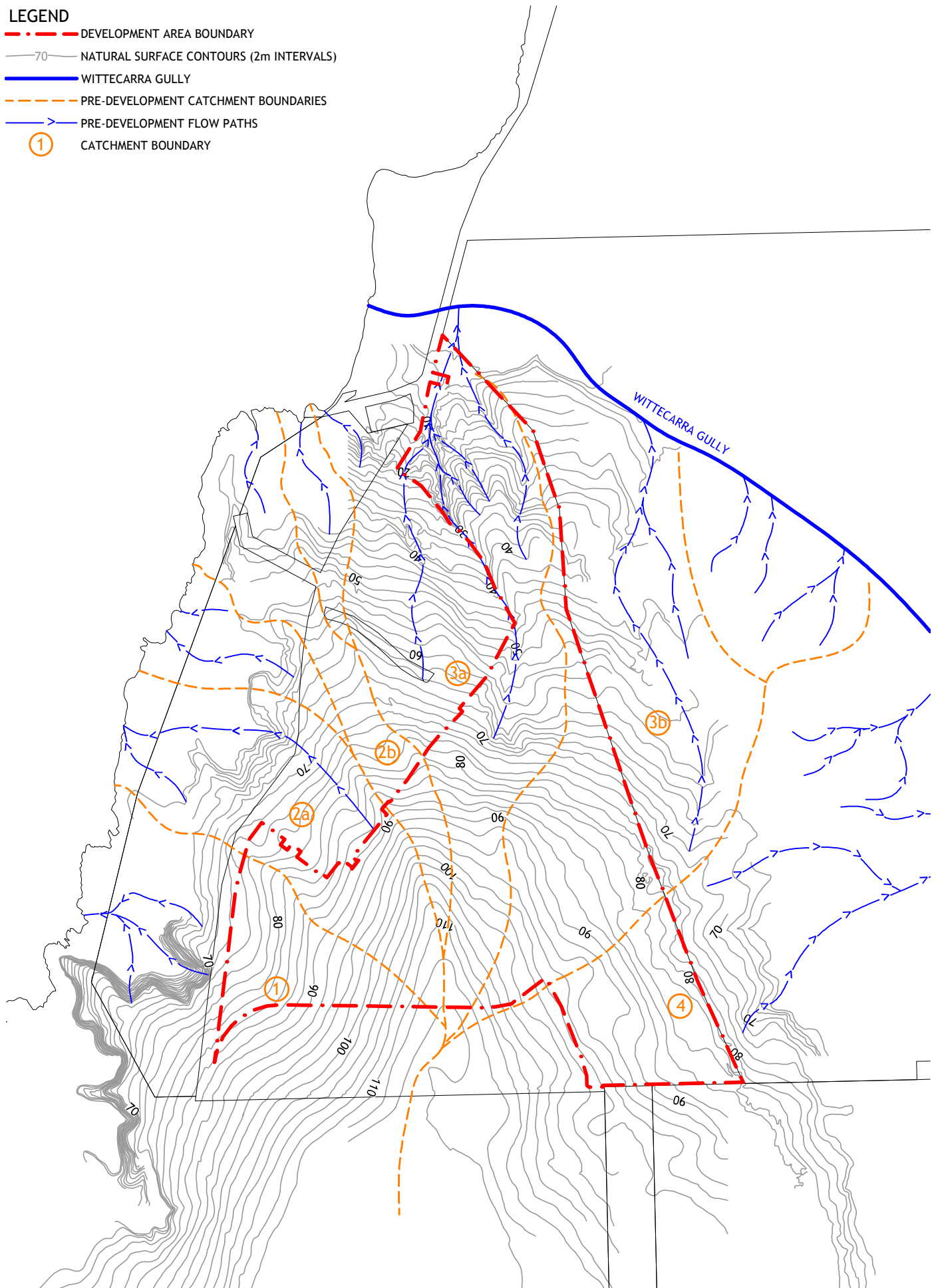
**MONITORING BORE LOCATIONS  
 AND GROUND WATER CONTOURS**

Job Number | 3844  
 Revision | A  
 Date | OCTOBER 2014

**FIGURE 2.3**

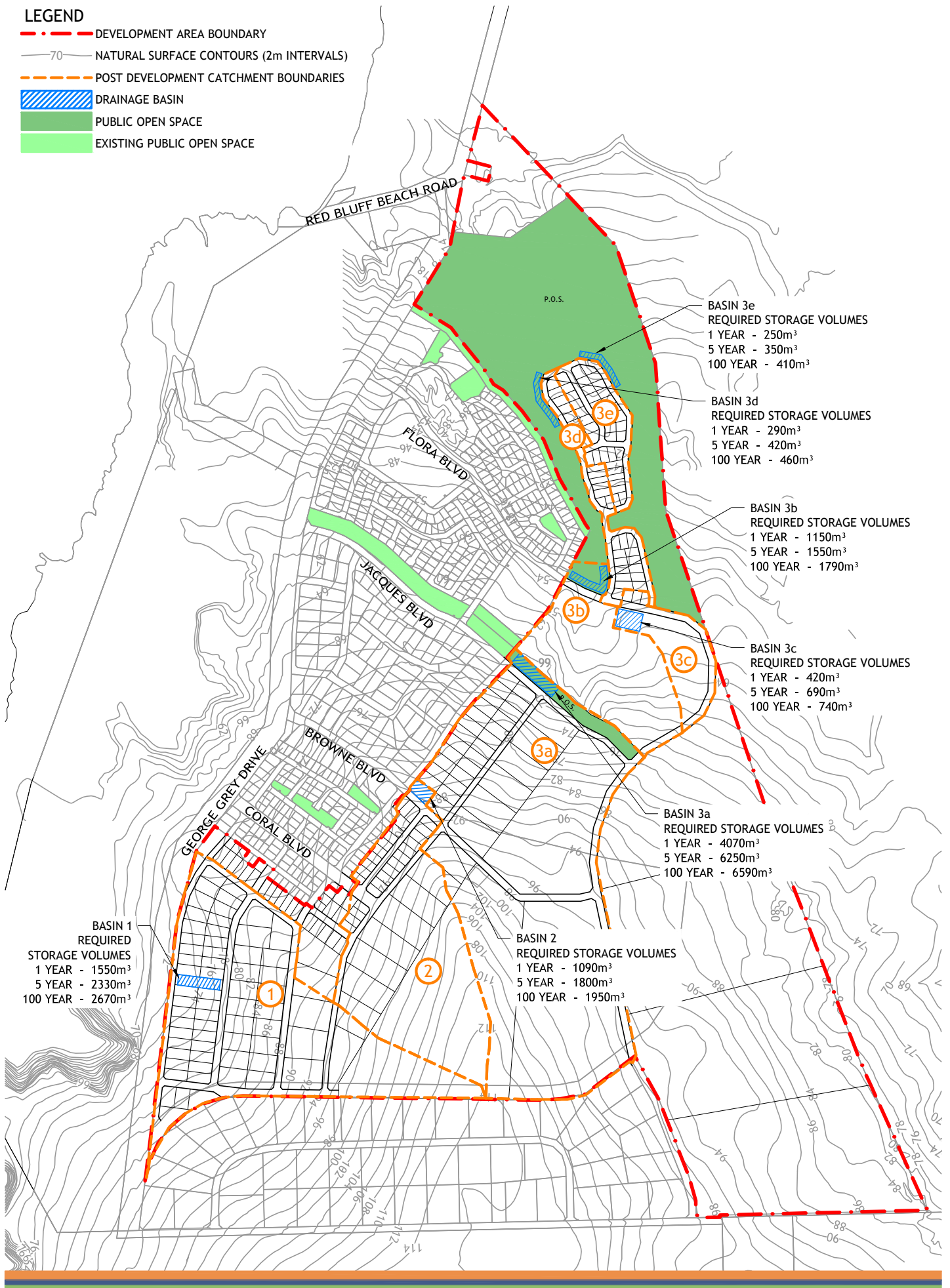
**LEGEND**

- · - · - DEVELOPMENT AREA BOUNDARY
- 70 NATURAL SURFACE CONTOURS (2m INTERVALS)
- WITTECARRA GULLY
- - - PRE-DEVELOPMENT CATCHMENT BOUNDARIES
- > PRE-DEVELOPMENT FLOW PATHS
- 1 CATCHMENT BOUNDARY



**LEGEND**

- · - · - DEVELOPMENT AREA BOUNDARY
- 70 — NATURAL SURFACE CONTOURS (2m INTERVALS)
- - - - - POST DEVELOPMENT CATCHMENT BOUNDARIES
- DRAINAGE BASIN
- PUBLIC OPEN SPACE
- EXISTING PUBLIC OPEN SPACE



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**POST DEVELOPMENT  
 DRAINAGE MANAGEMENT**

Job Number | 3844  
 Revision | C  
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**FIGURE 5.1**

## APPENDIX A - Stormwater modelling parameters



## Post-development surface water modelling parameters

Post-development stormwater modelling was also undertaken using the XP Storm design package.

The program uses a node & link network to model the hydrology of the urban catchment, and the hydraulic elements such as basins and piped or open drains.

The following sections outline the parameters used in modelling the subdivision runoff.

### *Design rainfall*

Design storm durations varied between 1 hour & 72 hours, for 1yr, 5yr & 100yr ARI design storms. Design rainfall Intensity Frequency Duration (IFD) data was created using the Bureau of Meteorology's online IFD-generator tool. The data used for the Kalbarri site is presented in Table A.1 below.

Table A.1 - IFD design data

ARI	Duration					
	Intensity (mm/hr)					
	1 hour	6 hour	12 hour	24 hour	48 hour	72 hour
1 year	15.3	4.53	2.82	1.78	1.09	0.789
2 year	19.9	5.84	3.63	2.27	1.4	1.03
5 year	26.3	7.5	4.63	2.91	1.82	1.33
50 year	41.7	11.5	7	4.43	2.8	2.06
100 year	46.8	12.8	7.79	4.93	3.13	2.3

### *Catchment properties*

The breakdown of subcatchment areas by land use is shown in Table A.2 below.

The catchment parameters for the various land uses included in the modelling are outlined in Table A.3 & Table A.4 below.

Table A.2 - Subcatchment landuse breakdown

Catchment number	Total area	Lot area (<2,000 m <sup>2</sup> )	Lot area (>2,000 m <sup>2</sup> )	Road reserve area	POS area
1	32 ha	9 ha	17 ha	5 ha	-
2	22 ha	3 ha	17 ha	2 ha	-
3a	52 ha	7 ha	39 ha	5 ha	2 ha
3b	13 ha	-	12 ha	1 ha	-
3c	4 ha	-	3	1 ha	-
3d	5 ha	3 ha	-	2 ha	-
3e	5 ha	3 ha	-	2 ha	-

Table A.3 - Post-development land use

Post-development landuse	% impervious
Residential lots <sup>1</sup>	0 %
Road reserve	80 %
POS	0 %

Note 1 - Runoff from impervious areas within residential lots is to be retained on site via soakwells and/or rainwater tanks.

Table A.4 - Manning's n & infiltration losses

Landuse	Manning's roughness	Initial loss (mm)	Continuing loss (% of rainfall)
Impervious surfaces	0.014	1 mm	0 mm/hr
Road verges	0.03	10 mm	20 %
POS and lots >2,000 m <sup>2</sup> (refer Note 1)	0.03	6 mm	50 %

Note 1 - The loss model for POS and large lots was calculated to approximate pre-development flows from the catchment.

# REVISED LOCAL STRUCTURE PLAN

BROWNE FARM – LOTS 9502 & 9505 GEORGE GREY DRIVE,  
KALBARRI – SHIRE OF NORTHAMPTON

JANUARY 2015

REF: 15982



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## REVISION HISTORY

Version	Date	Author	Reviewed	Change Description
0.0	20/5/2014	S. Fernandez		
1.0	5/11/2014	S. Fernandez		Addition of engineering and environmental detail
2.0	16/12/2014	S. Fernandez		Modifications to reference of density ranges

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## EXECUTIVE SUMMARY

### *Purpose*

This Local Structure Plan (LSP) has been prepared for Lots 9502 and 9505 George Grey Drive Kalbarri. The land the subject of this LSP comprises (2) lots located approximately 4 kilometres south of the Kalbarri town centre and is adjacent to the Kalbarri National Park. The LSP area is within the Kalbarri Townsite Strategy.

This LSP provides the planning framework to guide and facilitate the development of 257.33 hectares of land for residential purposes and has been prepared in accordance with the provisions of the Shire of Northampton Town Planning Scheme No. 9

The LSP forms part of the future residential growth area of Kalbarri and is adjacent and is a revision to the former 'Kalbarri Vision' Structure Plan that covers 'Residential' and 'Rural' zoned land on the eastern side of George Grey Drive. The LSP design provides for integration with the adjoining urban developed areas and approved 'Kalbarri Vision' Structure Plan.



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## ABBREVIATIONS

**Revised Local Structure Plan**

Browne Farm - Lots 9502 & 9505, George Grey Drive, Kalbarri



CERTIFIED THAT THIS STRUCTURE PLAN WAS ADOPTED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON

..... Date

Signed for and on behalf of the Western Australian Planning Commission

.....

An officer of the Commission duly authorized by the Commission pursuant to section 16 of the *Planning and Development Act 2005* for that purpose, in the presence of:

.....

Witness Date

And by

RESOLUTION OF THE COUNCIL OF THE SHIRE OF NORTHAMPTON ON

.....

Date And

PURSUANT TO THE COUNCIL'S RESOLUTION HEREUNTO AFFIXED IN THE PRESENCE OF

.....

President, Shire of Northampton

.....

Chief Executive Officer, Shire of Northampton .....

Date

The Structure Plan is prepared under the provisions of the Shire of Northampton Local Planning Scheme

**Table of Modifications**

Modification no.	Description of modification	Date endorsed by council	Date endorsed by WAPC
Modification 1			
Modification 2			

Table 1 Structure Plan Summary Table

Item	Data	Section number referenced within the structure plan report
Total area covered by structure plan	257.33hectares	
Area of each land use proposed: -Residential -Rural Residential -Rural	35.47 hectares 21.64 hectares 138.86 hectares	
Estimated lot yield	242 lots	
Estimated number of dwellings	241dwellings	
Estimated residential site density	N/A	
Estimated population	554 people	
Number of high schools	N/A	
Number of primary schools	N/A	
Estimated commercial floor space (for activity centres if appropriate)	N/A	
Employment self-sufficiency targets	N/A	
Estimated number and % of public open space: Regional open space District open space	Nil hectares ----- % 34.64 hectares13.5 %	
Estimated area and number: Neighbourhood parks  Local parks	0 hectares 0 Parks  1.77 hectares 1 parks	
Estimated number and area of natural area and biodiversity assets	34.64 hectares 1 sites + 19 areas of Priority Flora Locations	

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## BROWNE FARM STRUCTURE PLAN

### PART ONE (STATUTORY SECTION)

#### *1.1 Local structure plan area*

This structure plan shall apply to Lots 9502 and 9505 being the land contained within the inner edge of the line denoting the structure plan boundary on the structure plan map (plan 1).

#### *1.2 Local structure plan content*

This structure plan comprises:

- a) Part 1 – Statutory section  
This section contains the structure plan map and statutory planning provisions and requirements.
- b) Part 2 – Non-statutory (explanatory) section  
This section is to be used as a reference guide to interpret and justify the implementation of Part One.
- c) Appendices – Technical reports and supporting plans and maps.

#### *Interpretation and relationship with the scheme*

Unless otherwise specified in this part, the words and expressions used in this Structure Plan shall have the respective meanings given to them in the Shire of Northampton Town Planning Scheme No.9 (the Scheme) including any amendments gazetted thereto.

The structure plan map (Plan 1) outlines land use, zones and reserves applicable within the structure plan area. The zones and reserves designated under this structure plan apply to the land within it as if the zones and reserves were incorporated into the Scheme.

Pursuant to clause 5.28.6.3 of the Scheme:

- a) The provisions, standards and requirements specified under Part One of this Structure Plan shall have the same force and effect as if it were a provision, standard or requirement of the Scheme. In the event of there being any variations or conflict between the provisions, standards or requirements of the Scheme and the provisions, standards or requirements of this structure plan, then the provisions, standards or requirements of this Structure Plan shall prevail;

- 
- b) Any other provision, standard or requirement of Part One of the Structure Plan that is not otherwise contained in the Scheme, shall apply to the structure plan area as though it is incorporated into the Scheme, and shall be binding and enforceable to the same extent as if part of the Scheme; and
  - c) Part Two of this Structure Plan and all appendices are to be used as a reference only to clarify and guide interpretation and implementation of Part One.

### *1.3 Operation*

In accordance with clause 5.28.12 of the Scheme, this structure plan shall come into operation when it is either certified by the Western Australian Planning Commission (WAPC) pursuant to clause 5.28.12.1 of the Scheme or adopted, signed and sealed by the Council pursuant to clause 5.28.10.2 of the Scheme, whichever is the latter.

### *1.4 Land Use and Subdivision*

The Structure Plan Map (Plan 1) outlines land use, zones and reserves applicable within the Structure Plan area. The zones and reserves designated under this Structure Plan apply to the land within it as if the zones and reserves were incorporated into the Scheme.

#### *1.4.1 Land Use Permissibility*

Land use permissibility within the structure plan area shall be in accordance with the corresponding zone or reserve under the Scheme. Except for the following:

- a) No exceptions

#### *1.4.2 Residential*

##### *1.4.2.1 Dwelling Target*

- a) Objective

To provide for a minimum of 241 dwellings within the structure plan area.

- b) Subdivisions are to achieve the following:
  - i) Land coloured orange will achieve 2.5 to 5 dwellings per ha
  - ii) Land coloured blue will achieve 5 to 10 dwellings per ha
  - iii) Land coloured pink will achieve 10 to 20 dwellings per ha
  - iv) Land designated as Special Rural will achieve 1 dwellings per 1 ha

- 
- v) Land designated as Rural will achieve 1 dwellings per 15ha

#### 1.4.2.2 Density

- a) Plan 1 (the LSP) defines the broad residential density ranges that apply to specific areas within the Structure Plan. Lot specific residential densities are indicative of the desired outcome at the time of development of the LSP and are subject to variation within the ranges indicated on Plan 1. A Residential Code Plan is to be submitted before or at the time of subdivision to the WAPC and shall indicate the R-Code applicable to each lot within the subdivision and shall be consistent with the Structure Plan, and the Residential Density Ranges identified on Plan 1 and locational criteria contained in Clause 1.4.2.3.
- b) Approval of the Residential Codes shall be undertaken at the time of determination of the subdivision application by the WAPC.
- c) Variations to the Residential Codes will require further approval of the WAPC, with a revised LSP submitted generally consistent with the approved plan of subdivision issued by the WAPC. The revised LSP shall be consistent with Residential Density ranges identified on Plan 1 and the locational criteria contained in Clause 5.3.3.
- d) Residential Code Plans are not required if the WAPC considers that the subdivision is for one or more of the following:-
- i) The amalgamation of lots;
  - ii) Consolidation of land for "superlot" purposes to facilitate land assembly for future development;
  - iii) The purposes of facilitating the provision of access, services or infrastructure; or
  - iv) land which by virtue of its zoning or reservation under the Structure Plan cannot be developed for residential purposes.

#### 1.4.2.3 Locational Criteria

The allocation of residential densities on the LSP shall be in accordance with the following criteria:

- a) within the Residential zone an residential density of of between R2.5 to R20- shall be provided for residential lots; and
- b) within land identified for 'Future Special Residential' densities of 8 lots per 138 hectares shall be provided.

Note: Residential Codes have been addressed as part of the LSP. The Residential Codes includes densities ranging from R2.5 to R20. The Residential Codes are based on current market demand and will be subject to change based on changes on long term development trends.

### 1.4.3 Public Open Space

The provision of a minimum of 10 per cent public open space being provided in accordance with the WAPC’s Liveable Neighbourhoods. Public open space is to be provided generally in accordance with Plan 1 and Table 3, with an updated public open space schedule to be provided at the time of subdivision for determination by the WAPC, upon the advice of the Shire of Northampton

Table 2

POS SITE	SIZE (HA)
Red Bluff P.O.S.	34.9ha
Linear P.O.S. (Jaques Boulevard)	1.78ha
Browne Boulevard P.O.S. and drainage reserve	2771m <sup>2</sup>
George Grey Drive P.O.S. and drainage reserve	4050m <sup>2</sup>

### 1.4.4 Reports/Strategies Required Prior to Subdivision

Prior to the lodgement of subdivision applications to the WAPC, the following management plans are to be prepared, as applicable, to the satisfaction of the relevant authority and provided with the application for subdivision:

- a) Bushfire Management Plan – (Shire of Northampton)
- b) Local Water Management Plan – (Department of Water)
- c) Traffic Impact Assessment (Shire of Northampton)
- d) Implementation Plan

### 1.4.5 Conditions of Subdivision Approval

- a) At the time of subdivision the following conditions may be recommended, as applicable, requiring the preparation and/or implementation of the following strategies:
  - i) Bush fire management plan
  - ii) Local Development plans
  - iii) Retention and protection of key priority flora
  - iv) The provision of public utility services i.e. underground power, reticulated scheme water and reticulated effluent disposal to residential lots. Provision of septic systems to rural lots.
- b) At the time of subdivision the Shire of Northampton shall recommend to the WAPC the implementation of the following strategies which have been prepared and approved as part of the Structure Plan as conditions of subdivision:
  - i) Bushfire Management Plan – (Shire of Northampton)
  - ii) Local Water Management Plan – (Department of Water)

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- iii) Traffic Impact Assessment (Shire of Northampton)
  - iv) Implementation Plan

## 1.5 Other Requirements

### 1.5.1 Special Use (Development) Caravan Park

The northern portion of the LSP proposes a special use site that has been set aside to facilitate a local caravan park, short stay holiday accommodation or long term residential development. The shape of this lot has been configured to allow for maximum benefit of coastal views while still being cognisant of the protection of local flora in the adjacent public open space.

Further detailed design will be required within a planning application to indicate exact building layout and operations.



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## 2 PART TWO (EXPLANATORY SECTION)

### 2.1 *Planning background*

#### 2.1.1 *Introduction and purpose*

The purpose of this document is to revise the central and eastern area of the 'Kalbarri Vision' Structure Plan and extend the area of the Structure plan to the east. This new (Revised) Local Structure Plan is now known as Browne Farm. This Local Structure Plan is as per instructions from the Western Australian Planning Commission (WAPC) and in accordance with the provisions made under Amendment **No. XX** of the Shire of Northampton Town Planning Scheme No.9.

This Local Structure Plan (LPS) shall apply to Lots 9502 and 9505 George Grey Drive, Kalbarri. This is a residential and rural development known as Browne Farm (herein known as the subject site.)

Whelans has been commissioned by the land owner who wishes to progress the structure plan. The owner's details can be found in section 2.1.2.3 Legal Description and Ownership.

The subject site currently is zoned 'Rural' under the Shire of Northampton Town Planning Scheme No. 9 (TPS9).

A Structure Plan that was prepared and endorsed by the Shire and the WAPC covers most of the area of the new Browne Farm LSP; however this structure plan was never fully acted upon by the previous land owner. This revised LSP looks to update this plan and expand the area covered by the LSP. This is in line with the new owner's vision for the direction of future development.

#### 2.1.2 *Land description*

##### 2.1.2.1 *Location (Location Plan)*

The subject site is located approximately 4km south of the Kalbarri town centre on the east side of George Grey Drive Kalbarri within the Shire of Northampton. Please refer to Figure 1 Location Plan, at the end of this report.

##### 2.1.2.2 *Area and Land Use*

The total area of the subject site is 257.33ha and is comprised of two super lots both zoned 'Rural'. Lot 9502 is 93.7429ha is located to the south west of the subject site and bound by George Grey Drive to the west, rural residential development to the south and residential development to the north it abuts Lot 9502 to the east. Lot 9502 is 163.5872ha and is irregular in shape with Lot 9502, both residential and rural residential land and George Grey Drive abutting to the west. To the south the lot abuts the Kalbarri state forest reserve and to the east abuts super lot 10792.

The land has been cleared in areas in line with works completed from previous development. The land forms part of the undulating coast line for the area with high points to the south with views facing both inland northeast and northwest to Red Bluff.

**2.1.2.3 Legal Description and Ownership**

Following is the list of the original lots and the associated land owners. These details are listed on Figure 3 Land Holdings Plan found under figures at the end of this report. Refer to the reference number to locate each lot on the figure.

Lot No.	Deposited Plan	Certificate of Title	Owner
9502	57812	2699/529	Virginia Ann Clarke, Ronald Edward John Clarke (Joint tenants in 1/3 share)  Ilam Pty Ltd (1/3 share)  Silkcharm Pty Ltd C/o Duncan McPhail & Co. (1/3 share)  Tenants in Common
9505	58862	1092/252	Virginia Ann Clarke, Ronald Edward John Clarke (Joint tenants in 1/3 share)  Ilam Pty Ltd (1/3 share)  Silkcharm Pty Ltd C/o Duncan McPhail & Co. (1/3 share)  Tenants in Common

**2.1.3 Planning framework**

**2.1.3.1 Zonings and Reservations**

Under the Shire of Northampton TPS9 the zone for the subject site is 'Rural'. It is envisaged that this LSP will form the basis of the documentation as an extension to **Amendment XX** of TPS9.

**2.1.3.2 Planning Strategies**

The subject site is referred to in the Shire of Northampton's Kalbarri Townsite Strategy. The planning area of 'PK1' refers to the western and central areas of Lot 9502 and the northern portion of Lot 9505. These areas are designated as 'Low Density Mixed Residential Estate'. This planning area allows for a range of lots sizes from R.2.5 to R30.

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The eastern side of Lot 9502 and the southern portion of Lot 9505 are referred to as 'PK2' and are designated for 'Medium Term Residential'. This area can be developed pending adequate creation of housing choices provided within the main townsite. Both 'PK1' and 'PK2' areas subject to Use and Development provision.

#### 2.1.3.3 Policies

State Government Policies that relate to the LSP include:

- State Planning Policy No.2.5 – *Land Use Planning in Rural Areas (WAPC 2012)*
- State Planning Policy No.3 - *Urban Growth and Settlement (WAPC 2006)*
- Development Control Policy 3.4 – *Subdivision of Rural Land (WAPC 2012)*

#### 2.1.3.4 Other Approval and Decisions

Amendment No.XX to the Shire of Northampton TPS9 has been developed in conjunction with and is informed by the preparation of this LSP over the subject site.

## 2.2 Site conditions And Constraints

### 2.2.1 Biodiversity and natural area assets

Advice has been received from the Department of Park and Wildlife (DPaW) in regards to the existing situation within the Structure Plan area in terms of Threatened Species, Bushfire Mitigation, Weed Control, Water Management and Boundary Interface. A letter from Nigel Sercombe dated 4 February 2014 makes the following recommendations that have been addressed.

- Threatened species and communities of flora were identified within the northern area of the LSP especially south of the land designated for the Special Use site. DPaW recommended that this land be designated as POS to protect these species and the design of the LSP has incorporated this recommendation.
- An acknowledgement was made that the LSP is within close proximity to the Kalbarri National Park and as such bushfire mitigation measures would need to be installed to protect the LSP should a major bushfire incident occur. A Bushfire Management Plan has been prepared for the LSP area that does not place imposition on Kalbarri National Park itself.
- As anticipated within the DPaW correspondence a Local Water Management Strategy has also accompanies this LSP and addresses the issues of surface water runoff.

### 2.2.2 Flora

Bio Diverse Solutions was commissioned by Ilam Pty Ltd and Silkcharm Pty Ltd to conduct a flora and vegetation assessment of the special use site on the northern tip of the proposed Browne Farm Development area.

During the field survey 59 species, consisting of 26 families and 54 genera were found. The most common families were Myrtaceae, Poaceae and Asteraceae. This list includes 43 native species and 16 introduced species. Three species of priority flora were found within the survey area including: *Baeckea subcuneata*, *Chamelaucium marchantii* and *Verticordia polytricha*.

The northern section of the survey area is considered to be in degraded to completely degraded condition as a result of fruit cultivation and farming activities, which have completely cleared and modified the area. Some regeneration has occurred to the south of the main mango farm area, but the vegetation structure is completely altered and the overstorey now dominated by *Acacia rostellifera*, with minimal species diversity and a high level of weed invasion throughout this area.

The vegetation associated with the transition zone between the rocky breakaway and the deep red sand ecotypes is considered to be in very good - excellent condition. This area contains significant bare areas that have been invaded by weeds such as *\*Cuscuta epithymum*, *\*Lysimachia arvensis* and *\*Mesembryanthemum crystallinum*. The ground cover composition and structure has been somewhat altered by the weed invasion, particularly in areas where *\*Mesembryanthemum crystallinum* is present.

### 2.2.3 Landform and soils

#### 2.2.3.1 Existing landform

The site's natural topography generally falls from south to north at an average grade of approximately 4%, with levels falling from 114m AHD at the site's highest point on the southern boundary to 4m AHD at the lowest point of the Special Use site in the northern corner. An area in the site's south-western corner, between Stiles Road and the previously-developed Capital Hill Estate, falls to the west towards George Grey Drive and the coast, with the remainder of the site falling towards the north and north-east.

#### 2.2.3.2 Geotechnical conditions

A geotechnical investigation was carried out in 2007 over the southern part of the site, which established that geotechnical conditions in this area consisted of sand of varying depths, overlying rock or well-cemented sand. The depth of the rock/cemented material varied from 0.5m below natural surface in several locations near George Grey Drive, to >8m below natural surface in the area surrounding a ridge at the southern end of the site.

Additional geotechnical investigations will be required prior to subdivision for the central and northern parts of the LSP area, to verify the geotechnical conditions of the remainder of the site. There is exposed at-surface rock at the northern end of the site, where the natural topography drops away towards Wittecarra Gully.

### 2.2.4 Groundwater

An assessment of the hydrogeological conditions at the site was carried out by Coffey Geotechnics in 2005. This assessment found that an overall gradient of groundwater flow exists from east of the

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LSP area, discharging along the coast line to the west of the development area. A local groundwater mound exists between Wittecarra Creek and the coast, with some north-easterly “back” flow towards the creek.

#### 2.2.4.1 Groundwater levels

Groundwater levels at the site were measured during construction of the previous stage of the development as a condition of the groundwater licence. Five production/irrigation bores and three monitoring bores were monitored between December 2006 and January 2008.

Groundwater levels in December 2006 were between -2mAHD and 19mAHD (5m-72m below natural surface). The lowest level was at bore ‘Charlie 2’, which is located in the Wittecarra Gully immediately to the north of the LSP area. The highest groundwater level was measured at bore MB2, located approximately 1.5km to the east of the LSP area.

Groundwater levels have also been measured by the Water Corporation at their production and monitoring bores on Stiles Road, approximately 1km east of the LSP area. Groundwater levels were last measured at the Water Corporation bores in 2005, which showed groundwater to be between 39 and 41mAHD at this location (9m-11m below natural surface).

The sandstone breakaway areas and fringing vegetation are significant for conservation of the priority listed taxa located during the survey and should be excluded from development if possible (Figure 4). These ecotypes are not readily developed due to their rocky and uneven terrain and would not be expected to add significant value to the proposed development on this site. Inclusion of this area in the public open space to the south would achieve protection for known populations of *Verticordia polytricha* and *Baeckea subcuneata* and for >70% of the population of *Chamelaucium marchantii* within the survey area.

### 2.2.5 Surface water

#### 2.2.5.1 Existing infrastructure

The drainage infrastructure for the existing developments generally follows the site’s natural topography. The existing stormwater drainage network is a piped network which discharges towards the west, into a series of detention basins, before discharging into an existing open drain on the eastern verge of George Grey Drive, which follows the natural fall of the land towards Wittecarra Gully to the north.

#### 2.2.5.2 Surface water management

Stormwater runoff from the LSP area will be similarly managed via a pit and pipe network which will follow the natural topography where possible. Stormwater detention areas will be located in strategic locations in low points in the natural topography.

To ensure that downstream areas are not impacted by development within areas further upstream in the catchment, the stormwater detention basins will be sized to ensure that post-development flow rates remain within pre-development levels. This will ensure that the flow rates generated by

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runoff from the currently undeveloped land are not increased as a result of the development and there is no impact on the downstream environment.

#### 2.2.5.3 Major flood management

To ensure that developed areas are not subjected to flooding, detention areas will be provided with an overland flow path to the downstream environment that will allow stormwater to exit the site in major flood events.

The roads within the subdivision will be designed to eliminate trapped low points wherever possible, and to ensure that finished lot levels are above the 100-year flood level to protect houses from flooding in major storm events.

#### 2.2.6 Bushfire hazard

A Bushfire Management Plan was prepared by Bio Diverse Solutions to assess and make recommendations in relation to a fire hazard assessment. A full copy of this report has been supplied with this LSP.

The basic requirements of the Bushfire Management Plan (BMP) is to identify potential issues or problems relating to environmental fire threats and recommend specific actions by certain persons, agencies, authorities and developers to ensure, as much as practical, that the lives and assets of the location are not put at undue threat from any unplanned fire event.

The subdivision has been rated as having a **Moderate** Bushfire Hazard as defined by the hazard assessment procedure defined in Planning for Bushfire Protection Edition 2, 2010 and the Draft Planning for Bushfire Risk Management Guidelines (WAPC, 2014) due to internal and adjacent Woodland, Shrubland and Scrub bushfire risks. There are low to moderate slopes across the site. This requires "Performance Principle" and "Acceptable Solutions" to be met.

The Elements which are met either through the objectives of the "Performance Principle" or "Acceptable Solutions" for the Subject site include:

- **Element 1 – Location:** The subdivisions are located in an appropriate landscape with a Moderate Bushfire Hazard Rating. No building greater than BAL 29, HSZ and building to BAL and AS3959-2009 as outlined in Table 4 of the BMP report.
- **Element 2 - Siting and design of development:** The design of the subdivision allows for bushfire hazard mitigation measures to be incorporated reducing threat to people, property and infrastructure.
- **Element 3 - Vehicular access:** The presence of linking road networks which has a minimum of 20m road reserves and meets technical standards as outlines in Table 5 of the BMP report; and
- **Element 4 – Water:** Reticulated water to subdivision and water hydrants to Water Corporation WA standards.

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A full list of Developers and Owners responsibilities and works program, in relation to the BMP are, set out in the BMP report. The implementation of the Bushfire Management Plan for stage 1 is provided in the BMP report.

## 2.2.7 *Heritage*

### 2.2.7.1 *Cultural Heritage*

As part of previous structure planning, a detailed archaeological and heritage assessment was undertaken and no specific heritage sites were found relating to the current LSP area. In relation to the Kalbarri Vision site, the Heritage Council has advised (in previous correspondence relating to the Port Kalbarri Project Structure Plan) of sites potentially significant in terms of cultural heritage, including the Wittecarra Gully, Wittecarra Spring and Sir George Grey's cave (1839). These, however, are outside of the LSP area and are contained in the area previously known as Superlot 1. Further consideration of these heritage sites will be taken into consideration in future planning of the Superlot 1 area.

### 2.2.7.2 *Indigenous Heritage*

Previous consultation with the Department of Indigenous Affairs for comment, advised that there are three registered Aboriginal Heritage sites located in the area previously known as Superlot 1, which is to the north of this revised LSP area. The Shire of Northampton required that the landowner consider this matter in the future planning for Superlot 1 area. It is noted that these do not have any impact for the current LSP.

## 2.2.8 *Coast and foreshores*

The High Water Mark of the coast is in excess of 300m from the nearest point of the LSP area crossing George Grey Drive. The site at its lowest point is set approximately 4m above the High Water Mark, however the bulk of the residential area ranges between 72m AHD and 92m AHD. As such the LSP will not have any impact on the existing land abutting the coast and foreshore.

## 2.3 *Land use and subdivision requirements*

### 2.3.1 *Land use*

The proposed LSP (Plan 1) is the guide by which further subdivision of the subject site can take reference. The LSP sets out road networks, residential densities, open space and infrastructure pertinent to future development. Following is a brief outline of the points that justify the proposed land uses and their integration in the surrounding land use.

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The majority of the site is cleared for pastoral uses; however the quality of the soil and the rocky nature of the subject site leave the area generally unproductive for farming purposes. The subject site will be far better utilised as an area of residential development.

The western side of the LSP will be low density residential located in areas along George Grey Drive and completing areas of existing residential development. This style of lots will be in keeping with the rural residential character of the surrounding area and will act as a transitional interface to larger lots to the east. The rural lots to the east provide greater flexibility for future growth, allowing a location for rural living with the option for further subdivision dependant on future demand.

To the north of the subject land an area is designated for a Special Use (Development) Site. Further investigation will be require as to the adequacy of this area, however it is envisaged, given the proximity to the beach at Red Bluff and the Wittecarra Creek Conservation Reserve, this will be an location for tourist accommodation and a caravan park site.

South of the Special Use Site is an area of rocky terrain that will be set aside as a location of public open space (POS) maintaining the natural bush land. This location will preserve several locations of priority flora as well as provide a location for capture of rainfall runoff and drainage. Secluded in this location is a development area that will incorporate larger residential lots (R10), that will form a premium lot location having both a natural bush land buffer and ocean views in a hamlet setting.

A Linear POS link will be extended from the existing George Grey Drive connection east towards the rural lots. This avenue of POS will provide walkable access to the coast and the beach at Red Bluff. Flows of natural drainage and rainfall runoff can also be directed to this is area.

### 2.3.2 Open space

Four areas of POS are located within the LSP. The first is the extension of the POS link that connects George Grey Drive with proposed rural land area. This POS will provide a walkable link as well as a location for a drainage basin to capture rainfall runoff.

The second POS location is that of the reserve for bushland at the north of the subject land. This location provides several benefits. It will preserve several locations of priority flora, it will provide an area for rainfall runoff retention and will provide a backdrop for both the Special Use (development) site and the premium R10 hamlet. This area also abuts the Wittecarra Creek Conservation Reserve.

The remaining smaller POS sites on Browne Boulevard and George Grey Drive have been established as part of the LWMS while also facilitating development as valuable recreational and access linkages.



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### 2.3.3 Residential

All residential development in this LPS shall conform to standards set out in the Residential Design Codes (RCodes) and the Shire of North Hampton TPS9.

Design aspects of the LSP that are key features are as follow:

- Topography and Location – The design has taken into consideration the sloping nature of the subject site, the existing vegetation and the proximity to the George Grey Drive and the Coast. Extension of the POS link and retention of an area of natural bushland, orientation and position of higher density lots to the west of the estate, transitioning into larger rural lots heading east will maintain the character of the area with a rural community ‘feel’.
- Road Network – The arterial bypass connection to the Kalbarri Townsite exists through George Grey Drive. This is enhanced by directing all vehicular access to the estate through several strategic boulevard locations. No eastern access into the estate will be established.

The internal road network is generally grid in nature and well interconnected to allow good vehicle permeability while encouraging walking and cycling along the road network that borders the POS.

- Lot Layout – Where possible passive solar design has been considered, wherever possible future lot design has been considered to keep dwelling orientation north-south or east-west facing. The higher density lots have been strategically placed to maximise the views and access to the ocean.

### 2.3.4 Movement networks

The amended structure plan does not propose any additional access points onto George Grey Drive to service the proposed residential lots, and access will be via the four existing boulevards – Flora Blvd, Jacques Blvd, Browne Blvd and Coral Blvd. The estimated lot yield of the development is being reduced when compared with the current structure plan, and there will be a corresponding reduction in forecast traffic demand on the existing subdivision roads and George Grey Drive. Therefore, no additional road improvements on George Grey Drive or the existing internal road network are proposed.

A new access point onto George Grey Drive will be required for the Special Use (development) Site in the northern corner of the LSP area. A traffic review by Riley Consulting has confirmed that safe access to this site (which may potentially be developed as a caravan park) can be achieved from George Grey Drive with consideration to intersection sight distances, space for right-turn lanes, and forecast traffic demands.

The current LSP shows an alternative access road to Kalbarri, which runs along the southern and eastern boundaries of the LSP area. We understand that the Shire of Northampton’s draft planning scheme has relocated this access road to the north of Wittecarra Gully, and it has been removed from this LSP accordingly.

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### 2.3.5 Water management

The Department of Water has set overarching design objectives for new developments that should be used as a basis for water sensitive urban design. These design objectives cover the following categories:

- water conservation
- water quantity management (i.e. water levels and flows)
- water quality management
- mosquito management

The initiatives that are being investigated to achieve the specific design objectives and criteria in the LSP area are outlined in the Local Water Management Strategy that has been prepared by Wave International to support this LSP. A summary of the design criteria and the associated design initiatives is included in the sections below.

#### 2.3.5.1 Water conservation

The State Water Plan (WA Government, 2007) sets a target for total water use of no more than 100 kL/person/year. This water consumption target is reflected in the Department of Water's interim guidelines for developing an LWMS, which also sets an aspirational target of no more than 40-60 kL/person/year of potable (scheme) water use. These targets will be met by the use of waterwise fittings and appliances inside new houses, water-efficient landscape design, and encouraging the use of groundwater or rainwater for irrigation and non-potable water uses.

#### 2.3.5.2 Water quantity management

Peak post-development surface water flow rates from the development are required to be within pre-development levels. This will be achieved through the use of stormwater detention basins, which will be sized to attenuate surface runoff across the site and ensure that post-development flow rates are within pre-development levels.

#### 2.3.5.3 Water quality management

Post-development surface water and groundwater quality is to be maintained at pre-development levels. Bioretention areas are to be provided in each stormwater basin to retain and treat runoff from frequent, 'first-flush' storm events to ensure that surface water quality in downstream environments is not degraded as a result of the development.

Groundwater quality will be managed through the appropriate use of fertilisers in landscaped areas (and the use of low-fertiliser-use plants), to minimise the amount of nutrients that can infiltrate into the groundwater.

#### 2.3.5.4 Mosquito management

The DoW requires that stormwater basins be designed to ensure that between the months on November and May, detained immobile stormwater is fully infiltrated within 96 hours (5 days), to reduce the health risk from mosquitoes. Detailed design of the stormwater basins at subdivision stage will ensure that this design objective can be met.

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### 2.3.6 Education facilities

The WAPC has its general requirements for school sites set out under Development Control Policy 2.4. Within this policy section 3.1 refers to *The Demand for School Site*. The following sub section outlines the policy that is applicable:

*3.1.2 The Department for Education and the main non-government education providers require the following provision for school sites.*

*Primary Schools – 1 site for between 1500 and 1800 housing units for government schools.*

The LSP is estimated to provide for 241 dwellings; this is below the 1500 housing requirement and therefore a primary school facility within this LSP is not required.

### 2.3.7 Activity centres and employment

There is no activity centre as part of this LSP. It is the intention of the Shire of Northampton to have the majority of commercial activity directed to the existing facilities within the town of Kalbarri. The key commercial facilities in the vicinity of the LSP include land previously set aside in the existing 'Kalbarri Vision' structure plan along George Grey Drive allowing for a medical centre and local service station.

In addition the Special Use site is intended for future development as a local caravan park, short stay holiday accommodation or long term residential development. This will be the only business operation located within the LSP area.

### 2.3.8 Infrastructure coordination, servicing and staging

#### 2.3.8.1 Sewer reticulation

Only lots that are smaller than 2,000m<sup>2</sup> are required to be serviced by the Water Corporation sewer network. This includes the R10 lots surrounding the existing Capital Hill estate, and the R10 lots in the north-eastern corner of the LSP area. The lots surrounding the existing Capital Hill estate can easily be serviced by extending the existing sewer infrastructure to these new lots.

The R10 lots in the north-eastern corner will require a new reticulated sewer network, which will discharge to an existing sewer manhole on George Grey Drive just south of the existing Kalbarri Sewer Pump Station K4.

The Special Use development site in the northern corner of the LSP area can only be partially serviced by the existing Pump Station K4. This site will either need to be filled so that it can discharge via gravity sewer to the existing pump station, or to install a private sewer pump station that will then pump into the Water Corporation's pump station.

#### 2.3.8.2 Water reticulation

All lots that are smaller than 2ha are required to be serviced with potable water.

---

The existing Water Corporation water supply infrastructure at the site includes an elevated tank on Stiles Road, and a balance tank near Browne Blvd to the east of the Capital Hill estate. The two tanks are connected via a DN110 water main. This existing infrastructure is intended to be a temporary/interim measure, and significant upgrades are required to service the ultimate development.

Some of the proposed lots may be able to be serviced from the Water Corporation's existing infrastructure. The Water Corporation is currently in the process of determining the highest elevation that can be serviced from their existing tanks.

The Water Corporation's planning for the area includes the decommissioning of the existing ground level tank and the existing DN110 water main near Browne Blvd, and the construction of new permanent ground-level tanks on Stiles Road (at the existing elevated tank site) and DN300 water main to service the future development. The Water Corporation is in the process of determining the trigger points in the staging of the development that will trigger the requirement to carry out these permanent works. The Water Corporation's capital investment program currently shows these upgrade works being funded in 2025.

#### *2.3.8.3 Power*

Existing overhead Western Power HV distribution lines run along Stiles Road and the eastern boundary of the LSP area, from which the existing subdivision areas are serviced.

The estimated yield of the structure plan area is for approximately 250 additional residential lots and a "special use" site which could potentially be developed as a caravan park. The residential lots will require an estimated total load of 1.2 MVA based upon a load allowance of 4.7kVA/lot (excluding the "special use" site).

Project feasibility studies should be conducted by Western Power to determine optimum infrastructure requirements and to provide an estimate of any developer contributions that may be required.

#### *2.3.8.4 Communications*

It is envisaged that telecommunications and broadband infrastructure in this development would be supplied via the National Broadband Network (NBN) which requires developers to install an approved pit and pipe system as part of the development. The NBN rollout has not yet commenced in this area and initially the service will have to be supplied via existing Telstra fixed line or wireless service.

Subsequent to the installation of the NBN pit and pipe system by the developer, the network infrastructure will be installed by NBN appointed contractors.

#### *2.3.9 Developer contribution arrangements*

The Shire of Northampton does not have a Developer Contributions Scheme (DCS) for the area contained in the LPS. As there is not a DCS, the construction of the infrastructure, such as services,

## Revised Local Structure Plan

Browne Farm - Lots 9502 & 9505, George Grey Drive, Kalbarri



---

drainage, roads, and open space will be guided by the Implementation Plan, approved as a part of this structure plan.

## TECHNICAL APPENDICES

Table 3 Technical Appendices Index

Appendix no.	Document title	Nature of document	Referral/approval agency	Summary of document modifications
1	Infrastructure Servicing Report	Supporting document for the revised LSP	Shire of Northhamton Department of Water	Rev B
2	Local Water Management Strategy	Supporting document for the revised LSP	Shire of Northhamton Department of Water	Rev B
3	LEVEL 1 FLORA and VEGETATION SURVEY	Supporting document for the revised LSP	Department of Environment	Final 8/12/2014
4	Bushfire Management Plan	Supporting document for the revised LSP	Department of Fire and Emergency Services	Draft 12/12/2014






DEVELOPMENT LOT OPTIONS:  
 - Caravan Park  
 - Res de Mal  
 - Tourism Development

LOT 112 COMMERCIAL ZONE  
 - Medical Centre  
 - Service Station

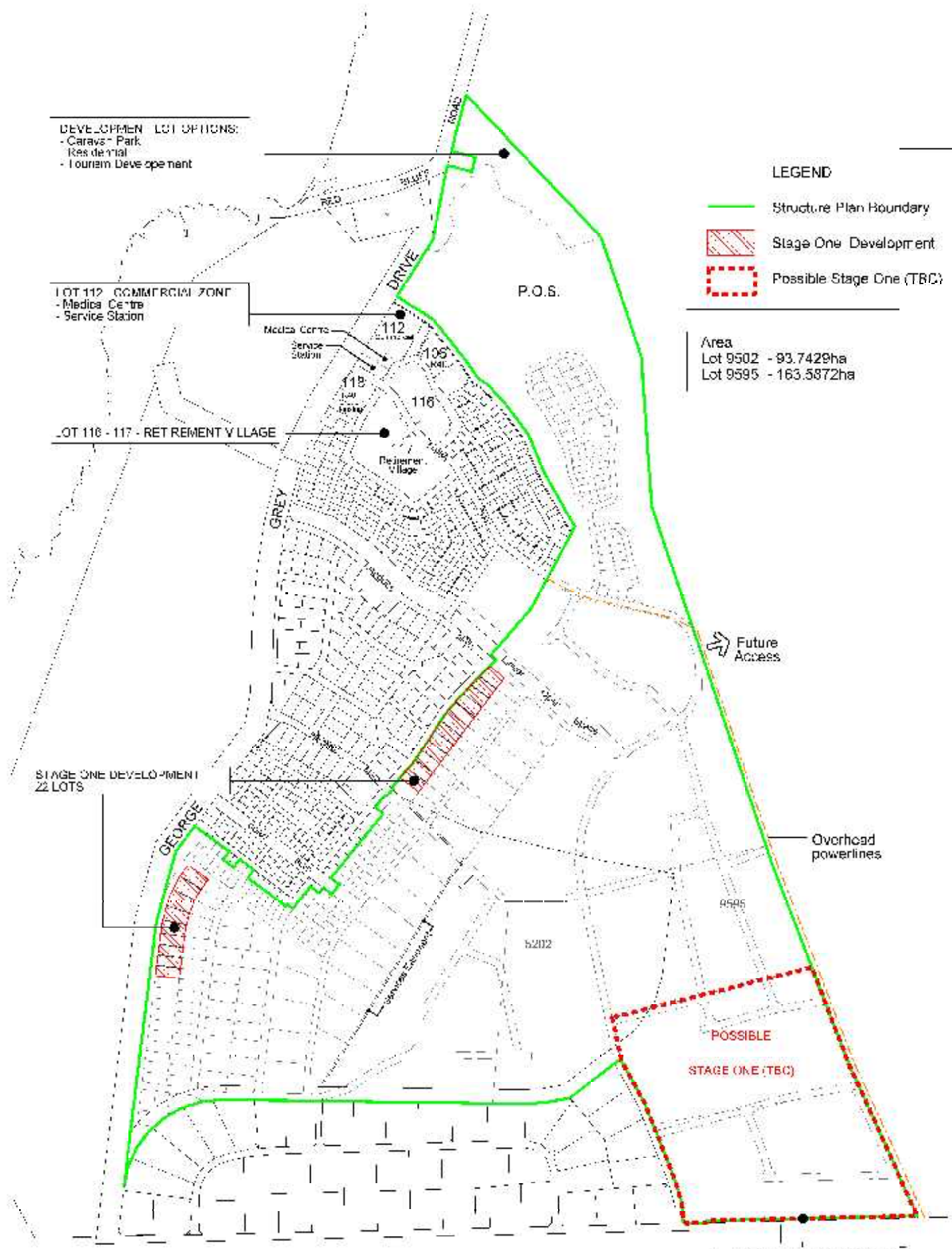
LOT 116 - 117 - RETIREMENT VILLAGE

STAGE ONE DEVELOPMENT  
 22 LOTS

LEGEND

-  Structure Plan Boundary
-  Stage One Development
-  Possible Stage One (TBC)

Area  
 Lot 9502 - 93.7429ha  
 Lot 9595 - 163.5872ha



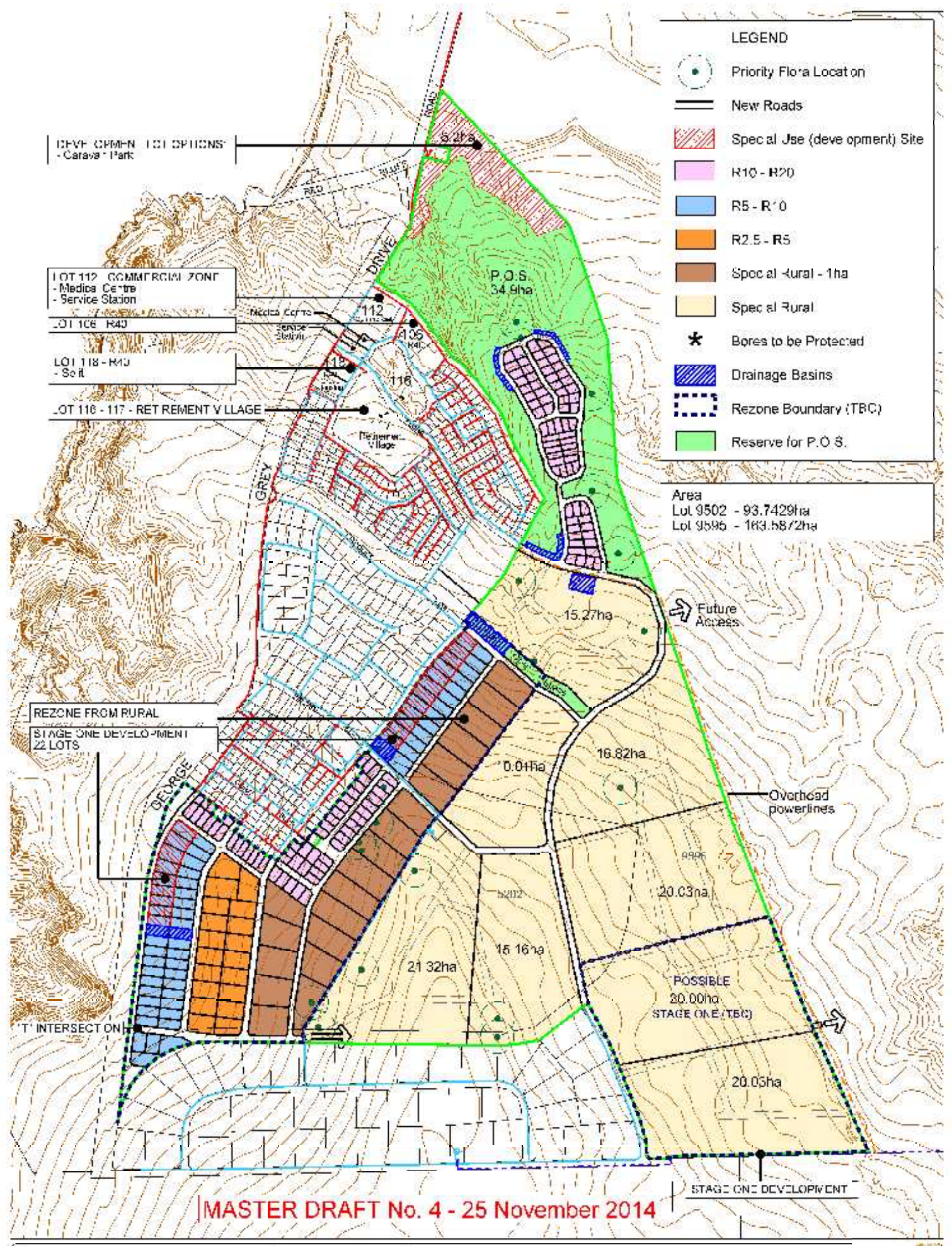
**[MASTER DRAFT No. 4 - 25 November 2014]**

Plan No.: 1593-10  
 Revision: 04/12  
 Scale: 1:1000/500

STAGE PLAN  
 BROWNE FARM - GEORGE GREY DRIVE KALBARRI

-  1:1000/500
-  1:1000/500
-  1:1000/500
-  1:1000/500
-  1:1000/500
-  1:1000/500





**LEGEND**

- Priority Flora Location
- New Roads
- Special Use (development) Site
- R10 - R20
- R5 - R10
- R2.5 - R5
- Special Rural - 1ha
- Special Rural
- Bores to be Protected
- Drainage Basins
- Rezone Boundary (TBC)
- Reserve for P.O.S.

Area  
 Lot 9502 - 93.7429ha  
 Lot 9505 - 163.5872ha

Future Access

Overhead powerlines

POSSIBLE  
 20.00ha  
 STAGE ONE (TBC)

STAGE ONE DEVELOPMENT

**MASTER DRAFT No. 4 - 25 November 2014**

Plan No: 15923  
 Revision: 04  
 Scale: 1:1000  
 Date: 25/11/2014

- Water Main
- Sewer Main
- Power Line
- Gas Line
- Overhead Powerline
- Applicant Area

Figure 1: LOCAL STRUCTURE PLAN  
 LOTS 9502 AND 9505  
 BROWNE FARM - GEORGE GREY DRIVE KALBARRI

DATE: 25/11/2014  
 SCALE: 1:1000  
 REVISION: 04



**Browne Farm,  
Lots 9502 and 9505  
George-Grey Drive,  
Kalbarri**

# Bushfire Management Plan



19/12/2014

Kathryn Kinnear

Bio Diverse Solutions

# DOCUMENT CONTROL

## TITLE

Lots 9502 & 9505 George Grey Drive Kalbarri Bushfire Management Plan

Author (s): Kathryn Kinnear

Reviewer (s): Vern Butterly

Job No. WHEL026

Client : REJ Clarke & VA Clarke, Ilam Pty Ltd & Silkcharm Pty Ltd

## REVISION RECORD

Revision	Summary	Revised By	Date
Draft id 5/11/2014	<b>Planning Review</b>	<b>Whelans</b>	<b>5/11/2014</b>
Draft 12/12/2014	<b>Client review</b>	<b>REJ Clarke &amp; VA Clarke, Ilam Pty Ltd &amp; Silkcharm Pty Ltd</b>	<b>12/12/2014</b>
Draft Id 12/12/2014	<b>DFES review</b>	<b>DFES J.Dunn</b>	<b>15/12/2014</b>
Final Id 19/12/2014	<b>Issued to Client</b>	<b>K.Kinnear</b>	<b>19/12/2014</b>

## **DISCLAIMER**

*The recommendations and measures contained in this assessment report are based on the requirements of the Australian Standards 3959 – Building in Bushfire prone Areas, DFES's planning for Bushfire Protection and CSIRO's research into Bushfire behaviour. These are considered the minimum standards required to balance the protection of the proposed dwelling and occupants with the aesthetic and environmental conditions required by local, state and federal government authorities. They DO NOT guarantee that a building will not be destroyed or damaged by a bushfire. All surveys and forecasts, projections and recommendations made in this assessment report and associated with this proposed dwelling are made in good faith on the basis of the information available to the fire protection consultant at the time of assessment. The achievement of the level of implementation of fire precautions will depend amongst other things on actions of the landowner or occupiers of the land, over which the fire protection consultant has no control. Notwithstanding anything contained within, the fire consultant/s or local government authority will not, except as the law may require, be liable for any loss or other consequences (whether or not due to negligence of the fire consultant/s and the local government authority, their servants or agents) arising out of the services rendered by the fire consultant/s or local government authority.*



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- APPENDIX F – DFES INFORMATION
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- APPENDIX H – WORKS PROGRAM
- APPENDIX I – DFES CHECKLIST



## 1. Introduction

Ilam Pty Ltd & Silkcharm Pty Ltd (“the Clients”) commissioned Bio Diverse Solutions (Bushfire Consultants) to undertake a fire hazard assessment and prepare a Bushfire Management Plan to guide all future fire management for a proposed Structure Plan (and subsequent subdivision) of Lots 9502 and 9505 George Grey Drive, Kalbarri.

The basic requirements of any Bushfire Management Plan (BMP) is to identify potential issues or problems relating to environmental fire threats and recommend specific actions by certain persons, agencies, authorities and developers to ensure, as much as practical, that the lives and assets of the location are not put at undue threat from any unplanned fire event. A BMP takes into account various physical attributes of the land, including topographical and vegetation properties, local climatic impacts, biodiversity, past and current land use, past fire history and management practices, local authority fire management obligations, road access, water supplies, adjacent property and tenure, and future obligations by various parties should the subdivision application be successful.

Such planning takes into consideration standards and requirements specified in various documents such as Australian Standard (AS) 3959-2009, WA Planning for Bushfire Protection Edition 2 (2010) and due regard to the Draft “Planning for Bushfire Risk Management Guidelines (WAPC, 2014). These plans have developed to ensure uniformity to bushfire management with interpretation of onsite vegetation types, site design, and building standards.

The subject area is described as Lots 9502 and 9505 George Grey Drive, Kalbarri and is shown in Location Mapping Appendix A and Structure Plan Appendix B.

### 1.1. Statutory Conditions

This BMP has been prepared for Lots 9502 and 9505 George Grey Drive, Kalbarri to address fire management issues associated with the proposed Structure Plan, consistent with State and Local Government planning instruments, in particular the Department of Fire and Emergency Services (DFES) and Western Australia Planning Commission (WAPC) Planning for Bushfire Protection (2010) The Plan aims to resolve any conflicts and provide planning information and guidance for the Shire of Northampton, DFES, present and future owners.

This document and the recommendations contained are aligned to the following policy and guidelines:

- AS 3959-2009 “Construction of Buildings in Bushfire Prone Areas”;
- “Planning for Bushfire Protection Edition 2” WAPC (2010);
- Draft “Planning for Bushfire Risk Management Guidelines (WAPC, 2014);
- *Bushfires Act 1954*; and
- Shire of Northampton (SoN) current Fire Break Notice.

### 1.2. Suitably Qualified Bushfire Consultant

This BMP has been prepared by Kathryn Kinnear (nee White), who has 10 years operational fire experience with the DEC (1995-2005) and has the following accreditation in Fire Management:

- Incident Control Systems;
- Operations Officer;
- Prescribed Burning Operations;
- Fire and Incident Operations;
- Wildfire Suppression 1, 2 & 3;
- Structural Modules – Hydrants and hoses, Introduction to Structural Fires, and Fire extinguishers; and
- Ground Controller.

Kathryn Kinnear currently has the following Tertiary Qualifications:

- BAS Technology Studies & Environmental Management;
- Diploma Business Studies; and
- Progression towards Masters of Environmental Management (current).

Kathryn Kinnear is presently a member of Fire Protection Australia Association and a committee member of the Bushfire Subcommittee Western Australia. Kathryn is a suitably qualified Bushfire Consultant to prepare this Bushfire Management Plan.

## **2. Aims of this Plan**

The aim of this BMP is to reduce the occurrence of, and minimise the impact of bushfires, thereby reducing the threat to life, property and the environment. The BMP has been prepared by Bio Diverse Solutions (Bushfire Consultants) for the Clients with the “Subject site” being Lots 9502 and 9505 George Grey Drive, Kalbarri.

### **2.1. Planning Context**

The BMP has been prepared to support a Structure Plan proposal (and subsequent subdivision proposal) of Lots 9502 and 9505 George Grey Drive, Kalbarri and to seek endorsement for the development of the land.

### **2.2. Site inspection**

To ensure that every aspect of the proposed subdivision meets the planning requirements as set in Planning for Bushfire Protection Ed. 2 (2010), a site inspection was undertaken on the 8<sup>th</sup> and 9<sup>th</sup> September 2014 by Kathryn Kinnear (Bushfire Consultant, Bio Diverse Solutions) to assess the vegetation and the site conditions.

The site was assessed as having a “**Moderate**” bush fire hazard rating due to the presence of adjacent Woodland, Shrubland and Scrub vegetation. The “Elements” which are to be met either through the objectives of the “Performance Principle” or “Acceptable Solutions” (WAPC, 2014) for the subject site include:

- Element 1 - Location;
- Element 2 - Siting and design of development.
- Element 3 - Vehicular access; and
- Element 4 – Water.

### **2.3. Objectives**

The objectives of this BMP are:

- Achieve consistency with objectives and policy measures of SPP 3.7, AS3959-2009 (current and endorsed standards), the Planning for Bushfire Protection Guidelines (WAPC 2010, current and endorsed guidelines) and due regard to the Draft “Planning for Bushfire Risk Management Guidelines (WAPC, 2014);
- Understand and document the extent of the bushfire risk to the subject site
- Prepare bushfire risk management measures for bushfire management of all land within the subject area with due regard to people, property, infrastructure and the environment;
- Nominate individuals and organisations responsible for fire management and associated works within the subject area; and
- Aligned to the recommended assessment procedure which evaluates the effectiveness and impact of proposed, as well as existing, bushfire risk management measures and strategies.

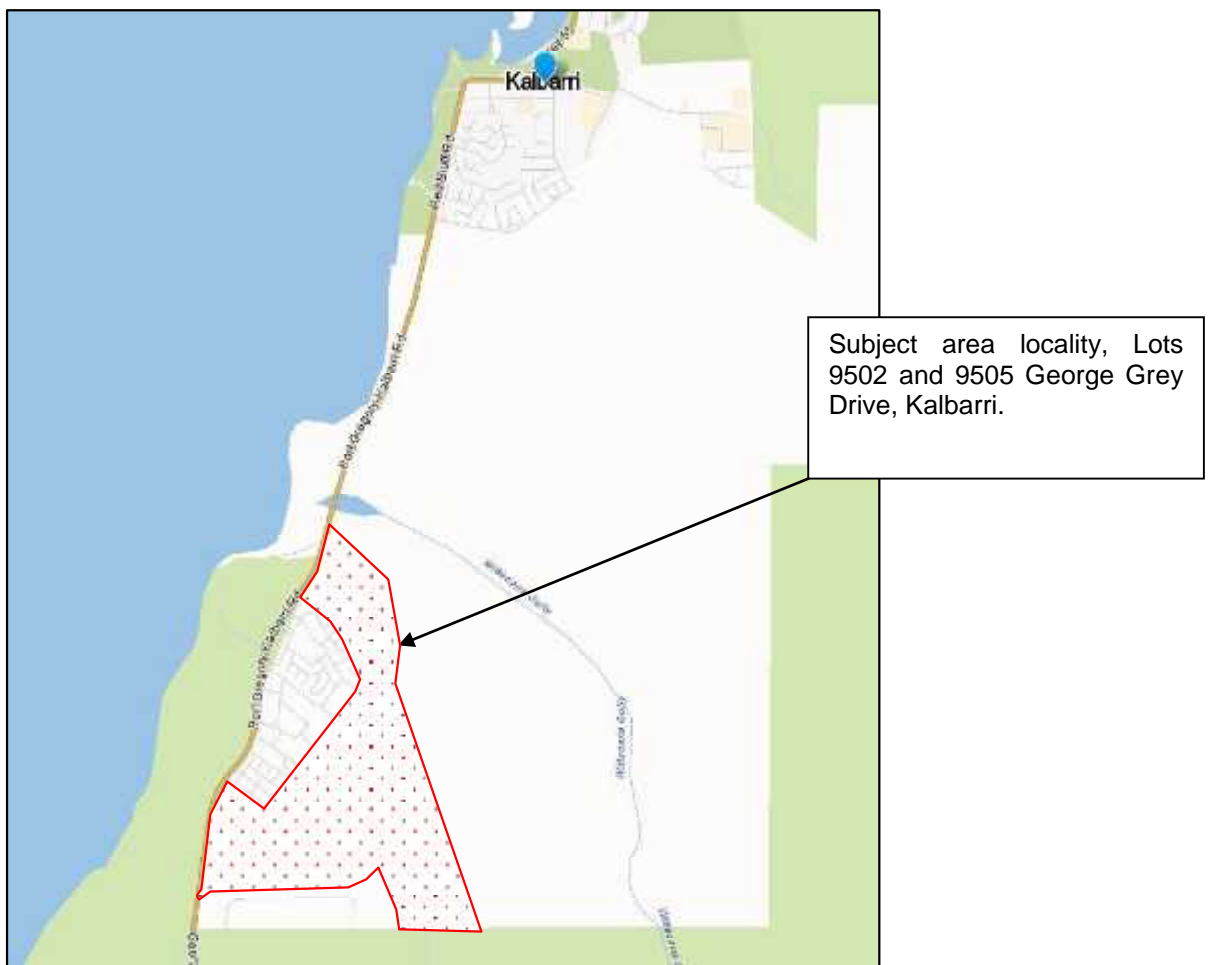
The BMP applies to the proposed subdivision at Lots 9502 and 9505 George Grey Drive, Kalbarri.

### 3. Description of the area

#### 3.1. Location

The survey area is located approximately 3.6 km south/south west of Kalbarri within the municipality of the Shire of Northampton. The subject site is a 257.3271 ha made up of 2 existing lots (Lot 9502 – 93.7429ha, Lot 9595 – 163.5872ha) which have been used for historical grazing and have existing adjacent subdivision. Please refer to Figure 1 below - Locality Map, and Location Mapping Appendix A.

**Figure 1 – Subject site locality**



#### 3.2. Development proposal

The applicant is seeking to subdivide the subject area for subdivision development with Special Use (development) areas, Reserves for Public Open Space (POS) and dwellings in Special Rural (1ha lots), R10, R5 and R2.5 densities. The BMP has been prepared during WAPC assessment for Structure Plan, to verify the hazard rating, document control mechanisms to reduce the risk of fire to residences and give recommendations to the current and future owners and the developer of the site.

Please refer to the Draft Structure Plan as provided by Whelans (28/8/2014), Appendix B.



#### 4. Desktop Assessment – Regional Setting

##### 4.1. Current site land use

The site is currently 2 rural lots of predominantly cleared paddocks with grasslands and adjacent existing subdivision developments. Historically the subject area has been used for grazing/agricultural pursuits. . Please refer to Photographs 1 and 2 below.



**Photograph 1** – View of cleared grassland areas used historically for grazing.



**Photograph 2** – View of existing subdivision on location 9502 and 9505 George Grey Drive.

There is a Water Corporation WA town water supply located central in the subject site and an easement from the south to the tanks. Refer to Photographs 3 and 4 below.



**Photograph 3** – View of Water Corporation town water supply infrastructure located central on subject site.



**Photograph 4** – View of Water Corporation easement to tank infrastructure.

In the north west there is a Water Corporation pump and overflow facility located off George Grey Drive. Refer to Photographs 5 and 6.





**Photograph 5** – View of pump infrastructure located off George Grey Drive in the north west of the subject site.



**Photograph 6** – View of pump overflow area in north west of the subject site.

#### 4.2. Surrounding Land uses

To the west and south of the subject site is Kalbarri National Park, which is managed by the Department of Parks and Wildlife (DPaW), Western Australia. Refer to Photographs 7 and 8 below.



**Photograph 7** – View of Kalbarri National Park to the south of the subject site.



**Photograph 8** – View of Kalbarri National Park to the west of the subject site.

Adjacent to the north and north west of the site is Witlecarra Creek, a Shire of Northampton (SoN) managed reserve and to the north is a small horticultural farm. Refer to photographs 9 and 10.



**Photograph 9** – View of Wittlecarra Creek, Shire Managed Reserve to the north and north west of the subject site.



**Photograph 10** – View of Horticultural farm to the north of the subject site.

To the east is a Western Power transmission line and private property which has been cleared and grazed, as well as pockets of remnant vegetation. Refer to Photographs 11 and 12.



**Photograph 11** – View from south east of the property, Western Power transmission line and cleared grazed areas to the east (right of photo).



**Photograph 12** – View from dominant ridge in the subject site to the north east, remnant vegetation on private property.

### 4.3. Climate

Kalbarri experiences a warm Mediterranean climate, characterised by hot, dry summers and mild, winters. These seasons extend into the autumn and spring months, which are transitional periods between the main seasons (BoM, 2014).

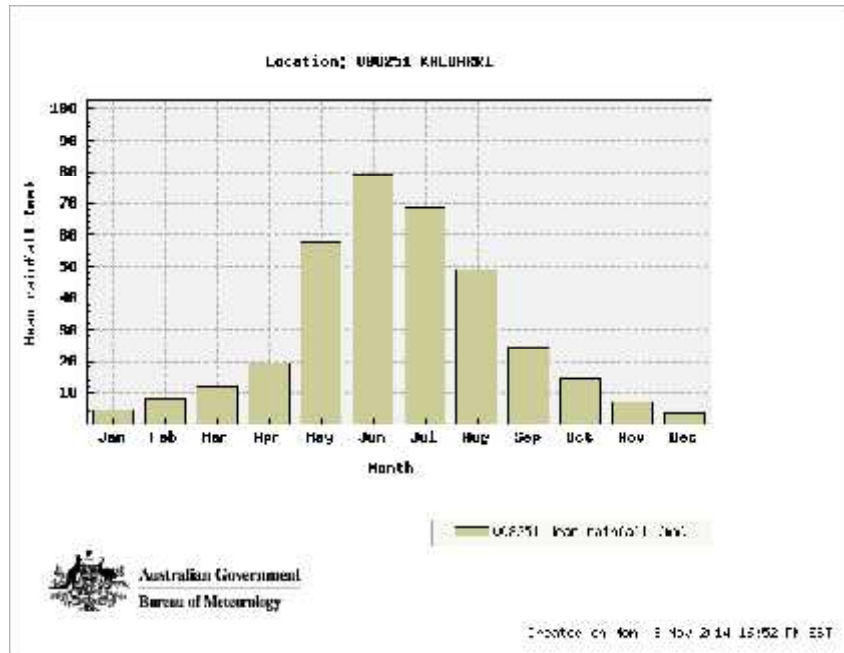
The climate of the region is strongly influenced by the position of the axis of the band of high pressure known as the sub-tropical ridge, and in the warmer months by the development in the easterlies to the north of the ridge of a trough of low pressure near the West Coast. For much of the year the ridge is located to the south allowing the east or southeasterly winds to prevail. During the cooler months the ridge periodically moves to the north allowing cold fronts to pass over the west coast and deliver much of the annual rainfall. Sometimes these fronts interact with tropical cloud bands from the northwest and this can enhance the amount of rainfall produced.

#### 4.3.1. Rainfall

Long term climate statistics from Kalbarri Bureau of Meteorology (BOM) station (Site number 008251) indicates an annual mean rainfall of 374.3mm (BOM, 2014), which occurs on 44 rain

days, approximately 80% usually falls between May and September. Flooding is rare to the region, however heavy rain may be produced by strong winter cold fronts or, by summer storms or by decaying tropical cyclones. The highest mean monthly rainfall is 79.0mm recorded in June, with the driest month being December with 3.9mm mean rainfall. It is not unusual for there to be extended dry periods during the warmer months. Please refer to Kalbarri BOM Station - Annual Rainfall graph below (Figure 2).

**Figure 2 – BoM Rainfall for Kalbarri Station (#008251)**

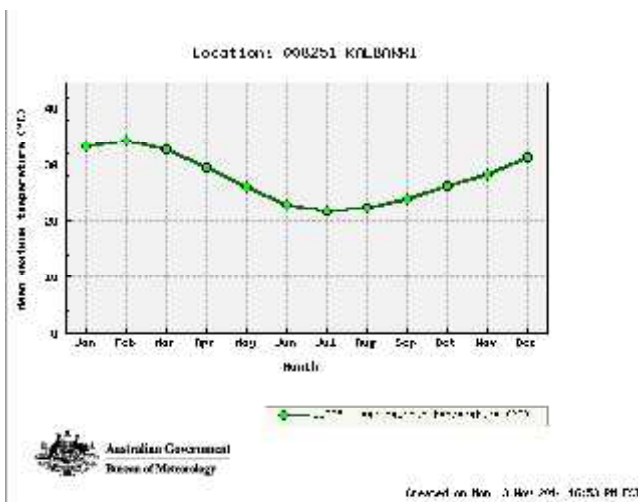


(BoM, 2014)

**4.3.2. Temperature**

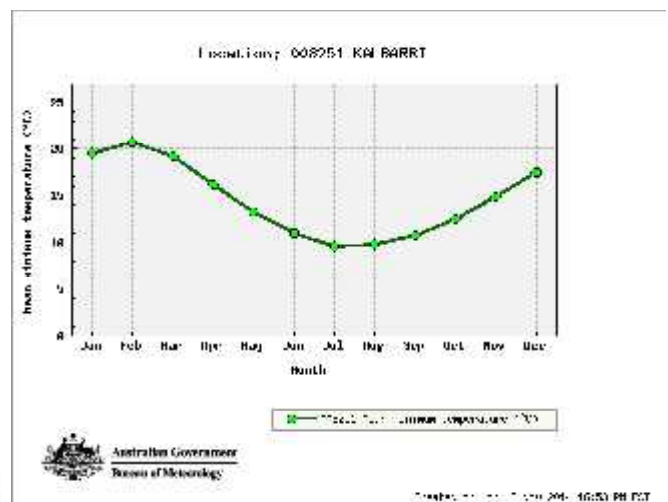
Mean monthly air temperatures range from 34.3°C in February to 21.8°C in July (BoM , 2014). Summer maximum temperatures are strongly dependent upon the arrival time of the reliable sea breezes. Heatwaves are associated with strong easterly winds and the late arrival or absence of the sea breeze. The average minimum temperature ranges from 9.6°C in July to 20.7°C in February. Please refer to average temperatures over the page for Kalbarri Station Figure 3 and Figure 4 below.

**Figure 3 – Mean Max Temperatures**



(BoM, 2014)

**Figure 4 – Mean Min Temperatures**

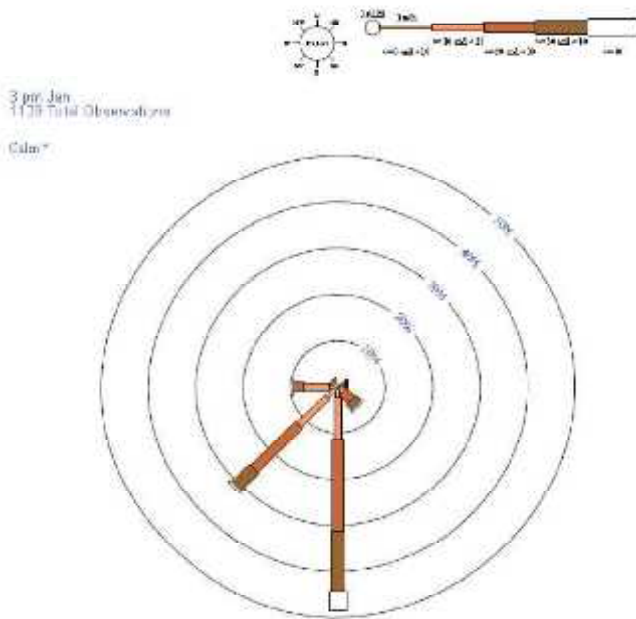


### 4.3.3. Wind

Winds are mainly easterly but varied in the warmer summer months by reliable afternoon sea breezes from the south south and south west and in the cooler months by the westerlies that are associated with the bulk of the annual rainfall. Despite the occurrence of strong winds or gales, average wind speeds in winter are considerably lighter than in summer (BoM, 2014). Please refer to Figure 5 and 6 below.

**Figure 5 – Summer (Jan) wind rose BoM**

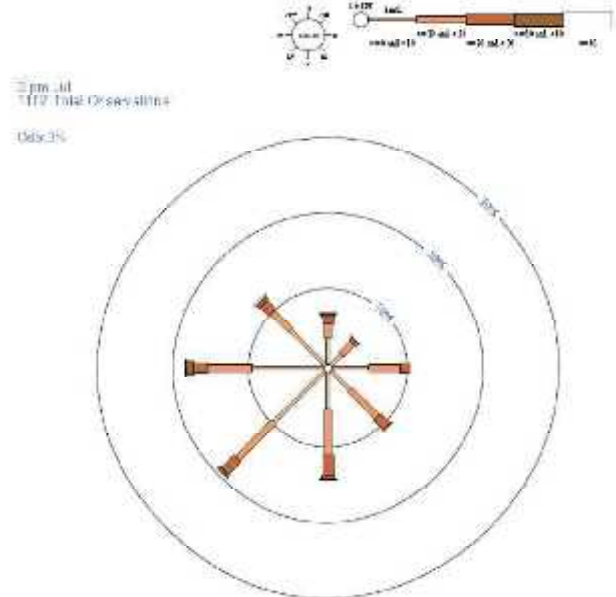
Rose of Wind direction versus Wind speed in km/h (01 Nov 1970 to 30 Sep 2010)  
Centre lines indicate that count is less than 0.5%.  
**KALBARRI**  
See the notes on the back of this chart for more information.  
An asterisk (\*) indicates that count is less than 0.5%.  
Other important info about this chart is available in the accompanying notes.



(BoM, 2014)

**Figure 6– Winter (July) wind rose BoM**

Rose of Wind direction versus Wind speed in km/h (01 Nov 1970 to 30 Sep 2010)  
Centre lines indicate that count is less than 0.5%.  
**KALBARRI**  
See the notes on the back of this chart for more information.  
An asterisk (\*) indicates that count is less than 0.5%.  
Other important info about this chart is available in the accompanying notes.



### 4.4. Prevalent Fire Weather

Fire weather is characterised by mid-level disturbances across the south west of Western Australia, bringing unstable atmospheric conditions (thunder and lightning) from the north or north-west wind directions. This is characteristic of “Extreme” Fire Weather conditions to the area with hot dry conditions prior to storm events. Risk of lightning strikes, spark ignition, arson and other causes of fire give rise to wild fires under these conditions.

Prevalent winds which most wildfire events occur in the region are from the north-west, east and north-east direction. Conditions tend to be dry with low relative humidity. High winds and excess fuels can lead to hazardous conditions for residents. Strong south and south westerly winds exist at the subject site during dry summer periods (Figure 5). These circumstances place residential housing under the most risk from wildfire events.

### 4.5. Climate Change

Climate change is expected to impact on the future rainfall pattern of the area. It is recognised that the average rainfall has already declined by 20%-30% over the past few decades and that the long term impact of climate change may lead to a shift in rainfall, as well as dryer climatic conditions for the region. The long term changes are predicted to impact on the flora, fauna and water availability for the region (Climate Commission 2010).



The Climate Commission (Climate Commission 2010) estimates that

“...Rainfall patterns in Western Australia have changed over the last 40 years. There is significant evidence that climate change has contributed to the marked drying trend in the southwest of the state.”

The construction of the proposed development is not predicted to be affected by sea-level rise, however could be affected from increased intensity rainfall events or extended drying periods. Increased extreme weather from climate change could affect fire frequency and behaviour in Western Australia (DEC, 2012), this Bushfire Management Plan has been prepared to reduce the risk of fire on the proposed residential dwellings in the newly created subdivision.

#### 4.6. Topography

The subject site is located on a northerly facing slope in an undulating landscape on the Geraldton Sandplains with the average “Effective Slope” (AS3959-2009) classified for the site as 4.46° (degrees), assessed as an average over 10 slopes and ranges between 2.7 (northern and southern slopes) to 6.7° (mid to southern slopes near breakaway country). Please refer to slope analysis on the Vegetation Mapping Appendix C.

#### 4.7. Bushfire fuels – Vegetation

The survey area lies within the Geraldton Sandplains Interim Biogeographic Regional Area (IBRA) bioregion and the Geraldton Hills sub region. The bioregion is characterised by extensive proteaceous heaths rich in endemic species occurring on undulating, lateritic sandplains (Desmond and Chant 2001). The Geraldton Hills subregion incorporates the southern end of Carnarvon Basin and northern end of the Perth Basin, with exposed areas of siltstone and sandstones, mostly overlain by sandplains, alluvial plains, and coastal limestones. Vegetation consists of heaths with emergent *Banksia* and *Actinostrobos*, York Gum woodlands on alluvial plains, proteaceous heath and *Acacia* scrubs on limestones and low closed forest of *Acacia rostellifera* on alluvial plains (Desmond and Chant 2001).

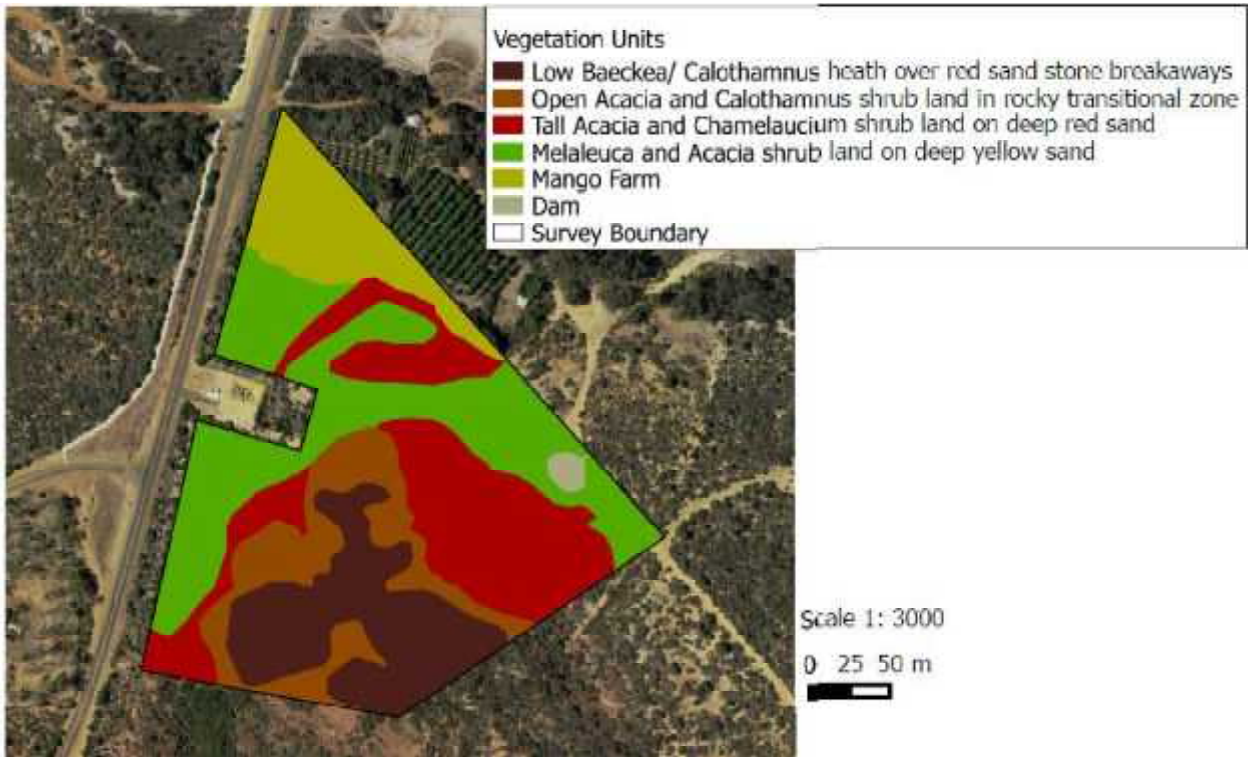
Vegetation survey was undertaken by Bio Diverse Solutions in the northern “Special Use” (6.5ha) site in September 2014 (Bio Diverse Solutions, 2014) and by Parsons Brinkerhoff (PB) Australia Pty Ltd in September 2007 (PB, 2008) in the remainder of the subject site. The following Vegetation units were identified by Bio Diverse Solutions and PB, refer to Table 1.

**Table 1 – Vegetation communities recorded flora and vegetation surveys 2007 & 2014**

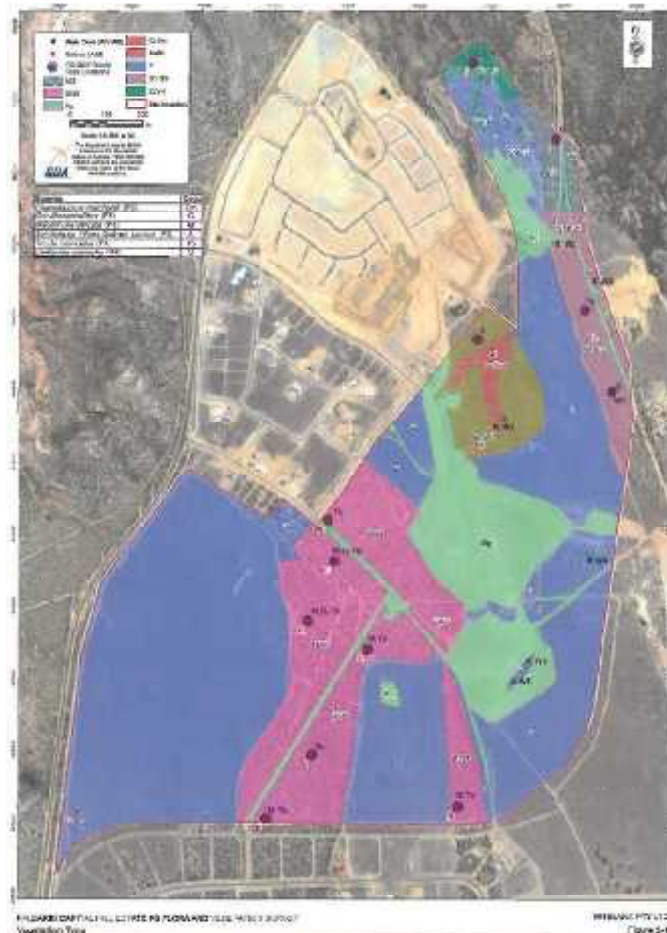
Vegetation Community	Survey undertaken by
Low <i>Baeckea/calothamnus</i> heath over red sand stone breakaways	Bio Diverse Solutions, 2014
Open <i>Acacia</i> and <i>Calothamnus</i> shrubland in rocky transitional zones	Bio Diverse Solutions, 2014
Tall <i>Acacia</i> and <i>Chamelaucium</i> shrubland on deep red sand	Bio Diverse Solutions, 2014
<i>Melaleuca</i> and <i>acacia</i> shrubland on deep yellow sand	Bio Diverse Solutions, 2014
Paddock Land (inc horticultural land)	Bio Diverse Solutions, 2014 & PB, 2007
Dam & Bare areas	Bio Diverse Solutions, 2014 & PB, 2007
Low Open <i>Banksia</i> Woodland	PB, 2007
Low Open <i>Eucalyptus eudesmoides</i> Woodland	PB, 2007
Closed Sedgeland.	PB, 2007
Tall Open Scrub	PB, 2007
Tall Shrubland	PB, 2007
Tall Open Shrubland/closed heath	PB, 2007
Low shrubland/sedgeland	PB, 2007
Open Low Heath	PB, 2007

Refer to Figures 7 and 8 showing the results of the vegetation surveys.

**Figure 7 – Vegetation units, Bio Diverse Solutions, 2014**



**Figure 8 – Vegetation Units, PB, 2007**



The Vegetation type for the subject site (internal) has been classified as per AS3959-2009 as:

- **Shrubland (Type C)** – *Tall Shrubland: Vegetation is dominated by shrubs (especially eucalypts and acacias) with a multi-stemmed habit, usually greater than 2 metres in height <30% foliage cover. Understorey of widespread to dense low shrubs (Acacia) or sparse grasses (AS3959-2009); located internal across the site.*
- **Scrub (Type D)** - *Found in areas wet enough to support eucalypt trees, which are affected by poor soil fertility or shallow soils. >30% foliage cover. Dry heaths occur in rocky areas. Shrubs 1-2m high. Typical of coastal wetlands (AS3959-2009). In rocky breakaway areas and gullies/transitional zones from the breakaway country.*
- **Grassland (unmanaged) (Type G)** – *All forms, including situations with shrubs and trees, if the overstorey foliage is less than 10% (AS3959-2009); located internal across the site.*
- **Low threat vegetation and non-vegetated areas (AS3959-2009)** – *Non- Vegetated areas, including waterways, roads, footpaths, buildings and rocky outcrops; and Low threat vegetation including managed grassland, maintained lawns, golf courses, maintained public reserves and parklands, botanical gardens, vineyards, orchards, cultivated ornamental gardens, commercial nurseries, nature strips and wind breaks (AS3959-2009). Located at the horticultural farm, the pump station, dam site and Water Corporation tank area.*

The Vegetation type adjacent (external) to the subject site has been classified as per AS3959-2009 as:

- **Woodland (Type B)** – *Trees 10-30m high, 10-30% foliage cover dominated by eucalypts; understorey low trees to tall shrubs typically dominated by Acacia, Callitris or Casuarina (AS3959-2009); located to the north along the creek area.*
- **Shrubland (Type C)** – *Tall Shrubland: Vegetation is dominated by shrubs (especially eucalypts and acacias) with a multi-stemmed habit, usually greater than 2 metres in height <30% foliage cover. Understorey of widespread to dense low shrubs (Acacia) or sparse grasses (AS3959-2009); predominantly to the west and north east of the site in national park/reserves.*
- **Grassland (unmanaged) (Type G)** – *All forms, including situations with shrubs and trees, if the overstorey foliage is less than 10% (AS3959-2009), predominantly to the east in private property paddocks.*
- **Low threat vegetation and non-vegetated areas (AS3959-2009)** – *Non- Vegetated areas, including waterways, roads, footpaths, buildings and rocky outcrops; and Low threat vegetation including managed grassland, maintained lawns, golf courses, maintained public reserves and parklands, botanical gardens, vineyards, orchards, cultivated ornamental gardens, commercial nurseries, nature strips and wind breaks (AS3959-2009). Located adjacent to the site along road reserves and within the developed subdivision areas adjacent to the west.*

These assessments are based on dominant tree/vegetation heights and vegetation structure according to Table 2.3 AS3959-2009. Please refer to Photographs 13 to 22 showing vegetation types classified as per above and shown in Vegetation Mapping Appendix C.





**Photograph 13** – View of predominant vegetation types, isolated introduced shrubs, weeds and grasslands. Grasslands Type G.



**Photograph 14** – View of Acacia Shrubland, Vegetation Type C.



**Photograph 15** – View of Open *Acacia* and *Calothamnus* shrubland in rocky transitional zones, Vegetation Type D.



**Photograph 16** – View of Low *Baeckea* /*calothamnus* heath over red sand stone breakaways, Vegetation type D.



**Photograph 17** – View of Coastal heath in Kalbarri National Park, Vegetation Type C.



**Photograph 18** – View of grasslands internal and to the east, Vegetation Type G.





**Photograph 19** – View of George Grey Road and old caravan park in background, Low Threat Vegetation and non vegetated areas.



**Photograph 20** – View of existing subdivision, Low Threat Vegetation and non vegetated areas.



**Photograph 21** – View of Eucalyptus and Casuarina Woodland to the north along Wittlecarra Creek, Vegetation Type B.



**Photograph 22** – View of horticultural lot to the north, Low Threat Vegetation and non vegetated areas.

#### 4.8. Assets

The subject site has cleared/bare areas adjacent to remnant vegetation, the site is valued for its proximity to the expanding residential areas of Kalbarri. Once developed, the values which will be potentially affected by fire include:

- **Human lives:** It is likely that more than 554 people could be resident at the newly created subdivisions;
- **Assets:** The development will contain dwellings and valuable infrastructure; and
- **Environmental Conservation Values:** Internal POS conservation areas, adjacent National park and Shire of Northampton Reserve area to the north west.

#### 4.9. Access

Vehicle access to the subject site is from George Grey Drive from the west and Explorer Avenue to the south.

#### **4.10. Fire Breaks**

There are existing firebreaks around the property. A DPaW strategic firebreak to 100m exists to the south of the subject site in Kalbarri National Park.

#### **4.11. Water Supply**

Water supply is presently from on site bore sources.

## 5. Potential Bushfire Issues and Bushfire Hazards

The bushfire hazard assessment provides a measure of the fire intensity and likelihood of bushfire attack measures on a dwelling, subdivision or residential area (Planning for Bushfire Protection, Edition 2 2010). This measure can provide an assessment of the land for suitability for residential construction and takes into account:

1. Vegetation Assessment – type and class in each direction;
2. Distance - between the predominant vegetation class and proposed building;
3. Topography and slope – with reference to accessibility; and
4. Land use – surrounding and internal to the proposal.

(Refer to Planning for Bushfire Protection, Edition 2, 2010)

The Vegetation type for the subject site has been classified as per AS3959-2009 as Woodland Type B, Shrubland Type C, Scrub Type D, Grassland Type G and Low threat Vegetation (as per vegetation classifications outlined in AS3959-2009). The bushfire hazard (risk) ratings have been assessed as per the methodology as outlined in Planning for Bushfire Risk Management Guidelines (Draft May, 2014). Please refer to Table 2 below.

**Table 2 – Bushfire Hazard Level Categories**

CATEGORY	CHARACTERISTICS
<b>Low</b>	<ul style="list-style-type: none"> <li>• Areas devoid of standing native vegetation (less than 0.25ha cumulative area)</li> <li>• Areas which, due to climatic or vegetation (eg. rainforests) conditions, do not experience bushfires</li> <li>• Inner urban or suburban areas with maintained gardens and very limited native standing vegetation (less than 0.25 ha cumulative area)</li> <li>• Pasture or cropping areas with very limited native standing vegetation that is a shrubland, woodland or forest</li> <li>• Generally areas with slopes of less than 10 degrees</li> </ul>
<b>Moderate</b>	<ul style="list-style-type: none"> <li>• Areas containing pasture or cropping areas with slopes in excess of 10 degrees</li> <li>• Open woodlands</li> <li>• Open shrublands</li> <li>• Low shrubs with slopes of less than 10 degrees or flat land</li> <li>• Suburban areas with some native tree cover</li> </ul>
<b>Extreme</b>	<ul style="list-style-type: none"> <li>• Forests</li> <li>• Woodlands</li> <li>• Tall shrubs</li> <li>• Any area not otherwise categorised as low or moderate</li> </ul>

(WAPC, 2014)

### **Internal Bushfire Risks**

The subject site has sustained vegetation clearing and has a cleared landscape where previous agricultural pursuits such as grazing occurred. In the south of the subject site there is remnant Shrubland and Scrub vegetation patches with low to moderate slopes, presenting a “Moderate” bushfire risk, as per Table 2, (WAPC, 2014)

The mid internal area contains breakaway rocky country supporting heaths, scrub and shrubland, these areas have moderate effective slopes, presenting a “Moderate” bushfire risk, as per Table 2, (WAPC, 2014)

It is proposed that 34.6 ha of the mid to northern portion of the subject site will become POS reserve for conservation. An additional area was outlined in the 2014 flora survey which contained Priority Listed Flora (Bio Diverse Solutions, 2014). The vegetation conserved under POS

reservation will regenerate, however will not become a differing structure and is predominantly classified as Scrub Type D vegetation, as per AS3959-2009 classification. These areas have moderate slopes and would be classified as a "Moderate" bushfire risk, as per Table 2, (WAPC, 2014).

To the south east internal to the site there is clearing associated with an existing track and the Western Power transmission line. There is extensive areas of grassland (pasture) and cleared areas in the mid to east and south eastern areas, which would be classified as "Low" bushfire risk, as per Table 2, (WAPC, 2014). The open Shrubland (Type C) in the north has moderate to low slopes and would be classified as a "Moderate" bushfire risk, as per Table 2, (WAPC, 2014)

Refer to Bushfire Risk Mapping Appendix D.

### **External Bushfire Risks**

Surrounding the subject site to the west there is remnant heathland reserved in Kalbarri National Park. These areas (within 100m of subdivision) have low slopes and low vegetation (<0.5m) and has been classified as Shrubland Type C. This presents a "Moderate" bushfire risk as per Table 2, (WAPC, 2014)

The Bushfire Hazard adjacent to the proposed subdivision to the north east, and south is Acacia Shrubland (Type C) and has moderate to low slopes and would be classified as a "Moderate" bushfire risk, as per Table 2, (WAPC, 2014). The National Park to the south has >100m slashed and maintained firebreak (DPaW managed land), presenting a substantial barrier to fire from the south.

To the north along Wittlecarra Creek there is Eucalyptus and casuraina woodland (Type B) with low slopes on the creek flats, this has low slopes, an open canopy and would be classified as a "Moderate" bushfire risk as per Table 2, (WAPC, 2014)

The south there are existing dwellings in large special rural lots. Some have been cleared, others are partially cleared. The existing vegetation on the lots is classified as Shrubland Type C with low slopes and would be classified as a "Moderate" bushfire risk, as per Table 2, (WAPC, 2014). The area of National Park to the south (eastern edge) of the subject site is separated by a 20m road reserve which is gravel formed and cleared to the boundaries. It is noted that this area of national park is slashed annually for a width >100m. This will also assist with protection from bushfire from the south east prevailing winds. The Shrubland vegetation to the south and the south east adjacent to the property is classified as a **Moderate** bushfire risk

To the east is existing rural land which has been cleared for grazing with minimal vegetation, these areas pose a "**Low**" threat of fire (as per WAPC Guidelines, Table 1). To the west there is existing dwellings in the newly created subdivision areas with minimal vegetation, these areas pose a "**Low**" threat of fire (as per WAPC Guidelines, Table 1).

The adjacent vegetated National Park to the west and south (shrubland vegetation) are **Moderate Risks**, which with slope and under hot conditions, can give rise to hot and intense fires in north (Summer mid-level disturbances) and south/south eastern (prevailing summer, figure 5) wind conditions. These external risks pose the most threat of bushfire from external sources.

Refer to Bushfire Risk Mapping Appendix D.

### **Proposed Subdivision Bushfire Risk Rating**

The Bushfire Hazard within the proposed R10, R5 and R2.5 subdivision areas has some low threat vegetation or non-vegetated areas with slopes <10°, or suburban areas with some native tree cover. This gives the newly built areas a **Low risk**.

The fire risk for this subdivision has been rated at **Moderate risk** due to the site being predominantly a cleared landscape with the presence of remnant internal and external patches of

Woodland, Shrubland and Scrub remnant native vegetation areas. The overall slopes for the residential areas are low, however setback distances of over 100m from native vegetation can not be achieved in most instances. Where 100m cannot be achieved, Planning for Bushfire Protection 2010 states that building to Bushfire Attack Levels (BAL) and AS3959-2009 will apply.

Refer to Bushfire Risk Mapping Appendix D.

The proposal will be required to meet the minimum "Performance Principle" and "Acceptable Solutions" as per Planning for Bushfire Protection Edition 2, 2010 and Draft "Planning for Bushfire Risk Management Guidelines (WAPC, 2014). These are outlined in **Section 6 – Bushfire Management/Mitigation Plan.**

## 6. Bushfire Management/Mitigation Plan

The management issues (Elements) which relate to this proposal include:

- Location
- Siting and Design of Development
- Vehicle Access; and
- Water

(WAPC, 2014)

The Development is required to meet the “Performance Principles” and “Acceptable Solutions” of each “Element”.

The site has been classified as a **Moderate** Bushfire Risk. The design allows for an appropriate level of bushfire risk with mitigation measures applied to the level of risk. These include:

- Meeting “Performance Principles” for location (Element);
- Meeting Acceptable Solutions for Siting of the development (Element);
- Meeting Performance Principles for Vehicles; and;
- Meeting Performance Principles for and Water (Elements).

The following sections outline the bushfire mitigation procedures and how the design meets either a Performance Principle or Acceptable Solution as per the sections of the Planning for Bushfire Protection Edition 2, 2010 and Draft “Planning for Bushfire Risk Management Guidelines (WAPC, 2014).

***(Note sections are aligned to the Draft “Planning for Bushfire Risk Management Guidelines (WAPC, 2014) as per recent DoP advice).***

### 6.1. Element 1: Location

Intent: To ensure that the subdivision, development or land use is located in areas with the least possible risk of bushfire, to help minimise risk to people, property and infrastructure.

*Performance Principle: The subdivision, development or land use is located in an area where the bushfire hazard assessment classification is or will be moderate or low, and the risk can be managed.*

The subdivision is located on land that will not require construction standards to greater than BAL 29. The subdivision has a **Moderate** rating due to the presence of internal adjacent remnant Woodland, Shrubland and Scrub areas. The bushfire hazard level is manageable and adequate setbacks can be achieved, after construction development of higher density dwellings (R10, R5, and R2.5), internal to the subject site is deemed to have a Low fire risk. Adjacent areas are predominantly cleared areas with shrubs/heathland to 1m in the west (in national park), intercepted by George Grey Drive. Prevailing fire winds are from the south (see Figure 5) for the site. There is a 100m+ scrub rolled firebreak along the southern extents of Kalbarri National Park, maintained by DPaW annually.

### 6.2. Element 2: Siting and design of development

Intent: To ensure that the siting of development minimises the level of bushfire impact.

*Performance criteria - The siting and design of the subdivision, development or land use (including paths and landscaping) is appropriate to the level of bushfire risk that applies to the site and minimises the bushfire risk to people, property and infrastructure.*



The site has been classified as a “**Moderate**” Bushfire Risk (Table 2, WAPC 2014). The design of the development allows for an appropriate level of bushfire risk with mitigation measures applied to the level of risk. These include:

- Roads along the external areas to assist achieving Hazard Separation Zones;
- Meeting Performance Principles for Vehicles and Water Elements; and
- Meeting Acceptable Solutions for Siting of the development.

As the subject site has internal and external bushfire hazards, the site has been classified as having BAL (Bushfire Attack Level) applied to at the interface of the adjacent remnant vegetation. It is recommended that buildings are built to BAL and AS3959-2009 construction standards are implemented.

The Subject site has a “**Moderate**” Bushfire risk rating (Refer to Bushfire Risk Mapping Appendix D), the Acceptable Solutions which will apply to this development include:

- Building Protection Zones;
- Hazard Separation Zones; and
- Building to BAL and AS3959-2009.

The development is able to meet the Acceptable Solutions as outlined in the proceeding sections.

#### **6.2.1. Dwelling construction (A2.1)**

A HSZ of 100m cannot be achieved from the Bushfire Hazards for all dwellings as outlined in the Bushfire Hazard Mapping Appendix D. Proposed dwellings which cannot meet >100m HSZ from Woodland, Shrubland or Scrub vegetation require a Bushfire Attack Level (BAL) and building to AS3959-2009 to apply to the lot (dwelling).

BAL is the determination of the construction requirements for a building site, with the threat or risk of bushfire attack assessed by an accredited Bushfire Consultant. BAL rating determinations are of 6 levels BAL-LOW, BAL-12.5, BAL-19, BAL-29, BAL-40, BAL FZ. Building is generally not recommended in BAL-40 or BAL-FZ areas. The BAL rating is determined by the distance of the building to vegetation, slope and vegetation type adjacent to the dwelling.

The proposed development will require the dwellings (residences) to be built to BAL, therefore construction to AS3959-2009 will apply. Minimum setbacks (inclusive of BPZ) will be required from vegetative areas >0.25 ha. The standards outlined in AS 3959-2009 provide reference to specific items of building and it is recommended that the developer discuss these in detail with the builder.

Table 3 outlines some of the construction consideration to AS3959-2009 when building in bushfire prone areas. Construction standards are to be approved by the SoN prior to construction. Building to AS3959-2009 only applies to Class 1 (residential) or 10a (sheds, if <6m from the building) or a deck associated with Class 1 buildings as defined in the Building Code of Australia (BCS), Section 3.7.4.

**Table 3 – AS3959-2009 Construction Requirement (Example)**

<b>Construction requirement AS3959-2009</b>
Flooring systems
Supporting posts, columns, stumps, piers and poles
External Walls
Windows
External Doors
Vents and weep holes
Roof
Eaves
Fascia's
Gutters and downpipes
Veranda and decks
Service Pipes (water and gas)

The construction standard that shall apply to the dwellings adjacent to the remnant vegetation is shown in Table 4 – Minimum Setback Distances and Construction Standards. The minimum of a 20m BPZ (see Section 6.2.2 for more detail) must apply to all dwellings and recommended around infrastructure buildings. An additional HSZ (See section 6.2.3 for more detail) is required to 100m and dictates the BAL construction (and AS3959-2009) standard depending on the distance to vegetation and slope as shown in Table 4 and shown on the draft BAL Rating Plan Appendix E.

As the subdivision is proposed to be staged further BAL rating plans should be submitted as an update to this plan as development/clearing vegetation occurs. A 100m HSZ is depicted on the BAL mapping, BAL may apply to these areas if they remain uncleared.



**Table 4 – Minimum Setback Distances and Construction Standards Class 1 Buildings**

Location on Structure Plan	Distance to Vegetation	Vegetation Type	BAL Rating	Construction
Stage 1 R5 density on western portions and northern areas of Structure Plan.	15-<22 metres Vegetation is >0 to 5 degrees	Shrubland Type C	BAL 29	AS3959-2009 to apply
Stage 1 R5 density on western portions and northern areas of Structure Plan.	12-<31 metres Vegetation is >0 to 5 degrees	Shrubland Type C	BAL 19	AS3959-2009 to apply
Stage 1 R5 density on western portions and northern areas of Structure Plan.	31-<100 metres Vegetation is >0 to 5 degrees	Shrubland Type C	BAL 12.5	AS3959-2009 to apply
Stage 1 R5 density on western portions and northern areas of Structure Plan.	No BAL Rating Required	All Vegetation	>100 metres	No construction standards required
Special use (development) site, northern portion of Structure Plan	17-<25 metres Vegetation is >0 to 5 degrees	Woodland Type B	BAL 29	AS3959-2009 to apply
Special use (development) site, northern portion of Structure Plan	15-<35 metres Vegetation is >0 to 5 degrees	Woodland Type B	BAL 19	AS3959-2009 to apply
Special use (development) site, northern portion of Structure Plan	35-<100 metres Vegetation is >0 to 5 degrees	Woodland Type B	BAL 12.5	AS3959-2009 to apply
Special use (development) site, northern portion of Structure Plan	No BAL Rating Required	All Vegetation	>100 metres	No construction standards required
R10 adjacent to POS area (central north) of Structure Plan	17-<24 metres Vegetation is >5 to 10 degrees	Shrubland Type C	BAL 29	AS3959-2009 to apply
R10 adjacent to POS area (central north) of Structure Plan	24-<35 metres Vegetation is >5 to 10 degrees	Shrubland Type C	BAL 19	AS3959-2009 to apply
R10 adjacent to POS area (central north) of Structure Plan	35-<100 metres Vegetation is >5 to 10 degrees	Shrubland Type C	BAL 12.5	AS3959-2009 to apply
R10 adjacent to POS area (central north) of Structure Plan	No BAL Rating Required	All Vegetation	>100 metres	No construction standards required

(as per AS3959-2009)

**Notes on BAL Assessment:**

- **Sites will be subject to detailed feature survey and the mapping depicted in the BAL Rating Plan Appendix E is a guide, with accuracy to within 5m.**
- **If dwellings cannot achieve >100m from the adjacent vegetation then BAL Construction will apply as outlined in Table 4.**
- **Any lots where two BAL allocations intercept across the lot, the higher BAL is to apply. Where the lot is predominantly clear of a BAL rating, there may be no BAL rating subject to house placement.**
- **BAL setback distances are measured from the edge of existing vegetation at time of feature survey and building construction approvals stages.**
- **Detailed assessment for BAL Construction as described in this document can be undertaken at construction stage by an accredited Bushfire Consultant with approval from the Shire of Northampton.**

As the subdivision will be staged, it is propose that clearing native vegetation in the internal areas will allow for 100m HSZ from internal bushfire risks therefore reducing the requirement of most internal lots to comply with building to BAL and AS3959-2009. Refer to Staging Plan Appendix B and further information on staging in Section 6.5.3.

The developer will be responsible for the implementation of a notification on title pursuant to Section 165 of the Planning and Development Act 2005.

The WAPC recommends the following wording to accompany Structure Plans:

*“Regardless of whether this land has been designated as bushfire prone, any buildings to be erected pursuant to this structure plan shall comply with the requirements of Australian Standard 3959 under the Building Code of Australia.”*

(WAPC Planning Bulletin 111/2013)

It is recommended the above wording accompanies the proposed Structure Plan for Lots 9502 and 9505 George Grey Drive, Kalbarri.

At time of subdivision, the developer will be responsible for the implementation of a notification on title at subdivision stages under Section 70A of the Transfer of Land Act 1983 to read:

*‘Registered proprietors and prospective purchasers of the land described above are notified that the use of the land is subject to an approved Bushfire Management Plan’.*

BAL construction is not retrospective to existing dwellings.

**6.2.2. Building Protection Zones (A2.2)**

The aim of the Building Protection Zone (BPZ) is to reduce bush fire intensity close to dwellings and to minimise the likelihood of flame contact with buildings (Planning for Bushfire Protection Edition 2, 2010). BPZ will minimise the risk of the building igniting, (thus protecting the occupants), and with the reduced fuel quantities, allow safer and more effective conditions for fire-fighters to contain wildfires. Roads, pathways, lawns, and other low hazard items should be placed within this zone to improve the effectiveness of the zone.

It is recommended that a 20 metre wide BPZ as the minimum width to be constructed around all buildings.

Activity within the BPZ (as per DFES recommendations) must include:

- Width: 20 metres measured from any external wall of the building or asset;
- Location: within the boundaries of the lot on which the building is situated;
- Fuel load: reduced to and maintained at 2 tonnes per hectare;
- All grasses to maintained to a maximum height of 50mm;

- Trees (crowns) are a minimum of 5 metres apart;
- Trees are low pruned at least to a height of 2 metres;
- No tall shrub or tree is located within 2 metres of a building (including windows);
- There are no tree crowns overhanging the building;
- Fences and sheds within the BPZ are constructed using non-combustible materials (e.g. colour bond iron, brick, limestone);
- Shrubs in the BPZ have no dead material within the plant;
- Tall shrubs in the BPZ are not planted in clumps close to the building i.e. within 3 metres;
- Trees in the building protection zone have no dead material within the plant's crown or on the bole;
- Gas cylinders should be isolated from the flame zone and stored in an area clear of flammable material;
- Firewood storage at least 20m from the building;
- Roof gutters should be free of leaves and other combustible material; and
- Roof mounted evaporative air coolers should be fitted with ember proof screens to the filter media to reduce the possibility of bushfire embers getting in the air cooler.

An example of BPZ from the “Planning for Bushfire Protection Edition 2” (WAPC, 2010) is shown in Figure 9.

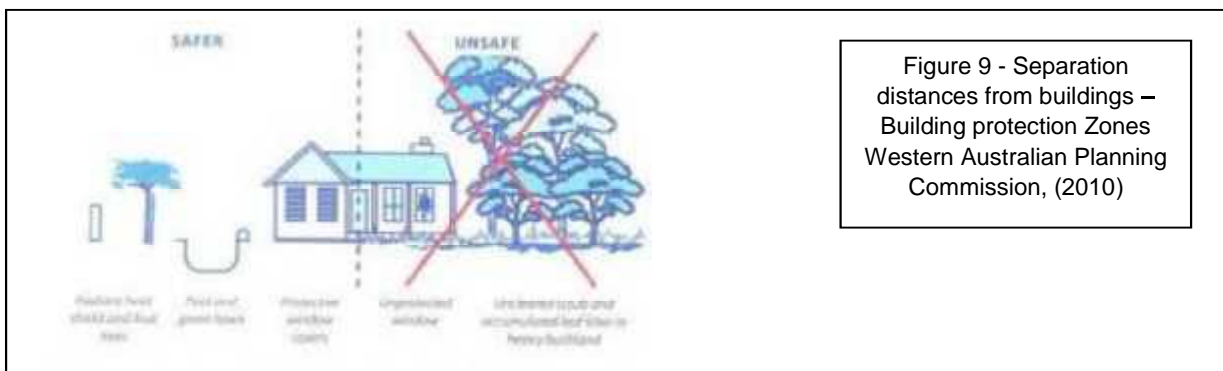


Figure 9 - Separation distances from buildings – Building protection Zones Western Australian Planning Commission, (2010)

The majority of the buildings utilise the Low Fuel Areas (as classified by AS3959-2009 and shown on BAL Rating Plan Appendix E) to achieve a 20m BPZ, either through the maintained lawn areas, carparks, driveways, or road reserves. Information on long term maintenance of BPZ as recommended by DFES is provided in Appendix F.

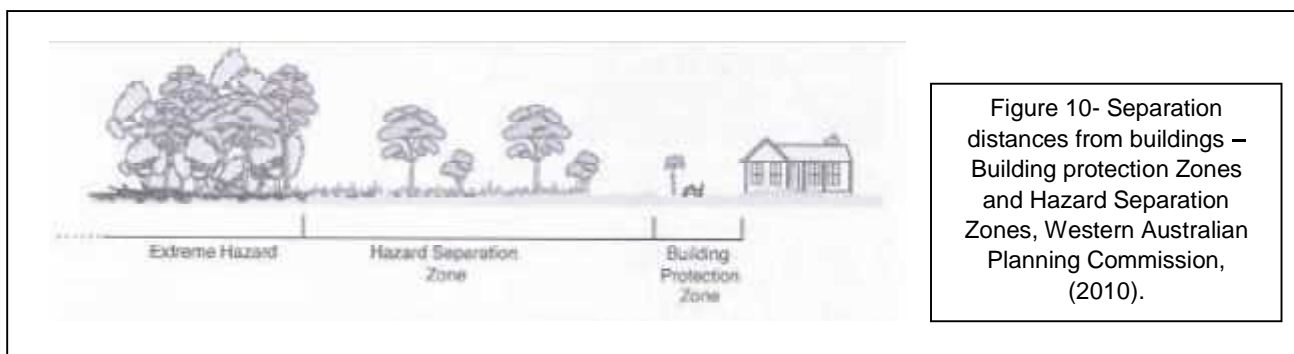
The area of National Park to the south and private property to the south east of the subject site is separated by a 20m road reserve which is gravel formed and cleared to the boundaries. The Structure Plan contemplates Special Rural Lots in this area which should enable a 20m BPZ to be cleared around all dwellings.

The proposed Structure Plan indicates R10 density in the central north area. It is proposed the 20m road reserve along the external boundary of this area will assist in achieving the 20m BPZ. This is shown in the BAL Plan Appendix E and Bushfire Management Plan Appendix G.

### 6.2.3. Hazard Separation Zones (A2.3)

Hazard Separation Zones (HSZ) are defined (as per Planning for Bushfire Protection Edition 2, 2010) as the area surrounding a building which is maintained in a fuel reduced state. This can be achieved at subdivision stage during the construction of roads by clearing for formation of roads, grazing of stock and slashing of understorey species. The internal road network, gardens, carparks etc. can assist to achieve HSZ.

An example of achieving 100m HSZ is shown below in Figure 10.



All new Class 1 dwellings, 10a and decks associated with Class 1 dwellings developed for residential use at the interface of the remnant vegetation will be required to meet Hazard Separation Zones (HSZ) as per the Planning for Bushfire Protection Edition 2 (2010) and have a Bushfire Attack Level (BAL) if >100m cannot be achieved from remnant vegetation. BAL and AS3959-2009 does not apply retrospectively to existing buildings.

A Hazard Separation Zone of 80 metres (100m combined with Building Protection Zone (BPZ)) is recommended in all areas where housing is sited adjacent to vegetated areas, measured from the outer edge of the BPZ. Where hazard separation cannot be achieved to 80m (100m combined with BPZ) adjacent to vegetation areas, the site will require building requirements of BAL with AS3959-2009 to be implemented by the owner of the property and approved by the SoN. Please refer to more detail in Table 4 and BAL Rating Plan Appendix E.

The area of National Park to the south and private property to the south east of the subject site is separated by a 20m road reserve which is gravel formed and cleared to the boundaries. The Structure Plan contemplates Special Rural Lots in this area which should enable a 100 HSZ to be cleared around all dwellings, if 100m HSZ cannot be achieved then building to BAL and AS3959-2009 will apply. It is noted that the area of National Park to the south (eastern edge of southern boundary of subject site) is slashed annually for a width >100m. This will also assist with protection from bushfire from the south east prevailing winds.

Information on long term maintenance of HSZ for the homeowner, as recommended by DFES is provided in Appendix F.

### 6.3. Element 3: Vehicle Access - Performance Criteria

Intent: To ensure that the vehicular access serving a subdivision/development is available during a bushfire event.

*Performance Principle: The internal layout, design and construction of public and private vehicular access in the subdivision allows emergency and other vehicles to move through it easily and safely at all times.*

The internal layout of the Subdivision's public roads and private access allows vehicles and other emergency vehicles to move through the subdivision at all times, meeting the Performance Principle.

Vehicle access technical standards as outlined in Table 4 (below) shall apply to this development; these standards are the minimum requirements from Planning for Bushfire Protection Edition 2 (2010) and Draft "Planning for Bushfire Risk Management Guidelines (WAPC, 2014). These standards shall be included in the engineering design of the subdivision. Refer to Table 5.

**Table 5 – Vehicular Access Technical Standards**

Technical requirements	Public Roads	Cul-de-sacs	Battle Axes	Private Driveways	Emergency Access Ways	Fire Service Routes
Minimum trafficable surface (m)	6	6	6	4	6	6
Horizontal clearance (m)	6	6	6	6	6	6
Vertical clearance (m)	4	N/a	4	4	4	4
Maximum grades	1 in 8	1 in 8	1 in 8	1 in 8	1 in 8	1 in 8
Maximum grades >50m	1 in 5	1 in 5	1 in 5	1 in 5	1 in 5	1 in 5
Maximum average grade	1 in 7	1 in 7	1 in 7	1 in 7	1 in 7	1 in 7
Minimum weight capacity(t)	15	15	15	15	15	15
Maximum crossfall	1 in 33	1 in 33	1 in 33	1 in 33	1 in 33	1 in 33
Curves minimum inner radius(m)	12	12	12	12	12	12
Signs					To DFES & LGA standards	To DFES & LGA standards
Gates					To DFES & LGA standards	To DFES & LGA standards

(WAPC, 2014)

#### 6.3.1. Two access routes (A3.1)

The subdivision meets the Performance Principle, with the design allowing for two way traffic and safe egress from the subdivision via newly established road networks linking from the west to the south with an average of 20m internal road reserves. Please refer to the Structure Plan (SP) Appendix B.

#### 6.3.2. Public roads (A3.2)

All internal public roads shall be constructed with a minimum of 20m road reserves meeting Performance Principle. The Vehicular Access Standards (Refer to Table 5 – Column 1) and relevant technical information shall be detailed in Civil Engineering Designs.

#### 6.3.3. Cul de Sacs (A3.3)

Cul-de-sacs do not apply to this development.

#### **6.3.4. Battle Axes (A3.4)**

Battle Axes do not apply to this development.

#### **6.3.5. Private Driveways (A3.5)**

Private driveways will conform to the minimum technical standards as outlined in Table 5 – Column 4.

#### **6.3.6. Emergency Access Ways (A3.6)**

Emergency Access Ways (EAW) will be along the established internal roads, with a separate dedicated Emergency Access Way not required, meeting the Performance Principle. As the subdivision will be staged, the Emergency Access Ways will be along the existing established road reserves or links made to other existing roads to ensure there is two way access at all time. A possible temporary EAW for staging is depicted in the Bushfire Management Plan Appendix G to allow access to the south east in the event of bushfire from the north or west. Also refer to Section 6.5.3 for more detail on staging of this development.

The standards for EAW's will be as per Table 5, column 5 and will meet the Performance Principle.

#### **6.3.7. Fire Service Access Routes (A3.7)**

Fire Service Access (FSA) Routes are proposed along the internal roads, a separate dedicated FSA is recommended along the eastern boundary to assist with fire control from private property to the east and north east. This is depicted on the Bushfire Management Plan Appendix G.

Where a FSA crosses a private property boundary (eastern Special Rural properties) an easement in gross shall be registered on title informing the owner of the access over the property. The easement in gross shall be vested with the Shire of Northampton and maintenance will be the responsibility of the SoN. These areas on will be gated refer to Section 6.3.8 for more detail.

At the completion of the internal road reserves, light unit fire appliance and heavy unit (truck appliances) will have suitable access in an emergency throughout the subdivision along public roads. The standards for FSA will be as per Table 5, column 6 and will meet the Performance Principle.

#### **6.3.8. Gates (A3.8)**

Gates are proposed for this development along the FSA along the eastern boundary and are depicted on the Bushfire Management Plan Appendix G.

These will be locked, with keys available for fire services only and are to meet minimum requirements wide enough to accommodate 3.4 Heavy Duty Fire Appliances. Gate standards will be as follows:

- Minimum width 3.6 metres;
- Be clearly signposted (see Section 6.3.9);
- Approved by the SoN and
- Locked with keys supplied for, or by DFES/Kalbarri BFB.

#### **6.3.9. Signage (A3.9)**

Fire Service Access Ways and Emergency Access Ways are along the internal road network. Signage will be required along the FSA on the eastern boundary. Any new signage shall be to the DFES and SoN recommended standards:

- Have the wording 'Fire Service Access only'
- Minimum height above ground level 0.9 metres;
- Design and construction to be approved by relevant local government; and
- Lettering height 100mm.

Refer to Bushfire Management Plan Appendix G for location of signs.



### 6.3.10. Individual Fire breaks

Internal fire breaks are not required in an urban landscape (western R10 zonings) where lots are less than 2000m<sup>2</sup> (0.2ha). Lots over 2000 m<sup>2</sup> (0.2ha) (R5, R2.5 and Special Rural zonings) require a 3m perimeter graded/ploughed/hoed cleared firebreak and to be cleared of all flammable materials or be mulched and are to be implemented from October 1 and maintained clear up to and including 2 March (SoN, 2014). Please refer to the SoN “Annual Fire Break Order”, this is updated annually and the current versions should be obtained from the Shire of Northampton website:

<http://www.northampton.wa.gov.au>

As the subdivision is staged it will be the responsibility of the developer to maintain existing firebreaks until the site is developed or changes ownership.

### 6.4. Element 4 Water – Performance Criteria

Intent: To ensure that water is available to the subdivision, development or land use to enable people, property and infrastructure to be defended from bushfire.

*Performance Principle: The development is provided with a permanent and secure water supply that is sufficient for fire fighting purposes.*

Scheme water will be provided to the subdivision meeting the Performance Principle. Fire hydrants outlets must be installed to Water Corporation standards installed in accordance with the *Water Corporation’s No 63 Water Reticulation Standard* and are to be identified by standard pole and/or road markings and installed by the Developer.

Fire Hydrants are to be installed by the developer every 200m in the road reserve, these must be to the following standards:

- Hydrants shall be screw-down hydrant with built-in isolation valve and installed only on DN100 or larger pipes. Hydrants shall be located: so that the maximum distance between a hydrant and the rear of a building envelope, (or in the absence of a building envelope the rear of the lot) shall be 120m and the hydrants shall be no more than 200m apart;
- Centrally along the frontage of a lot to avoid being under driveways;
- Where appropriate at the truncation of road junctions or intersections so that they can serve more than one street and can be readily located;
- On both sides of the major roads at staggered intervals where there are mains on both sides of the road;
- At major intersections on dual multi-lane roads, where two hydrants are to be sited on diagonally opposite corners;
- Hydrants should be located at least 20m from traffic calming devices i.e. median slow points or chokers, chicanes, mini traffic circles, and intersection ‘pop-outs’ to ensure traffic is not impeded;
- In a position not less than 10m from any high voltage main electrical distribution equipment such as transformers and distribution boards. AS 2419.1-2005
- Hydrants with washout bends shall be used only in cul-de-sac situations; and
- Australian Standards approved underground fire hydrants are required.

The location of the hydrants for the subject site will be detailed in the technical engineering drawings at time of subdivision.

## 6.5. Other Fire Mitigation measures

### 6.5.1. Shielding

Some houses/dwellings within the subdivision will be setback from 'Shrubland Vegetation' (>100m) and are able to be constructed **without** building to AS3959-2009. Further dwellings could be individually assessed as being "Shielded", this would need to be assessed by an accredited Bushfire Consultant on a case by case basis at building approval stage with approval required from the SoN. "Shielding" can be achieved for intensive residential areas (i.e. R10 areas) through careful design and placement of roads, infrastructure (pools, tennis courts, fences) to give separation or barriers to fire.

### 6.5.2. Landscaping/Streetscaping Areas

Landscaping and Streetscaping areas subject to similar standards that apply to the HSZ and the following minimum standards shall apply:

- Trees (crowns) a minimum of 5m apart (no continuous crowns);
- Trees should have no dead material within the plant's crown or on the bole;
- Fuel reduced to <8t/ha; and
- Shrubs should be no higher than 0.5 m.

### 6.5.3. Staging

If the subdivision is staged, then the staged development will incorporate the following:

- Reduction of bushfire fuels to 100m from adjacent housing as outlined in the staging Plan Appendix B, or where native vegetation cannot be cleared building to BAL/AS3959-2009 - HSZ areas as specified in Table 4;
- Provide the SoN prior to each subdivision stage, with a map showing the BAL ratings for lots requiring increased construction standard for dwellings in accordance with AS3959-2009 Construction of Buildings in Bushfire Prone Areas (current and endorsed standards);
- Implementation of 20m BPZ to any adjacent dwellings for each stage of construction of the subdivision and during maintenance periods (where appropriate);
- Maintenance of fire protection measures in public areas (gates, access, landscaped areas etc) until the developer has relinquished construction/maintenance responsibility of public use areas to the SoN; and
- Slashing of grasslands should occur to maintain low fuel areas (i.e. HSZ) around housing and dwellings.



## 7. Shire of Northampton Fire Protection Plan

The Shire of Northampton has the assistance of the Department of Fire and Emergency Services (DFES) which is made up of emergency trained personnel and assisted by Volunteer Bush Fire Brigades. The SoN has bush fire fighting units and incident support teams. Training and induction courses are held regularly and land owners are encouraged to attend these. For more information refer to the Shire of Northampton and DFES website:

<http://www.dfes.wa.gov.au>

<http://www.northampton.wa.gov.au>

### 7.1. Fire Fighting Facilities

The subject area is in the Shire of Northampton, within the locality of Kalbarri. Kalbarri Volunteer Bush Fire Brigade (BFB) is located within 5km of the subject site. The BFB services maintain 3.4 fire appliance vehicles/trucks and fast attack units, this is also backed up with a modern communication system for call outs as well as communication on the fire ground. These are typical of bush fire brigades for fire fighting services within Western Australia.

The Kalbarri BFB have the following:

- Fully equipped fire station;
- Volunteer trained members;
- A communications and call out system;
- Protective clothing issue to volunteers; and
- DFES approved fire appliances.

Response times can vary depending on commitments of volunteers, fire events current at time and priority of the fire services in the south west of Western Australia during summer periods. DFES recommends that homeowners take care to prepare their individual dwellings for fire season and take precautions against fire as per the **'Bushfire Preparedness – Prepare. Act. Survive.'**

It is generally acknowledged that during large wildfire events, local resources may not be able to respond to every lot due to strategic deployments of services, priorities within the area or state and/or present commitments of volunteers and resources. It is therefore recommended that land owners implement strategies as recommended by DFES to protect life and property during the fire season.

### 7.2. Homeowner Protection

It is the responsibility of homeowners to protect their property from bushfire. DFES have readily available information online which can assist homeowners in their preparedness during fire season (October to May). The DFES website "**Bushfire Preparedness – Prepare. Act. Survive.**" should be accessed by all owners in bushfire prone areas. A hard copy of the A4 book "Prepare. Act. Survive" can be found at local Shire of Northampton Offices or DFES offices, or downloaded off the above web address:

<http://www.dfes.wa.gov.au>

### 7.3. Bushfire Plan

Residents should prepare their own individual fire plans, as they need to make a commitment to develop a bushfire survival plan detailing preparations and actions to take if a bushfire threatens.

When developing a bushfire survival plan, the following should be considered:

- If you plan to leave for a safer place - where will you go and how will you get there? Your safer place could be with friends and family, and may not be far away. Know where you will go and never 'wait and see'. Relocating at the last minute can be deadly
- Does your household include elderly relatives, young children, people with disabilities or illness? When, where and how will they be relocated? Who will care for them?
- What will you do with your pets and livestock?
- Can your home be defended? Is it in a location that makes it difficult or dangerous to actively defend? (refer to DFES's Homeowners Bushfire Survival Manual - PDF)
- Will your home provide shelter if you have to or decide to stay?
- Are you capable of defending your home without the support of fire fighters?
- Do you have the skills, knowledge and capacity to check for and put out spot fires for up to ten hours after the fire front has passed?
- Do you have the right equipment and resources to actively defend? (e.g. sufficient independent water supply of at least 20,000 litres and a petrol, diesel or generator powered pump capable of pumping 400 litres per minute)
- Will you cope with the noise and stress of a bushfire if you decide to actively defend? Being in a bushfire may be the most traumatic experience of your life.

(from DFES website, 2013)

Information is also available on the ABC Radio website to guide homeowners in the event of a fire emergency, such information includes:

Planning for an Emergency Bushfire:

- Survival Kit
- Fire Emergency Services
- Before a Bushfire
- During a Bushfire
- After a Bushfire

Refer to the following link for more information on how to prepare a bushfire plan:

<http://www.abc.net.au/news/emergency/?ref=front-page-slider-v2--emergencies>

*“Before summer starts you need to decide what you will do if a bushfire threatens. If you live or work in a bushland area you need to **prepare** your home, family or business and have a plan so you can **act** to make sure you **survive**.” (DFES 2010)*

## 8. Summary

### 8.1. Overall Fire Threat

Ilam Pty Ltd & Silkcharm Pty Ltd (“the Clients”) commissioned Bio Diverse Solutions (Bushfire Consultants) to undertake a fire hazard assessment and prepare a Bushfire Management Plan to guide all future fire management for a proposed Structure Plan (and subsequent subdivision) of Lots 9502 and 9505 George Grey Drive, Kalbarri.

The subject site has internal areas of Shrubland Type C, Scrub Type D, Cleared paddock areas Type G and Low threat vegetation or non vegetated areas (AS3959-2009). Adjacent to the site is Woodland Type B, Shrubland Type C, Cleared paddock areas Type G and Low threat vegetation or non vegetated areas (AS3959-2009). There are remnant vegetation patches to the west, north west, north east and south contained in Kalbarri National Park and Shire of Northampton reserve and private properties. There is existing urban infrastructure (subdivision) to the west. The urban areas and rural residential cleared areas, road reserves, and Water Corporation infrastructure adjacent to the subject site are classified as a low fire risk with areas of “*Low Threat Vegetation and Non Vegetated Areas*” (AS3959-2009).

The majority of the western areas of the subject site will be cleared for the subdivision with internal POS areas proposed to be landscaped and low fuel areas. The subdivision has been rated as having a **Moderate** Bushfire Hazard as defined by the hazard assessment procedure defined in Planning for Bushfire Protection Edition 2, 2010 and the Draft Planning for Bushfire Risk Management Guidelines (WAPC, 2014) due to internal and adjacent Woodland, Shrubland and Scrub bushfire risks. There are low to moderate slopes across the site. This requires “Performance Principle” and “Acceptable Solutions” to be met.

The Elements which are met either through the objectives of the “Performance Principle” or “Acceptable Solutions” for the Subject site include:

- Element 1 - Location;
- Element 2 - Siting and design of development.
- Element 3 - Vehicular access; and
- Element 4 – Water.

This Plan has identified a number of ways fire risk can be mitigated and managed across the lots to ensure there is protection to life and property and biodiversity assets. To mitigate fire risks and meet the Performance Principles this report outlines:

- **Element 1 – Location:** The subdivisions are located in an appropriate landscape with a Moderate Bushfire Hazard Rating. No building greater than BAL 29, HSZ and building to BAL and AS3959-2009 as outlined in Table 4.
- **Element 2 - Siting and design of development:** The design of the subdivision allows for bushfire hazard mitigation measures to be incorporated to reduce threat to people, property and infrastructure.
- **Element 3 - Vehicular access:** The presence of linking road networks which has a minimum of 20m road reserves and meets technical standards as outlines in Table 5; and
- **Element 4 – Water:** Reticulated water to subdivision and water hydrants to Water Corporation WA standards.

This BMP report provides details of the fire management strategies proposed to be implemented across the site as it is subdivided and developed to ensure adequate protection of life, property and biodiversity assets. To ensure the mitigation measures are implemented responsibilities are outlined in the following sections for the Future Lot Owner, Developer and SoN. A possible works program to guide the developer is also provided to guide the developer in Appendix H.

## 8.2. Owners Responsibility

***It is recommended the Future Property Owners shall be responsible for the following:***

- To take measures to protect their own assets on their property;
- Implement this document, BMP of Lots 9502 and 9505 George Grey Drive, Kalbarri as it applies to their individual property;
- Ensure that BPZ's are maintained to a minimum of 20 metres around all buildings to DFES standards (see Appendix F).
- Ensure that HSZ's are maintained from the vegetation (fire) risks (See Appendix F);
- Ensure that their property is built to BAL AS3959-2009 Building Standards (if it applies to their property);
- Each property owner is to be made aware of:
  - Fire Management Plan,
  - A hard copy of the A4 book "Prepare. Act. Survive",
  - Fire Control Information supplied by the Shire of Northampton; and
- It is the responsibility of the individual property owner to maintain in good order and condition BPZ, HSZ and driveway standards. Future modifications other than requirements as set out in this BMP can only be done with written agreement from the Shire of Northampton.

## 8.3. Developers Responsibility

Prior to development being given final approval by the Shire of Northampton, the Developer shall be required to carry out works that include the following but in respect to individual stages of development. Subsequent to the issue of final approval, the Developer shall have no further responsibilities to the provision of fire fighting facilities and fire management on individual lots that pass from their ownership.

***It is recommended that the Property Developer shall be responsible for the following:***

- Implement this document, Bushfire Management Plan of Lots 9502 and 9505 George Grey Drive, Kalbarri;
- Comply with standards as outlined by the Shire of Northampton and WAPC conditions of subdivision;
- Ensure that potential property owners are aware of this BMP;
- Comply with minimum construction standards as outlined by this BMP;
- Maintain fire protection measures in public areas (access, landscaped areas etc.) until the Developer has relinquished construction/maintenance responsibility of public use areas to the Shire of Northampton;
- Provide advice to contractors/ landscapers, etc of hydrant location on that land should one be present and responsibilities to ensure that they remain uncovered and unobstructed at all times;
- Maintain firebreaks in accordance with the Shire of Northampton Annual Fire Break Order;
- Clearing native vegetation to 100m in internal areas adjacent to proposed lots, or clearing HSZ (BAL requirements) as outlined in Table 4;
- Ensure HSZ and BPZ is maintained as per required standards until titles are relinquished to new owners;
- Provide the SoN prior to each subdivision stage, with a map showing the BAL ratings for lots requiring increased construction standard for dwellings in accordance with AS3959-2009 Construction of Buildings in Bushfire Prone Areas (current and endorsed standards);
- Implement wording to accompany Structure Plan:

*"Regardless of whether this land has been designated as bushfire prone, any buildings to be erected pursuant to this structure plan shall comply with the requirements of Australian Standard 3959 under the Building Code of Australia."*
- Implementing fire protection measures during staged development as per Section 6.5.3 of this BMP;
- Maintaining the subject site to minimise bushfire fuels and mitigate the risk of bushfire in accordance with the SoN Fire Control Order (yearly advise brochure updated annually);

- Construct access to the following standards as outlined in Table (5).

**Table 5 – Vehicular Access Technical Standards**

Technical requirements	Public Roads	Cul-de-sacs	Battle Axes	Private Driveways	Emergency Access Ways	Fire Service Routes
Minimum trafficable surface (m)	6	6	6	4	6	6
Horizontal clearance (m)	6	6	6	6	6	6
Vertical clearance (m)	4	N/a	4	4	4	4
Maximum grades	1 in 8	1 in 8	1 in 8	1 in 8	1 in 8	1 in 8
Maximum grades >50m	1 in 5	1 in 5	1 in 5	1 in 5	1 in 5	1 in 5
Maximum average grade	1 in 7	1 in 7	1 in 7	1 in 7	1 in 7	1 in 7
Minimum weight capacity(t)	15	15	15	15	15	15
Maximum crossfall	1 in 33	1 in 33	1 in 33	1 in 33	1 in 33	1 in 33
Curves minimum inner radius(m)	12	12	12	12	12	12

- At subdivision stage implement a notification on title pursuant to section 70A of Land Act 1893 of lots affected by an increase in construction standards consistent with BAL rating alerting owners of the lot and successors in title of the Bushfire Management Plan; and
- Provide each prospective owner with:
  - Bushfire Management Plan ,
  - A hard copy of the A4 book “Prepare. Act. Survive”; and
  - Fire Control Information supplied by the Shire of Northampton (Yearly advice Brochure updated annually).

A works program has been developed to guide the Developer outlining responsibilities, completion times and standards. Please refer to Appendix H.

#### 8.4. Shire of Northampton Responsibility

At approval and endorsement of this Bushfire Management Plan, the Shire of Northampton has statutory control and responsibility to ensure that aspects of the Plan and community fire safety are maintained.

***It is recommended the Shire of Northampton be responsible for the following:***

- Provide advice on standards and methods to achieve community fire protection to owners/occupiers of land through issue and enforcement of the current SoN Fire control Order (yearly advice brochure updated annually);
- Ensuring compliance with this Bushfire Management Plan with regard to any related conditions of subdivision approval;
- Enforcing AS3959-2009 Construction of buildings in bushfire prone areas (current and endorsed standards) for all dwellings affected by a BAL rating;
- Ensure individual Property Owners maintain in good order and condition Emergency Access/Fire Access Ways, Building Protection Zones, Hazard Reduction Zone and driveway standards.
- Developing and maintaining District Fire Fighting Facilities and related infrastructure;
- Maintaining roads and Fire Service Access consistent with the standards this Bushfire Management Plan an in the Planning for Bushfire Protection Guidelines (WAPC, 2010 current and endorsed guidelines) and due regard to the Draft Planning for Bushfire Risk Management Guidelines, (WAPC, 2014);
- Maintaining the public open space (after the handover from the developer) in a manner that will minimise bushfire fuels and mitigate the risk of fire; and
- Periodical review of the Fire Management Plan (recommended every 3 years).

## 9. Conclusions

This Bushfire Management Plan has been developed to meet “Performance Principles” and the “Acceptable Solutions” as outlined in Planning for Bushfire Edition 2 (WAPC 2010) (current and endorsed guidelines) and Draft Planning for Bushfire Risk Management Guidelines, (WAPC, 2014) with specific recommendations for:

- The layout of the subdivision and the facilities proposed have been designed to reduce the fire threat to persons and property within the development (i.e. Internal road design, access in alternative directions; low fuel POS/urban areas);
- Accessible “Fire Service Access” and “Emergency Access Ways” along road reserves in opposing directions through the subdivision for access and egress in fire events along the proposed and existing road reserves. Temporary EAW if required during staged development and FSA along the eastern boundary; and
- Building to **BAL** and AS3959-2009 where setbacks of 100m from internal and external remnant vegetation areas cannot be achieved.

A copy of DFES’s Compliance Checklist for “Performance Principles” and “Acceptable Solutions” is provided in Appendix I.

In summary it is recommended to the Developers that in building the proposed subdivision at Lots 9502 and 9505 George Grey Drive, Kalbarri, the Developer:

- Implements the fire protection standards as outlined in this document;
- Adhere to subdivision conditions;
- If any changes to detailed designs occur, that this Bushfire Management Plan is updated to reflect these changes, with approval from the Shire of Northampton and DFES; and
- Implement this document, Bushfire Management Plan Lots 9502 and 9505 George Grey Drive, Kalbarri, standards of construction and recommendations.



## 10. References

AS 3959-2009 Australian Standard, *Construction of buildings in bushfire-prone areas*, Building Code of Australia, Primary Referenced Standard, Australian Building Codes Board and Standards Australia.

Agriculture and Resources Protection Act (2011) Declared Plants List, Department of Agriculture and Food, Western Australia.

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<http://www.bom.gov.au/climate/data/index.shtml>

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Department of Fire and Emergency Services Website accessed August 2014:

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[http://www.northampton.wa.gov.au/assets/documents/2014\\_2015\\_firebreaks\\_notice.pdf](http://www.northampton.wa.gov.au/assets/documents/2014_2015_firebreaks_notice.pdf)

Western Australian Planning Commission (WAPC) (2010) *Planning for Bushfire Protection Edition 2* Fire and Emergency Services Authority of Western Australia and Department for Planning and Infrastructure Western Australia.

Western Australian Planning Commission (WAPC) *Planning Bulletin 111/2013 Planning for Bushfire*.

Western Australian Planning Commission (WAPC) (2014) *Draft Planning for Bushfire Risk Management Guidelines*. Western Australian Planning Commission and Department of Planning WA, Government of Western Australia.

## **Appendices**

**Appendix A – Location Mapping**

**Appendix B – Local Structure Plans**

**Appendix C - Vegetation Mapping**

**Appendix D – Bushfire Risk Mapping**

**Appendix E – BAL Rating Plan**

**Appendix F – DFES Information**

**Appendix G – Bushfire Management Plan**

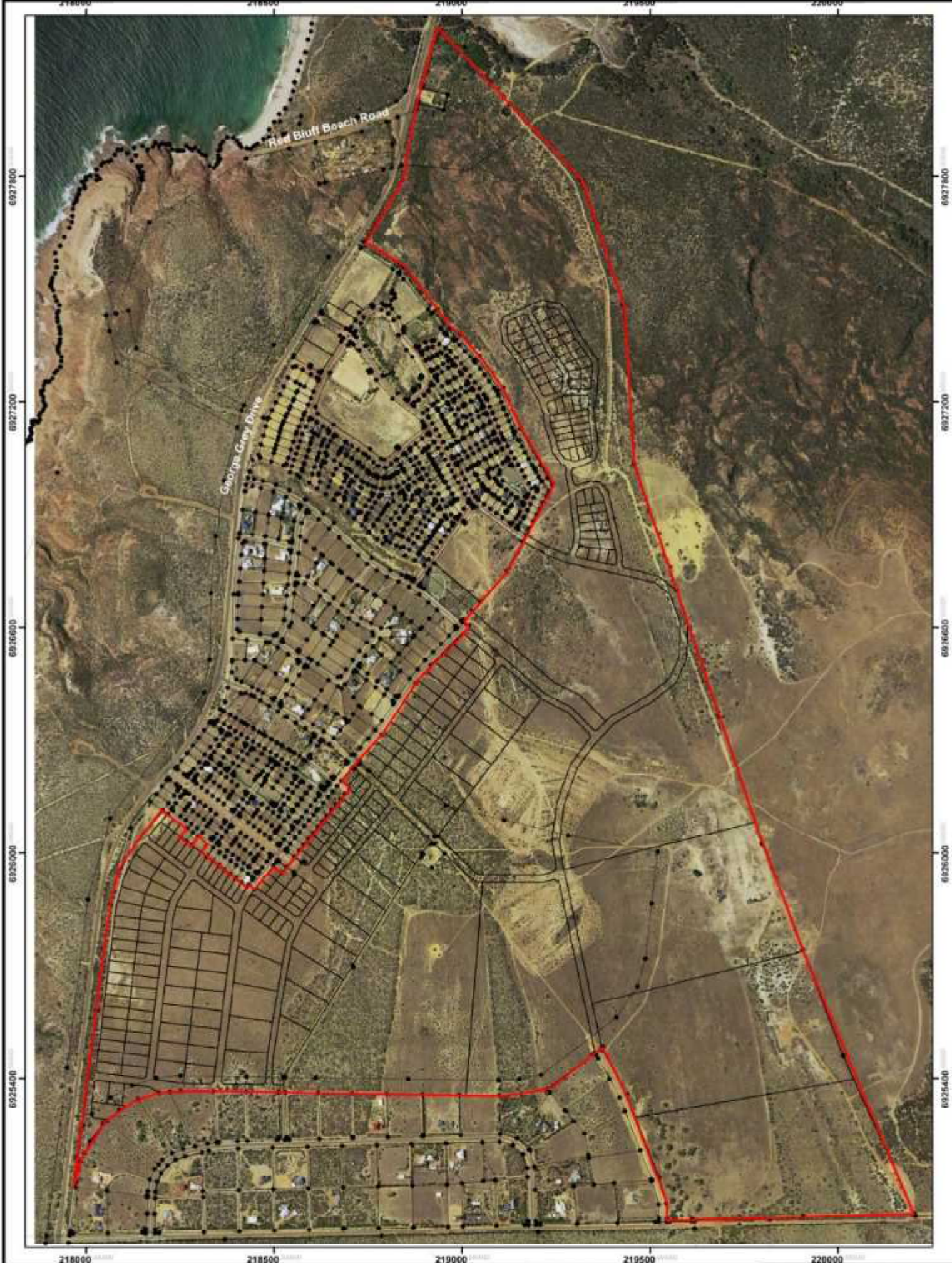
**Appendix H – Works Program**

**Appendix I – DFES Checklist**



**Appendix A**

**Location Mapping**



Legend  
 Subject Site


  
 Scale 1:3,750 @ A3  
 GDA 94 Zone 50

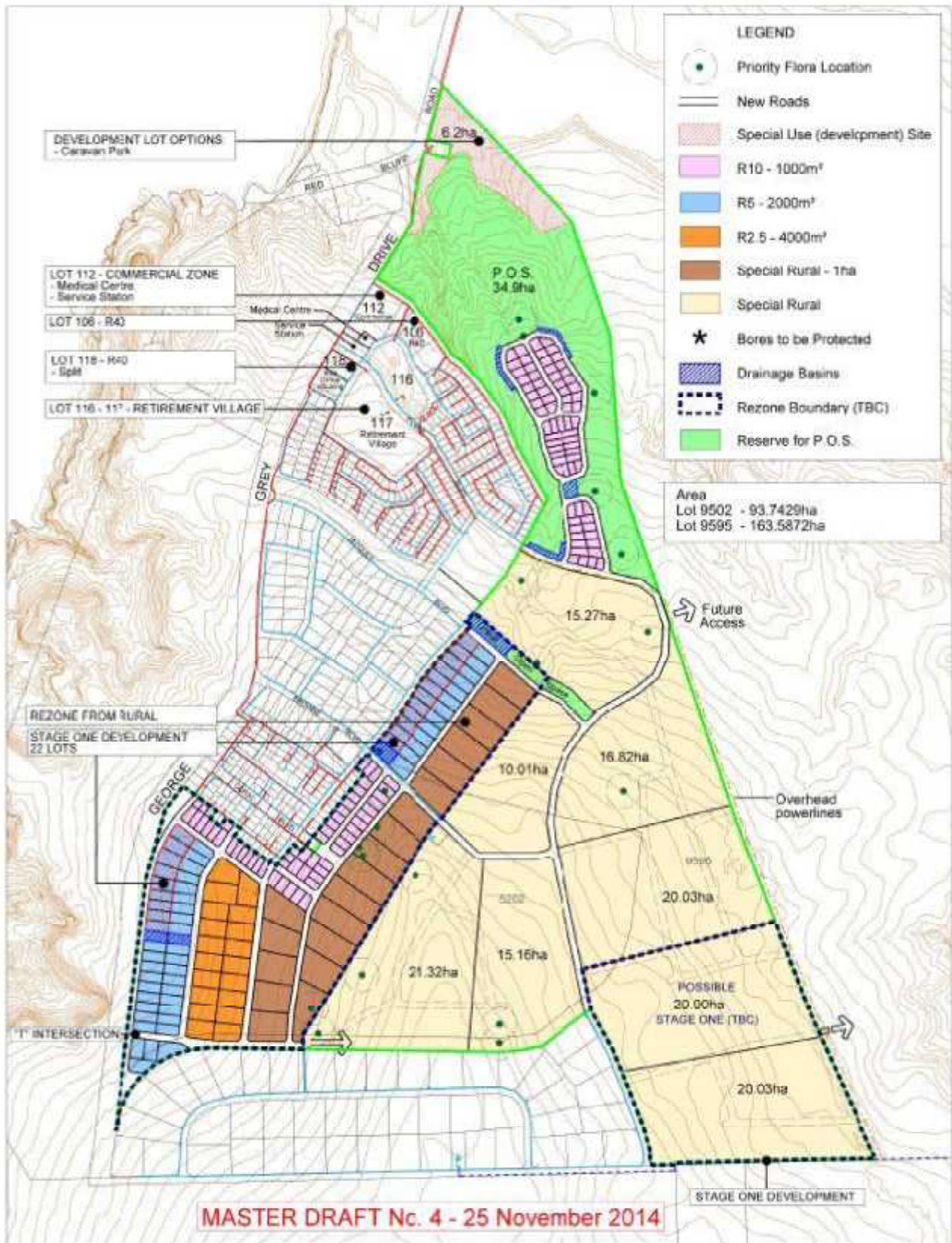

**BIO DIVERSE SOLUTIONS**  
 80 Poppleton Drive  
 Albany WA 6177  
 Australia  
 Tel: 08 9441 3838  
 Fax: 08 9441 3839  
 Web: www.bds.com.au

CLIENT <b>Sam Pty Ltd &amp; Sora-Charm Pty Ltd</b> Lots 8102 & 8105 George Grey Drive Kalbarri WA		
<b>Location Mapping</b>		
STATUS <b>FINAL</b>	DATE <b>08/08/24</b>	BY <b>WILLIAM</b>

**Appendix B**

Structure Plan





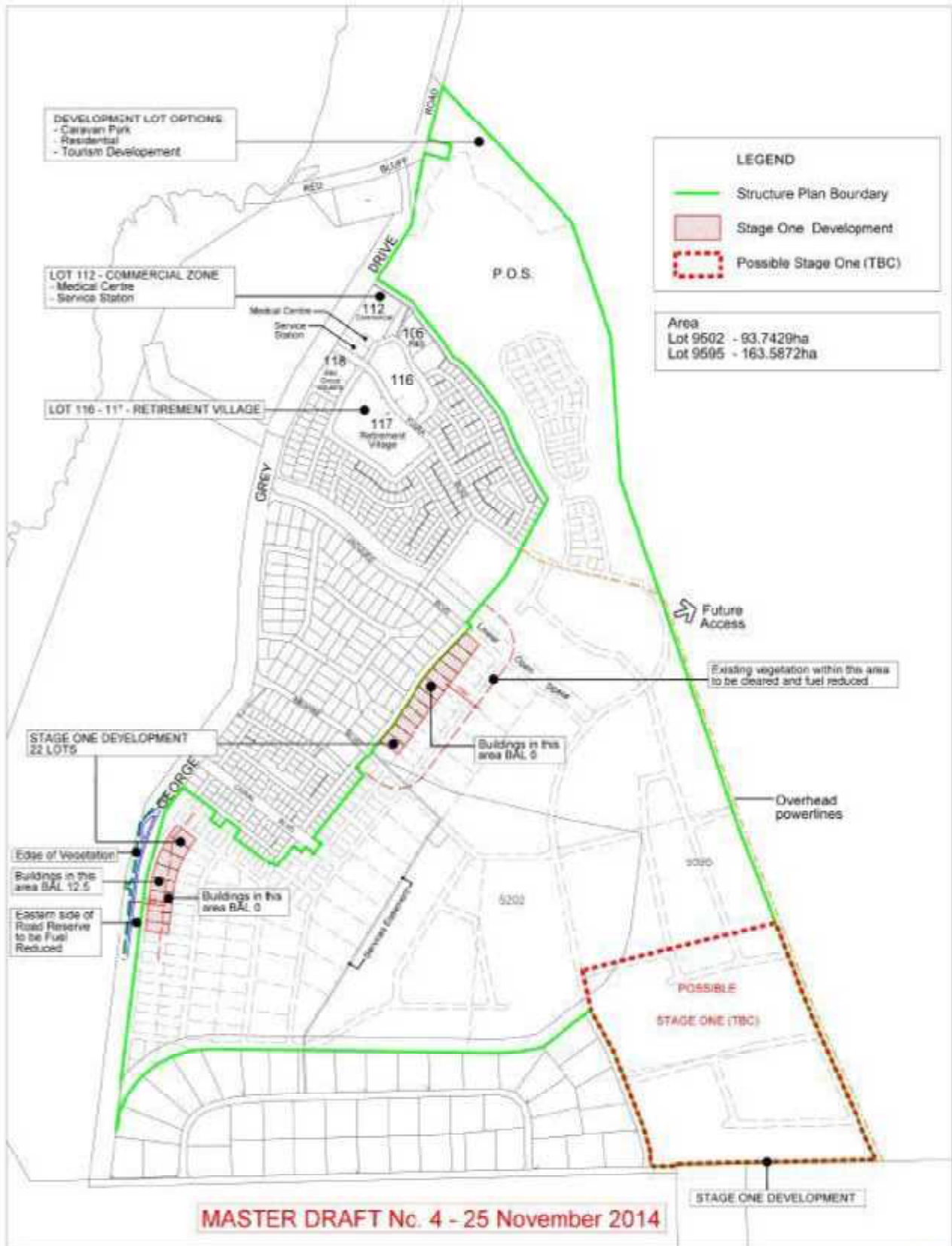
Plan No: 15804  
Version: 04/11  
Scale: 1:10,000

**LEGEND**

- Water Main
- Over Water
- Power Lines
- Drains
- Existing Boundary
- Proposed Boundary
- Appraisal Area

**LOCAL STRUCTURE PLAN**  
LOTS 9502 AND 9505  
BROWNE FARM - GEORGE GREY DRIVE KALBARRI

whelan  
10 YEARS



Part No: 1580-11  
 Revision: 30/11  
 Scale: 1:10000  
 11 Robinson Road, Suite 101, Sydney NSW 2000  
 www.whelan.com.au

**STAGE PLAN**  
**LOTS 9502 AND 9505**  
**BROWNE FARM - GEORGE GREY DRIVE KALBARRI**

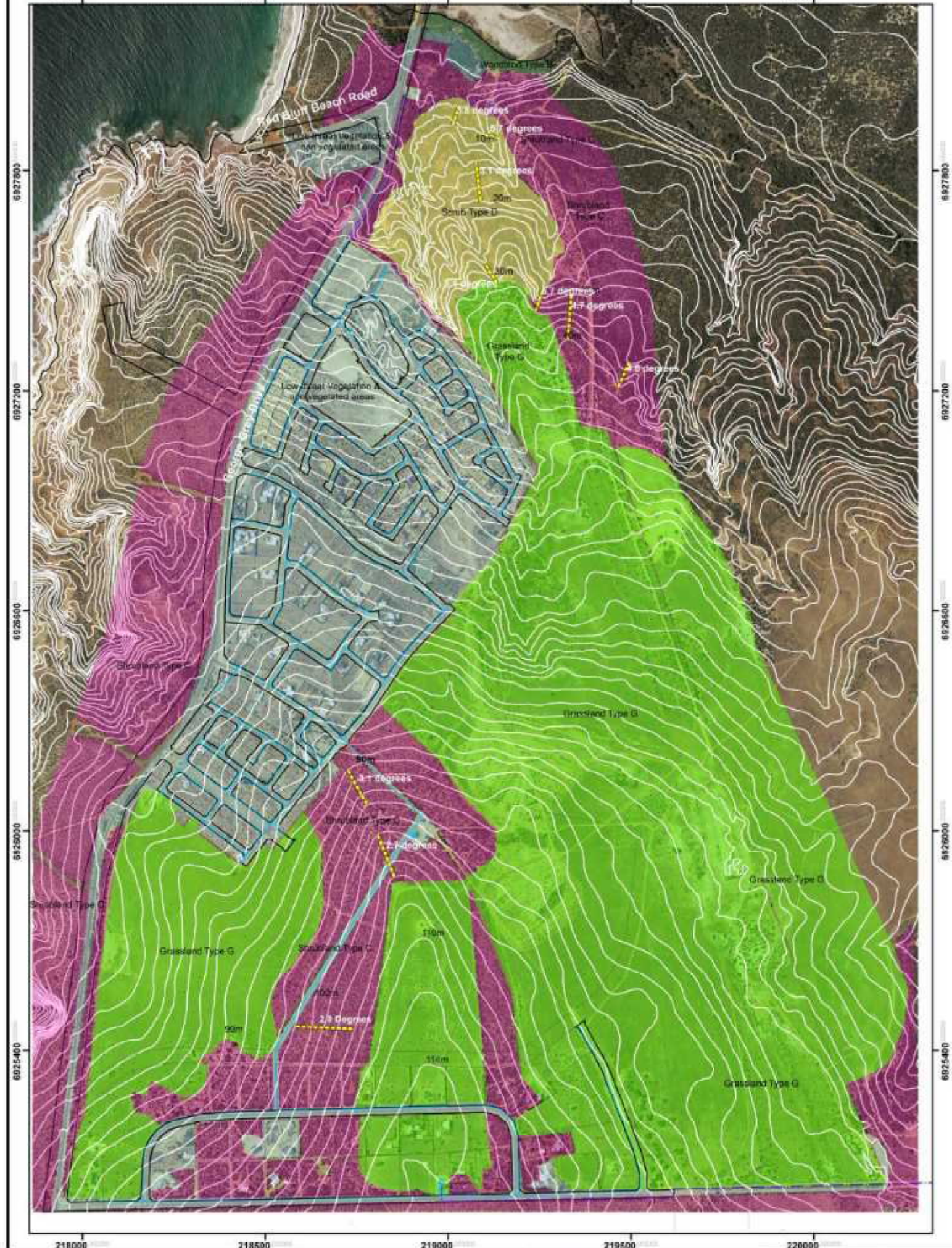
11 Robinson Road, Suite 101, Sydney NSW 2000  
 www.whelan.com.au



**Appendix C**

Vegetation Mapping





**Legend**

Slope degrees	Scrub Type D	Low threat vegetation
Woodland Type B	Grassland Type G	
Shrubland Type C		

N  
 Scale  
 1:9000 @ A3  
 GDA 94 Zone 90



**BIO DIVERSE SOLUTIONS**  
 25 Popplewood Drive  
 Albany WA 6170, Australia  
 Tel: 08 9407 3028  
 Fax: 08 9401 3028  
 Mob: 0407 303 318

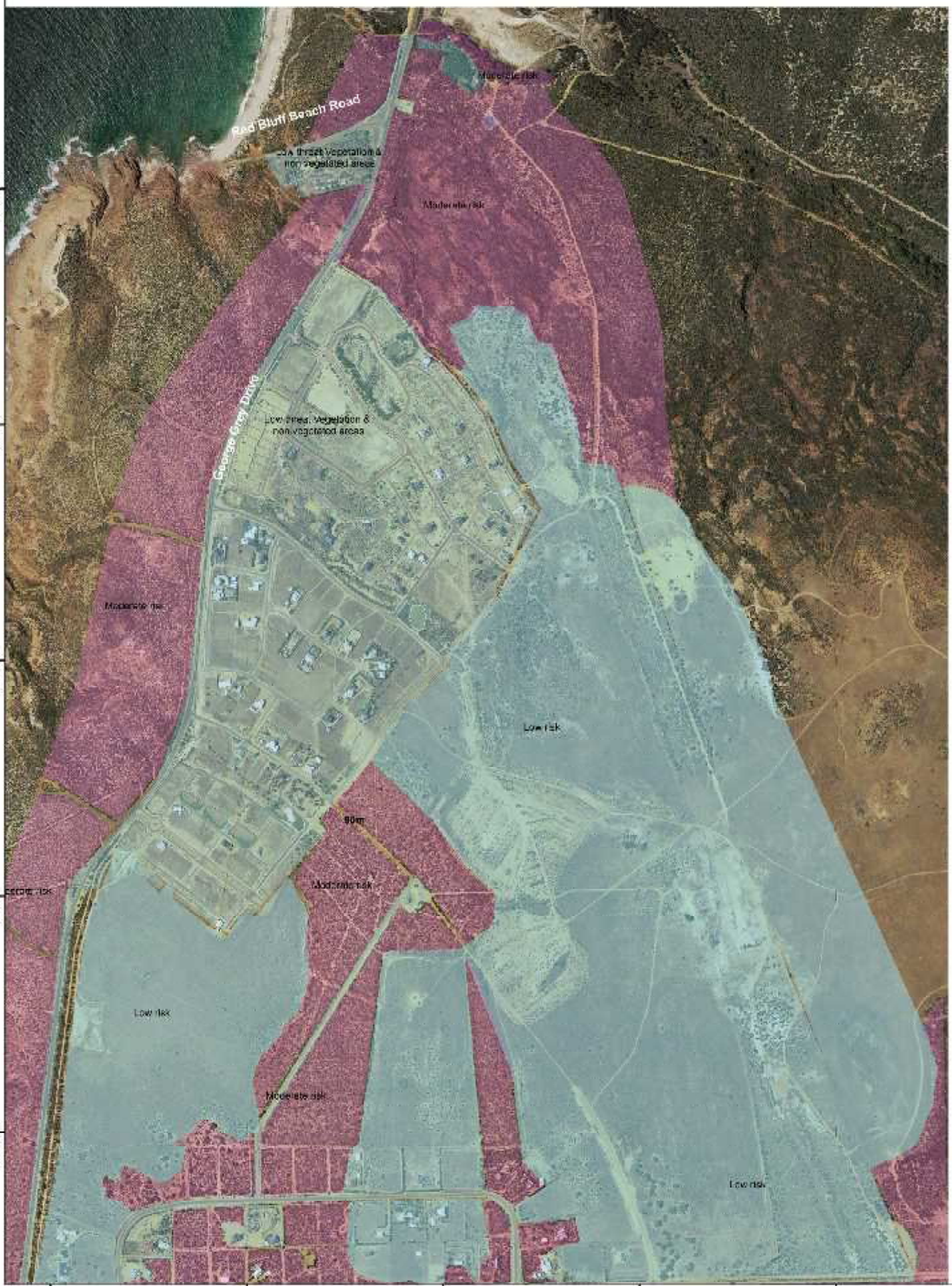
CLIENT	Barr Pty Ltd & Silkcharm Pty Lots 2053 & 2055 George Grey Drive Kalamunda WA		
<b>Vegetation Mapping</b>			
DATE	ISSUE	REV	BY
			07/2018



**Appendix D**

Bushfire Hazard Rating





**Legend**

- Moderate
- Low bushfire risk
- Low
- Shrubland Type C

  
 Scale  
 1:1000 @ A3  
 GDA 94 Zone 50


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 Lot 2022 & 2023 George Grey Drive  
 Kalbarri WA

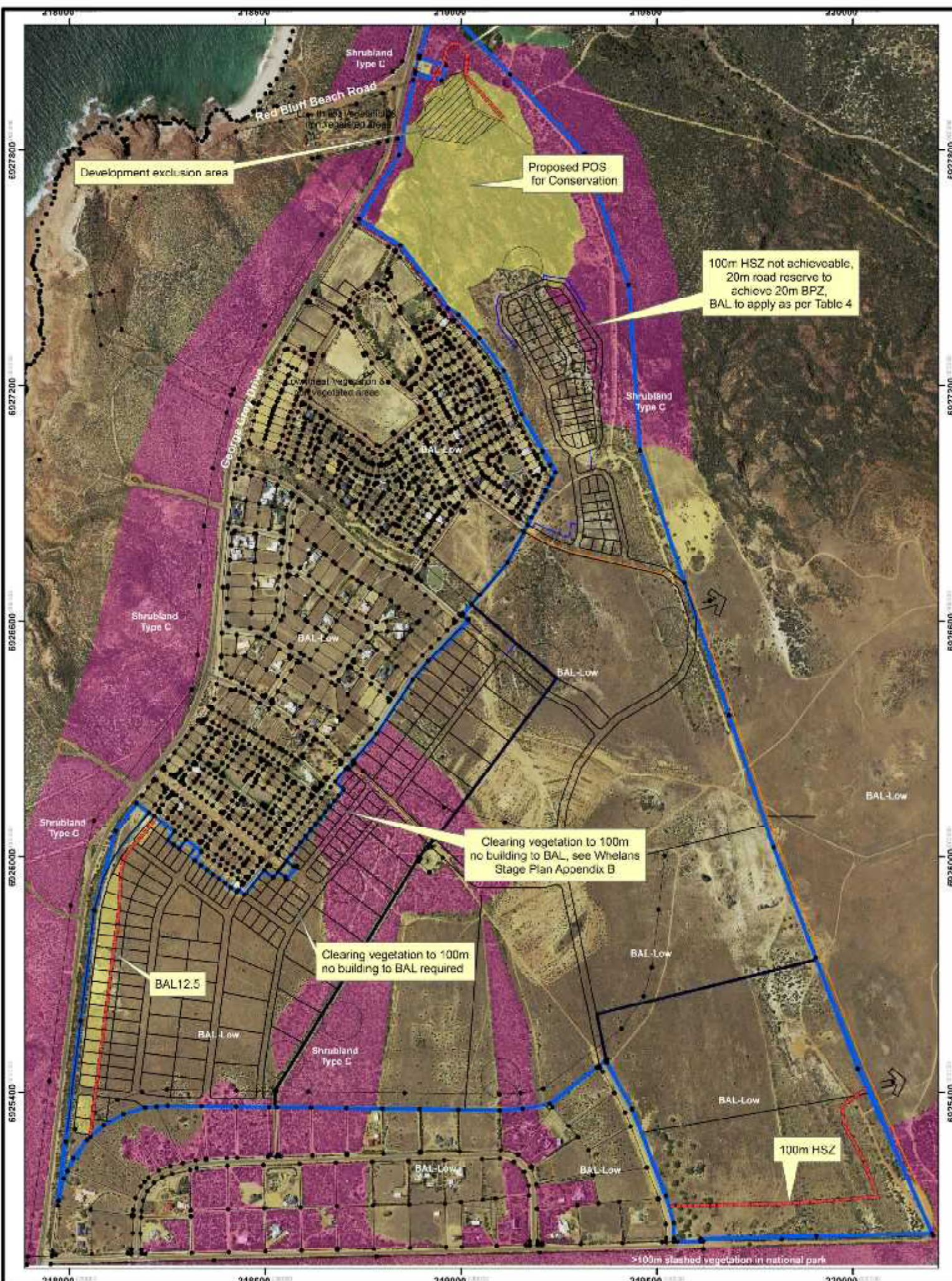
**Bushfire Hazard Mapping**

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**Appendix E**

BAL Rating Plan





**Legend**

- 100m HSZ
- BAL 12.5
- Woodland Type B
- Scrub Type D
- Subject site
- Exclusion area
- Shrubland Type C

Scale: 1:8,500 @ A3  
 OZMA Zone 50

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**BAL Rating Plan**

DATE	BY	CHKD	DATE
1/11/2014	WELLS	WELLS	15/01/14



**Appendix F**

DFES Information



## What is a Building Protection Zone?

### Key Points

- ⇒ Fuel loads influence bushfire intensity.
- ⇒ The lower the fire's intensity the less impact on the building.
- ⇒ Creating a minimum 20 metre reduced fuel load area (building protection zone) will increase the protection of the building.
- ⇒ Ember protection is important to protect the building.

### Definitions

- ⇒ Scrub crown is the green, leaf material on the scrub plants.
- ⇒ Surface fire is the fire burning the leaves and scrub on the top of the ground.
- ⇒ Mineral earth firebreak is a firebreak without vegetation.
- ⇒ Ember attack is where the bark and fine vegetation material is set alight and carried forward

Managing and reducing fuel loads for a minimum of 20 metres around a building will increase its likely survival from a bushfire.

Known as the Building Protection Zone (BPZ), the aim of this area is to ensure that there will be no direct flame contact on the building from a bushfire. By utilising fuel management options it will also be possible to reduce the potential radiant heat impact on the building.

If there is little or nothing to burn then the fire's impact will be reduced. This can be achieved by:

- ⇒ Maintaining a minimum 2-metre gap between trees and the building. Make sure that no trees overhang the house.
- ⇒ Shrubs should be planted at a distance of at least three times their height at maturity from buildings.
- ⇒ Do not clump shrubs or trees, ensure that there is a gap.
- ⇒ Keeping the grass short and prune the scrub so that it is not dense, nor does it have fine, dead aerated material in the crown of the scrub.
- ⇒ Raking up leaf litter and twigs under trees and remove trailing bark.
- ⇒ Pruning lower branches (up to 2 metres off the ground) to stop a surface fire spreading to the canopy of the trees.
- ⇒ Creating a mineral earth firebreak.
- ⇒ Having your paths adjacent to the building and have your driveway placed so that it maximises the protection to the house.
- ⇒ Storing firewood away from the building
- ⇒ Ensuring fences of combustible material will not burn down and break the integrity of the building by breaking windows allowing fire to enter.
- ⇒ Keeping your gutters free of leaves and other combustible material
- ⇒ Ensuring gas bottles are secured and positioned so that they will vent away from the building if subject to flame contact or radiant heat.

Most homes that are unattended during a bushfire are lost to ember attack from the bushfire. These burning embers get into gaps within the building, such as into the roof cavity, and ignite the material within the cavity. It can take a number of hours before the burning can be observed and by that time the building may not be able to be saved. It is recommended that all homes that may be affected by embers be made ember proof. If a bush fire occurs in the general area then the roof cavity and other crevices should be inspected to ensure that no embers have caused a fire. Be aware that there are electricity cables in the roof area and the introduction of water will be a safety issue.

For more information contact the Environmental Protection Branch on 9395 9300, email: [environment@dfes.wa.gov.au](mailto:environment@dfes.wa.gov.au) or visit [www.dfes.wa.gov.au](http://www.dfes.wa.gov.au)

## What is a building protection zone?



A well prepared Building Protection Zone with reduced fuel.

Reduced fuel in the Building Protection Zone contributed to the survival of this home in a bushfire.



A home destroyed by bushfire, note the tree branches overhanging the house.

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