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CITY OF ALBANY

OUTLINE DEVELOPMENT PLAN

LOT 48 MORGAN PLACE, MCKAIL
LOT 49 MORGAN ROAD, MCKAIL
LOTS 47, 50 AND 51 LANCASTER ROAD, MCKAIL

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Final March 2010

CONTENTS

APPENDICES

TABLES AND PLANS

ENDORSEMENT OF OUTLINE DEVELOPMENT PLAN

The Western Australian Planning Commission resolved on 20 January 2010 to endorse the Outline Development Plan for Lots 118, 114 and 113 Boundary Street, Lot 51 Le Grande Avenue, and Lots 115, 116 and 117 Flemington Street, McKail, dated March 2008, as a guide for subdivision within the locality.

Signed for and on behalf of the Western Australian Planning Commission

an officer of the Commission duly authorised by the Commission pursuant to section 24 of the *Planning and Development Act 2005* for that purpose in the presence of

Witness

28/6/10 Date

Date of Expiry: **19 OCTOBER 2028**

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1.0 INTRODUCTION

The purpose of this Outline Development Plan (ODP) is to provide the necessary details in order to guide the future subdivision of Lot 48 Morgan Place, Lot 49 Morgan Road and Lots 47, 50 and 51 Lancaster Road, McKail in a manner that will ensure that future development:

i) Respects the sites constraints and opportunities;
ii) Is coordinated with surrounding development;
iii) Is fully serviced and subdivided at the Residential 'R20' and 'R30' density codes; and
iv) Allows for coordination of development between lots within the ODP area.

This ODP shows the coordinated development of the subject land, which is currently proposed to be zoned 'Residential Development' in the City of Albany Town Planning Scheme No.3. The 'Residential Development' zoning requires that the Council adopt an Outline Development Plan (ODP) over the site prior to allowing subdivision or further development.

The ODP has been prepared in accordance with the requirements of the City of Albany Town Planning Scheme No. 3 and is guided by Western Australian Planning Commission (WAPC) guidelines.

Details of the ODP are at Plan 3. The plan creates a logical internal road layout, installs appropriate drainage measures, establishes suitable, useable lots with good solar orientation and makes suitable cost sharing arrangements in regard to public open space, dual use paths and drainage infrastructure. The proposed density of residential use within the ODP area is to be R20, with areas of R30 fronting Public Open Space.

The ODP was prepared with the assistance of Wood & Grieve Civil Engineers who provided an Engineering Report and Opus International Consultants who provided the Site Assessment and Land Capability Study. The Engineering Report is attached at Appendix A and the Land Capability Study is attached at Appendix B.

2.0 BACKGROUND

The subject land lies directly to the north of the existing area under the jurisdiction of the McKail Local Structure Plan 1999. This area is currently nearing the extent of its full development and planning, hence the natural progression of the Albany urban front to the north of Lancaster Road.

The ODP area was previously identified as suitable for 'Special Residential' purposes and an overlay plan was formulated linking and coordinating the development of the ODP area with Special Residential area to the east. As the urban front has now reached the ODP area, unsewered Special Residential development is clearly an underutilisation of the land and this proposal has been abandoned.

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The subject land is currently zoned 'Residential Development' by City of Albany Town Planning Scheme No.3.

The subject land consists of rural residential retreats at present, on land titles varying in size from 2.0ha to 3.7ha. The subject land has been fully cleared as a result of past rural activities.

The current rapid growth of the McKail urban front, coupled with restrictions placed on other Albany urban fronts has increased pressure for development of fully serviced residential lots in this area.

3.0 CONSULTATION

This ODP has been prepared with the assistance of Wood & Grieve Civil Engineers and Opus International Consultants.

Officers from the City of Albany, Water Corporation, Department of Water and Department for Planning and Infrastructure were consulted during the drafting of this ODP.

4.0 OWNERSHIP OF LAND

Below is an ownership regime, which contains details of the Certificates of Title and the registered proprietors of each lot.

Lot No.	Diagram No.	Certificate of Title Details			Area	Registered Proprietor/s
Lot 47	78349	C/T	Vol. 1891	Fol. 304	2.0279ha	Nancy and Mark Nelson
Lot 48	78349	C/T	Vol. 1891	Fol. 305	2.0233ha	Pasquale & John Boccamazzo, Annette Ovens and Annette Robinson
Lot 49	78349	C/T	Vol. 1891	Fol. 306	2.0234ha	Ronald and Erin Wilkinson
Lot 50	78349	C/T	Vol. 1891	Fol. 307	2.0371ha	Eckard and Shirley Klein
Lot 51	78349	C/T	Vol. 1891	Fol. 308	3.7466ha	Nunziata Angela Lembo

Table 1: Ownership Regime for the ODP area.

All Certificates of Titles are attached at Appendix C. All landowners have actively contributed to the drafting of the document and all support the content.

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5.0 THE SUBJECT LAND

5.1 Area to Which this ODP Applies

This Outline Development Plan (ODP) applies to Lot 48 Morgan Place, Lot 49 Morgan Road and Lots 47, 50 and 51 Lancaster Road, which is located approximately 5.5 kilometres northwest of the Albany CBD.

The total land area affected by the ODP is 11.8583ha. The ODP has a frontage of approximately 370 metres to Lancaster Road, which will perform a District Distributor Road role in the future.

5.2 Site Context

The ODP area is located some 5.5 kilometres northwest of the Albany CBD in the suburb of McKail.

The City of Albany Housing Position Paper (2005) describes McKail as "*...a suburb of Albany bounded by Link Road, Albany and South Coast Highway, Drome Road and Le Grande Avenue. The precinct is predominantly rural with the progressive newer developing residential area centred around McKail Lake. The Touristville Shop is located within the precinct.*"

McKail is one of many identified urban fronts in Albany. It is currently characterised by sewered residential lots (600-700m^2) and unsewered residential (2000-4000m^2) development. The McKail Local Structure Plan controls the majority of the land currently being developed. Other structure plans, like this ODP, are being developed in the vicinity to assist in controlling and coordinating the supply of residential land.

The subject land has access to a local convenience store at present, being the Touristville Shop (700m). The proposed Orana Neighbourhood Shopping Centre is approximately 1.2 kilometres southeast of the ODP area.

The subject land has good access to education opportunities being 1.2 kilometres from the Great Southern Regional College of TAFE and 1.4 kilometres from the North Albany Senior High School. It is expected that the new Primary School proposed within the McKail Local Structure Plan will service the ODP area and is located 1 kilometre to the south.

See the Location Plan and Site Plan at Plans 1 and 2 for details.

5.3 Land Use

5.3.1 Current Land Use

The subject land is currently utilised for the purposes of rural residential retreats, as is found in many locations on the urban periphery of Albany. However, given the extent of urban development occurring within the McKail/Milpara vicinity and the excellent location of the ODP area for residential use, these lifestyle lots are seen as an underutilisation of the land.

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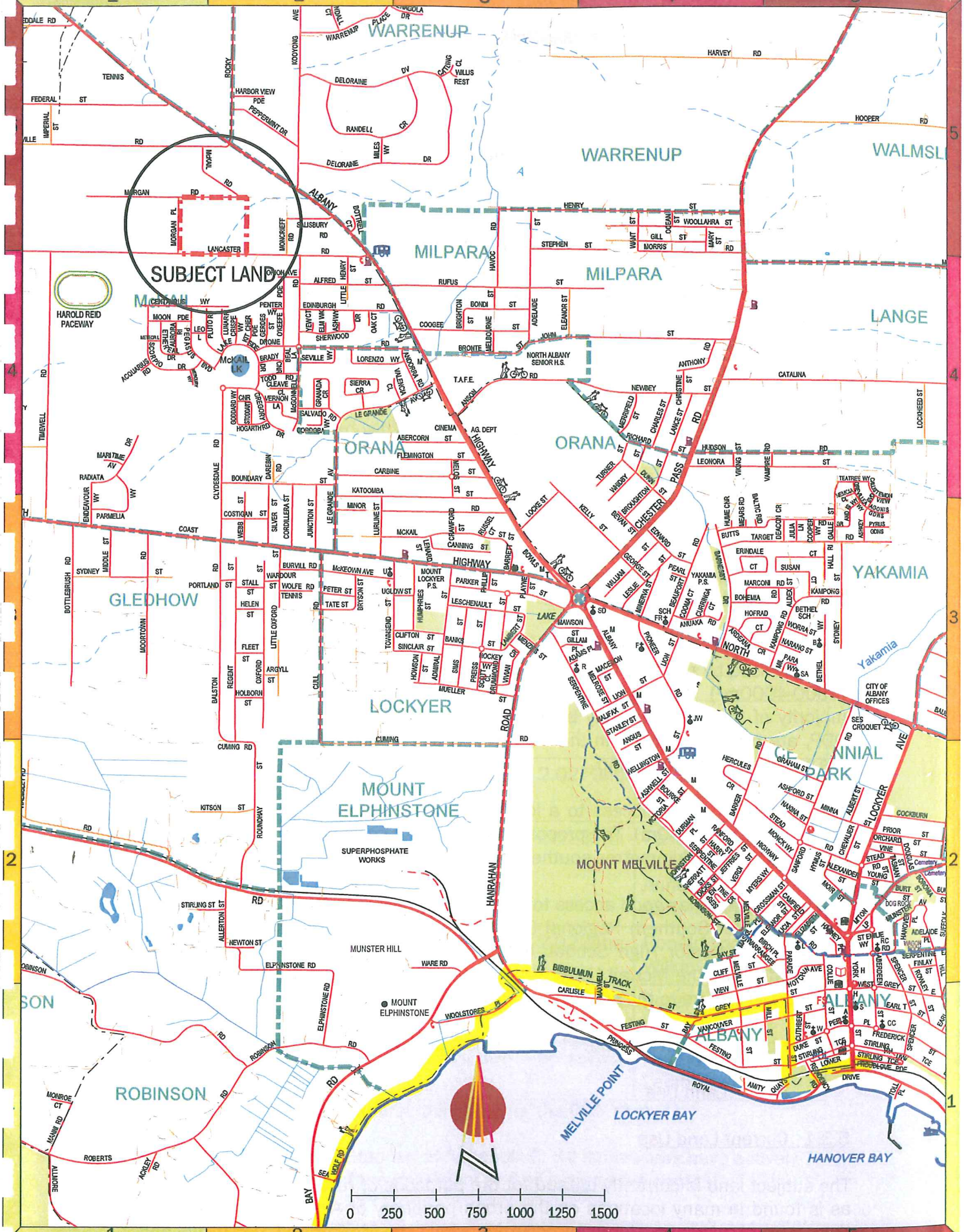

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rev	details	date
A	Original drawing	10-04-07

survey: COMPILED	cad file: 14117-01A.dgn
drawn: ABS 10-04-07	checked: SP 10-04-07
horiz datum	level datum
scale at A4: 1 : 30000	all distances are in metres

description: LOCATION PLAN
LOTS 47,50 AND 51 LANCASTER ROAD, LOT 48 MORGAN PLACE AND LOT 49 MORGAN ROAD. McKAIL

client: WILKINSON

drawing no: 14117-01A

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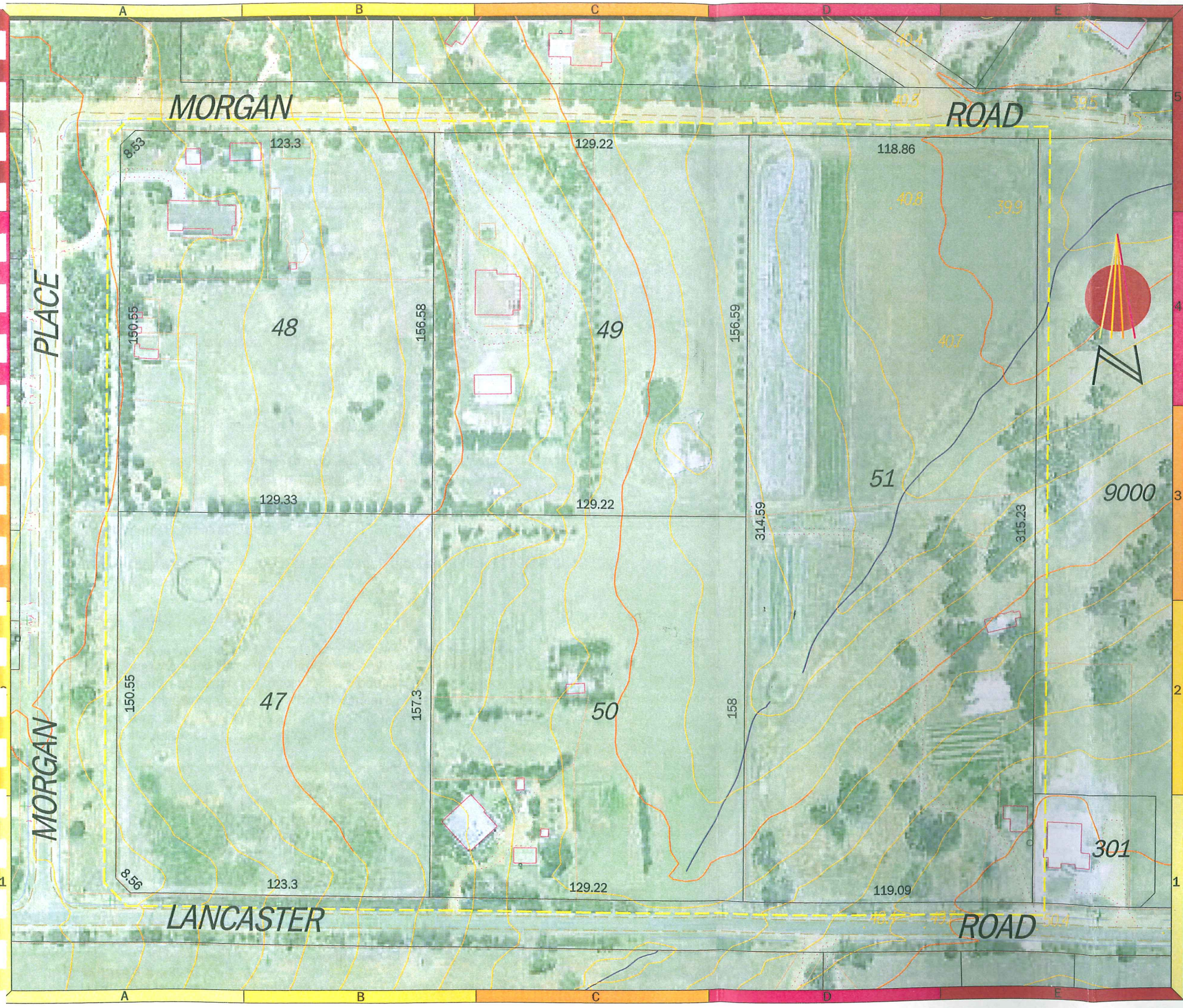
PYRMONT HOUSE. ALBANY



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drawn: ABS 10-04-07	checked: SP 10-04-07
horiz datum: MGA94	level datum: AHD

scale at A3: 1 : 1500 — all distances are in metres (0 20 40 60)

client: WILKINSON

description: SITE PLAN
LOTS 47, 50 AND 51 LANCASTER ROAD, LOT 48 MORGAN PLACE AND LOT 49 MORGAN ROAD. McKAIL

drawing no: 14117-02A

PYRMONT HOUSE
ALBANY

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5.3.2 Surrounding Land Uses

To the north and west of the subject land are lots currently used for lifestyle lot purposes. It is expected that they will form the future residential land of the City of Albany.

To the south of the ODP area, on Lancaster Road, is the existing extent of the McKail suburb. This area of land is within the control of the McKail Local Structure Plan 1999.

To the east of the subject land is land zoned 'Rural' in the City of Albany Town Planning Scheme No.3. This land has not yet been developed for Special Residential uses. It is expected that these land uses will include residential lot sizes of 2000m^2 and above.

5.4 Environmental Characteristics

5.4.1 Topography

The ODP area lies within the top catchment of a tributary of the Willyung Creek, which connects to the King River and subsequently drains into Oyster Harbour.

There is a small valley on the subject land. Therefore, the slope of the land is down from the east and west to this valley, which then gently slopes down in a north east direction. The subject land has a high point of approximately 54m AHD, in the southwest corner of Lot 47, and a low point of approximately 40m AHD, in the northeast corner of Lot 51.

Within the valley of the subject land is a small tributary, which is intermittent in flow in the summer months.

5.4.2 Soil Type/Land Capability

The land falls into the 'Dc Dempster' and 'S7 Minor Valleys' soil types. The land quality assessment from the Shire of Albany Local Rural Strategy – 'Physical Assessment and Hazards' publication produced by AGC Woodward – Clyde describes the S7 soil type as "*broad concave valleys incised in sedimentary rocks*...with...*deep leached sands and podzols on the slopes with humus podzols and some yellow duplex soils on the floors (S7f).*"

The document describes the Dc soil type as "*broad convex crests of spurs and ridges with gravely yellow duplex soils and some lateritic boulders.*"

Within the ODP area, Dempster soil types cover the southern portion of Lots 47 and 50, and the southern half of Lot 51. Minor Valley soil types dominate the remainder of the ODP area.

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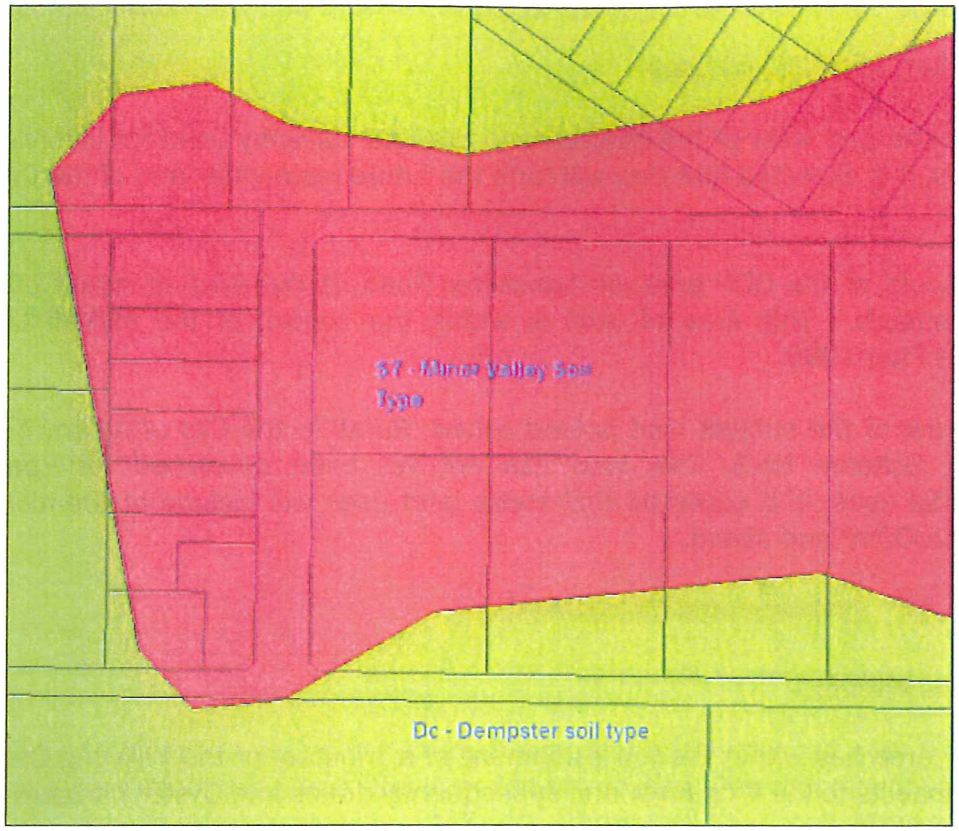

Figure 1. CSIRO land form/soil mapping units

The following is the land quality assessment table from the Shire of Albany Local Rural Strategy – 'Physical Assessment and Hazards' publication produced by AGC Woodward – Clyde.

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Land Qualities	Map Unit Minor Valley (S7)	Map Unit Dempster (Dc)
Water Erosion Risk	Moderate	V_Low
Wind Erosion Risk	Low	Moderate
Microbial Purification Ability	Very Low	Low
Water Pollution Risk O.F.	Moderate	Moderate
Water Pollution Risk S.D.	Very High	Low
Ease of Excavation	Moderate	Low
Inundation Risk	Low	Moderate
Flood Risk	Moderate	Nil
Foundation Soundness	Good	Fair
Slope Instability	Nil	Nil
Soil Absorption Ability	High	Low
Subsoil Water Retention	Low	High
Soil Workability	Fair	Poor
Nutrient Availability	Low	Low
Nutrient Retention Ability	Very Low	Moderate/High
Topsoil Nutrient Retention	Very Low	Moderate
Moisture Availability	Very Low	Moderate
Rooting Condition	Easy	Moderate
Salinity Risk	NS	NS
Exposure Factor	Very Low	Low
Wind Erodibility	High	High
Water Erodibility	Low	Moderate
Soil Resistance	Low	Moderate
Rain Acceptance	Very High	Moderate

Table 2: AGC Woodward-Clyde Assessment of Soil Units.

The above information only indicates the general capabilities of the ODP area for supporting housing. Importantly, it must be noted that these soil classifications have been developed upon in Yakamia, McKail and Gledhow and should be seen as suitable for residential development within the ODP area.

Opus International Consultants undertook a Land Capability Study, which is attached at Appendix B. This study included the drilling of 10 test pits, 2 on each lot of the ODP area. This study found that the ODP area is capable of supporting urban development, with all limitations being able to be overcome by design measures.

Of note, the study classified the land into three mapping units, being A, B and C. The C mapping unit consisted of deep sands, which were waterlogged. Mapping unit B was low-lying but still capable of being used for urban development and

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mapping unit A was well suited to urban development. Refer to the Land Capability Study at Appendix B for more details.

It is acknowledged that a detailed geotechnical assessment will be required as a condition of subdivision within the ODP area.

5.4.3 Existing/Remnant Vegetation

The entirety of the ODP area is either cleared or parkland cleared. Foreign species have been introduced and remnant vegetation has generally been depleted on all of the subject sites.

There are some scattered marri trees located on the subject land. However, they are sparsely located and do not represent a complete habitat or ecosystem. All habitat values have diminished in the past years due to the clearing of the land for agricultural purposes and stock grazing/agistment.

Every effort will be made to retain remnant vegetation on the site and add to it through revegetation measures using native endemic species within Public Open Space and road reserves.

5.4.4 Surface Water

There is no formal surface water area within the ODP area. There are some waterlogged soils on the southern boundary of Lot 51, which during winter have a temporary ponding of water.

The majority of surface water infiltrates onto the subject land, or drains via an overland flow path to the northeast low point of the subject land. During moderate rainfall events, the overland flow becomes a small creek, but this generally occurs during winter months.

5.4 Existing Services

The subject land is currently well positioned for connection to the relevant services. Currently connected are reticulated water, power and telecommunications. It is anticipated that some upgrades to services required for the ODP area will be needed.

5.5.1 Sewerage

The ODP area is not currently connected to the reticulated sewerage system. A Type 10 pump station and rising main will be required to pump the flows to the reticulated network.

There is opportunity to connect to either an existing network immediately to the south in the Sanctuary development or to a new network at the corner of Lancaster Road and Albany Highway.

See the Wood & Grieve Engineering Report at Appendix C for more details.

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5.5.2 Potable Water Supply

Water is currently supplied via a 200mm CI water main on the southern side of Lancaster Road, a 58mm AC main on Morgan Place, and a 100mm AC main on Morgan Road.

It is expected that the development of the ODP area will require the installation of a new 150mm PVC main on Morgan Place, which will connect to the existing 200mm CI water main in Lancaster Road.

The remainder of the ODP area will be serviced by 100mm PVC mains.

5.5.3 Power

There are existing aerial power lines in Lancaster Road, Morgan Road and Morgan Place. It is assumed that these supplies will be of adequate capacity to service the development of the ODP, however accurate power assessment cannot take place until the subdivision stage of development.

It is expected that Western Power will require the under grounding of power supplies servicing the ODP area.

It is expected that at least two transformers and a switchgear will be installed to service the ODP area.

5.5.4 Telecommunications

The subject land is fully connected to telecommunications, which are assumed to be of a sufficient capacity to support the development of the ODP area.

5.5.5 Road Network

The ODP area is serviced by Lancaster Road, Morgan Road and Morgan Place. Lancaster Road is identified in the Albany Local Planning Strategy as performing a District Distributor Road role in the future and is currently being upgraded, funded by residential development to the south. At completion, it will have a 7.4m wide asphalt seal, kerbing, drainage and a dual use path.

Morgan Road and Morgan Place are currently constructed to a rural road standard, with a 6m wide two coat bitumen seal, and open drains. It is expected that the City of Albany will require contribution to the upgrading of Morgan Road. As the ODP does not intend to front Morgan Place, it is not proposed to provide upgrading to this road.

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Figure 2. Lancaster Road is currently being upgraded by the developers of the Sanctuary.

Figure 3. Morgan Road

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Figure 4. Morgan Place

5.5.6 Public Transport

There is currently only one public transport service, the extension of the 101 route, operated by Loves Bus Service, which services the ODP area. It has a stop on Lancaster Road and operates three times per day. It is expected that route frequency will improve as Albany's urban area grows outward.

5.5.7 Pedestrian/Cycling Facilities

A dual use path will be installed on the frontage of the subject land to Lancaster Road. This will connect cyclists and pedestrians to Albany via a dual use path on Albany Highway. It will also connect the future ODP area residents to the Touristville Shop on the corner of Lancaster Road and Albany Highway.

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6.0 EXISTING STATUTORY AND PLANNING CONSIDERATIONS

6.1 Draft Albany Local Planning Strategy (2006)

Council resolved to receive a draft of the Albany Local Planning Strategy (ALPS) at it's meeting of the 20th December 2005, ALPS was adopted by the City of Albany on the 21 August 2007.

The draft Albany Local Planning Strategy sets out the long term planning direction for the City of Albany and shall have regard to all State and regional planning policies to the City's planning.

Draft ALPS identifies the subject site as "Existing Residential".

ALPS recommends consolidation of urban areas. This ODP has the objective of consolidating larger residential uses which are appropriately zoned in Albany's urban fringe. The ALPS document also favours the use of structure planning as a means of achieving coordinated development.

ALPS encourages a smaller development footprint and seeks to "*...encourage smaller lot subdivision and development of existing rural living areas, based on land capability and other constraints, to achieve higher sustainable lot yields as the first priority to meet future demands.*"

It is also noted that the land lies to the north-east of the Waste Water Treatment Plant Buffer in the ALPS Plan 9B. The subject land is not included in the existing or proposed buffer areas for the Waste Water Treatment Plant.

6.2 Guidelines for the Preparation of Local Structure Plans for Urban Release Areas (1992) (the Guideline)

This Guideline has been released as part of the WAPC Development Control Policies (including subdivision) and seeks to offer guidance on the preparation of structure plans and development plans for urban release areas.

The Guideline offers a hierarchy of plans ranging from "Strategy Plans" for broad level planning to "Development Plans" that are more detailed and are intended to show enough detail to guide subdivision and development. The Guideline refers to Development Plans as follows:

"...are a requirement of some town planning schemes and may be referred to as Outline Development Plans or Comprehensive Plans of Development. These development plans are required to be prepared prior to the subdivision and development of land occurring in urban release areas (usually referred to as Residential Development Zone). They are usually prepared at a scale of 1:2000, showing more detail than LSP's. They guide subdivision and development, often showing the lot layout, major buildings, (eg shopping centres) and in some cases, landscaping proposals."

This ODP has been prepared in a manner that is mindful of the requirements of both this Guideline and Town Planning Scheme No 3.

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6.3 Town Planning Scheme No.3

The subject land is currently zoned 'Residential Development' by City of Albany Town Planning Scheme No.3. Clause 5.2 of this scheme notes that in order for 'Residential Development' zoned land to be subdivided, an ODP must first be adopted by the Council and approved by the Western Australian Planning Commission.

6.4 Liveable Neighbourhoods Edition No.4 (2008)

This document is a statutory document. Liveable Neighbourhoods is intended to operate as a policy to facilitate the development of sustainable communities. It is to be used in the preparation of structure plans and subdivisions. The following Liveable Neighbourhoods aims are relevant to this proposed change of zoning:

- *To ensure cost-effective and resource efficient development to promote affordable housing;*
- *To maximise land efficiency wherever possible; and*
- *To provide a variety of lot sizes and housing types to cater for the diverse housing needs of the community at a density that can ultimately support the provision of local services. Higher density housing should be concentrated in areas closer to town and neighbourhood centres, near public transport stops and in areas with high amenity such as next to parks.*

Liveable Neighbourhoods advocates a mix of densities and housing types as elements of sustainable development.

6.5 McKail Local Structure Plan 1999

The McKail Local Structure Plan covers land directly to the south of the ODP area. It was adopted in 1999 by the City of Albany as a means of achieving coordinated development of all included lots.

The McKail Local Structure Plan denotes the development of 'R20' residential uses on Lancaster Road, adjacent to the ODP area, as well as Public Open Space, with on-site drainage dispersal measures incorporated. It is expected that the development of these areas shall be consistent with the ODP area.

6.6 City of Albany Housing Position Paper (2005)

The Housing Position Paper makes recommendations regarding the residential areas throughout the City of Albany. The Vision of this document is to *"facilitate and encourage the provision and development of a significant variety of housing choice, types, styles, and opportunities through the City of Albany and provide a high standard of residential amenity and facilities for the benefit of the residents of the City."*

The Position Paper makes general recommendations applicable to the entire Local Government area and specific recommendations based on a precinct basis.

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The subject site falls within Precinct 4A, McKail. Precinct 4A recommends that residential density should be consistent with that of the McKail Local Structure Plan (which recommends a base density of R20).

6.7 Speedway Noise Buffer Area

This policy relates to the Atwell Park Speedway located on Reddale Road in McKail. It establishes guidelines as to the development of housing in proximity of the speedway and measures to mitigate noise within residential housing.

Measures include:

- Locating dwellings on opposite side of house to speedway;
- Insulation of house for noise;
- Use of materials which have insulating properties; and
- Locating non-habitable rooms on same side of house as speedway.

The Noise Buffer Area established in the Policy does not affect the subject land, but impacts lots opposite on Morgan Place.

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Overall Aim: To provide for the coordinated development of the subject land, encompassing key planning principles and practices regarding water sensitive urban design and traffic management.

-Only one road crossover onto Lancaster Road.

-10 percent Public Open Space in a central, accessible location, which is to be fully landscaped and include drainage infrastructure

-16 metre wide road reserves and 12 metre road reserves fronting Public Open Space;

-'R20' base residential density for the subject land with 'R30 residential density overlooking Public Open Space;

-A Detailed Area Plan (DAP) shall be required as a condition of subdivision for lots abutting Public Open Space/foreshore areas.

-Development to proceed only when connection to deep sewer is established;

-The majority of drainage to be retained onsite and dispersed in accordance with water sensitive urban design principles

-Simple, uncomplicated subdivision pattern that fully utilises the opportunities and constraints of the subject land.

-No driveway access to Morgan Place from ODP area.

-A Foreshore Management Plan shall be submitted and implemented and a Living Stream shall be implemented as a condition of subdivision.

-An Urban Water Management Plan is required to be submitted at the subdivision application stage.

Outline Development Plan

Lot 48 Morgan Place, Lot 49 Morgan Road, Lots 47, 50 and 51 Lancaster Road McKail

CITY OF Albany

SCALE AT A3 1:2000

0 20 40 60 80 100

ALL DISTANCES ARE IN METRES

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7.0 THE OUTLINE DEVELOPMENT PLAN

7.1 Overview

This Outline Development Plan (ODP) is to be officially known as the 'Outline Development Plan – Lot 48 Morgan Place, Lot 49 Morgan Road and Lots 47, 50 and 51 Lancaster Road, McKail'. This ODP is to be read in conjunction with the Engineering Report at Appendix A, the Land Capability Study at Appendix B and Plan 3 of this report.

Details of the ODP are at Plan 3. The plan creates a logical internal road layout, installs appropriate drainage measures, makes provision for public open space, acknowledges the site's constraints and establishes suitable, useable lots. The proposed density of residential use within the ODP area is to be R20, with R30 areas fronting Public Open Space. Lots have been orientated to achieve a good level of solar orientation.

This ODP has been kept deliberately simple and concise as the subject land is relatively small, nor will it yield many lots considering the context of the McKail Local Structure Plan. The main purpose of this ODP is to allow the coordinated development of small fragmented lots to be rezoned 'Residential Development', requiring them to connect to services and providing for a Public Open Space. It is anticipated that detailed studies (such as geotechnical investigations) will be required as conditions of subdivision.

7.2 Aim

To provide for the coordinated development of the subject land, encompassing key planning principles and practices with particular regard to solar orientation of lots and water sensitive urban design principles.

7.3 Elements of the Outline Development Plan

Future subdivision of Lot 48 Morgan Place, Lot 49 Morgan Road and Lots 47, 50 and 51 Lancaster Road, McKail shall generally accord with the details shown in the Outline Development Plan (ODP) at Plan 3.

7.3.1 Projected Population

Given its location and base density coding of 'R20', the ODP area is expected to mainly accommodate families. Based on Census 2006, conducted by the Australian Bureau of Statistics, the average persons per household is 2.31. This figure has been obtained by dividing the total state population by the number of dwellings. The total projected population for the ODP area is expected to be approximately 346 persons, calculated at 2.31 persons per household, based on a lot yield of approximately 150 lots for the ODP area. This may be slightly higher, given the family orientation of the area.

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7.3.2 Proposed Land Use

The ODP area will be developed for residential purposes at the base density of 'R20', with areas of 'R30' medium density land use fronting Public Open Space.

There is no requirement for school sites or shopping facilities within the ODP area, these have been adequately provided for in the existing urban areas to the south (approx. 1.2km) and are planned for as part of the future areas of McKail to the west (approx. 1.0km).

7.3.3 Staging

There are to be no staging measures as part of this ODP. The ODP has been designed so that most landowners can develop independently of each other.

Should Lot 51 Lancaster Road choose to not subdivide for some time, individual drainage measures will have to be put in place until such time as the shared drainage site becomes available.

7.3.4 Proposed Lot Sizes and Density

The base residential density proposed in the ODP area is 'R20', which allows an average lot size of 500m^2. As is current practice, medium density 'R30' lots have been placed fronting Public Open Space. Given the suburban location and good access to shopping and education opportunities it is anticipated that the ODP area will be developed largely for family housing, although it is acknowledged that a mix of housing leads to a sustainable community.

7.3.6 Road Layout

Access to the ODP area will occur from surrounding roads as well as a network of internal 'access streets'. One new road will be constructed connecting to Lancaster Road, as it is necessary to service land to the east of the drainage line of the subject land.

The standard road reserve width is expected to be 16 metres. This width allows sufficient room for the development of 6 metre wide surfaced and kerbed road, with a sufficient road kerb width. Road construction is to be of kerbed and asphalted standard, with brick paved intersections in accordance with the recommendations of Appendix A of this document and the City of Albany Subdivision and Development Guidelines.

There are exceptions to a minimum road reserve width of 16 metres. In accord with Liveable Neighbourhoods, it is also proposed to reduce road reserve widths adjacent to Public Open Space. These road reserves will be a minimum of 12 metres in width, with a reduced kerb width of 1 metre adjoining Public Open Space.

A reduced road reserve width of 14.2 metres is also proposed in cul-de-sacs. Liveable Neighbourhoods suggests that for access streets with less than 150

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vehicles/day, it is allowable to reduce the road reserve to 14.2 metres. It is expected that on these roads there will be little/no requirement for on-street parking and the pavement width can be reduce to 5-6 metres.

It is proposed to base street design on that recommended by Liveable Neighbourhoods Edition No.4, 2008. Given the relatively low number of dwellings fronting roads, and no 'shortcut' options, it is expected that road design could be based upon Access Streets C and D of Liveable Neighbourhoods, which are demonstrated below.

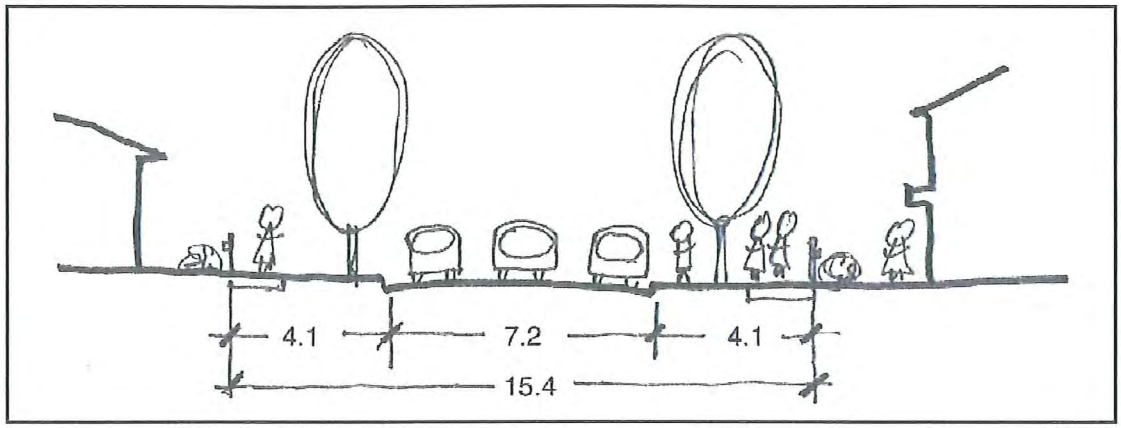

Figure 5: Access Street C, draft Liveable Neighbourhoods Edition No.3, 2004.

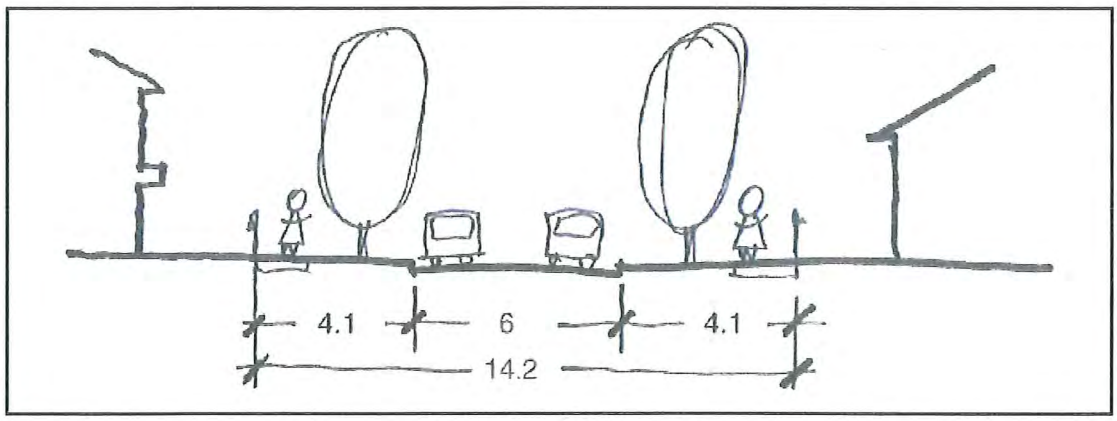

Figure 6: Access Street D, draft Liveable Neighbourhoods Edition 3 2004.

The 'Special Residential' development to the east of the ODP area has a 10m wide Right of Way (ROW) connecting the internal road layout to the ODP area. A 10m wide connecting laneway has been established by this ODP so that there is connectivity between the two developments.

The Engineering Report at Appendix A discusses the existing road standards in and around the ODP area and the upgrading and contributions required toward upgrading of these roads.

7.3.7 Pedestrian/Cycling/Public Transport

Pedestrian: It is proposed that a 1.5m wide footpath is provided on the eastern side of Morgan Place, south side of Morgan Road and eastern side of Public Open Space (POS) separating residential lots from the POS. This will

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ensure that all residents are connected to Public Open Space as well as the local dual use path network.

It is proposed to construct a 2.5m wide Dual Use Path (DUP) within the Public Open Space, as shown on Plan 3. The form of DUP's is shown below in Figure 7.

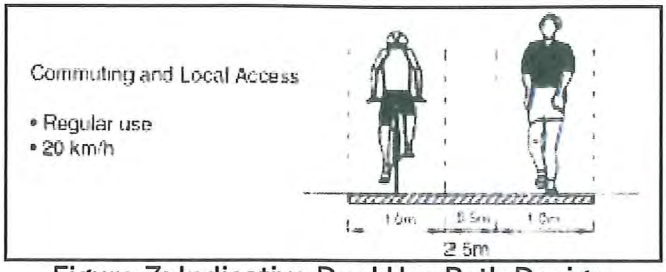

Figure 7: Indicative Dual Use Path Design.

Cycling: Given the contained nature of the ODP area, it is expected that the construction of a DUP within the Public Open Space of the ODP area, as well as the use of the existing DUP on Lancaster Road, will be an adequate provision for cycling of the ODP area.

Public Transport: The McKail Local Structure Plan 1999 suggested the future establishment of a public transport route (bus) on Lancaster Road. Should these routes be established, all residents of the ODP area will be within 400 metres suggested walking distance from a public transportation stop.

7.3.8 Services

All proposed lots to be developed within the Outline Development Plan will be connected to reticulated water, sewerage, power and telecommunications as a condition of subdivision.

An investigation of servicing has been undertaken by Wood & Grieve Civil Engineers in Appendix A. It found that:

- Reticulated water can be provided to ODP via existing pipes and relatively minor upgrades to some existing services;
- It is assumed that power of a suitable capacity connection can be established from the existing power supply but that this cannot be determined until a formal application for subdivision is lodged;
- The existing Telstra network could be connected to service the development;
- Reticulated gas is not located in the adjacent area; and
- The provision of a reticulated sewerage service is to occur, through the installation of a Type 10 wastewater pump station within Public Open Space. It will connect, via a rising main, to a pump station on the

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southern side of Lancaster Road or to a new system at the intersection of Lancaster Road and Albany Highway.

See Appendix One for details.

7.3.9 Public Open Space (POS)

Within the ODP area there is to be the provision of one family park. This park is to be 17191m² in area and will contain within it the drainage infrastructure of the subject land. This park is located within 400 metres walking distance of all proposed lots in the ODP area.

Although the park is 17191m² in area, it comprises an area ceded as foreshore reserve, allows for landscaped drainage basins with permanent water and provides for the equivalent of 10% of the land area of all landholdings.

i) The drainage basins will be permanent water bodies covering a total surface area of 1500m². R30, R31 and R32 of Liveable Neighbourhoods indicate that these artificial lakes or restricted use public open spaces can make up to 2% or one-fifth of the total POS contribution. Therefore all of the drainage basins can be credited to POS as per the WAPC Liveable Neighbourhoods 2008.

ii) A 20m wide foreshore reserve (10m either side of the creek) has been ceded in excess of the 10% Public Open Space requirement. This amount of land adds up to a total of 5306m² of land. This requirement will be further refined by the preparation and implementation of a Foreshore Management Plan as a condition of subdivision.

iii) The combined area of the subject site as it stands is 11.858ha.

There is a requirement that 10% of the total land area is ceded as POS, this equates to 1.186ha.

The contribution to this Public Open Space, via land or cash in lieu, is outlined within the Contribution Schedule to Public Open Space, contained within Section 8.0.

The proposed POS is to be of adequate size to accommodate both active and passive recreation activities. This will include the establishment of a living stream, which will allow predevelopment water flows to meander through the ODP area. This will be at a relatively small scale. Drainage infrastructure, principally drainage basins, will be developed as shown in Appendix A and to be further outlined in a Urban Water Management Plan, to be prepared prior to the subdivision of the land.

7.3.10 Remnant Vegetation

The subject land is either fully cleared or parkland cleared. The retention of remnant vegetation, particularly trees, to characterise any future development, will be a goal of the ODP area.

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7.3.11 Drainage Infrastructure

Water Sensitive Design Principles are to be incorporated into subdivision within the ODP area. As advised by the Department of Water, it will be required to prepare an Urban Water Management Plan prior to applying for subdivision. The requirement for this plan is specified by the Department of Water's Better Urban Water Management guidelines and is outlined on Plan 3.

Proposed drainage in the ODP area includes on-site drainage dispersal at a household level, with the overflow being directed to two drainage basins, to be located within the proposed Public Open Space contributed by Lot 51. These drainage basins have been located and a preliminary design provided by Wood & Grieve Civil Engineers. It is recommended that the drainage basins are predominantly permanent basins with a maximum 10 year ARI water surface area of a total of 1500m^2.

The drainage basins has been designed to attenuate a 10 year ARI post development flow. It has been assumed that existing pre-development flows will be able to be discharged into the drainage system in Morgan Road, which will in turn eventually flow into the Willyung Creek.

Within the proposed ODP area all lots will be required to dispose of drainage on-site, through the use of on-site soak wells of adequate capacity. Future residents will be encouraged to harvest and store rain water, as a measure to reducing the overall water requirement of the ODP area.

For further details on drainage basin design, please refer to the Engineering Report at Appendix A.

7.3.12 Detailed Area Plan

A Detailed Area Plan (DAP) is proposed to ensure lots overlook POS, provide a better passive solar outcome, encourage a more intimate streetscape with housing dominating rather than garaging. A DAP is proposed in this instance to strongly link the subdivision and the eventual built form.

The main elements of this plan will include:

1. Decreased front setback for some housing within the ODP area;
2. Garage locations and orientation of housing;
3. Solar access and design principles; and
4. The design of housing overlooking Public Open Space.

It is expected that the Western Australian Planning Commission will require the submission of a Detailed Area Plan for lots overlooking Public Open Space as a condition of subdivision.

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8.0 COST SHARING

Cost sharing measures will be implemented as part of this ODP. The three cost sharing measures will include:

-Public Open Space;
-Construction of a dual use path; and
-Onsite drainage dispersal infrastructure and works in Public Open Space;

8.1 Public Open Space

Within the proposed ODP area there is to be one significant area of Public Open Space, the majority of which will be ceded by Lot 51, 50 and 49. The owners of Lot 51 and 49 Lancaster Road are required to cede more than 10 percent land for Public Open Space. However they will be adequately compensated by cash in lieu payments from those landowners who are not providing a land component toward POS.

As stated in section 7.3.9 the 17911m^2 park consists of 12609m^2 of POS, the remainder is foreshore reserve and drainage basins. Therefore the cost sharing table below is based on the requirement to contribute 10% of the subdivisible area to POS only. The foreshore reserve and drainage basin area is to be ceded free of cost by the owner of Lot 51. Table 3 below summarises the contributions of land or cash in lieu required to create the Public Open Space.

Lot No.	Total Area of Lots	POS Required	Land Contribution	Cash-in-Lieu Owing
47	2.329ha *2.0279ha + Morgan Pl (3011m^2)*	0.2329ha	Nil	10%
48	2.3244ha *2.0233ha + Morgan Pl*	0.2324ha	Nil	10%
49	2.0234ha	0.2023ha	0.1719ha	1.51%
50	2.0371ha	0.2037ha	0.0915ha	5.51%
51	3.7466ha	0.3747ha	1.0013ha	Nil
Total	12.460ha	1.246ha	1.246ha	

Table 3: Contribution Schedule to Public Open Space

- Therefore the owners of Lots 47 and 48 are to pay their POS as a cash in lieu payment.
- The owner of Lot 49 is to pay the equivalent of 1.51% of their totals land area as a cash in lieu payment; and
- The owner of Lot 50 is to pay the equivalent of 5.51% of their totals land area as a cash in lieu payment; and

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- The owner of Lot 51 is to be paid the equivalent of the value of 6266m² of land at the time of subdivision as reimbursement of the additional land area required to create the family park.

All areas and dimensions are to be confirmed by detailed survey at the subdivisional stage.

8.2 Dual Use Path

Within the OPD it is proposed that a dual use path is to be constructed through the Public Open Space of the ODP linking Lancaster Road through to Morgan Road and then running east along Morgan Road. The contribution to dual use path will be appropriately determined by the proportionate area of each lot within the ODP. This is demonstrated in Table 4 below.

Lot No.	Total Area (ha)	Proportionate Contribution to Cost of Dual Use Path and Drainage Infrastructure(%)
47	2.0279ha	17.1
48	2.0233ha	17.0
49	2.0234ha	17.0
50	2.0371ha	17.2
51	3.7466ha	31.7
Total	11.8583ha	100.0

Table 4: Contribution Schedule to Dual Use Path and Drainage Infrastructure in Public Open Space.

The dual use path shall be constructed at the time of ceding the POS by the owner of Lot 51 with costs being reimbursed to this landowner as other landowners subdivide on a proportionate basis. The cost of the dual use path will increase with CPI after the construction date.

8.3 Drainage Infrastructure

It is proposed that within the ODP area on-site drainage retention and dispersal shall occur. This shall include drainage infrastructure within road reserves but also drainage retention basins within the Public Open Space reserve. Drainage infrastructure within road reserves shall be the responsibility of individual land owners and occur at the time of subdivision. Contribution of cost to drainage infrastructure within the Public Open Space reserve shall be determined via proportionate contribution of cost, as shown in Table 4 above.

Contributions shown within this cost-sharing scheme are to be reinforced by the Western Australian Planning Commission and Council. Further contributions to on-site infrastructure are to be adequately determined by the Western Australian Planning Commission at the time of subdivision.

The drainage infrastructure shall be constructed at the time of ceding the POS by the owner of Lot 51 with costs being reimbursed to this landowner as other

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landowners subdivide on a proportionate basis. The cost of constructing the drainage basins will increase with CPI after the construction date.

All areas and dimensions are to be confirmed by detailed survey at the subdivisional stage.

9.0 CONCLUSION

Urban development within the City of Albany has pressured the subject lots to be developed for residential purposes, given their ideal location and accessibility to proposed services. The proposed ODP will allow for the coordinated development of this fragmented land and create fair and equitable cost sharing arrangements.

The proposed lot layout is a simple, logical pattern that provides for the subdivision of lots with a legible road pattern centrally located Public Open Space. The ODP enables a logical extension of the residential development in the City of Albany.

The adoption of this ODP will allow for the extension of the urban front to the north of the McKail Local Structure Plan area, allowing the subject site to fully integrate with facilities and residential development occurring to the south.

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Appendix A

Engineering Report - Wood & Grieve Engineers

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WOOD & GRIEVE ENGINEERS

Lot 48 Morgan Pl, Lot 49 Morgan Rd, Lots 47, 50 and 51 Lancaster Rd, McKail Outline Development Plan Engineering Report

Provision of Civil Engineering Consultancy Services for

Harley Survey Group
Attention: Craig Pursey

19 September 2007

Prepared by Michael Prior Project Number: 19710-ALB-C
11 Duke Street, Albany, Western Australia 6330
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WOOD & GRIEVE ENGINEERS

Contents

WOOD & GRIEVE ENGINEERS

1. Background

This document has been established by Wood and Grieve Engineers at the request of Harley Survey Group, to provide engineering advice and recommendations in relation to the attached Outline Development Plan for Lot 48 Morgan Place, Lot 49 Morgan Road, Lots 47, 50 and 51 Lancaster Road, McKail, Albany (see Figure 1 – Harley Survey Group Site Plan, Drawing # 14117-02A).

This report should be read in conjunction with Harley Survey Group's Outline Development Plan Report.

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2. Topography, Soil Types and Groundwater

The site contours vary in height from approximately 54m AHD at the south western corner of Lot 47 Lancaster Road to approximately 40m AHD in the north east corner of Lot 51 Lancaster Road. The site grades quite uniformly in a gentle slope that could easily be developed as is, or with the option of filling and retaining of the proposed lots. There is a naturally occurring low lying gully / swale that runs through Lots 50 and 51 Lancaster Rd that is predicted to be damp most months of the year.

No detailed on site geotechnical works have been undertaken in establishing this engineering report, however, a limited investigation was performed by Opus International Consultants when undertaking the Site Assessment and Land Capability Report dated July 2007. As noted in the Opus report, it has been found that the in-situ soils will consist of a silty organic topsoil layer (50-400mm thick) with a varying depth of underlying silty sands above a motley clay layer. In certain pockets around the site, it is predicted that a dense organic dark silty sand and coffee rock layer may be encountered above the clay layer. This is generally a stable inert layer.

In the lower (eastern) sections of the site, it is demonstrated that the silty sand profile layer is deeper in profile (up to 2m) than what will is encountered in the higher (western) sections (generally between 100 – 400mm). The underlying clays are expected to be only moderately active, however with the separation layers of silty sands and sandy gravels, are not predicted to cause significant issues in relation to residential structures if the foundations are assessed and modified correctly.

In the areas with the underlying motley clay profiles, it is perceived that a perched water table will be encountered. This will thus require the installation of sub soil drainage infrastructure along the sides of roads and behind any constructed retaining walls to ensure control of the ground water levels.

If earthworks and retaining was to occur, the lots would need to be filled with imported clean, granular free draining sand, as the existing in-situ soils are expected to be unsuitable for cut to fill purposes.

Note that a detailed geotechnical investigation and report will need to be performed prior to detailed development design to confirm the above assumptions and provide technical advice on the in-situ soil types and profiles.

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3. Stormwater Drainage

The proposed development is to establish approximately 133 residential lots at a zoning of R20 with a couple of pockets of R30 development encompassing approximately 18 lots, resulting in 151 proposed lots in total (see Figure 2 - Harley Survey Group Site Plan, Drawing # 14117-05B).

The existing contours of the land lends itself for the construction of drainage basins / reserves to be constructed along the low lying gully area in the north eastern section (see Figure 3 – Indicative Roads, Drainage and Footpath Plan). It is perceived that these basins will be constructed so that they will mould into the surrounds via landscaping of smooth batters and allow for the continued usability of the proposed POS area.

The existing flow along the gully line would not be impacted upon by ensuring the basins allow for the continuation of the current existing flow path and volumes. However the basins will allow for the attenuation of stormwater and the collection of coarse sediment from the newly created development to pre-development levels. The naturally occurring low lying area can be planted out with wetland species which will greatly assist in the uptake and removal of nutrients created from the development. Furthermore, by utilizing the existing low lying drain, the development is encouraging on site infiltration.

The basins would be constructed to attenuate a 10yr ARI post development flow allowing the discharge of the 5yr ARI pre-development flow. From preliminary calculations, the larger (western) basin is expected to have a typical water surface area of approximately 1100m^2 (if no significant soakage is able to occur) and a total top of bund area of approximately 1500m^2. This area may be greatly reduced if the geotechnical analysis demonstrates that on-site infiltration is able to occur.

The development will be designed with a pipe network which allows for the 5 year ARI post development flow. The network will provide house connection pits for all lots, which will be designed with blue metal weep hole bases to allow as much 'in train' on site infiltration/recharge as possible.

The development will also be constructed with subsoil drainage lines running along side roads (where required) to assist with the control of groundwater.

4. Road and Footpath Networks

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A preliminary traffic study undertaken by Wood & Grieve Engineers indicates that the development will generate approximately an extra 1510 vehicles per day (vpd) when the proposal is fully developed. Based on typical traffic movement assumptions, it has been calculated that the three roads surrounding the development will have an increase in traffic volumes to the following extents:

- Morgan Pl – 570 vpd
- Morgan Rd – 590 vpd
- Lancaster Rd –850 vpd

Currently the section of Lancaster Road that fronts this proposed development is being upgraded as part of the Sanctuary development, and further more, the City of Albany are proposing to upgrade the section of Lancaster Road east of this development, back to the intersection of McGonnell Road. Upon completion of both these works, Lancaster Road will be constructed to a 7.4m wide asphalt seal, with kerbing, drainage and a dual use path. As such, there will be no further upgrade requirements for Lancaster Road.

At present, both Morgan Place and Morgan Road are constructed to a 6m wide, two coat seal standard with 1m wide shoulders and open drains. The current width of these roads appears satisfactory for the surrounding use and the predicted increased traffic volumes generated. However it is expected that these roads will be required to be upgraded to a residential standard (asphalt, kerbing, drainage and street lights) of the same current width.

As part of the development, a portion of the existing Morgan Place road reserve (which is currently 40m in width) is proposed to be closed. On examination of the existing service within the reserve, it appears that this will not require significant infrastructure re-alignments.

Due to the relatively low number of lots being developed, we would recommend the construction of a range of road sizes from 4.5m to 6m internally depending on the road reserve widths established. The roads would be to a kerbed and asphalted standard, with brick paved intersections. We would perceive that the Public Open Space area would be provided with a few parallel parking bays to allow for public usage.

We would recommend the construction of a 1.5m footpath along Morgan Place and Morgan Road for the frontage of the development and the construction of a 2.5m wide DUP through the POS and development to link to Lancaster Road.

See Figure 3 for the indicative road and footpath plan.

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5. Sewerage

The proposed development will be connected by a reticulated sewerage network.

At present, the Water Corporation are assessing the overall Albany sewerage scheme and are formulating a more up to date strategy for various major catchment areas. As such, we cannot at present confirm where this development will connect to, however, from preliminary discussions with the Water Corporation, it is expected that it will connect to either the existing network in the Sanctuary development on the southern side of Lancaster Road (directly opposite this proposed development), or to a new network at the corner of Lancaster Road and Albany Highway.

Either arrangement would require the installation of a Type 10 pump station and rising main to pump the flows to the reticulated network (see Figure 4 for the indicative proposal).

Due to anticipated low flows, preliminary calculations suggest that this development could connect to the existing network within the Sanctuary development and that the current pump station will be removed and graded out. However confirmation of this proposal would need to be sort with the Water Corporation upon formal discussions and applications.

It is expected the pump station site will encompass approximately 700m^2 and will be located adjacent the Public Open Space area.

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6. Water Reticulation

There is currently an existing 200mm CI water main on the southern side of Lancaster Road, a 58 mm AC main on Morgan Place, and a 100 mm AC main on Morgan Road.

It is expected that this development will require the installation of a new 150mm PVC main installed along Morgan Place connecting to the 200mm CI main on Lancaster Road. This would extend along Morgan Place and Morgan Road for the full frontage of the development.

Internally, the development would be serviced with 100mm PVC mains (see Figure 4 for the indicative proposal).

Confirmation of these assumptions would need to be assessed by the Water Corporation upon formal discussions and applications.

7. Power

There is existing overhead power lines along Lancaster Road for the frontage of the development. We assume that a suitable capacity connection can be established to this existing network, however, this cannot be determined until a formal request to Western Power is made.

It is likely that Western Power will require all adjacent overhead lines to be lowered as part of the development.

We would expect that at least two transformers and a switchgear will be required to be installed in Public Open Space areas to service the development.

8. Telstra

There is an existing Telstra network on Lancaster Road, Morgan Place and Morgan Road which we would expect could be used as the connection for the development.

9. AlintaGas

There is currently reticulated gas installation occurring along Lancaster Road as part of the adjacent Sanctuary subdivision. As such, it is expected that this network will be extended underneath Lancaster Road and distributed throughout the proposed development.

10. Summary

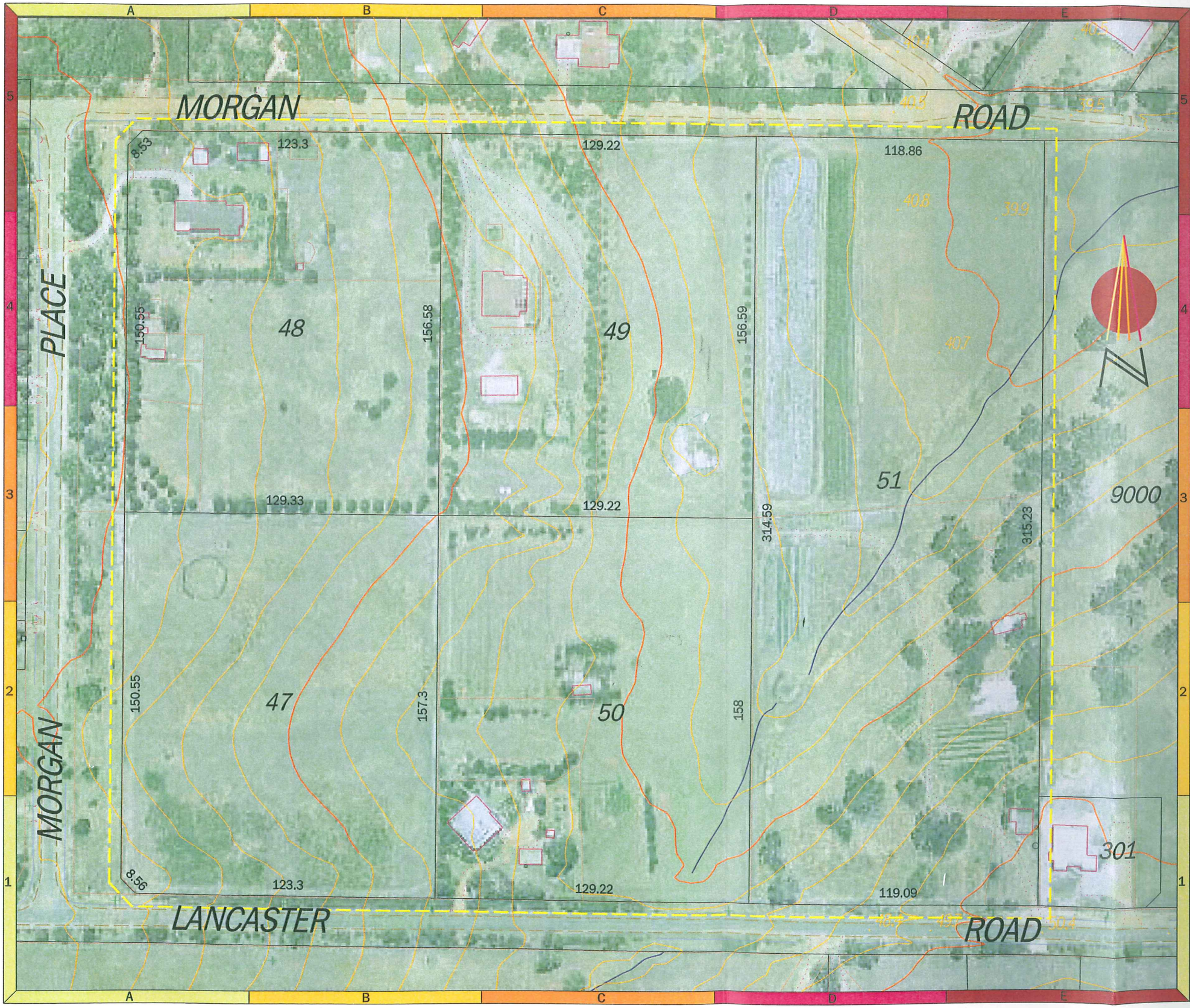
In summary, we believe that Lot 48 Morgan Place, Lot 49 Morgan Road and Lots 47, 50 and 51 Lancaster Road have the ability to be co-ordinated and developed effectively to change the currently disjointed rural area into a complimenting residential development.

Figure 1

WOOD & GRIEVE ENGINEERS

Harley Survey Group Site Plan

FIGURE 1: SITE PLAN



A	Original drawing	10-04-07
rev	details	date

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survey: COMPILED	cad file: 14117-02A.dgn
drawn: ABS 10-04-07	checked: SP 10-04-07
horiz datum: MGA94	level datum: AHD

scale at A3: 1 : 1500 — all distances are in metres: 0 20 40 60

client: WILKINSON

description: SITE PLAN
LOTS 47, 50 AND 51 LANCASTER ROAD, LOT 48 MORGAN PLACE AND LOT 49 MORGAN ROAD. McKAIL

drawing no: 14117-02A

PYRMONT HOUSE
ALBANY

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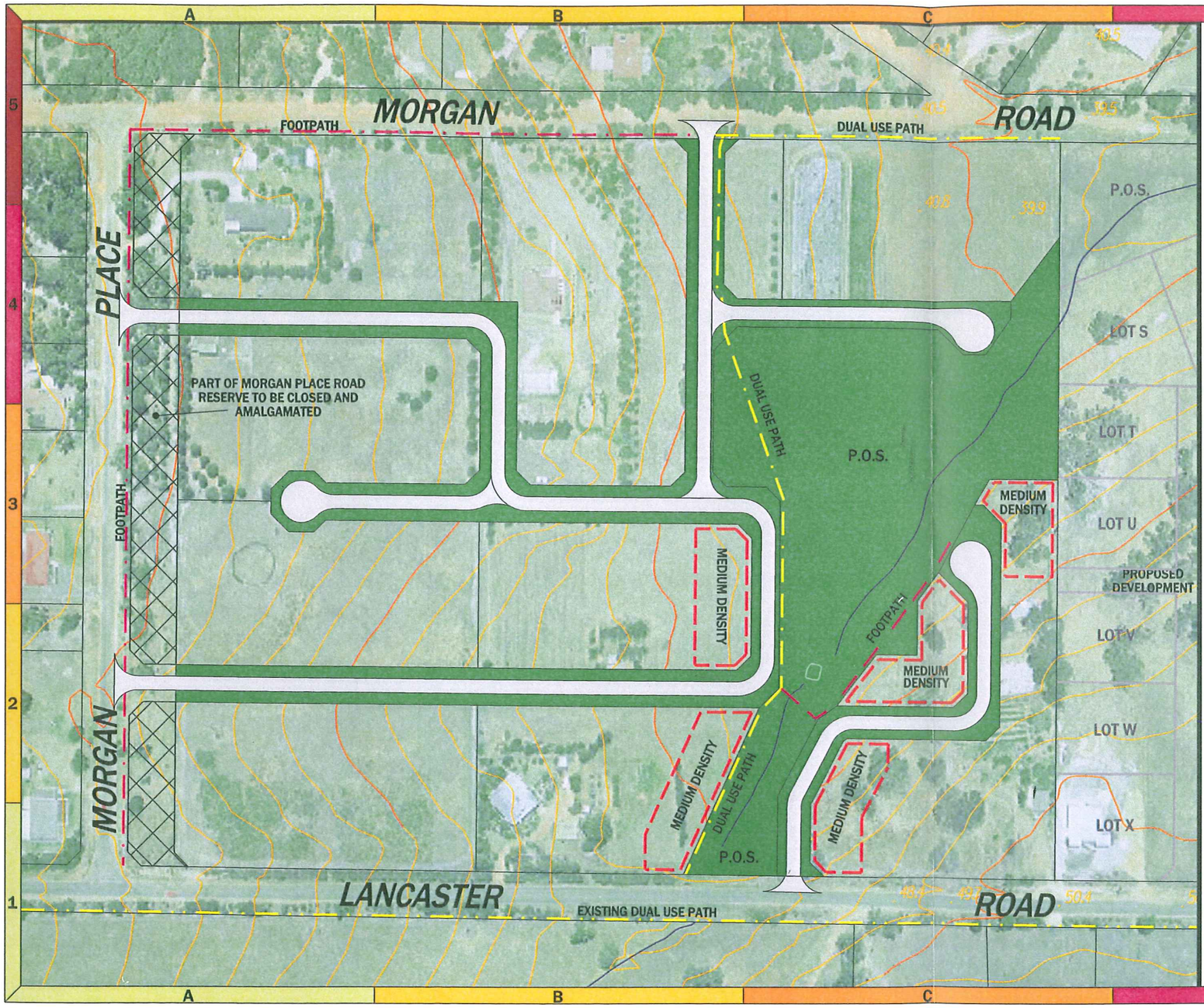
Figure 2

Outline Development Plan



Overall Aim: To provide for the coordinated development of the subject land, encompassing key planning principles and practices regarding the distribution of medium density housing, water sensitive urban design and traffic management.

-Only one additional road crossover onto Lancaster Road, which is not to be the main entry;

-10 percent Public Open Space in a central, accessible location, which is to be fully landscaped and include drainage infrastructure

-16 metre wide road reserves and 12 metre road reserves fronting Public Open Space;

-'R20' base residential density for the subject land, with 'R30' residential density adjacent to or adjoining Public Open Space;

-Development to proceed only when connection to deep sewer is established;

-Morgan Place to be narrowed, in agreement with the City of Albany, to 20 metres, the available land will be amalgamated with Lots 47 and 48 and then subdivided, resulting in land consolidation.

-The majority of drainage to be retained onsite and dispersed in accordance with water sensitive urban design principles

-Simple, uncomplicated subdivision pattern that fully utilises the opportunities and constraints of the subject land.

FIGURE 2:
OUTLINE DEVELOPMENT PLAN
MCKAIL

scale at A3 1:2000

0 20 40 60 80 100

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Figure 3

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Roads, Drainage and Footpaths Plan

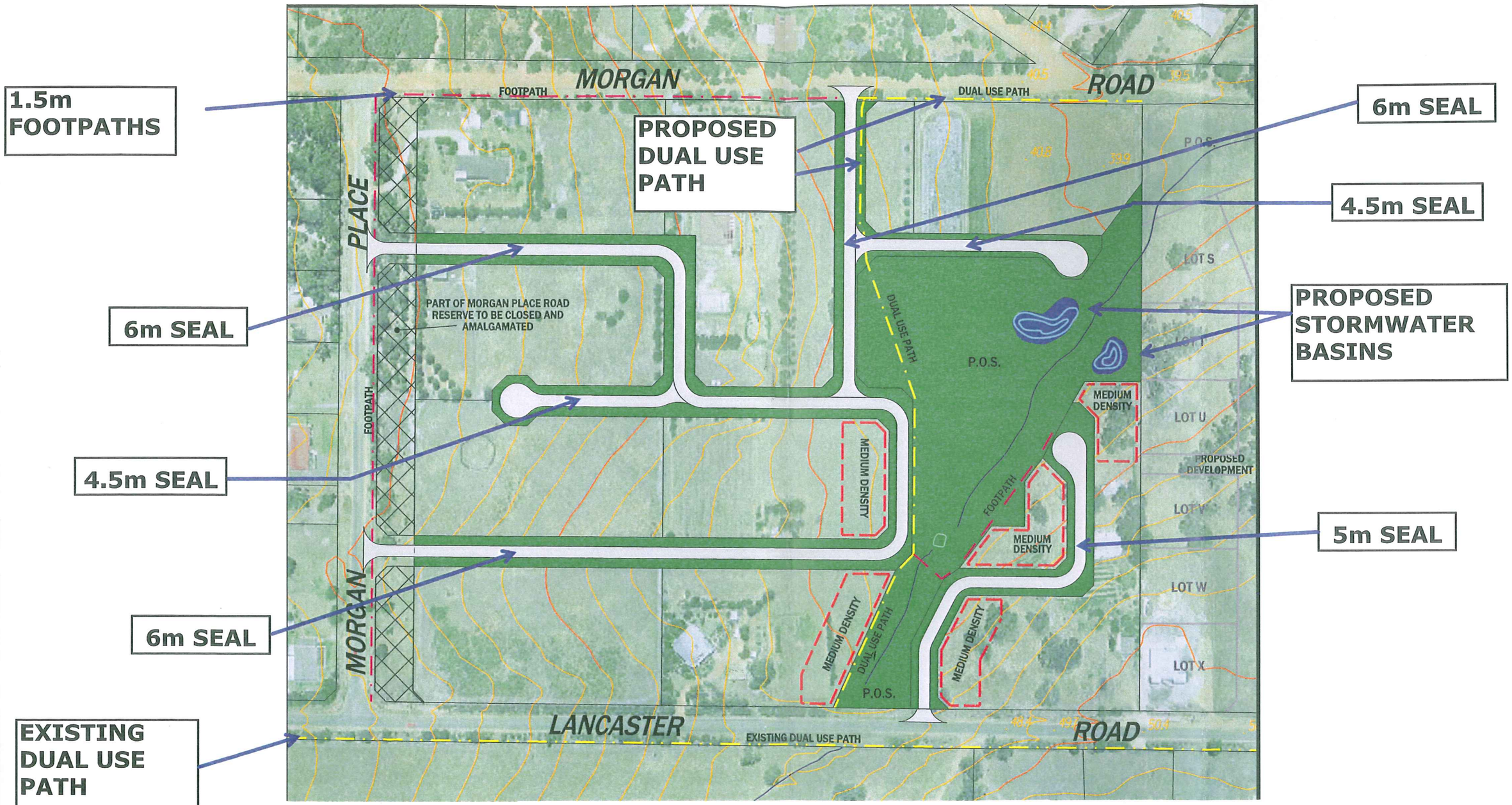

FIGURE 3 - ROADS , DRAINAGE AND FOOTPATHS PLAN

scale at A3 1:2000

0 20 40 60 80 100

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HSG Ref 14117-05D Drawn ABS 02-08-07

Figure 4

WOOD & GRIEVE ENGINEERS

Sewerage & Water Reticulation Plan

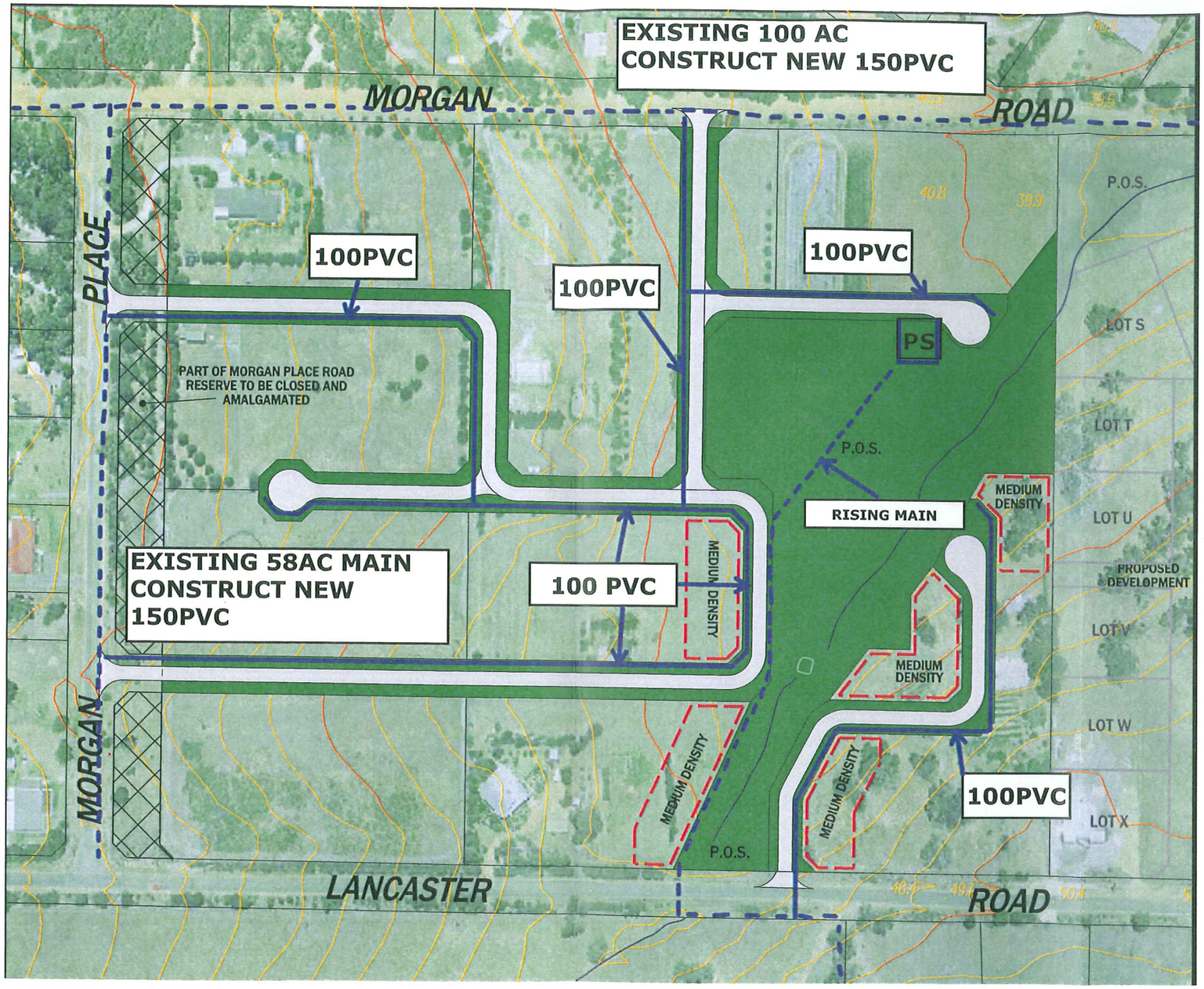

FIGURE 4

SEWERAGE & WATER RETICULATION PLAN

scale at A3 1:2000

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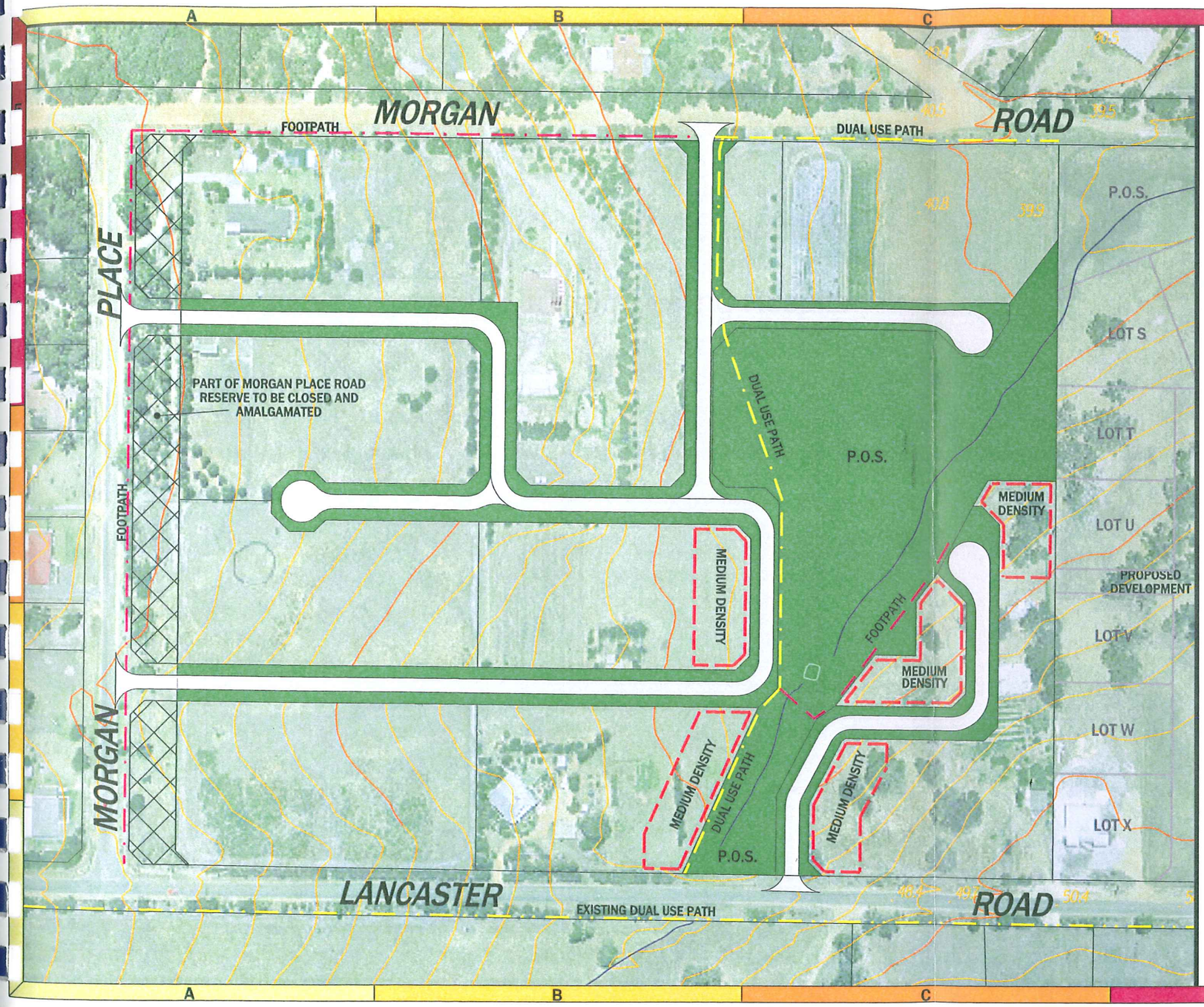
Appendix 1

Proposed Development Plan

Appendices



Overall Aim: To provide for the coordinated development of the subject land, encompassing key planning principles and practices regarding the distribution of medium density housing, water sensitive urban design and traffic management.

-Only one additional road crossover onto Lancaster Road, which is not to be the main entry;

-10 percent Public Open Space in a central, accessible location, which is to be fully landscaped and include drainage infrastructure

-16 metre wide road reserves and 12 metre road reserves fronting Public Open Space;

-'R20' base residential density for the subject land, with 'R30' residential density adjacent to or adjoining Public Open Space;

-Development to proceed only when connection to deep sewer is established;

-Morgan Place to be narrowed, in agreement with the City of Albany, to 20 metres, the available land will be amalgamated with Lots 47 and 48 and then subdivided, resulting in land consolidation.

-The majority of drainage to be retained onsite and dispersed in accordance with water sensitive urban design principles

-Simple, uncomplicated subdivision pattern that fully utilises the opportunities and constraints of the subject land.

Outline Development Plan

Lot 48 Morgan Place, Lot 49 Morgan Road, Lots 47, 50 and 51 Lancaster Road McKail

scale at A3 1:2000

0 20 40 60 80 100

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HSG Ref 14117-05D Drawn ABS 02-08-07

Appendix B

Site Assessment & Land Capability Study - Opus International Consultants

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Site Assessment and Land Capability

Morgan Rd, Morgan Pl, Lancaster Rd

Harley Survey Group

OPUS

Prepared by

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Approved by

Evan Chadfield
Manager, Albany

Date: September 2007
Reference: G:\Environmental Services\ Environmental Projects\Morgan Pl
Status: Final
Reference: Job No: WAENV052

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SITE ASSESSMENT AND LAND CAPABILITY

MORGAN PL, MORGAN RD AND LANCASTER RD

CONTENTS

APPENDICES

1 Introduction

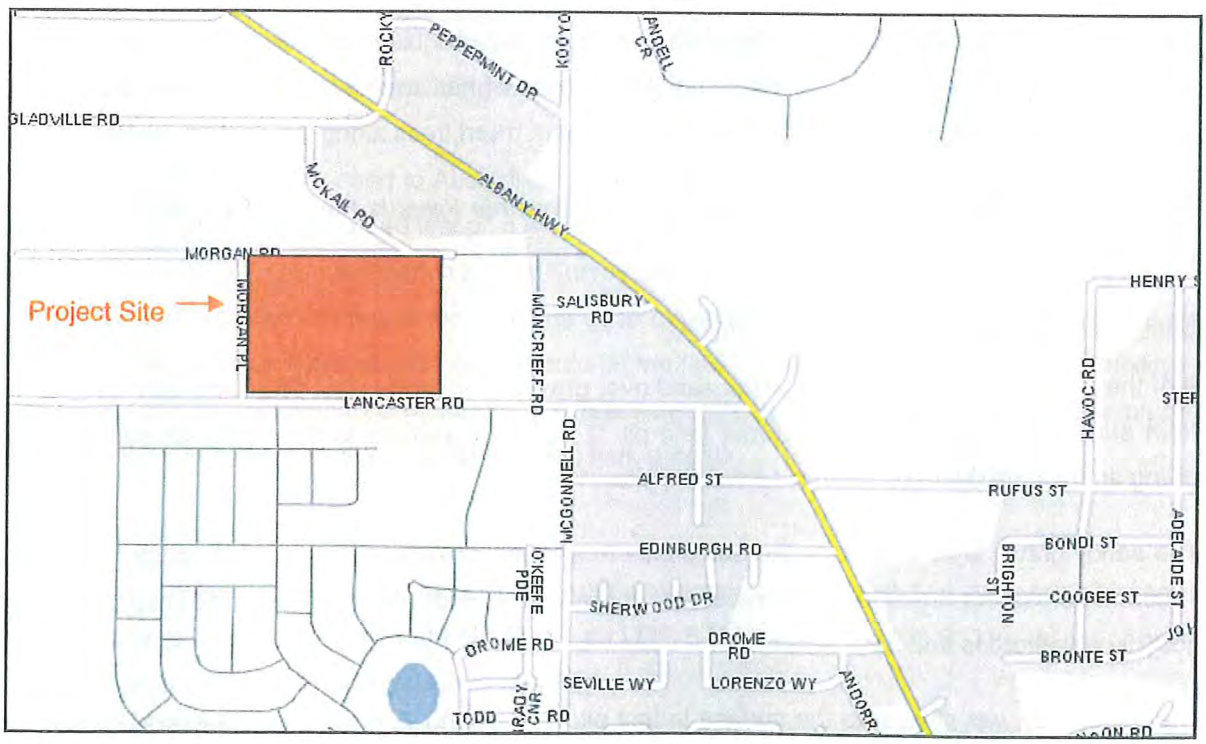
Harley Survey Group commissioned Opus Consultants to undertake a site assessment of a proposed subdivision site to determine the soil classification, soil profile and land capability across the site. The subdivision site is located on Morgan Place, Morgan Road and Lancaster Road in the suburb of McKail in Albany. This report outlines the findings of these investigations and provides recommendations with respect to soil and land capability for the proposed development.

The assessment does not give detailed consideration to planning, heritage, Aboriginal heritage and environmental issues relating to the site and its locality.

2 Locality and Site Description

The project site, lot 48 Morgan Place, lot 49 Morgan Road and lots 47, 50 and 51 Lancaster Road, is located in the suburb of McKail in Albany, Western Australia. Please refer to the location map below. Lot 48 Morgan Place, lot 49 Morgan Road and lots 47, 50 and 51 Lancaster Road cover areas of 2.02ha, 2.02ha, 2.03, 2.04ha and 3.75ha respectively. The lots form a rectangle with the northern boundary adjacent to Morgan Road, the western boundary adjacent to Morgan Place, and the southern boundary adjacent to Lancaster Road. The eastern boundary of the subject lot is bordered by private property – lot 52 Lancaster Road.. An aerial view of the lot location is presented in Appendix 1.

Locality Map



3 Development Proposal

An Outline Development Plan is proposed to coordinate development over lot 48 Morgan Place, lot 49 Morgan Road and lots 47, 50 and 51 Lancaster Road, with a total lot yield of 151 lots. The majority of lot 51 Lancaster Rd is proposed to be designated public open space with a dual use path through the centre. Please refer to Appendix 2 – Proposed Development Plan.

4 Site Assessment

Opus Consultants carried out a site inspection and conducted field testing with Albany Soil and Concrete Testing on Wednesday 27th June 2007. The site assessment included recording of site details as per Australian Standard AS/NZS 1547:2000, soil profile logging by visual classification to a depth of 2m and observing water table depths to water table below existing surface level.

A total of 10 bore pits – two pits for each lot - were drilled by mechanical auger and water depths were recorded after one hour. CBR tests were conducted on 2 soil samples, 1 from test pit 3 and 1 from test pit 7. The subject site is primarily sand with silt over gravel over clay, however there is a band of deep sand running east of centre through the site. Please refer to Appendix 2 Field Testing Results for test pit locations and field testing details.

5 Site Report

The subject site is comprised of 5 lots that form a rectangular block of land that extends in an east west direction. All 5 lots have been almost completely cleared of native vegetation, with lot 51 retaining the most amount of native vegetation in the form of some remnant marri trees along the eastern section of the lot.

The site is situated on a small ridge that slopes downwards towards the east, with lot 51 being the lowest positioned lot.

Sand over Gravel over Clay (Mapping Unit A)

6 of the 10 test pits contained a layer of sand over gravel over sandy clay. The sand with silt layer extended from surface to 50mm at its shallowest (test pit 7) and from surface to 400mm at its deepest (test pit 4), giving an average depth of 180mm across the site.

The sandy gravel layer existed in the soil profile to a depth of 760mm on average, ranging from 700mm to 1200mm across the 6 test pits. The presence of gravel soils indicate that there is the capacity of the soil to absorb phosphorous and nitrogen

The sandy clay was closest to the surface in test pits 1, 2, 3 and 7, these pits all recorded a layer of sandy clay commencing at 700mm. Test pit 8 recorded sandy clay at 800mm and test pit 9 recorded sandy clay at 1200mm.

The water table was not reached in any of the test pits containing the sand over gravel over clay soil profile.

Sand (Mapping Unit B)

The remainder of the site contained a band of deep sand with silt, as demonstrated by test pits 5, 6, 8 and 10. The sand extended to 2000mm, which is where excavation ceased. Test pits 6 and 8 contained a layer of gravelly sand at 1600 and 1300mm respectively.

The water table was reached at 900mm in test pit 5 and 1000mm in test pit 8.

Waterlogged (Mapping Unit C)

The south west corner of lot 50 contained an area of waterlogged sandy soils and the waterlogged area extended in a north east direction across lot 51. Aerial photographs indicate that this section is seasonally innunated/waterlogged. It appears that the inundated area is a drainage line flowing from the south to the north east through the lots.

6 Soil Classification

On the 27th June 2007, Opus Consultants conducted a site inspection of lot 48 Morgan Place, lot 49 Morgan Road, and lots 47, 50 and 51 Lancaster Road. 10 test pits were excavated to a depth of 2 metres. The soils recorded on site were predominantly sand over gravel over clay or deep sand containing some sandy gravel.

Californian Bearing Ratio tests were conducted on two representative samples and the results indicate that the soaked CBR at test pit 3 was 4 and for test pit 7 10.5. The results indicate that if the design of the development were to include excavation up to 1.5 metres, in depth considerations would be required to improve the sub grade particularly surrounding test pit 3.

Soils for this site have been assessed to Australian Standard 2870, 1996, Section 2 as having class 'S' at all test pit locations except at test pit 5 and test pit 8 which are classed as 'P' and class 'M' respectively. Test pits 5 and 6 fall within the P.O.S as identified in Harley Survey Group Outline Development Plan. Test pit 8 which is located to the north eastern corner of the site, has been classified as marginal class 'S' and due to some evidence of a water table at 1000mm, the area should be verified by a structural engineer for suitability as a bearing material or design of structural elements. The draining of this site will improve the classification of this site and should be considered at design stage of this development.

Drainage

The water table as above was identified at LOC 8 at 1000mm as above and LOC 5 at 900mm. Consideration for sub soil drainage would be required at LOC 8 only as LOC 5 falls within the P.O.S. The extent of any sub soil drainage should be considered in the detailed design.

7 Land Capability

This section outlines the Land Capability for the proposed subdivision development of the subject site, and is aligned to the Department of Agriculture Western Australia and State Planning Commission three step methodology for Land Capability Assessment, being:

- Land Use Requirements of the proposal,
- Land Resource Survey, and
- Land Capability Analysis

(Land Capability Assessment for Local Rural Strategies, Department of Agriculture and State Planning Commission, 1989).

This report evaluates the subject land according to Rural Residential proposed land-use (Land Capability Assessment for Local Rural Strategies, 1989). The Department of Agriculture Land Capability Assessment Guidelines assesses rural residential and urban development according to proposed lot sizes. These are described as urban development being 500m to 2000m^2, and rural residential from 1ha to 5ha. The land use requirements have been rated in view of the soil investigation, historical land use, and topography.

8 Description of Land Use Requirements

Areas of land for sub-division approval are assessed through Land Capability to analyse the sustainability of the particular activity and the environmental effects the proposed use may have on the land. This determines the attributes the land contains which can affect the proposed land use for the area. The Land Use proposed is Urban Development.

M & N Nelson, P & F Boccamazzo, E & S Klein, N & T Simon and R Wilkinson propose to develop the subject site into 151 lots with 133 lots at R20 density and 18 lots at R30 density.

This Land Capability Assessment has been assessed as per the Western Australian Planning Commission and the Department of Agriculture Guidelines for "Urban Development" assessment criteria.

The subject site is approximately 11.8ha with the approximately 10% proposed for Public Open Space. it is proposed to subdivide the lot into 149 lots and the development will not commence until connection to deep sewer is established. The majority of drainage will be retained onsite and dispersed in accordance with water sensitive urban design principles. It is proposed to create a simple uncomplicated subdivision pattern that fully utilises the opportunities and constraints of the subject land.

The assessment of the subject lot to support Urban Development includes assessing the following land capabilities ease of excavation, foundation stability, waterlogging hazard, water erosion hazard, wind erosion hazard, flood hazard, water pollution hazard, and water availability.

9 Land Capability Assessment Method

The Land Capability Assessment compares the physical requirements for a particular land use with the qualities of the land. This analysis determines the ability of the land to sustain a particular land use without resulting in significant environmental degradation. The land use that has been considered for this study area is Urban Development. This study has included analysis of the soil and landform from soil survey and environmental assessment.

The Department of Agriculture utilises a five class system of assessing land capability, these five classes rate the degree of physical limitations associated with land use and management needed for these. Please refer to Table One, below.

Table One Land Capability Classes – Dept Agriculture Western Australia

CAPABILITY CLASS	DEGREE OF LIMITATION	GENERAL DESCRIPTION
I	Very low	Areas with a very high capability for the proposed activity or use. Very few physical limitations to the specified use are present or else they are easily overcome. Risk of land degradation under the proposed use is negligible.
II	Low	Areas with a high capability for the proposed activity or use. Some physical limitations to the use do occur affecting either its productive use or the hazard of land degradation. These limitations can however, be overcome through careful planning.
III	Moderate	Areas with a fair capability for the proposed activity or use. Moderate physical limitations to the land use do occur which will significantly affect its productive use or result in moderate risk of land degradation unless careful planning and conservation measures are undertaken.
IV	High	Areas with a low capability for the proposed activity or use. There is a high degree of physical limitations which are either not easily overcome by standard development techniques or which result in a high risk of land degradation without extensive conservation requirements.
V	Very High	Areas with a very poor capability for the proposed activity or use and the severity of physical imitations is such that its use is usually prohibitive in terms of either development costs or the associated risk of land degradation.

9.1 Land Resource Characteristics

The Land Resource Characteristics have been overlaid to determine the mapping units assessed at Lot 2 Gunn Road, Albany. The mapping units were determined by the following information:

- Soil and Landscape characteristics, including texture, depth, soil profile, aspect, slope and water table; and
- Soil testing and Laboratory analysis;

The Three mapping units are defined in Table Two below.

Table Two– Mapping Units Lot 2 Gunn Road

MAP UNIT	CHARACTERISTICS
Map Unit A	Gently sloping land containing a soil profile of sand over gravel over clay
Map Unit B	Gently sloping to flat land containing a soil profile of deep sand with some gravelly sand around 1500mm
Map Unit C	Similar to Mapping Unit B, however has the potential to be water logged

The mapping units have grouped soil characteristics that shall be referred to in the Land Capability Rating procedure and have been summarised in Table Three.

Table Three Soils Summary of Final Mapping Units

Final Mapping Units	Soil Texture	Soil Depth (max)	Slope (degrees)	Soil Permeability
A	Sand/gravel/clay	≤2000mm	<15˚	Moderately drained
B	Sand	≤2000mm	<10˚	Moderate drained
C	Sand with potential for waterlogging ˚	≤2000mm	>5˚	Poorly drained

Please refer to the Test Pit Locations and Soil Profile in Appendix 2.

9.2 Qualities and limitations

The proposed land use has a set of qualities for which the Land Capability Assessment will be considered. Table Four below outlines the landscape qualities and characteristics that will be assessed within the scope of this study.

Table Four – Landscape Qualities and Limitations – Residential Component

Landscape qualities	Subclass	Landscape qualities	Subclass
Ease of excavation	x	Flood hazard	f
Foundation stability	b	Soil absorption ability	p
Water logging hazard	i	Water pollution hazard	s
Water erosion hazard	e	Water availability	g
Wind erosion hazard	w		

9.3 Land Capability Rating -Degree of Limitations Map Unit A to C

Land qualities have been assessed in terms of the degree of limitation (Tables Six to Eleven) of the proposed land-use. The limitation is then matched to what the land can support and rated on the Land Capability Map, located at the end of this Report. The limitations which affect the proposed land-use are given ratings and keys according to their Land Capability Sub-class (from Tables Four and Five).

9.3.1 Degree of Limitation – Mapping Unit A

Table Five Degree of Limitation Map Unit A – Urban Development

Degree of Limitation	Limitation	Description	Capability	Rating & Sub-class
Moderate	Ease of excavation	Moderate physical limitations – the clay may cause excavation difficulties	Residential	III – x
Moderate	Foundation stability	Moderate physical limitations	Residential	III – b
Low	Water logging hazard	Low physical limitations due to slope and clay >700mm	Residential	II – I
Moderate	Water erosion hazard	Sand over gravel over clay however slope between 10 and 15%	Residential	III – e
Very low	Wind erosion hazard	Not deemed to have inherent risks	Residential	n/a
Very low	Flood hazard	Not deemed to have inherent risks	Residential	n/a
Moderate	Soil absorption ability	Generally deep soils which contain gravel, although also contains clay	Residential	III – p
Low	Water pollution hazard	Low physical limitations plus the site is to be deep sewered	Residential	II – s
Low	Water availability	Not deemed to have inherent risks due to nature of development	Residential	n/a

Limitations Include:

- Ease of excavation – consideration should be given regarding excavating soils at the end of summer, when the clay would be at its driest and hardest;
- Foundation stability – due to clay soils being present in the soil profile at 700mm below surface level, a structural engineer should provide advice regarding footings and stability;
- Soil absorption ability – due to clay soils being present in the soil profile at 700mm below surface level there is a moderate degree of limitation, however the site is to be deep sewered; and
- Water pollution hazard – If lawns are to be fertilised, there is the potential to contaminate surface water which will flow into the drainage line that crosses lot 51.

9.3.2 Degree of Limitation – Mapping Unit B

Table Five Degree of Limitation Map Unit B – Urban Development

Degree of Limitation	Limitation	Description	Capability	Rating & Sub-class
Very low	Ease of excavation	Deep sand with silt >2m in depth	Residential	I – x
Low	Foundation stability	Deep sand with silt >2m in depth	Residential	II – b
Moderate	Water logging hazard	Sand may become saturated during heavy winter downpours	Residential	III – I
Low	Water erosion hazard	Not deemed to have inherent risks	Residential	II – e
Very low	Wind erosion hazard	Not deemed to have inherent risks	Residential	n/a
Low	Flood hazard	Not deemed to have inherent risks	Residential	n/a
Low	Soil absorption ability	Deep sands with some gravel content >2m in depth	Residential	II – p
Low	Water pollution hazard	Low physical limitations plus the site is to be deep sewered	Residential	II – s
Low	Water availability	Small dam located on lot 51 however not deemed to have inherent risks due to nature of development	Residential	II - g

Limitations include:

- Water logging hazard – effective drainage plans and works to be undertaken to stop shallow soils increasing the risk of water logging;

9.3.3 Degree of Limitation – Mapping Unit C

Table Ten Degree of Limitation Map Unit C – Rural Residential

Degree of Limitation	Limitation	Description	Capability	Rating & Sub-class
Very low	Ease of excavation	Deep sand with silt >2m in depth	Residential	I – x
Low	Foundation stability	Deep sand with silt >2m in depth	Residential	II – b
Very high	Water logging hazard	Areas of land were saturated at time of site visit in July	Residential	V – I
Low	Water erosion hazard	Not deemed to have inherent risks	Residential	II – e
Very low	Wind erosion hazard	Not deemed to have inherent risks	Residential	n/a
Low	Flood hazard	Not deemed to have inherent risks	Residential	n/a
Low	Soil absorption ability	Deep sands with some gravel content >2m in depth	Residential	II – p
Low	Water pollution hazard	Low physical limitations plus the site is to be deep sewered	Residential	II – s
Low	Water availability	Small dam located on lot 51 however not deemed to have inherent risks due to nature of development	Residential	II - g

Limitations include:

- Limitations are similar to mapping Units A and B, with the exception of the very high degree of risk of waterlogged soils. It is recommended that this area is not developed and remains as public open space.

10 Overall Land Capability Summary

The overall capability of the subject area to sustain the proposed developments is summarised within the mapping units in Table Twelve.

Table Twelve – Overall Land Capability Summary Table

Mapping Unit	Urban Development
Mapping Unit A	II
Mapping Unit B	II
Mapping Unit C	II

I = Mapping Unit capable of supporting the Land Use.

II = Mapping Unit capable of supporting the land use and limitations can be overcome by design and management inputs.

IV = Mapping Unit with a low capability of supporting the land use. There is a high degree of physical limitations.

Below is a summary of limitations from the Mapping Units:

Mapping Units A and B

- Ease of excavation – consideration should be given regarding excavating soils at the end of summer, when the clay would be at its driest and hardest;
- Foundation stability – due to clay soils being present in the soil profile at 700mm below surface level, a structural engineer should provide advice regarding footings and stability;
- Soil absorption ability – due to clay soils being present in the soil profile at 700mm below surface level there is a moderate degree of limitation, however the site is to be deep sewered;
- Water pollution hazard – If lawns are to be fertilised, there is the potential to contaminate surface water which will flow into the drainage line that crosses lot 51; and
- Water logging hazard – effective drainage plans and works to be undertaken to stop shallow soils increasing the risk of water logging.

Mapping Unit C

- Limitations are similar to mapping Units A and B, with the exception of the very high degree of risk of waterlogged soils. It is recommended that this area is not developed and remains as public open space.

11 Recommendations

The water table was reached in 2 of the 10 test pits, at levels of 900mm and 1000mm. The sandy gravel layer in the soil will assist with phosphorus and nitrogen absorption.

Opus Consultants recommends that for the subject site – lot 48 Morgan Place, lot 49 Morgan Road, lots 47, 50 and 51 Lancaster Road – to be capable of supporting Urban Development, it will be necessary to undertake planning and engineering designs, and these will need to be implemented to overcome the discussed limitations.

12 References

Land Capability Assessment for Local Rural Strategies, 1989, Department of Agriculture Western Australia.

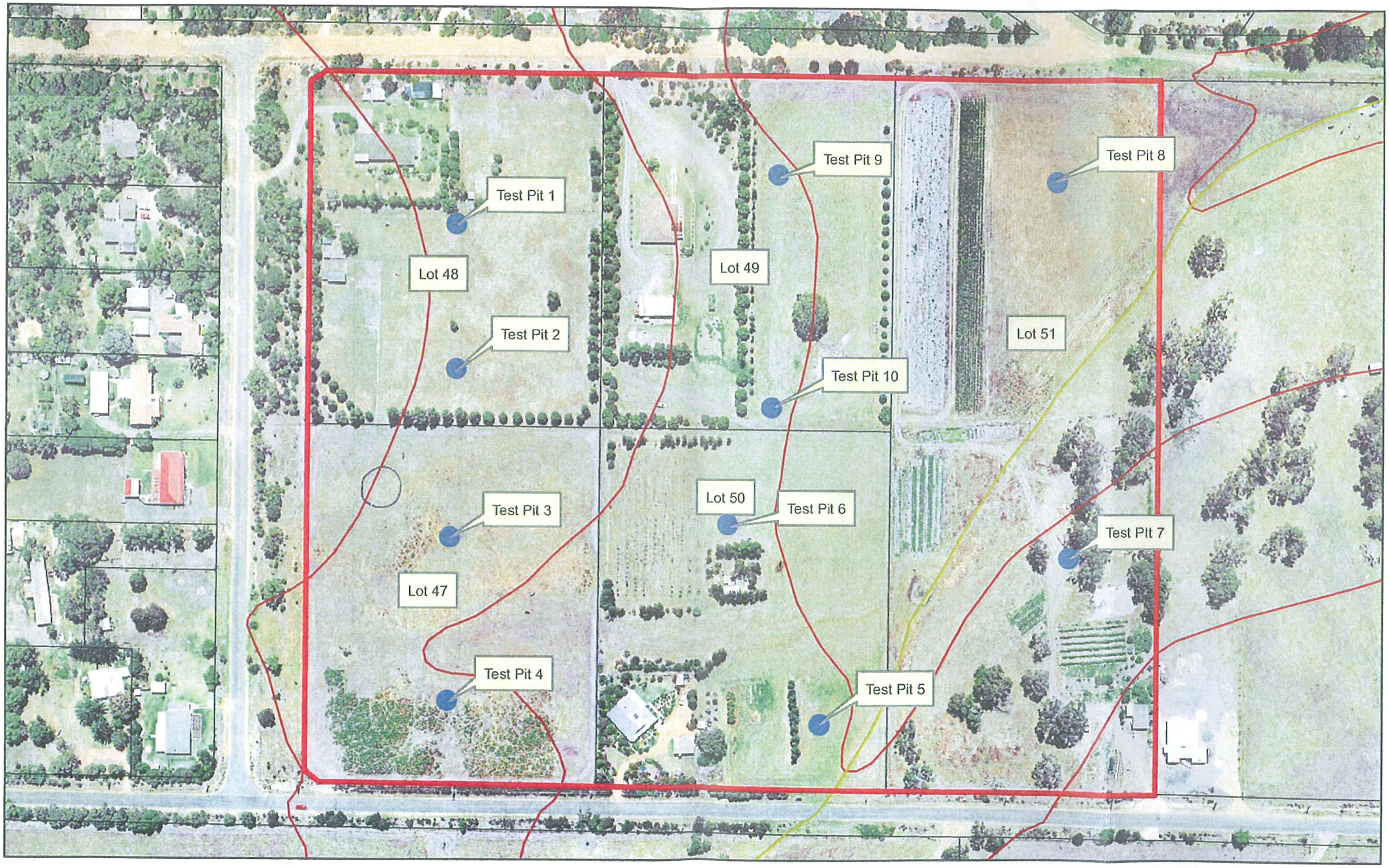
"Australian Geoscience Mapping, Map series S50-11 Part of Sheet S150-15, Mt Barker to Albany".

Appendix 2

Test Pit Locations

Field Testing Results

Lots 48 Morgan Pl, Lot 49 Morgan Rd, Lots 47, 50 & 51 Lancaster Rd, McKail
Test Pit Locations



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OPUS

Excavation Log for AS/NZS1547

Albany Soil and Concrete Testing
39 Hill Street
Ph: 0427 277 797

Opus International Consultants
PO Box 5236 Albany WA 6331
Ph: (08) 9842 6155

Client name: Harley Survey Group *Project name*: Site Assessment Morgan Rd, Morgan Pl and Lancaster Rd *Project number*: WAENV052

Site Location: Lot 48 *Logged by*: C Gough, E Huxley *Date of inspection*: 27th June 2007

Pit/borehole no: 1 *Slope*: 2 – 5% *Landform element*: east side of slight ridge *Ground cover*: paddock grasses

Surface condition: moist *Indicative drainage*: none *Surface stones*: no

Water table depth: n/a *Perched water table*: n/a *Vegetation*: originally jarrah-marri *GPS:*

Layer	Lower depth mm	Moisture condition	Colour (moist)	Field texture	Coarse fragments % volume	Structure	Modified Emerson	Soil category	Sample taken (Y/N)	Consistency	Perm-eability	Other
1	100	moist	dark grey	sand with silt	<2	single grained		2	N			
2	700	moist	dark brown	sandy gravel	20 – 50	n/a		1	N			
3	2000	wet to moist	orange brown	sandy clay	<2	n/a		5	N			

- *Describe moisture condition as: dry, moist, very moist or saturated.*
- *n/a due to bore pit being excavated by an auger*

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Client name: Harley Survey Group *Project name*: Site Assessment Morgan Rd, Morgan Pl and Lancaster Rd *Project number*: WAENV052

Site Location: Lot 48 *Logged by*: C Gough, E Huxley *Date of inspection*: 27th June 2007

Pit/borehole no: 2 *Slope*: 2 – 5% *Landform element*: east side of slight ridge *Ground cover*: paddock grasses

Surface condition: moist *Indicative drainage*: none *Surface stones*: no

Water table depth: n/a *Perched water table*: n/a *Vegetation*: originally jarrah-marri *GPS:*

Layer	Lower depth mm	Moisture condition	Colour (moist)	Field texture	Coarse fragments % volume	Structure	Modified Emerson	Soil category	Sample taken (Y/N)	Consistency	Perm-eability	Other
1	100	moist	dark grey	sand with silt	<2	single grained		2				
2	700	moist	dark brown	sandy gravel	20 – 50	n/a		1				
3	1300	moist	orange brown	sandy clay	<2	n/a		5				
4	2000	moist	red brown	sandy clay	<2	n/a		5				

- *Describe moisture condition as: dry, moist, very moist or saturated.*
- *n/a due to bore pit being excavated by an auger*

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Client name: Harley Survey Group *Project name*: Site Assessment Morgan Rd, Morgan Pl and Lancaster Rd *Project number*: WAENV052

Site Location: Lot 47 *Logged by*: C Gough, E Huxley *Date of inspection*: 27th June 2007

Pit/borehole no: 3 *Slope*: 2 – 5% *Landform element*: east side of slight ridge *Ground cover*: paddock grasses

Surface condition: moist *Indicative drainage*: none *Surface stones*: no

Water table depth: n/a *Perched water table*: n/a *Vegetation*: originally jarrah-marri *GPS:*

Layer	Lower depth mm	Moisture condition	Colour (moist)	Field texture	Coarse fragments % volume	Structure	Modified Emerson	Soil category	Sample taken (Y/N)	Consistency	Perm-eability	Other
1	100	moist	dark grey	sand with silt		<2	single grained		2			
2	700	moist	dark brown	sandy gravel		20 – 50	n/a		1			
3	1300	wet to moist	orange brown	sandy clay		<2	n/a		5			
4	2000	moist	red brown	sandy clay		<2	n/a		5			

- *Describe moisture condition as: dry, moist, very moist or saturated.*
- *n/a due to bore pit being excavated by an auger*

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Client name: Harley Survey Group

Project name: Site Assessment Morgan Rd, Morgan Pl and Lancaster Rd

Project number: WAENV052

Site Location: Lot 47

Logged by: C Gough, E Huxley

Date of inspection: 27th June 2007

Pit/borehole no: 4

Slope: 2 – 5%

Landform element: east side of slight ridge

Ground cover: paddock grasses

Surface condition: moist

Indicative drainage: none

Surface stones: no

Water table depth: n/a

Perched water table: n/a

Vegetation: originally jarrah-marri

GPS:

Layer	Lower depth mm	Moisture condition	Colour (moist)	Field texture	Coarse fragments % volume	Structure	Modified Emerson	Soil category	Sample taken (Y/N)	Consistency	Perm-eability	Other
1	100	moist	dark grey	sand with silt	<2	single grained		2				
2	400	moist	light brown grey	silty sand	<2	n/a		2				
3	800	moist	orange brown	sandy gravel	20 - 50	n/a		1				
4	2000	wet to moist	orange brown	sandy clay	<2	n/a		5				

- *Describe moisture condition as: dry, moist, very moist or saturated.*
- *n/a due to bore pit being excavated by an auger*

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Ph: (08) 9842 6155

Client name: Harley Survey Group *Project name*: Site Assessment Morgan Rd, Morgan Pl and Lancaster Rd *Project number*: WAENV052

Site Location: Lot 50 *Logged by*: C Gough, E Huxley *Date of inspection*: 27th June 2007

Pit/borehole no: 5 *Slope*: 2 – 5% *Landform element*: east side of slight ridge *Ground cover*: paddock grasses

Surface condition: moist *Indicative drainage*: none *Surface stones*: no

Water table depth: 900mm *Perched water table*: n/a *Vegetation*: originally jarrah-marri *GPS:*

Layer	Lower depth mm	Moisture condition	Colour (moist)	Field texture	Coarse fragments % volume	Structure	Modified Emerson	Soil category	Sample taken (Y/N)	Consistency	Perm-eability	Other
1	250	wet	dark grey	sand with silt	sand with silt	<2	single grained		2			
2	2000	moist	light grey	sand with silt	silty sand	<2	n/a		2			

- *Describe moisture condition as: dry, moist, very moist or saturated.*
- *n/a due to bore pit being excavated by an auger*

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Client name: Harley Survey Group *Project name*: Site Assessment Morgan Rd, Morgan Pl and Lancaster Rd *Project number*: WAENV052

Site Location: Lot 50 *Logged by*: C Gough, E Huxley *Date of inspection*: 27th June 2007

Pit/borehole no: 6 *Slope*: 2 – 5% *Landform element*: east side of slight ridge *Ground cover*: paddock grasses

Surface condition: moist *Indicative drainage*: none *Surface stones*: no

Water table depth: n/a *Perched water table*: n/a *Vegetation*: originally jarrah-marri *GPS:*

Layer	Lower depth mm	Moisture condition	Colour (moist)	Field texture	Coarse fragments % volume	Structure	Modified Emerson	Soil category	Sample taken (Y/N)	Consistency	Perm-eability	Other
1	100	moist	dark grey	sand with silt	sand with silt	<2	single grained		2			
2	1600	moist	grey	sand with silt	sand with silt	<2	n/a		2			
3	2000	moist	brown	gravely sand	gravelly sand	10 – 20	n/a		1			

- *Describe moisture condition as: dry, moist, very moist or saturated.*
- *n/a due to bore pit being excavated by an auger*

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Client name: Harley Survey Group *Project name*: Site Assessment Morgan Rd, Morgan Pl and Lancaster Rd *Project number*: WAENV052

Site Location: Lot 51 *Logged by*: C Gough, E Huxley *Date of inspection*: 27th June 2007

Pit/borehole no: 7 *Slope*: 2 – 5% *Landform element*: east side of slight ridge *Ground cover*: paddock grasses

Surface condition: moist *Indicative drainage*: none *Surface stones*: no

Water table depth: n/a *Perched water table*: n/a *Vegetation*: originally jarrah-marri *GPS:*

Layer	Lower depth mm	Moisture condition	Colour (moist)	Field texture	Coarse fragments % volume	Structure	Modified Emerson	Soil category	Sample taken (Y/N)	Consistency	Perm-eability	Other
1	50	moist	dark grey	sand with silt	<2	single grained		2				
2	500	moist	brown	sandy gravel	20 - 50	n/a		1				
3	700	moist	light brown	gravely sand	10 - 20	n/a		1				
4	1500	moist	light brown	sandy clay	<2	n/a		5				
5	2000	moist	orange brown	sandy clay minor gravel	10 - 20	n/a		5				

- *Describe moisture condition as: dry, moist, very moist or saturated.*
- *n/a due to bore pit being excavated by an auger*

Excavation Log for AS/NZS1547

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Ph: (08) 9842 6155

Client name: Harley Survey Group *Project name*: Site Assessment Morgan Rd, Morgan Pl and Lancaster Rd *Project number*: WAENV052

Site Location: Lot 51 *Logged by*: C Gough, E Huxley *Date of inspection*: 27th June 2007

Pit/borehole no: 8 *Slope*: 2 – 5% *Landform element*: east side of slight ridge *Ground cover*: paddock grasses

Surface condition: moist *Indicative drainage*: none *Surface stones*: no

Water table depth: 1000mm *Perched water table*: n/a *Vegetation*: originally jarrah-marri *GPS:*

Layer	Lower depth mm	Moisture condition	Colour (moist)	Field texture	Coarse fragments % volume	Structure	Modified Emerson	Soil category	Sample taken (Y/N)	Consistency	Perm-eability	Other
1	150	moist	dark grey	sand with silt	<2	single grained		2				
2	2000	moist	light grey	sand with silt	<2	n/a		2				

- *Describe moisture condition as: dry, moist, very moist or saturated.*
- *n/a due to bore pit being excavated by an auger*

Excavation Log for AS/NZS1547

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PO Box 5236 Albany WA 6331
Ph: (08) 9842 6155

Client name: Harley Survey Group *Project name*: Site Assessment Morgan Rd, Morgan Pl and Lancaster Rd *Project number*: WAENV052

Site Location: Lot 49 *Logged by*: C Gough, E Huxley *Date of inspection*: 27th June 2007

Pit/borehole no: 9 *Slope*: 2 – 5% *Landform element*: east side of slight ridge *Ground cover*: paddock grasses

Surface condition: moist *Indicative drainage*: none *Surface stones*: no

Water table depth: n/a *Perched water table*: n/a *Vegetation*: originally jarrah-marri *GPS:*

Layer	Lower depth mm	Moisture condition	Colour (moist)	Field texture	Coarse fragments % volume	Structure	Modified Emerson	Soil category	Sample taken (Y/N)	Consistency	Perm-eability	Other
1	100	moist	dark grey	sand with silt	<2	single grained		2				
2	350	moist	light grey	sand with silt	<2	n/a		2				
3	1200	moist	brown	sandy gravel	20 – 50	n/a		1				
4	2000	wet to moist	orange brown	sandy clay	<2	n/a		5				

- *Describe moisture condition as: dry, moist, very moist or saturated.*
- *n/a due to bore pit being excavated by an auger*

Excavation Log for AS/NZS1547

Albany Soil and Concrete Testing
39 Hill Street
Ph: 0427 277 797

Opus International Consultants
PO Box 5236 Albany WA 6331
Ph: (08) 9842 6155

Client name: Harley Survey Group *Project name*: Site Assessment Morgan Rd, Morgan Pl and Lancaster Rd *Project number*: WAENV052

Site Location: Lot 49 *Logged by*: C Gough, E Huxley *Date of inspection*: 27th June 2007

Pit/borehole no: 10 *Slope*: 2 – 5% *Landform element*: east side of slight ridge *Ground cover*: paddock grasses

Surface condition: moist *Indicative drainage*: none *Surface stones*: no

Water table depth: n/a *Perched water table*: n/a *Vegetation*: originally jarrah-marri *GPS:*

Layer	Lower depth mm	Moisture condition	Colour (moist)	Field texture	Coarse fragments % volume	Structure	Modified Emerson	Soil category	Sample taken (Y/N)	Consistency	Perm-eability	Other
1	100	moist	dark grey	sand with silt	<2	single grained		2				
2	1300	moist	light grey	sand with silt	<2	n/a		2				
3	2000	moist	brown	gravelly sand	10 – 20	n/a		1				

- *Describe moisture condition as: dry, moist, very moist or saturated.*
- *n/a due to bore pit being excavated by an auger*

Appendix 3

CBR Results

Albany Soil & Concrete Testing

39 Hill St, Albany. W.A. 6330

Phone/Fax: 08 98415309 Mobile: 0427 277797

Email: albsoil@omninet.net.au

REF: 11022 **TESTED BY:** COLIN GOUGH **DATE TESTED:** 27-07-07

CLIENT: OPUS INTERNATIONAL CONSULTANTS

PROJECT: MORGAN RD, MORGAN PLACE & LANCASTER RD, ALBANY

APPROVED BY: COLIN GOUGH **SIGNATURE:**

CALIFORNIAN BEARING RATIO OF REMOULDED SPECIMENS TEST REPORT

TMWA 141.1 CALIFORNIAN BEARING RATIO OF REMOULDED SPECIMENS			
SAMPLE ID		LOC 3 DEPTH 1300-2000mm	LOC 7 DEPTH 1500-2000mm
MAXIMUM DRY DENSITY	t./m³	1.860	1.885
OPTIMUM MOISTURE	%	15.5	12.5
TEST CONDITIONS OF SPECIMEN			
PERIOD OF SOAKING	Days	4	4
SURCHARGING OF SPECIMEN	Kg	13.2	13.2
COMPACTIVE EFFORT			
No. of blows x No. of layers x Hammer mass (kg)		20x5x4.9	20x5x4.9
TEST RESULTS			
DRY DENSITY			
SPECIMEN AT COMPACTION	t/m³	1.785	1.784
SPECIMEN AFTER SOAKING	t/m³	1.716	1.783
DRY DENSITY RATIO			
SPECIMEN AT COMPACTION	%	96.0	94.7
SPECIMEN AFTER SOAKING	%	92.2	94.6
MOISTURE CONTENT			
SPECIMEN AT COMPACTION	%	15.1	13.0
SPECIMEN AFTER SOAKING	%	19.8	16.0
Top 30mm Layer of Specimen After Penetration	%	21.5	14.4
Entire Depth of Specimen After Penetration	%	18.8	14.9
MOISTURE RATIO			
SPECIMEN AT COMPACTION	%	97.4	103.5
SPECIMEN AFTER SOAKING	%	127.8	128.2
Top 30mm Layer of Specimen After Penetration	%	138.9	115.2
Entire Depth of Specimen After Penetration	%	121.5	119.2
SPECIMEN SWELL	%	3.98	0.05
PENETRATION	Mm	5.0	5
CALIFORNIA BEARING RATIO	%	4.0	10.5

COMMENTS: SOAKED CBR

Albany Soil & Concrete Testing

39 Hill St, Albany, W.A. 5330

Phone/Fax: 08 98415309 Mob: 0427377791

Client: OPUS INTERNATIONAL CONSULTANTS

Project: MORGAN RD, MORGAN PL & LANCASTER RD, ALBANY

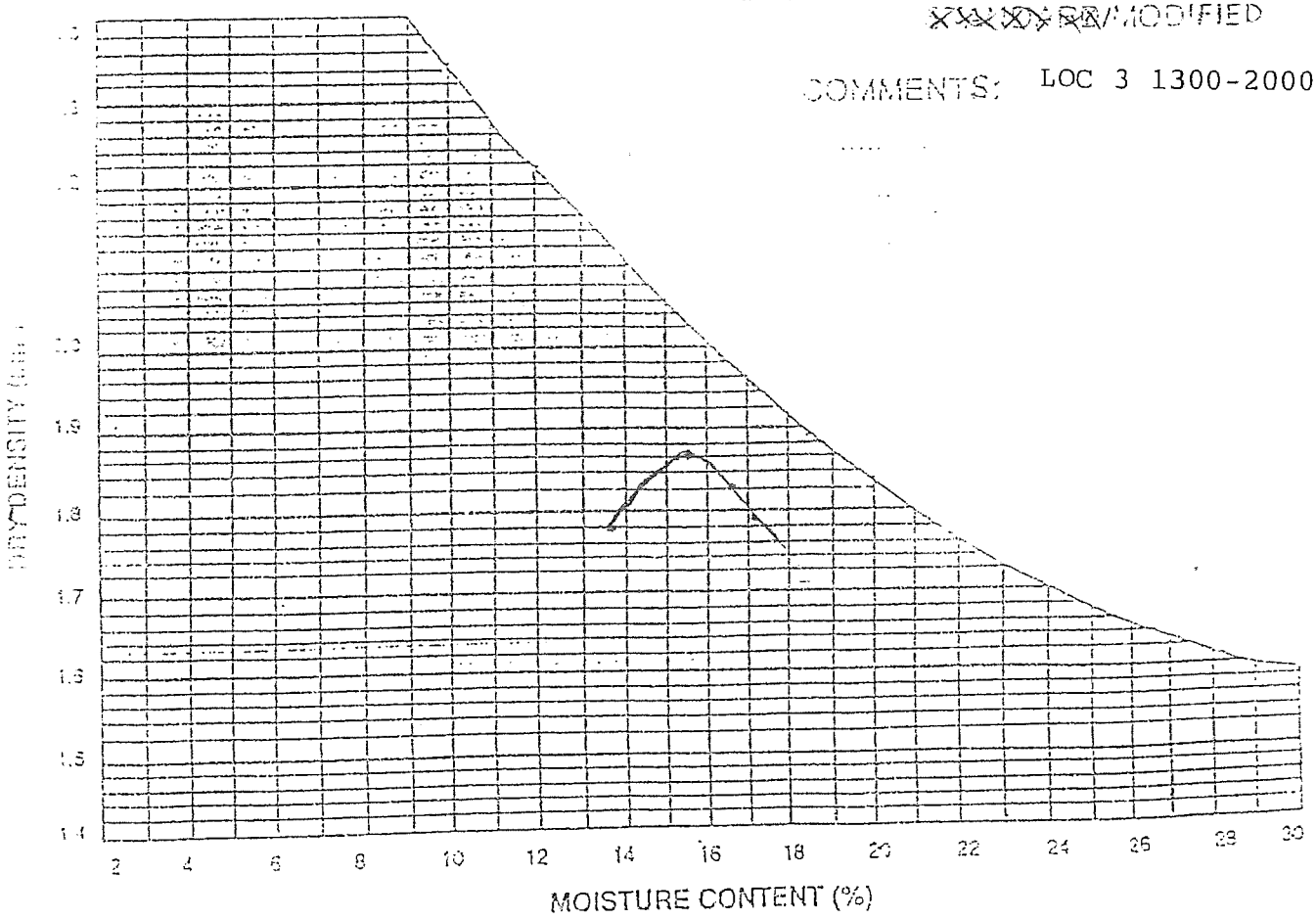
Reference No: 11022 Date Sampled: 27-06-07 Date Tested: 9-07-07

DRY DENSITY/MOISTURE CONTENT RELATIONSHIP REPORT

SOIL DESCRIPTION	RED/BROWN SANDY CLAY		
Maximum Dry Density (t/m³)	1.860	Soil Retained on 19mm sieve (%)	N/A
Optimum Moisture Content (%)	15.5	Equivalent replaced	0

METHOD USED: AS 1289 E 1.1/E 2.1 ~~XXXXX~~ RS/MODIFIED

COMMENTS: LOC 3 1300-2000mm



DRY DENSITY MOISTURE CONTENT CURVE

TESTED BY	REPORTED BY	DATE REPORTED
C GOUGH	M GOUGH	16-08-07

ASCT

Albany Soil & Concrete Testing

39 Hill St, Albany, W.A. 6330

Phone/Fax: 08 98415309 Mob: 0427377741

Client: OPUS INTERNATIONAL

Project: MORGAN RD, MORGAN PL & LANCASTER RD, ALBANY

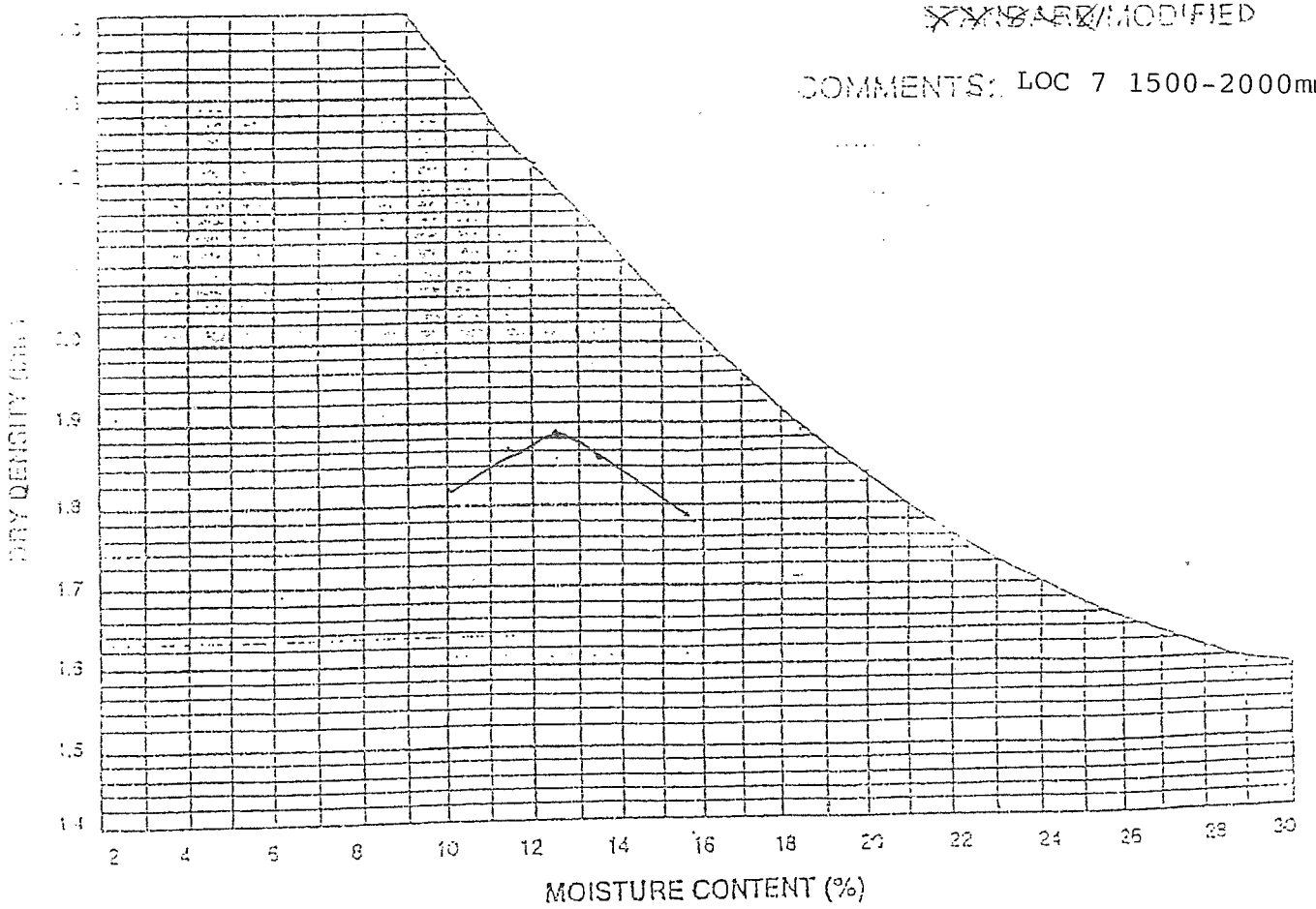
Reference No: 11022 Date Sampled: 27-06-07 Date Tested: 9-07-07

DRY DENSITY/MOISTURE CONTENT RELATIONSHIP REPORT

SOIL DESCRIPTION	ORANGE/BROWN SANDY CLAY MINOR GRAVEL		
Maximum Dry Density (t/m³)	1.885	Soil Retained on 19mm sieve (%)	N/A
Optimum Moisture Content (%)	12.5	Equivalent replaced	0

METHOD USED: AS 1289 E 1.1 & E 2.1 ~~STANDARD~~/MODIFIED

COMMENTS: LOC 7 1500-2000mm



DRY DENSITY MOISTURE CONTENT CURVE

TESTED BY C GOUGH

REPORTED BY M GOUGH

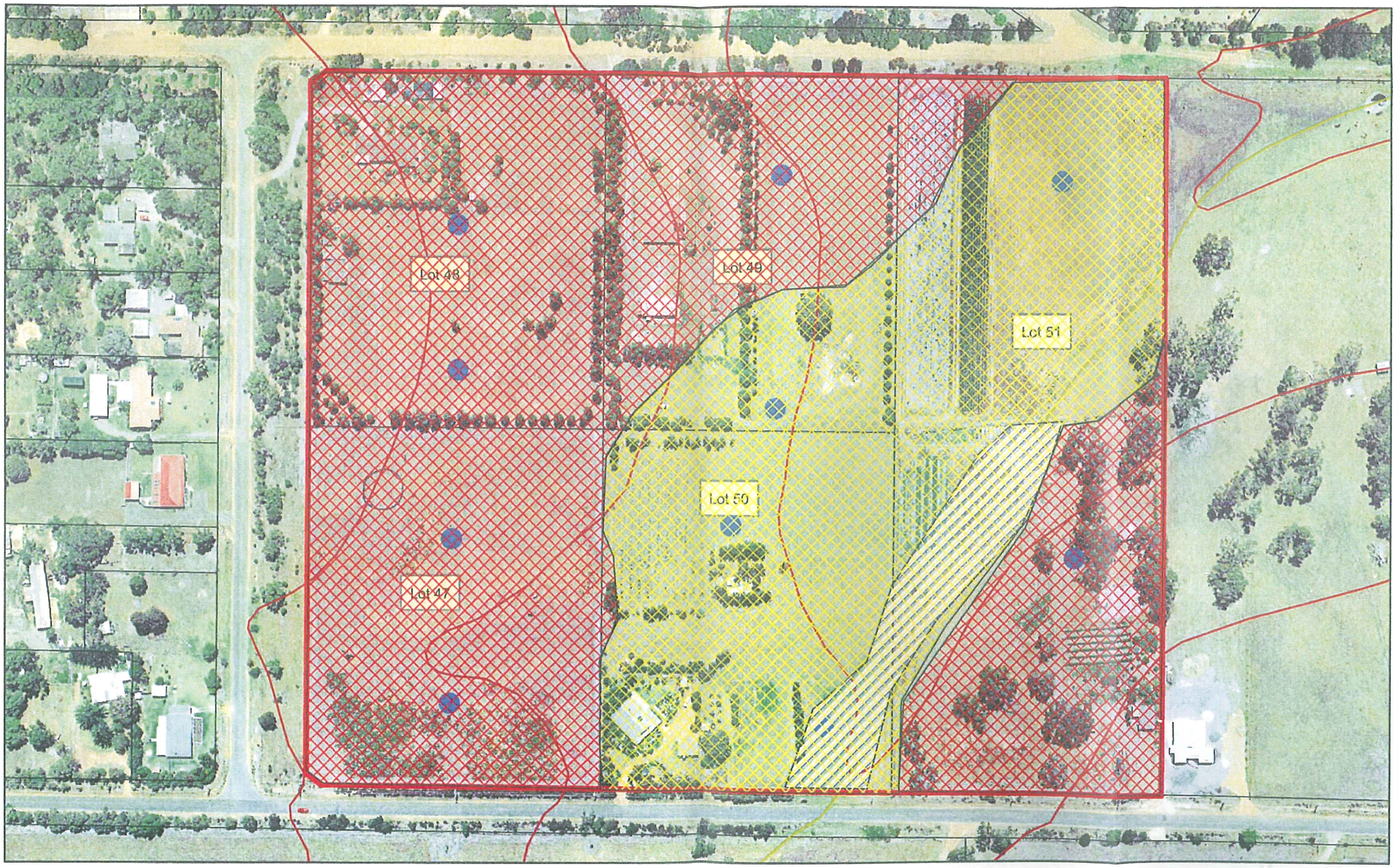
DATE REPORTED 16-08-07

ASCT

Appendix 4

Land Capability Map

Lots 48 Morgan Pl, Lot 49 Morgan Rd, Lots 47, 50 & 51 Lancaster Rd, McKail
Land Capability



N
W E
S

0 30 60 120 Meters

Mapping Area A
Mapping Area B
Mapping Area C

16/07/07 Produced by
E Huxley Opus Consultants.
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OPUS

Appendix C

Certificates of Title

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WESTERN AUSTRALIA

REGISTER NUMBER	
50/D78349	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
2	14/12/2004

RECORD OF CERTIFICATE OF TITLE

VOLUME 1891 FOLIO 307

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 50 ON DIAGRAM 78349

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

ECKARD ERICH KLEIN
SHIRLEY PHYLLIS KLEIN
BOTH OF LOT 50 LANCASTER ROAD, ALBANY
AS JOINT TENANTS

(T J037401) REGISTERED 30 SEPTEMBER 2004

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. J037402 MORTGAGE TO WESTPAC BANKING CORPORATION REGISTERED 30.9.2004.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 1891-307 (50/D78349).
PREVIOUS TITLE: 1185-706.
PROPERTY STREET ADDRESS: 96 LANCASTER RD, MCKAIL.
LOCAL GOVERNMENT AREA: CITY OF ALBANY.

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WESTERN AUSTRALIA

REGISTER NUMBER	
49/D78349	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
N/A	N/A

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

VOLUME 1891 FOLIO 306

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 49 ON DIAGRAM 78349

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

RONALD DOUGLAS WILKINSON
ERIN PATRICIA WILKINSON
BOTH OF LOT 49 MORGAN ROAD, ALBANY
AS JOINT TENANTS

(T F355397) REGISTERED 3 NOVEMBER 1993

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. F636739 MORTGAGE TO R&I BANK OF WESTERN AUSTRALIA LTD REGISTERED 8.8.1994.
2. G092305 MORTGAGE TO BANK OF WESTERN AUSTRALIA LTD REGISTERED 5.2.1996.
3. *H754780 CAVEAT BY CITY OF ALBANY LODGED 22.5.2001.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 1891-306 (49/D78349).
PREVIOUS TITLE: 1185-706.
PROPERTY STREET ADDRESS: 61 MORGAN RD, MCKAIL.
LOCAL GOVERNMENT AREA: CITY OF ALBANY.

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WESTERN AUSTRALIA

REGISTER NUMBER	
48/D78349	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
2	29/9/2006

RECORD OF CERTIFICATE OF TITLE

VOLUME 1891 FOLIO 305

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 48 ON DIAGRAM 78349

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

JOHN ANTHONY BOCCAMAZZO
IN 1/4 SHARE
PASQUALE BOCCAMAZZO
IN 1/4 SHARE
ANNETTE OVENS
IN 1/4 SHARE
LYNETTE ROBINSON
IN 1/4 SHARE
ALL OF 7 BALLARD HEIGHTS, ALBANY
AS TENANTS IN COMMON

(T J869108) REGISTERED 10 AUGUST 2006

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
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Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	1891-305 (48/D78349).
PREVIOUS TITLE:	1185-706.
PROPERTY STREET ADDRESS:	26 MORGAN PL, MCKAIL.
LOCAL GOVERNMENT AREA:	CITY OF ALBANY.

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WESTERN AUSTRALIA

REGISTER NUMBER	
47/D78349	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
N/A	N/A

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

VOLUME 1891 FOLIO 304

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 47 ON DIAGRAM 78349

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

MARK JAMES NELSON
NANCY FIONA NELSON
BOTH OF 180 FRENCHMAN BAY ROAD, ALBANY
AS JOINT TENANTS

(T K003028) REGISTERED 28 NOVEMBER 2006

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. *K003029 MORTGAGE TO NATIONAL AUSTRALIA BANK LTD REGISTERED 28.11.2006.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 1891-304 (47/D78349).
PREVIOUS TITLE: 1185-706.
PROPERTY STREET ADDRESS: 116 LANCASTER RD, MCKAIL.
LOCAL GOVERNMENT AREA: CITY OF ALBANY.

NOTE 1: DUPLICATE CERTIFICATE OF TITLE NOT ISSUED AS REQUESTED BY DEALING K3028

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WESTERN AUSTRALIA

REGISTER NUMBER	
51/D78349	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
N/A	N/A

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

VOLUME 1891 FOLIO 308

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 51 ON DIAGRAM 78349

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

NUNZIATA ANGELA LEMBO OF CARE OF WHITE STAR HOTEL, STIRLING TERRACE, ALBANY
(T G042305) REGISTERED 30 NOVEMBER 1995

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. G042306 MORTGAGE TO NATIONAL AUSTRALIA BANK LTD REGISTERED 30.11.1995.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	1891-308 (51/D78349).
PREVIOUS TITLE:	1185-706.
PROPERTY STREET ADDRESS:	74 LANCASTER RD, MCKAIL.
LOCAL GOVERNMENT AREA:	CITY OF ALBANY.

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