



Assessment Report

for the
ENVIRONMENTAL IMPACT STATEMENT
Buckland Park Residential Development
Proposal





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Department of Planning and Local Government

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1 INTRODUCTION

1.1 SUMMARY

This Assessment Report (AR), prepared by the Minister for Urban Development & Planning, assesses the environmental, social and economic impacts of a proposal by Walker Corporation to develop land in Buckland Park into residential allotments, roads, shopping and community facilities. The proposed development is located approximately 32 kilometres north of the Adelaide Central Business District (CBD), adjoining the western side of Port Wakefield Road (Highway 1), opposite Virginia. The final population when the proposed development is finished will be approximately 33 000 people.

The development is proposed to be undertaken in several stages over a 25 year period. The development will be based on a Master Plan accommodating approximately 12,000 residential allotments, and allotments for the schools, centres, parks, employment and mixed use precincts and road network necessary to support the housing that will be built on those residential allotments. The proposal is for a land division of the whole development into super allotments, which will be subdivided again over time as the proposal is implemented. This initially includes the land division of super lot 1 (Stage 1) into 614 allotments, a neighbourhood centre site, new public roads, public reserves and balance lots. The proposal also includes the establishment and operation of a display village, containing 32 residential allotments, located adjacent to the neighbourhood centre.

This Assessment Report is intended to be a ‘stand alone’ document, but the detailed information on which it is based is contained in the proponent’s Environmental Impact Statement (EIS) released on 4 May 2009, submissions on the EIS, and responses to submissions in the proponent’s Response Document (RD) dated October 2009, plus 5 supplementary letters. This AR also relies on information, comments and advice provided by relevant South Australian Government agencies and additional information (including minor modifications to the proposal) provided by the proponent which is appended to the released Response Document.

The proponent is the Walker Corporation Pty Ltd (Walker Corporation). They are developers of residential, commercial, retail and industrial projects across Australia. In South Australia they are presently undertaking another residential development in Mt Barker called Bluestone, and an industrial development at Salisbury, called Vicinity.

The proponent’s objectives for the proposed development are to increase the supply of housing allotments in Adelaide and provide sustainable physical and social infrastructure.

The assessment process is detailed in the next section of this Assessment Report.

1.2 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

Environmental Impact Assessment (EIA) is a process of identifying the potential social, environmental and economic impacts of a proposal and of identifying appropriate measures that may be taken to minimise any impacts. The main purpose of EIA is to inform decision-makers of the likely effects of a proposal before any decisions are made. EIA also allows the community to make submissions on a proposal.

The specific EIA procedures for Major Developments or Projects in South Australia are prescribed in Sections 46 to Section 48 of the *Development Act 1993* (the Act).

Outlined below is a summary of the steps in the EIA process followed by the Walker Corporation:

1.2.1 Major Development Declaration

The proposal is for a large, comprehensive residential development. This bears no relationship to a previous rural living project proposed on the site in 2003. The current proposal is the subject of a revision to the 2003 declaration made on 4 January 2007. It was further amended on 12 June 2008, to include an additional 500 hectares close to Port Wakefield Road, and development including:

- Land division into more than one allotment including ancillary works.
- Establishment and operation of shopping centre of up to 8,000m² of gross leasable floor area and associated community uses, including any related ancillary development including signage.
- A display village including any related development, including signage.

1.2.2 Level of Assessment and Guidelines

Following the Minister's declaration, the Walker Corporation lodged an application, for referral to the Development Assessment Commission (DAC). Under the Major Development process, the DAC has responsibility for determining the level of assessment that should apply to the proposed development and to set Guidelines for an Environmental Impact Statement (EIS), a Public Environment Report (PER) or a Development Report (DR).

To assist in the preparation of Guidelines and set the level of assessment for the Walker Corporation, the DAC sought advice from the Environment Protection Authority (EPA), the Department for Environment and Heritage (DEH) in relation to the Dolphin Sanctuary, as well as other State Agencies with expertise in environmental, social and economic matters.

On 10 August 2007 the DAC determined the proposal would be subject to the processes and procedures of an Environmental Impact Statement (EIS), as prescribed in section 46B of the *Development Act 1993* and finalised the Guidelines. Amended Guidelines (taking into account an extended project area) were publicly released on 16 September 2008. Pursuant to Section 46B of the Act, the proponent must comply with the DAC's Guidelines when preparing the EIS.

1.2.3 EIS Public Exhibition and Response Document

The proponent prepared the EIS in response to the Guidelines and submitted it to the Minister on 20 March 2009 for approval to release the document for public exhibition. The EIS was placed on public exhibition from 4 May 2009 until 15 June 2009, during which time submissions were invited from the public and relevant Government Agencies.

On 13 May 2009 a statutory public meeting was held at the Virginia Horticulture Centre to describe the project and provide advice on the Major Development process including how to make a submission.

Forty three submissions were received during the public exhibition period, with a number of late submissions received after 15 June 2009 which were accepted.

The EIS was provided for download from the Department of Planning and Local Government's (DPLG) internet site. Copies of the document were also available for viewing at DPLG, the Conservation Council, the Virginia Horticulture Centre and the City of Playford offices. To make the submissions process quicker and easier, DPLG established a specific email address to accept submissions from the public, in addition to the traditional lodgement

of submissions via mail. The City of Playford also held their own meeting (independent of the statutory process by the Department of Planning and Local Government) to assist residents interested in making a submission on the proposal. The notes from this meeting were recorded and provided as part of the submission made by the City of Playford.

Notification of the exhibition period was made through advertisements in *The Advertiser* (9 May 2009), the *Messenger – News Review* and *The Bunyip* (both on 13 May 2009).

1.2.4 Response Document

Following the public exhibition period, the proponent lodged a Response Document in October 2009. After the Response Document the Proponent provided further information support to the proposal. Pursuant to Section 48B of the Act, the Minister may permit a proponent to vary an application and any associated documents provided the relevant proposed development remains within the ambit of the EIS. The variations to the project were considered to be minor and within the ambit of the EIS.

1.2.5 Assessment Report

Pursuant to Section 46B(9) of the Act, the Minister, in preparing this AR, has taken into account the proponent's EIS, public and Government Agency submissions; the proponent's Response to these submissions, and other matters the Minister considered appropriate.

1.2.6 Decision

This AR provides advice to the Governor, who is the final decision-maker on the proposed development. Pursuant to Section 48(5) of the Act, when making a decision on the proposed development, the Governor must have regard to the provisions of the appropriate Development Plan and Regulations (so far as they are relevant), the Building Rules (if relevant), the Planning Strategy, the objects, general environmental duty and relevant environment protection policies under the *Environment Protection Act 1993* (if the development involves a prescribed activity of environmental significance), the proponent's EIS/Response Document (and additional information provided) and the Minister's AR and any other matters considered relevant by the Governor. Pursuant to Section 48(7) of the Act, the Governor may also specify any conditions that should be complied with if a development authorisation is granted.

1.2.7 Structure of this Assessment

Sections 2 and 3 of this Assessment Report provide a summary of nature of the proposal and the existing environment where it is proposed. Section 4 provides an outline of relevant legislation and policy that has provided the framework, as well as providing an indication of further approvals and permits that would be required, should the Major Development be approved. Section 5 provides a summary of feedback from consultation activities undertaken by the Walker Corporation and the Department of Planning and Local Government. The core part of the assessment can be found in section 6, which examines the potential impacts on the environment, communities and the economy. Section 7 has conclusions and Section 8 has recommendations. The Appendix contains figures referred to in the body of the report which are maps and concept illustrations of the proposed development.

2 THE PROPOSED DEVELOPMENT

2.1 THE SITE

According to the information provided by the proponent, the site has been predominantly used for agriculture and horticulture since European occupation. According to the proponent the site measures approximately 1,340 ha and is 6 km across from the south west to north east. There is a small Crown Land allotment, which has been excluded from the development.

There are areas of remnant native vegetation and Thompson Creek passes through the southern portion of the proposed site. The Gawler River is the border of the northern part of the site. Most of the site is flat and the site levels are lower towards the bottom half the site.

2.2 THE LOCALITY

The Buckland Park site is within the City of Playford and is bounded by the Gawler River, Port Wakefield Road, horticulture and grazing land and the Cheetham Salt Pans. It is approximately 32 km from the Adelaide CBD and the nearest town is Virginia. The nearest regional shopping/community centres are Salisbury and Elizabeth.

2.3 NATURE OF THE PROPOSAL

2.3.1 Summary of Proposal

The proposal is for a master planned community of up to 12,000 residential allotments. The EIS considers the proposal in five residential stages, with detailed land division design provided for Stage 1 of the development. Planning projections for the timing of Stages 2 to 5 have been prepared to inform the proposal's planning, however these will be subject to variation, depending on demand. The proponent is seeking approval for the following components:

- Land division, super lots which include an indicative layout for stage 2-5 land division stages, employment lands, recreation/water management and transport infrastructure areas.
- Stage 1 land division (which is 'Super Lot 1' under the land division application) which measures 63.23 ha and which is to be divided into 614 residential allotments. A school site, neighbourhood centre site, display village and community facilities are also to be provided
- Works and activities associated with the development – includes infrastructure such as roads, traffic management, footpaths, bicycle paths, stormwater/flood management systems, effluent treatment, water supply and gas/power/communication networks
- Construction and operation of the Stage 1 neighbourhood centre, with associated landscaping and sales office and display centre.
- Construction and operation of the display village.

The Proponent has submitted drawings showing the main elements of the proposal, which inform the super lot and Stage 1 land division plans. These include the road hierarchy, bus routes, biodiversity and open space areas, neighbourhood centres, the district centre, storm/flood water management and land use plans – both for the Master Plan and Stage 1. Plans are provided for the Stage 1 neighbourhood centre and ancillary sales and display office, and the display village.

However, as this plan is not 'development' as defined under the *Development Act 1993*. Hence the Minister for Urban Development and Planning is considering a rezoning to deal with the Master Plan.

2.3.2 Stage 1

Stage 1 includes a neighbourhood centre and a display village. The display village will have allotments for 32 houses. The neighbourhood centre may consist of a small supermarket, a community space and specialty shops, as well as a sales and display centre for the project, car parking and children's playground (Response Document Section 1.3).

The works and activities associated with the Stage 1 subdivision includes street signs, footpaths and associated signage. It also includes stormwater and flood management systems and effluent treatment. Utilities will also be required (gas, power and telecommunication networks). To facilitate Stage 1, part of Legoe Road is proposed to be closed and be replaced with a new alignment. Other new roads will be provided within the subdivision. Figure 1 is an illustration of Stage 1 which reflects changes from the EIS.

2.3.3 Master Plan

According to the Master Plan, and the proposal drawings and documents, the development includes the following aspects:

- A land division for approximately 12,000 allotments, with a range of densities
- Roads – hierarchy of roads ranging from collector roads to a main entry boulevard.
- One district centre, four neighbourhood centres and local centres
- Mixed use/employment/commercial precincts
- Stormwater/floodwater management systems
- Open space provision
- Centrally located sites for four primary schools and two secondary schools
- Sensitive land uses have been separated from existing non residential areas in the locality

Figure 2 is an illustration of the revised Master Plan which reflects changes from the EIS.

2.3.4 Proponent's Response to Submissions

The proponent's Response Document (Section 5.2) states that as a result of feedback from submissions (particularly neighbouring properties and the City of Playford) the following changes have been made to Stage 1 of proposal:

- Small reserves on Legoe Road were removed and the land incorporated into allotments or road reserves. The City of Playford raised issues about the ongoing future costs of maintaining small reserves.
- Design changes were made to two culs-de-sac proposed to make them compliant with the City of Playford's Land Division Requirements 2008.
- A neighbour (SA Potatoes) requested consideration in the design to retain the potential to develop their own neighbouring land. A road reserve has been provided.
- A setback for the allotments adjoining SA Potatoes has been created. A 15 metre wide easement has been proposed at the back of properties adjoining the SA Potatoes property.
- A road reserve 20 metres wide has been created to create a setback from a neighbouring property.

The amendments have reduced the number of allotments proposed in Stage 1 from 616 allotments to 614 allotments.

As part of the EIS, public submission and Government Agency feedback process, the following changes have been made to the Master Plan:

- Super Lots – The Super Lots for the whole site were adjusted to align with roads/infrastructure. A new plan was provided showing the 5 stages of development then three other lots for recreation areas, water management and land put aside for a future grade separation crossing over Port Wakefield Road.
- Economic, social and planning - Adjusting the relationship between the neighbourhood centres, employment areas and open space/pedestrian/bicycle/road networks.
- Biodiversity - The open space areas were adjusted after research and feedback on the site's flora and fauna. In particular, the areas of river red gums were incorporated into open space. Adjustments were made to incorporate native vegetation into open space and stormwater channels in the southern portion of the site. Adjustments have been made to the residential area in the western portion of the land to take into account replacement plantings. A buffer has been created between the Cheetham Salt Pans and the residential areas in the south west of the proposal.
- Groundwater and potential urban salinity - Residential neighbourhoods have been removed from a portion of the site's south and south west to reduce the impact on the water table in relation to potential urban salinity. These locations have high ground water table levels.
- Potential Acid Sulfate Soils –Parts of the development site to the south and south west have been removed from residential development. These areas have been incorporated into open space.
- Topographical – The lowest parts of the site are mainly within the open space areas. These are areas which may be potentially impacted by tidal surge associated with any sea level rise. The redesign of the Master Plan has minimised the residential areas which will require fill to meet the 4.00m AHD finished site level.
- Sustainability – Residential neighbourhoods have been removed from the south western portion of the site to maximise the capture of stormwater for reuse.
- Local – Residential streets were removed from the southern portion of the site closest to Jeffries Soils and will be incorporated into landscaped open space. A buffer of 1.7 km from the Jeffries Soils site is required based on odour modelling.

3 EXISTING ENVIRONMENT

3.1 PHYSICAL SETTING

The EIS provides a description of the physical setting of the proposal. It is described as being approximately 1,340 hectares used primarily for low intensity agriculture and horticulture since European occupation. There are areas of remnant vegetation on parts of the site, particularly along the Gawler River to the South of the site. The highest point of the site in the north eastern portion is approximately 10-12 m AHD. The lowest towards the Thompson Outfall Channel sits at approximately 2-3 m AHD (EIS Section 5.1.1)

The site contains public roads, some of which are sealed and others unmade and/or inaccessible because of gates and fencing on properties.

The EIS acknowledges the Kaurna people as the traditional owners of the land. There are three previously reported Aboriginal Heritage sites, and field work as part of recent investigations on the site identified six more sites. There is more detail on the proposed compliance with the *Aboriginal Heritage Act 1988* in Section 4.8.1 of this document.

The European history of the Buckland Park area mostly relates to agricultural/horticultural properties. There are no items or buildings of interest in the development area (EIS Section 4.12). The Buckland Park Estate is located across the Gawler River to the north of the proposed development site.

3.2 GENERAL CLIMATE

The existing climate in Buckland Park is representative of the Adelaide Plains, a Mediterranean climate with cool winters and hot, dry summers. The average annual rainfall is 442 mm. (EIS Section 5.7)

3.3 GEOLOGY AND HYDROGEOLOGY

The geology of the site varies from the west to the east across the site. The investigations for the EIS found that the topsoil was clayey or sandy clay. In the south west portion of the development site the saline groundwater has a greater impact on the soil profiles. The vegetation in this lower lying land tends to be salt tolerant vegetation (EIS Section 5.1.1)

3.4 TERRESTRIAL AND COASTAL ECOLOGY

The proposed development site is between 2.5 and 3 km from the shoreline. The Cheetham salt pans and farming land separate the site from the coastal ecological environment. The surveys found that that the coastal and marine ecosystems support a variety of flora and fauna. The coastal environment, however, has been impacted by the Cheetham salt pans and agricultural activities (EIS Section 5.4).

3.5 EXISTING INFRASTRUCTURE

The existing infrastructure in Buckland Park reflects its current agricultural/horticultural land uses. There are existing electricity substations at Virginia, Angle Vale and Bolivar. The Virginia electricity substation is the closest. EPIC Energy has a gas main to the east of the site, and there is a gas gate station in the site's vicinity. In relation to wastewater and water there is the Bolivar Waste Water Treatment Plant and the Little Para Water Treatment Plant. The site presently has limited stormwater infrastructure and no flood water infrastructure. Within the development site most roads are unmade and not publically accessible due to

locked gates and fences. The No.900 bus runs between Virginia and Elizabeth and Salisbury, once in the morning and once in the evening.

3.6 SURROUNDING LAND ISSUES

Surrounding land uses are mostly horticultural and productive and non productive agriculture. There are very few buildings or houses. The SA Shooting Park is to the south of the site. Jeffries Soils is also to the south. Windamere Farm estate adjoins the western boundary and another pastoral property adjoins on the other side of the Gawler River. The Cheetham salt pans are located to the south west of the development site. (EIS Chapter 4)

3.7 EXISTING SOCIAL ENVIRONMENT

The Response Document includes some local statistics from the 2006 Census for the State Statistical Suburb of Buckland Park. This information was not provided in the EIS, the analysis was on 'comparative suburbs' for the development once it has been completed.

Comparative areas were used in the social characteristics of the EIS, and it has looked at the population on three different levels:

- The Adelaide urban area (as defined by the Adelaide Statistical Division in the 2006 Census)
- The Playford (c) Local Government Area (approximate of the City of Playford for the 2006 Census)
- Six comparison suburbs – Andrews Farm, Blakeview, Burton, Craigmore, Hewett and Mawson Lakes

The characteristics of the comparison suburbs were provided as indicative of what the community at Buckland Park may eventually be like.

3.8 SOCIAL DEMOGRAPHICS

Information from the 2006 Census indicates that Buckland Park had a low density of people indicative of the horticultural/agricultural uses of the site (250 people over an area of 62.8 square kilometres for the Suburb). The main employment for the population at the 2006 Census reflected the land use, mainly horticultural/agricultural industries. At the time of the Census almost 50% of the population spoke a language other than English at home. (ABS 2006 Census)

There are no community service providers in Buckland Park and it does not have public transport. There are community uses like the SA Shooting Park. The nearest local shops and health services are located in Virginia. Primary school aged children have the option of attending Virginia Primary School and there are buses available to the area for students to attend Gawler High School. Non government schools run buses to the Virginia region based on demand.

3.9 EXISTING ECONOMY

The EIS concluded that regional employment opportunities are within Port Adelaide, Gillman, Dry Creek, Cavan, LeFevre Peninsula, Edinburgh Parks and Kingsford Estate. The comparison suburbs used from the 2006 Census indicate there are a high proportion of people working in the manufacturing industry. There are also new employment precincts planned for Playford and Blakeview (EIS Section 4.3.2). The new Australian Defence Force Battalion moving to Edinburgh is already having an impact on housing demand in the region.

From within the site studies undertaken for the EIS estimated the total farm gate value of production as being \$786,000 for the financial year 2007/2008. This estimation was done by

talking to the landowners in Buckland Park (EIS Section 4.3.2). The seasonal/crop rotation nature of crops means production can vary year to year.

4 CONFORMITY WITH LEGISLATION AND POLICIES

Section 48(5) of the *Development Act, 1993*, requires that, before the Governor considers a proposal that has been declared a Major Development, the Governor must have regard to, amongst other things, the provisions of the appropriate Development Plan and the Regulations (so far as they are relevant) and the Planning Strategy. Other matters considered relevant by the Governor can also be taken into account.

The Crown Solicitor has advised that in respect of applications being assessed as Major Developments under the *Development Act 1993*, the appropriate Development Plan and Planning Strategy are those current at the time of the decision. Section 53 of the *Development Act, 1993*, does not apply to the Major Development.

4.1 DEVELOPMENT PLAN

The proposed Buckland Park residential community is located within the City of Playford local government area. The proposal comprises two zones under the Playford (City) Development Plan (consolidated on 18 June 2009), namely the Horticulture (West) Zone and MOSS (Recreation) Zone as identified on Maps Play/3 and Play/4. The subject site is also contained within the Gawler River Flood Plan Policy Area 1 (Maps Play/23 and Play/24) and a number of Council Wide Objectives are considered relevant to the proposal. An assessment of the proposal against the relevant provisions of the Development Plan is provided below.

4.1.1 Horticulture (West) Zone

The primary intent of the Horticulture (West) Zone is to retain land for horticultural purposes including market gardens, greenhouses, hydroponics, vineyards, orchards and pasture. The zone takes advantage of proximity to produce markets, major transport routes and labour supply.

Opportunities for value adding businesses, such as packing sheds, cold storage facilities and small scale processing facilities are also supported in the zone. The Development Plan seeks to preserve and enhance the rural character and existing areas of biodiversity within the zone and does not support conversion to residential/rural living activities. Industrial, commercial or retail development not associated with horticulture or related industries are also not supported within the zone.

The principles of development control encourage the provision of appropriate physical infrastructure, vehicle access, stormwater management and waste disposal, preservation of native and remnant vegetation, water courses and flood mitigation measures.

The proposal is not consistent with the intent of the current zone which supports rural activity.

It is noted a substantial glass house enterprise will remain on the site, should the proposal be approved. It has been incorporated into one of the Master Plan's employment precincts to facilitate its retention, and is shown as part Lot 73 on the Superlot Land Division plan.

However in the context of the region, the value of the site for horticultural production is considered to be of 'lower value', suitable for hydroponic greenhouse production, as identified in the South Australian Government's *Development of Horticulture Industries on the Adelaide Plains - A Blueprint for 2030* (July 2007) (Blueprint for Horticulture). As such the loss of the land for residential purposes is not considered significant.

Importantly the operations of surrounding horticultural uses are to be appropriately accommodated and appropriate buffers are to be provided to existing horticultural uses.

Commitments 84 and 85 provided in the proponent's RD require detailed land division plans (for stages 2, 3, 4 and 5) to be submitted to PIRSA for their consideration of buffers to adjoining horticultural activities. Furthermore, the plans for these stages would be required to address the requirements of the EPA's *Guidelines for Separation Distances 2007* when creating residential allotments. The AR supports these commitments. In relation to Stage 1, should the project be approved, the AR recommends that a condition be imposed which requires a 40 m buffer to the adjoining SA Potatoes land on the southern boundary.

It is considered the extension of major infrastructure for water, sewer, electricity and transport to the proposed Buckland Park residential community would have benefits for any potential expansion of the horticultural industry on the Adelaide Plains. Further, increases in the local population could provide employment opportunities to sustain an expanded horticultural industry in the region.

In the context of the lesser value of the land for agricultural purposes and the potential benefits the proposed development has to support the expansion of the horticultural industry, as well as the proponent's commitments to provide appropriate buffers to existing horticulture, the AR concludes that, on balance, merit has been demonstrated to support non-compliance with the zone.

If approved, it is proposed that a Development Plan Amendment (DPA) process be undertaken to establish complementary zoning and policies commensurate with the approved land uses.

4.1.2 MOSS (Recreation) Zone and Metropolitan Open Space System (MOSS) Policy

The primary intent of the MOSS (Recreation) Zone and associated MOSS Policy is to provide for the establishment of a regional open space network, which provides a linear open space for a range of public and private recreational activities, including integrated cycle and walking paths. The zone specifically seeks to protect the character and scenic amenity of the Gawler River and to protect and enhance the riparian zone. Significantly, land along the Gawler River is to be kept free of buildings and structures, except for uses of a special institutional nature. Notably structures of this nature are not to be located within 100m of the river. Further, the Gawler River 100 year Average Interval Flood Plain is to be kept free of development which could impede the flow of floodwaters.

Development control provisions seek to ensure that development does not result in:

- Pollution of the Gawler River;
- Unnecessary loss or damage of native vegetation;
- Erosion;
- Creation of dust;
- Noise disturbance;
- The introduction or increase in the number of pest plants or vermin;
- Reduction in the hydraulic capacity of the Gawler River;
- Landslip or landslide; or
- Damage to Aboriginal sites, objects or remains.

Although detailed subdivision planning has not been undertaken for the Super Lots that abut the Gawler River (part Lots 32, 53 and 30) this AR accepts the Proponent's RD and Master Plan proposals to provide open space along the Gawler River. This open space is proposed for passive and active recreational facilities, and the incorporation of stormwater and flood management systems are in accordance with the outcomes sought for the MOSS (Recreation) Zone.

In this regard, the proponent's commitments in the RD are supported, including:

- incorporating the Gawler River corridor, and associated areas of river red gums into the open space area;
- ensuring that clearing is minimized;
- locating lower density residential areas adjacent to the river corridor, and
- a commitment to achieving a significant environmental benefit.

Notably further approvals would be required to develop and subdivide the site (beyond Stage 1) in accordance with an approved conceptual framework shown in the Master Plan, should the Governor approve the current application. In this regard, the AR considers that an amended Playford (City) Development Plan would be an appropriate statutory mechanism to regulate future approvals over later stages of the development. Given the proposed timing of the stages that abut the river (generally beyond 2032), there is little sense in prescribing detailed conditions at this point beyond providing for appropriate buffer widths to the river. This approach allows for the Development Plan to be amended from time to time reflecting current best practice for stormwater, flood management and environmental protection.

4.1.3 Gawler River Flood Plain Policy Area 1

The Gawler River Flood Plain Policy Area identifies three levels of 'Hazard Zones' which relate to different degrees of flood hazard and covers the majority of the proposed development site. Stage 1, as well as future stages of the development would be required to introduce engineered storm and flood water management to the site.

4.1.4 Council Wide Objectives

The Buckland Park Master Plan proposes a range of different land uses. Accordingly, a number of Council Wide Objectives from the Playford (City) Development Plan are considered relevant for consideration in this AR, including:

General

- Form of Development
- Land Division
- Transportation (movement of people and goods)
- Public Utilities

Land Use

- Residential development
- Centres and shops
- Community facilities
- Rural development
- Country townships

Environmental

- Catchment water management
- Stormwater management
- Conservation
- Public open space
- General Objectives

Form of Development

The Playford (City) Development Plan seeks to manage orderly growth, in which living, recreation, shopping, community, business, employment, and modes of transport are

integrated, rationally distributed and meet community needs, while making optimum use of key infrastructure and services. Underpinning orderly growth is the protection of life and property from flooding and the prevention of development that could lead to a potential hazard in the event of a major flood.

To achieve these objectives, development is envisaged in accordance with the Playford Structure Plan (Overlay Map 1). Consistent with the zoning for the site, the Structure Plan currently earmarks the proposed site for 'Horticulture' and 'Open Space' purposes.

Although the proposed development is not consistent with that envisaged in the current Playford Structure Plan, it does demonstrate certain attributes that could contribute to the orderly development of the local government area, including the site's proximity to employment nodes (including the relocation of the Australian Defence Force 7RAR Battalion to Edinburgh) and major transport routes (including the Northern Expressway).

As recognised in the EIS, and provided for in the Master Plan, the proposed development provides the framework for key infrastructure and service provision for an ultimate population of 33,000 residents (including community, education, retail, recreational and employment precincts). This number of residents would attract State and local services and infrastructure, in a region currently undersupplied, and support the viability of private sector services and businesses in the region.

Land Division

The Playford (City) Development Plan seeks to ensure that appropriate land is divided into allotments in an orderly and economic manner, taking into account the cost of providing essential services. The division of land should not be haphazard or premature and should consider physical constraints, the need to preserve resources and the need to retain appropriate and useable open space.

Relevant Principles of Development Control sought by the Development Plan include:

- The provision of safe and convenient vehicle access;
- Conveniently accessible community facilities;
- Where land has frontage to the Gawler River, a reserve of at least 100m, measured from the centre of the river should be provided;
- Land affected by a 1 in 100 year flood should be kept free from development;
- Opportunities for storing, treating and retrieving stormwater run-off for subsequent use should be utilized; and
- Stormwater runoff directed to the Gawler River should first be filtered by wetlands located along the river.

The proposal involves the division of the site into 8 Super Lots and the division of proposed Super lot 1 into 614 allotments for housing, new public roads, school site, neighbourhood centre and public open space.

In response to issues raised by Playford Council and the adjoining SA Potatoes, amendments were made to the Stage 1 design, which reduced the yield from 616 to 614 allotments. Changes requested by Council included design modification to some local roads to ensure compliance with the City of Playford's *Land Division Requirements 2008*, and the removal of 2 small unusable reserves on Legoe Road. At the request of SA Potatoes, a link has been provided between their site and the proposed road network. As referred earlier, a condition is recommended that requires a 40m buffer on the shared boundary with SA Potatoes to separate the land uses and not constrain the adjoining agricultural activities.

The City of Playford does not support the location of the neighbourhood centre and considers that it should be more central within the land division. In the context of the broader Master Plan, and in particular the location of the proposed District Centre, the AR considers the proposed neighbourhood centre is appropriately located and could benefit from co-location with the larger centre, should it remain. As an interim measure and from a convenience point of view all residents entering Stage 1 would be required to drive/walk/cycle past the neighbourhood centre when entering and leaving Buckland Park.

The AR considers the land division design of Stage 1 is appropriate when considered in the broader context of the Buckland Park Master Plan, provided local design and construction standards are met.

Transportation (Movement of People and Goods)

The Playford (City) Development Plan seeks to ensure a comprehensive, integrated and efficient, public and private transport system that accommodates different modes of transport. Compatibility between land uses and transport systems is sought to protect amenity (minimising noise and air pollution), and provide adequate access and maximise safety.

The EIS indicates that the Master Plan has been designed to accommodate the provision of a transport system that links residential precincts with Buckland Park's schools, mixed use and employment precincts and centres (refer Figure 12.1 from the EIS). The EIS also acknowledges the importance of providing transport access beyond the site to external school, shopping and commercial facilities and the rail service to the Adelaide CBD.

The AR considers that the proposed development (including Stage 1) can meet the transportation objectives of the Development Plan, provided appropriate detailed designs for roads, intersections, pedestrian and cycle networks are prepared with each future stage in accordance with the framework set by Master Plan, including the following drawings - Proposed Road Hierarchy (1 April 2009), 'Proposed Bus Route Strategy 2031' (1 April 2009), 'Buckland Park Pedestrian and Cycle Network' (22 September 2009).

Public Utilities

The primary objective of the Public Utilities Policy is to achieve economy in the provision of public services. The EIS indicates that the proposal's scale, Master Plan and staging plan facilitates the orderly development of Buckland Park over 25 years. The ability to plan for the implementation and funding of infrastructure assets prior to the proposals commencement facilitates the timely and economic provision of public services as the community grows. The EIS and RD provide plans and projected timing for the provision of utilities, and this is summarised in the Infrastructure Schedule annexed to the proponent's letter of 18 November 2009.

The AR considers that public utilities can be delivered in a timely and economic manner provided an infrastructure agreement is negotiated and agreed with the proponent prior to commencement of Stage 1. An infrastructure agreement is a useful mechanism for large master planned developments where a development plan does not contemplate the proposed development, and which requires considerable front end investment in infrastructure.

The agreement can provide for the infrastructure (including community infrastructure) to be provided at the Proponent's costs or provided by the State/Council at a cost to the Proponent or a mix of both. This AR proposes that final design and costing of infrastructure be a reserved matter in any approval.

4.1.5 Land Use Objectives

Residential Development

The Playford (City) Development Plan seeks a compact urban form where urban growth is met primarily through regeneration and renewal of established suburbs. However, when demand dictates, development of appropriate greenfield land is supported, provided development:

- Is integrated and cohesive;
- Movement patterns and open space links are coordinated;
- Early provision of conveniently located community, shopping and public transport services; and
- Protection of significant eco-systems and cultural or natural features, including watercourses and indigenous vegetation.

Detailed Principles of Development Control prescribe detailed design outcomes/standards for residential development. These detailed standards would apply as future approvals for Stages 2 – 5 of the Master Plan are sought. Playford Council has undertaken an assessment of Stage 1 and suggested conditions in relation to the subdivision design.

The AR considers that the development can meet the outcomes sought for greenfield development in the Development Plan.

4.1.6 Centres, Community Facilities, Rural Development and Country Townships

Centres and Shops

The Playford (City) Development Plan seeks the development of integrated centres, which provide a range of facilities within a hierarchy based on function, so that each type of centre provides a proportion of the total community requirements for goods and services. The development of new centres should be of a size and type that would not lead to the deterioration of any existing centre zone or shopping area, and should be located in designated centre zones.

The proposed development envisages a primary catchment of approximate 33,000 people. This level of population could support what has been proposed in the Master Plan, being one district centre, three neighbourhood centres and local centres as required. The EIS indicates that the centres hierarchy has been based on the broad principles described in the *Planning Strategy for Metropolitan Adelaide* (December 2007).

The AR considers there is sufficient merit to support a hierarchy of centres within the Buckland Park site. Importantly, future approvals would be required for the detailed planning of each centre, at which point the range of goods and services proposed for each centre could be considered in the regional context, including the impact on existing facilities. The AR supports the conceptual proposal for a temporary Neighbourhood centre to be developed as part of Stage 1 to ensure the first residents of Buckland Park have convenient access to local level goods and services.

Community Facilities

The primary objective of the Community Facilities Policy is to provide the early provision of community facilities in new communities. The AR considers this can be achieved under the framework provided by the proposed development including commitments made by the proponent, provision of a community centre and funding for a community worker and community bus.

Rural Development

The objectives and principles of development control sought for rural development includes the retention of rural areas for agricultural and pastoral purposes. Similar to the assessment undertaken against the Horticulture (West) Zone, the AR considers sufficient merit has been demonstrated to depart from the objectives sought by the Development Plan.

Country Townships

The Playford (City) Development Plan seeks to protect the individual identities of the country townships of Angle Vale, One Tree Hill and Virginia by reinforcing a sharp contrast between townships and the surrounding rural areas. The AR does not consider the proposed Buckland Park master planned community to be a 'country township' as envisaged under the Development Plan. Country townships by their nature are small scale, contained communities with relatively low population numbers. Accordingly, the AR considers the proposal to be consistent with the Development Plan in relation to country township policies.

4.1.7 Environmental Objectives

Catchment Water Management

The Playford (City) Development Plan seeks to protect the quality and quantity of South Australia's surface and underground water, including

- Minimizing the generation of waste;
- Management and rehabilitation of watercourses to improve water quality and flow, and the natural values and ecological functions of the watercourse;
- Protection from erosion, pollution and habitat destruction; and
- Protection and enhancement of native vegetation bordering watercourses and floodplains.

The EIS indicates that site planning and engineering design can effectively respond to these provisions.

4.1.8 Stormwater Management

The Playford (City) Development Plan seeks to protect watercourses and land uses from the impact of stormwater. Development should:

- Prevent the discharge or deposit of stormwater directly into any waters.
- Incorporate stormwater management techniques to contain the quality, velocity, variability and quality of run-off, as well as encouraging reuse.
- Incorporate water sensitive urban design to assist in the sustainable use of water.
- Prevent erosion and stormwater pollution during and after construction.

The EIS indicates that detailed planning of future stages would be guided by the Master Plan, which accommodates a structure of storm and flood water management channels and detention basins.

4.1.9 Conservation

The Playford (City) Development Plan seeks to conserve, preserve or enhance scenically attractive areas, including the retention of native vegetation. To achieve this, land division and buildings should be sited to minimize native vegetation clearing, and building designs are encouraged to make efficient use of natural light and energy.

The EIS indicates that approximately 256 hectares (19%) of the 1,340 hectare site contains flora and fauna of some significance. Of this, approximately 180.3 hectares (13%) would be

included in the proposed open space areas (after rehabilitation and embellishment works are complete), should the project be approved. Due to the nature of the proposal, vegetation clearing is unavoidable within the residential areas, in the order of approximately 75.7 hectares (6%). Notably the proponent indicates there are no vegetation or habitat issues associated with Stage 1.

The proponent has committed to the following design principles to guide the detailed planning and design of stages 2 – 5.

Protection of vegetation during construction, and rehabilitation after construction;

- Retention of trees in parks and road reserves;
- Incorporation of trees within larger allotments;
- The location of buffers to particular areas, as road reserves, or within retained areas hatched in green on the drawings; and
- Retention of significant remnant communities and the Gawler River corridor protected within open space or MOSS zones under the Playford (City) Development Plan.

The AR considers the proponent’s commitments in relation to vegetation management, including the preparation and implementation of Vegetation Management Plans and the process set out to calculate Significant Environmental Benefits, accords with the conservation objectives of the Development Plan.

4.1.10 Public Open Space

The Playford (City) Development Plan seeks the establishment of useable and convenient public parks, recreation areas and linear open space linkages. Preservation and enhancement of the amenity of the Gawler River and land within a 100m of the river is sought for the protection of native flora and fauna habitats and to provide for passive and active recreation. Public open space in new developments should be provided in key locations of a size in excess of 5000m², so as to be useable for active recreational pursuits.

The EIS indicates that detailed design of open space areas would be undertaken for all future stages within the framework provided by the Master Plan. The detailed layout for Stage 1 incorporates two parks and a linear park network for pedestrian and bikeway connections. Advice from Playford Council indicates the two reserve parcels of 4760m² and 5010m² are acceptable as functional open space and that their configuration within the design is equitable and well integrated. Should the project be approved, it is recommended that a condition of approval require detailed landscape plans be provided for Stage 1 for approval prior to construction.

Notably the proponent has already committed to the preparation of a detailed landscape plan for the southern open space, including planting to visually screen the site from the Jefferies facility to the south.

The proponent has also committed to the preparation of a ‘Recreation Facilities Strategy’ in collaboration with Playford City Council prior to commencement of construction of Stage 1 that would consider:

- The recreation needs of the Buckland Park community and Playford’s population;
- The availability of facilities; and
- Requirements for additional facilities to meet those needs, particularly the location and timing for the provision of a district level sports complex with associated facilities within the site.

Further, the proponent would be required to provide open space in accordance with Section 50 of the *Development Act 1993*. Accordingly, the AR considers the proposed

development accords with the objectives sought for public open space, provided the proponent prepares landscape plans as part of the detailed design for future stages, as well as an overarching Recreation Facilities Strategy.

4.2 PLANNING STRATEGY

Under the *Development Act 1993* the Planning Strategy for Metropolitan Adelaide (December 2007) was the basis of the assessment for this proposal. The Walker Corporation has made reference to the (then) proposed 30-year Plan for Greater Adelaide in addition to this.

Based on the Planning Strategy for Metropolitan Adelaide (December 2007) the Planning Report (Appendix 2 of the EIS) on the project acknowledges that Buckland Park is outside the Urban Boundary. However, the Strategy identifies specifically the need to:

- Ensure there is an adequate and appropriate supply of land for residential purposes (the Government subsequently initiated a ‘Growth Investigation Areas’ project to identify broad acre land to provide a 25 year rolling supply for Adelaide).
- Concentrate new housing into areas that have employment, infrastructure and services.
- Achieve sustainability targets, particularly reducing our ecological footprint to reduce the impact of human settlements and activities.
- Ensure proposals to change the economic use of land to housing include an assessment of the implications of that change on economic activity.
- Prepare development strategies for surplus and under-used sites, including treatment of contamination, upgrading of physical infrastructure and community issues.
- Develop higher residential densities in strategic locations around centres and transport nodes and interchanges to provide housing choice and support public transport use.

The proposed development at Buckland Park supports a number of these objectives, including increasing the economic value of poor value agricultural land and contributing to the 25 year supply of residential land. However on balance the Assessment Report considered the proposal supports and furthers the relevant objectives of the Planning Strategy. While the proposal does not support the objectives for provision of housing in areas already serviced with appropriate infrastructure (both physical and social), the proponent has investigated and planned for extension of relevant infrastructure to the area.

4.3 DRAFT 30 YEAR PLAN FOR ADELAIDE

The *Draft 30 Year Plan for Greater Adelaide (Planning the Adelaide We All Want)* provides broad strategic direction for Metropolitan Adelaide. This draft plan identified the need for 124,000 dwellings beyond the present urban boundary for Adelaide. In particular Buckland Park is identified as being part of the ‘plan for key strategic new growth areas...beyond the existing urban and township boundaries’ (*Planning the Adelaide We All Want* p. 86). The Response Document responds to these issues by discussing the desired ratio of infill development (70%) and fringe development (30%).

If the development proceeds the housing provided will be a significant proportion of the supply of housing on the fringe (i.e. outside the Urban Boundary for Adelaide).

The Response Document also discusses the strategic location of Buckland Park for major transport routes and employment opportunities in northern Adelaide (Response Document Section 4.4).

While not legally relevant to the assessment, the proposal accords with the draft strategy, and is consistent with the detailed Strategy direction for Northern Metropolitan growth set out in that Plan.

4.4 BUILDING RULES

This AR does not include a specific assessment of the development against the provisions of the Building Rules under the *Development Act 1993*. If the Governor grants a provisional development authorisation, pursuant to Section 48 of the Act, further assessment and certification of the proposed development against the Building Rules may be set as a reserved matter for further decision-making.

However, a development authorisation (equivalent to a development approval under Part 1 of the *Development Act 1993*) will only be made by the Governor or his delegate *after* a private certifier or the relevant council for the area in which the development has been proposed, has assessed and certified that any work that constitutes 'building work' under the Act complies with the Building Rules and has supplied this information to the Minister (as required by Regulation 64 of the *Development Regulations 2003*). The Building Rules certification must be consistent with any provisional development authorisation and would ensure safety (including fire safety) and stability of construction.

4.5 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

The proposal for Stage 1 of the development was referred by the proponent to the Department of the Environment, Water, Heritage and the Arts (Australian Government) in relation to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). A response letter was sent to the proponent on 17 June 2009 stating that the Australian Government did not consider the proposal a controlled action under the EPBC Act. This was in relation to Stage 1 only, so future stages of the proposal would need to be referred to the Australian Government.

4.6 ROADS (OPENING AND CLOSING) ACT 1991

If the proposal for Stage 1 and the Master Plan is approved by the Governor, the partial closure of Legoe Road would be included in this approval. Stage 1 cannot be undertaken without this road closure/realignment.

The Roads (Opening and Closing Act) 1991 has been used to consult with the community about the partial closure/reconfiguration of Legoe Road as part of Stage 1 in Buckland Park. Sections 2(6A) and 7A of this Act allows for the Governor to approve road closures as part of the Major Development process.

The public consultation for this aspect of the development ran parallel to the consultation for the EIS. Relevant Government agencies and utility companies were informed of the proposal. Letters were also sent out to immediate neighbours to the proposed road closure. The proposed closure was also advertised with the notices for the EIS in newspapers.

There were five submissions in relation to the road closure. No submissions were received from the immediate neighbours contacted specifically on the road closure issue. ETSA identified that the electricity overhead mains/poles would need to be removed or relocated as part of the road closure. City of Playford identified that the closure was a Council road and it would be seeking compensation for the partial road closure. It also made reference to the fact that the new roads would eventually become Council assets also.

The proponent does not intend to block access to any neighbours who use the existing Legoe Road section in question. The closure of the section of Legoe Road would not occur in Stage 1 until the alternative access is constructed and legal access can be maintained for adjoining property owners.

See Figure 4 for a map of the proposed road closures in the Master Plan, including Stage 1. The road closure in context of the detailed land division is shown in Figures 5 to 8.

The Walker Corporation has stated it will separately seek approval for further road closures when new public roads are needed in future stages of the development. These would need to go through the standard procedure for road closure.

4.7 STATE STRATEGIC PLAN

The State Strategic Plan seeks to widen opportunities for all South Australians through the pursuit of the following objectives:

- Growing Prosperity
- Improving Wellbeing
- Attaining Sustainability
- Fostering Creativity and Innovation
- Building Communities
- Expanding Opportunity

The State Strategic Plan has targets which relate to these objectives which the proponent has identified as being relevant to their proposal. For reference these targets are abbreviated (e.g. T1.1). The proponent has addressed the following objectives and targets.

Growing Prosperity

The development is proposed to generate both construction and on-going jobs (T1.10, T1.11 and T1.12). In particular the EIS proposes that the development will contribute significantly over 25 years in construction, infrastructure and other elements. Also adding to the housing supply for Adelaide and contributing to Adelaide's competitive business climate (T1.2) (EIS Section 2.3).

Attaining Sustainability

The proposal aims to meet this objective through house design guidelines. The aim is to achieve a five star and higher rating for the new dwellings through the use of technology like solar panels and gas air conditioning (T3.12, T3.14 and T3.7). In particular the project is aiming to contribute to T3.5 which relates to reducing greenhouse gas emissions (EIS Section 2.3)

A biodiversity corridor along the Gawler River is proposed to assist with linking the coastal areas with the upper reaches of the Gawler River and its tributaries.

It is also proposed to have a positive impact on native vegetation through the protection and care of the river red gum woodland and the samphire shrub land.

Expanding Opportunity

The project aims to contribute to objectives relating to affordable housing (T6.7) and indirectly reduce the number of South Australian's experiencing housing stress (T6.8). There is also the 15% affordable housing that the development is statutorily obliged to provide (EIS Section 2.3).

4.8 OTHER RELEVANT LEGISLATION

4.8.1 Aboriginal Heritage Act 1988

The Guidelines requested the proponent identify the effect that the proposed development will have on any sites, objects or remains of significance to Aboriginal archaeology, anthropology,

history or tradition; including any items listed on the Register of the National Estate, the SA Register of Aboriginal Sites and Objects and any others identified by the Aboriginal traditional owners.

On 15 May 2009 Hon Jay Weatherill MP wrote to the Walker Corporation in relation to Section 12 of the Aboriginal Heritage Act 1998 stating that, after consultation was undertaken, that there were no sites within Stage 1 of the proposal. Consultation for the rest of the site would be required in the future.

There are existing sites identified prior to the EIS (three in total) and investigations for the EIS have identified six additional archaeological sites and seven potential archaeological deposits. This will be recognised in subsequent detailed subdivision design.

4.8.2 Native Vegetation Act 1991 (and amended Regulations)

Under the Native Vegetation Act 1991 and Regulations, native vegetation can be cleared in a development under certain conditions where section 48 of the Development Act 1993 applies. The approval to do this is subject to a number of conditions including that the Minister responsible for the *Development Act 1993* refers the proposed clearance to the Native Vegetation Council.

The Native Vegetation Council outlined three issues in relation to the EIS. These were:

- The development will be a precedent for further urban development west of Port Wakefield Road – reducing the buffer between high intensity land use and conservation areas
- There is insufficient information to properly assess later stages of the development where the environmental impacts are greatest.
- That the EIS lacks enough information to determine appropriate significant environmental offsets as required under the Native Vegetation Act

The City of Playford has provided feedback on Chapter 10 of the EIS which refers to the flora and fauna on the site. This chapter draws its information from technical appendices to the EIS. The Council has stated that overall it believes there is a need for more documentation in relation to impacts on vegetation on the site. It has raised issues that the removal of 100+ year old trees will be difficult to replace in relation to providing a Significant Environmental Benefit.

The City of Playford also raised issues that the proposal will have major detrimental impacts on the Thompson Creek scrublands. It was also concerned about the clearance of low samphire/chenopod scrublands in the south-western area of the development site. The submission also refers to the impacts on the environment from domesticated animals.

Due to the impact on vegetation on the site, the Department for Environment and Heritage would like to be consulted on Construction Management Plans for each stage.

The Response Document has provided more information in relation to native vegetation. As a result of submissions to the EIS the Master Plan has been changed and more information has been provided on provisions for a Significant Environmental Benefits (SEBs).

The Response Document states that the SEB's will be achieved over a 25 year period. However, there is no native vegetation in Stage 1 of the development which means that the SEBs will not be commenced until future Stages. The SEBs and other issues relating to native vegetation are detailed in Section 6.3 of this document.

4.8.3 Crown Lands Act 1929

There is a parcel of Unallotted Crown Land within the proposed development area. The Crown Solicitors Office have provided the advice that the land should not be used for development purposes unless the future act of the provisions of the Native Title Act 1993 are complied with which would require an Indigenous Land Use Agreement or compulsory acquisition. The parcel of land is excluded from the Master Plan.

4.8.4 Tackling Climate Change Greenhouse Strategy 2007-2020

Tackling Climate Change Greenhouse Strategy 2007-2020 is South Australia's strategy for greenhouse gas targets and climate change. The proposal is seeking to reduce greenhouse gas emissions, adapt to climate change and use innovations in technology and street/land subdivision design to address the targets in the Strategy (Response Document Section 4.11). Regardless the residential dwellings have to meet the 5 star energy rating. More detailed examination of sustainability issues can be found in Chapter 6 of this document.

The AR considers that the strategic and legislative requirements have been investigated as part of the EIS and Response Document process. The current development proposal is not envisaged in the current Planning Strategy, but is consistent with the *Draft 30 Year Plan for Adelaide*. The Walker Corporation is obliged to meet the requirements in relation to the Roads (Opening and Closing) Act.

5 CONSULTATION

5.1.1 Community

The EIS was placed on public exhibition from *4 May 2009* to *16 June 2009*. Seventeen submissions were received from the public. The main issues raised in public submissions included:

- Land use conflicts with neighbouring horticultural and agricultural uses
- Flood – in particular reference to the 2005 Virginia flood which blocked access to Port Wakefield Road and flooded areas of Buckland Park.
- The risks associated with a rising underground water table
- Concern that current horticultural/agricultural practices such as aerial spraying may be curtailed or stopped due to the development
- The need for more information on engineering for services and the buffer zones between the development and adjacent non residential land uses (e.g. Jeffries Soils)
- The development is premature and outside Adelaide's Urban Boundary
- Geographically disconnected from services like hospital, schools and public transport
- The cost and effectiveness of the flood management strategies – the use of channels instead of levees
- Concerned about the risk that a 1 in 100 year flood event from the Gawler River would isolate the community
- Would like consideration of the impacts on a broader area – Virginia and Two Wells
- Would like mandatory rainwater storage with new dwellings
- Concerned that odour from existing land uses in the area will impact on the new residents

The City of Playford held their own public meeting to assist residents interested in commenting on the proposed development. A summary of the issues raised in this meeting were included as an appendix to the City of Playford's submission. Issues raised in this meeting included:

- Water issues – including concerns about flooding, groundwater and emergency responses during floods
- Community services and facilities – in particular the provision of schools, medical services, aged care, childcare, youth services, the impact on existing retailers, recreation and the pressure on existing service providers in the Virginia region. Provision of open space and preserving existing native vegetation were also raised.
- Transport – concerns the bus services will be inadequate, suggestions were made for rail extensions to the region and there were suggestions for park and ride facilities near existing rail services. Other concerns related to access to the development from Port Wakefield Road and the need for an overpass.

Overall the issues of most concern were flooding, land use conflicts and the provision of transport/community services. Comments were also made about existing services in Virginia and the impacts of an increasing nearby population in Buckland Park. The Response Document has provided a summary list of community concerns (Section 3.2).

5.1.2 Local Government Consultation

The City of Playford is the main council impacted by this proposed development. Its response indicated that the impact would be significant in its eventual population size and service requirements from the Council. It also stated that the proposal was not considered logical for the sequencing of development in the region. In particular Council has concerns that the proposed development's release of land would have negative impacts on land releases and services for 'Playford Alive'.

Other issues in the submission from the City of Playford included:

- Consideration of the inclusion of land in Virginia and Angle Vale as part of a broader approach to planning housing growth if Buckland Park is approved.
- Concerned that the provision of community services for Buckland Park may detract from the services needed in adjacent areas.
- Public transport – currently there are only two bus services a day to Virginia, the lack of public transport will encourage private care use
- Environmental sustainability – would like the stormwater and wastewater initiatives to be broader than the Buckland Park site.
- Open space – the proposal includes public open spaces which will be transferred to the Council. Concerned that the quality and maintenance of these areas will be compromised by the naturally windy conditions and soil quality in Buckland Park
- Economic Sustainability – recognise that the development will generate economic activity in the region, but concerned that there may be activities transferred from Virginia to Buckland Park in the longer term.
- Economic Sustainability – Concerned that if the Buckland Park proposal is approved it will lead to other horticultural land being subdivided for housing. Would like this issue to be further explored as part of the EIS process.
- Economic Sustainability – The flooding of the Gawler River is of significant economic (and environmental) community concern.
- Economic Sustainability – Concerned that the ownership of Buckland Park means that there is only one access point in and out of the site to Port Wakefield Road. The design of a single boulevard entrance to the site is not considered an appropriate design outcome
- Financial Implications to the Council – Approval of the project will have financial implications in terms of public open spaces, civil infrastructure and community facilities – to be negotiated between the Council and the Proponent.
- Financial Implications to the Council – Financial modelling done by the Council based on rates and the cost of services. The modelling indicates that revenue may not be sufficient to meet the costs required for upkeep of public roads, reserves and rubbish collection.

The City of Playford has been in ongoing contact with the Proponent and the Department of Planning and Local Government on the issues of governance and the cost to the Council with new roads/parks/community facilities.

The District Council of Mallala also made a submission on the EIS. It was stated it is not objecting to the proposal, but wanted strategic, infrastructure and environmental issues considered. This included:

- Longer term planning needed for public transport opportunities – e.g. a rail link to Virginia and Two Wells
- Combination of Buckland Park and NEXY will result in shift in land use away from horticulture in the Virginia region. This needs to be considered in a regional context. Opportunity to consider a second wastewater irrigation pipeline from Bolivar to areas north of the Gawler River extending to the Light River
- Degradation of sensitive coastal ecosystems from off road activities has reached critical levels in the Port Gawler area – close proximity to Buckland Park
- Need for a coordinated management of the coastal ecosystems – their importance as feeding grounds for shorebirds and waders

5.1.3 Government Agencies

There were 19 Government agencies that provided submissions on the EIS were:

- Tourism SA
- Department for Environment and Heritage – Conservation Policy

- Environment Protection Authority and Zero Waste
- Department of Water Land and Biodiversity Conservation – Flood Hazard
- Department of Water Land and Biodiversity Conservation – Planning
- Department of Premier and Cabinet – Affordable Housing Innovations Unit
- Department of Further Education, Employment, Science and Technology
- Department for Energy Transport and Infrastructure – Aviation
- Department for Energy Transport and Infrastructure – Office of Major Projects and Infrastructure
- Department of Health
- Adelaide and Mt Lofty Ranges NRM Board
- SA State Emergency Service
- Department for Education and Children’s Services
- SA Water
- Native Vegetation Council
- Office for Recreation and Sport.

The issues raised in these submissions generally related to flooding, community services, transport and the impact of the development to neighbouring properties/businesses. In particular, the issue of flooding and potential isolation of communities was raised by several agencies. The cost of mitigation for mosquitoes in the later stages of the development was also raised.

The Environment Protection Authority provided feedback in relation to the Jeffries Soils, management of flood/stormwater, mosquitoes and the likely impacts of odour from Jeffries Soils. The issue in relation to Jeffries Soils related to the likelihood of complaints in relation to odour. The EPA has requested to be involved in the development of mosquito management plans.

The Department for Environment and Heritage (Conservation Policy and Programs) provided feedback on the EIS and then the Response Document particularly in relation to Sea Level Rise. This issue is discussed further in Section 6 of this document.

The State Emergency Service raised an issue about the provision of more than one ‘flood free’ access road to the development from Stage 1. Following further discussions about the issues with the Walker Corporation and Government Agencies it was agreed that the Proponent would provide plans and timing for the second flood free access point.

The Native Vegetation Council raised an issue about the amount of native vegetation which will be cleared over the 25 year life of the project. In particular Vegetation Management Plans needed to be prepared and endorsed before rezoning horticultural land. In the commitments at the back of the Response Document the Proponent has stated that ‘prior to any rezoning of the site from Horticulture (West), the Minister for Environment’s agreement to Vegetation Management Plans will be obtained, if required’ (Response Document Section 7.18).

SA Health stated in response to the EIS it was supportive of the Master Plan concepts of encouraging active lifestyles through design. It also identified other outcomes as being positive such as affordable housing and catering for diverse housing needs. Health raised an issue about flooding hazards and isolation. It also raised issues about mosquito management techniques proposed and the cost of mosquito mitigation measures in the later stages of the Master Plan. Following further discussions, SA Health recommended that the issues could be addressed using an Integrated Vector Management Strategy (IVMS) negotiated between the Proponent, SA Government and the City of Playford.

The IVMS is likely to relate to future stages of the project, mosquitoes are geographically unlikely to be of major concern for Stage 1 of the development.

The Department of Water, Land and Biodiversity Conservation (DWLBC) identified issues relating to:

- Sea level rise and inundation of the lower areas due to coastal flooding, and
- The potential for community isolation due to Port Wakefield Road being inundated, blocking access to and from the site.
- Stormwater, sea level rise, open space, potable water and native vegetation.

The DWLBC asked that detailed stormwater management designs be provided for each stage. It also wanted the preparation of a Risk Management Framework in relation to shallow groundwater monitoring. It also had an issue in relation to the majority of the open space provided being used for stormwater management. In relation to native vegetation, it requested that Vegetation Management Plans to the Minister for Environment needed to include consultation with the Native Vegetation Council.

In relation to affordable housing, Housing SA (Department for Families and Communities) is satisfied that the Walker Corporation has addressed the issues. Provision has been made for 15% affordable housing from Stage 1 of the development.

The Adelaide and Mount Lofty Ranges NRM Board made a comprehensive submission to the EIS which covered issues like including sustainable development principles, water licences, evidence for assumptions on car use, the impact on Thompson Creek, coastal retreat, groundwater, the impact on greenhouse gas emissions, integrated water management systems and urban design.

The NRM Board also provided a submission to the Response Document which identified that it fully support the position provided by the Department of Water Land and Biodiversity Conservation.

The Department for Transport, Energy and Infrastructure (DTEI) provided responses to both the EIS and the Response Document detailing issues for further investigation and resolution. This related to access points to the site from Port Wakefield Road and the form they will take from Stages 1 to 5 of the proposed development. The timing of traffic lights in contrast to a grade separation across Port Wakefield Road was discussed with DTEI and the Walker Corporation.

6 ASSESSMENT OF THE MAIN ISSUES

6.1 NEED FOR THE PROPOSAL

The proponent stated that their objective is ‘the creation of a steady supply of housing allotments to support Adelaide’s growth and economic well being over the next 25 years, which are well served with the physical and social infrastructure needed to create a well functioning and sustainable community’ (EIS page 2-1). This will be achieved by staging the development to provide for the demand for services and facilities over the 25 years, while minimising the potential impacts on the environment. Stage 1 also proposes to include a 15% affordable housing component.

6.2 WATER RELATED ISSUES

6.2.1 Flooding/Stormwater

The EIS (Section 7.1) includes a Flood Management Strategy that is based on modelling using recent flood mapping prepared for the Gawler River Flood Protection Management Authority.

While the proposed site adjoins the Gawler River, the banks of the river are higher than the surrounding floodplain (a ‘perched river’), and overtopping onto the floodplain tends to occur predominantly on the northern side of the river. Only minor breakouts occur southward onto the floodplain along the northern boundary of the site. The EIS (Section 7.1) identified the main flooding risk as an upstream breakout of the river that approaches the site from the east of Port Wakefield Road. The flood hazard is in the low – medium category as flows are relatively shallow, with low velocities. Flooding of the site from a breakout of the Gawler River occurs for flooding during a 20 yr ARI event.

The EIS (Section 7.1.1) states that the proposed flood management strategy would be to establish a flood channel system (rather than a network of levees) through out the site. The channels have been incorporated into the proposed Master Plan and are designed to collect and direct stormwater and flood flows to detention basins in the south-western corner of the site. In addition, fill would be used on the site adjacent to Port Wakefield Road (Stage 1) to protect development from flooding. Modelling indicates this would result in a negligible increase of flooding adjacent the site.

The original flow regime of the Gawler River system has been severely modified by the effects of land clearance, farm dam development and the construction of reservoirs. This has resulted in approximately 60% of the natural average flow being diverted for consumptive use.

The provision of a network of vegetated swales and basins within the floodplain could be designed to manage flood risk. This would detain floodwaters that could gradually be released back to the River) and to use stormwater to maintain existing and reinstated native vegetation. The health of River Red Gum and Black Box woodland communities would improve through better watering regimes, if flood out areas are established on the floodplain. This approach would also reduce the amount of floodwater and stormwater that would need to be directed to the detention basin in the SW corner of the site. While the EIS proposes a similar approach, the flood management strategy is mainly designed to direct water away from the river.

The Master Plan design and the Flood Management Strategy should be reviewed to consider the opportunities for providing environmental flows to the Gawler River through gravitational means (via swales/wetlands using natural topography or constructed flow paths) or ‘passive’

infrastructure using piping. This would only be possible near the Gawler River, and should be considered as part of detailed stormwater design for later stages adjacent to the River.

Drainage channels are also proposed for the western boundary of the site. While the channels would be vegetated, this appears to be a standard 'hard engineering' solution that could be improved to, not only to reduce flow volumes and velocities that would need to be dealt with at the discharge point of the system, but achieve greater environmental benefits. The open channel design should be reconsidered to achieve a system of vegetated swales and basins that progressively slow and capture flows to allow for natural infiltration and/or uptake by plants. This type of system would also enable the establishment of natural habitat that could create a buffer between the urban fringe and coastal communities.

A range of wetland types could be developed, with freshwater communities established near the Gawler River floodplain (such as Lignum swamps) to estuarine/saltwater communities (such as saltmarsh/chenopod shrublands, herblands and Gahnia sedgeland) near the coast and salt pans. This approach could also provide an opportunity to reinstate understory vegetation and ephemeral/annual wetland communities that are now rare in the region (such as still occur on Parafield Airport land).

A more extensive area of natural swales/basins would not only manage stormwater and flooding, but would also provide more habitat and help ameliorate the greenhouse implications/carbon footprint of the proposal.

This AR concludes that the Flood Management Strategy should be reviewed to consider the opportunities for providing environmental flows to the Gawler River through gravitational means (via swales/wetlands using natural topography or constructed flow paths) or 'passive' infrastructure using piping.

6.2.2 Coastal Flooding

The EIS (Section 7.1.2) acknowledges that, while the site is located several kilometres from the coast and is outside the coastal zone, it is linked to the Gulf via the Thompson Outfall Channel and would be subject to tidal surge. Potentially affected areas are located in the southern part of the site, where the land would need to be filled to a minimum site level of 4.0m AHD and a floor level of 4.25m AHD (in accordance with the Coast Protection Board and Development Plan policies for coastal flooding protection to 2050 and 2100). In addition, both the Coastal Protection Board and DEH have advised that flood risk beyond 2100 should be considered.

This AR considers that the Sea Level Rise risk is adequately dealt with through:

- **Requiring a minimum site development level of 4.0 m AHD.**
- **Requiring a minimum building floor level of 4.25 m AHD, thus providing levels beyond the Development Plan recommendation as means to address risk beyond 2100.**
- **Recognition that there is plenty of land to build low level levees (below 1 m in height) along the western boundary of the lower level land at the southern side of the site, if sea level rise is greater than anticipated beyond 2100.**
- **Recognition that the allowance for wave run up is very conservative given the site is a considerable distance from the existing coastline. In addition the southern lower lying areas are proposed for development at the end of the project. There is plenty of time should the approach require review as a response to actual sea level rise over the next decade.**

6.2.3 Stormwater Management

The proposed establishment of a substantial mixed use, residential development on a greenfield site provides the opportunity, through a master planned approach, to incorporate Water Sensitive Urban Design (WSUD) principles/measures and best practice water management.

In particular, the Department of Planning and Local Government has released a *Water Sensitive Urban Design Technical Manual for Greater Adelaide Region* (2009) that should be used to integrate the management of all water resources and the total water cycle into all components of the development (the residential, commercial, educational and community facilities).

In relation to stormwater management the Department for Transport, Energy and Infrastructure considers that WSUD should be an underpinning principle for a development of this nature, rather than an option to be encouraged. Additionally, the Adelaide and Mt Lofty Ranges Natural Resources Management Board considers that WSUD guidelines should be mandatorily applied at all stages of the development and in all development activities (including domestic buildings).

The proposal includes an integrated approach to total water cycle management which balances storm, potable, recycled and waste water, with the objective of minimising the use of potable water and maximising capture of stormwater for treatment and reuse (see EIS page 15-12, RD pages 25, 26, 27 and EIS, Appendix 18).

The EIS (Chapter 7 and Appendix 18) provides a comprehensive analysis of the hydrological characteristics of the site and the potential implications of the proposal on water related aspects. This includes stormwater management, existing watercourses, flooding risk and effects on groundwater. The EIS (Appendix 18; Table 2.1) calculates run-off, from a pre-development peak flow rate of 4 m³/s for a 1 year average return interval (ARI) rainfall event and 10 m³/s for a 100 yr ARI, would increase to 22 m³/s (1 yr ARI) and 82 m³/s (100 yr ARI) post development. With a climate change allowance included, these figures increase to 25 m³/s (1 yr ARI) and 92 m³/s (100 yr ARI). Thus, a substantial increase in run-off would result from the establishment of a substantial area of hard surfaces within the proposed development.

The EIS (Sections 7.1.1, 7.2.1 & 8.1) proposes a *Stormwater and Floodwater Management Strategy*, for the management of major storm events up to the 100 year ARI, which aims to replicate the existing hydrological system as closely as possible. However, the EIS (Section 7.4) states that, in stormwater events in excess of a 1 yr ARI, increased volumes of water would be discharged to the Thompson Outfall Channel (and ultimately the Gulf).

The net effect is expected to be a ~ 20% increase in annual run-off from the site compared to existing conditions, as it is not practical to capture the highest peak flows.

As the site is a small part of the entire catchment, the additional discharge represents only a 2-5% increase in the total amount of water discharged from the Thompson Outfall Channel into the Gulf (EIS page 7-12).

The EIS (Appendix 18; Section 3.1) considers that treatment of up to a 1 in 3 month storm event is equivalent to treatment of 93% of the annual run-off. It is not normally considered practical to capture and treat water for events greater than a 1 yr ARI.

The quality of water leaving the site was modelled and found as being suitable for discharge to the marine environment as it is expected to meet the EPA (2003) *Environment Protection (Water Quality) Policy – Aquatic Ecosystem (Marine Waters)* criteria.

As the volume of stormwater generated on the site post-development will be significantly higher than pre-development, additional stormwater infrastructure will be required to manage the increased run off created.

A series of linear stormwater channels and concrete pipes have been designed to convey stormwater to the Thompson Outfall Channel. As external and internal flood events are not expected to occur simultaneously, channels for floodwater can also be used for part of the stormwater network. A proposed detention basin (with a capacity of 250,000 m³) located in the south-western corner of the site would reduce peak 100yr ARI discharge flows to a maximum of 10 m³/s, as required by the Playford (City) Development Plan. The basin would also be used to capture and store minor stormwater flows for harvesting purposes.

The EIS (Section 7.3.2) recognises that the opportunity to store and treat stormwater for reuse on the site is limited. It is estimated that there is only 50 ML/yr capacity within the aquifer for an aquifer storage and recharge (ASR) scheme to operate on the site. The EIS (Appendix 18; Section 3.2) states that there is the potential to capture 2000ML/yr, but this level of storage in the T2 aquifer would significantly impact on existing bores from pressurising the aquifer. There is also limited ability to construct treatment wetlands, given the high water table.

Therefore, it is proposed to capture, treat, store and reuse stormwater up to the 50 ML/yr limit set by the ASR potential. This water would be used for irrigation of reserves within the site, and to top up the wetland water bodies.

Two treatment wetlands are proposed in the central and north-western part of the site to treat stormwater prior to its storage in the aquifer. For the remaining stormwater, a 'capture' basin would be created within the detention basin. This basin would be of sufficient size to capture approximately the volume of say a 1-in-3 month to 1-in-6 month flow, and incorporate the ability to pump that water off-site for treatment, storage and use by another party.

Treated water could also be potentially returned to the site to provide a supply of recycled water for non-potable uses. It is estimated the capture basin would require a volume of approximately 100,000 m³ or 100 ML. It is expected that the basin would be located in the upper sections of the detention basin, where the groundwater levels are deeper.

At this time other potential users for the water have not been identified, but could include (RD page 250, EIS page 7-11);

- Horticulture
- Industry
- Salisbury or Playford Council
- Environmental flows to Buckland Park Lake
- The proposal's open space and public domain.

The EIS (Section 7.3.2) includes a preliminary Stormwater Treatment Strategy. This Strategy is based on a Water Sensitive Urban Design approach, using the MUSIC and DRAINS modelling programs which would be progressively designed for each stage as they are implemented. The strategy employs the use of large lineal treatment swales and wetlands to promote natural water treatment processes to occur as the flows move through the catchment area. The stormwater layout will include trash racks, vegetated swales, bio-filtration beds/rain gardens and two wetlands to treat the stormwater prior to its reuse, or discharge. The channels would be designed to be relatively flat and shallow (especially the main

channel, which is 0.05% in some places), up to a maximum of 2 m deep, to keep the invert as high as possible to keep the risk of groundwater intrusion to a minimum.

For Stage 1, stormwater would be channelized, with the peak flows being held within a temporary detention basin (with a capacity of 16,000 m³) at the downstream end of the main channel. Water in the detention basin would be discharged into an existing open drain that would carry it to Thompson Creek, where the water would discharge to the Gulf via the Thompson Outfall Channel. It is considered that water held in the detention basin should be used for construction and landscaping/revegetation purposes, such as for dust control and irrigation of plantings.

The proposed site has characteristics that can make hydrological management problematic (especially to avoid flooding issues and salinity problems), including:

- Relatively flat topography that gently grades towards the coast.
- Shallow, saline groundwater (especially near the coast).
- Low lying topography, particularly around the south-west portion of the site.
- Shallow drainage lines (primarily Thompson Creek).
- Discharge point for local/regional floodwaters.

The proposal would need to be designed and managed to ensure stormwater run-off from the site is minimised beyond current volumes. In particular, flows to the Thompson Creek Outlet should minimise discharges to the marine environment of Gulf St Vincent. Additionally, in order to achieve a high level of sustainability, a wide range of measures need to be adopted to collect, treat and use stormwater run-off for urban and environmental purposes. Reuse of treated waste water would also minimise the effect on the marine environment from discharges from the Bolivar WWTP.

Several government agencies raised issues with the proposed stormwater management strategy, including:

- EPA: The MUSIC modelling undertaken did not take into account untreated stormwater concentrations of Total Phosphorus, Total Nitrogen and Total Suspended Solids; assumed removal effectiveness of different treatment points; nor maintenance requirements to ensure effectiveness of treatment points. The two proposed wetlands are located relatively high in the site catchment, due to shallow groundwater. This leaves a significant component of run-off that would have minimal treatment (only swales) prior to reaching the main detention basin.
- DWLBC: To reduce the potential for remobilisation of pollutants and nutrients, wetlands and detention basins should be capable of retaining a 1 in 25 yr 24 hour rainfall event (as per EPA guidelines), but are not inundated by the 25yr ARI event. The management plan needs to include maintenance measures to ensure capability to improve water quality. A risk management framework, which includes trigger values and mitigation strategies, should be incorporated in the strategy. This would be for monitoring of all potential storm and flood water risks for the proposed channels, wetlands, detention basins and swales.
- DTEI: Flooding frequency of flooding the proposed flood channels needs further consideration, as the system is likely to convey flows more frequently than 1 in 20 year ARI flows. Unclear how proposed stormwater basins and wetlands would interact with the flood channels. Wetlands/basins should be designed with a high flow by-pass, to ensure trapped pollutants do not get remobilised by increased velocities or a flood event.

The EPA has also raised an issue about the limited detail on the proposed detention basin in the SW corner of the site. It was uncertain whether the basin would be lined to prevent

groundwater seepage (thereby reducing aquifer recharge and accordingly reducing reuse potential) or whether it would leak and create a groundwater mound (and increase the flow rate of nutrient enriched groundwater to the coast). Furthermore, the basin would have a 1 in 3 month – 1 in 6 month capacity, indicating that stormwater from a higher intensity/duration event would immediately flow into the Thompson Creek Outlet with little or no treatment. Contingencies would be needed to deal with such a situation.

The DWLBC also considered that there was insufficient consideration of how the proposed stormwater management strategy integrates with the Playford City Council's existing system, initially and over time. In particular, Council has undertaken works (with more planned) to discharge greater volumes of stormwater from the Virginia area via the Thompson Creek Outfall. This could result in the system backing up and causing localised flooding, which could be exacerbated if sea level rise increases tail water effects.

As part of detailed subdivision design at each stage, the Proponent has committed to refine the approach to stormwater management, with the aim of reducing run-off at every opportunity and reducing discharges from the site, such as greater use of pervious surfaces (such as permeable paving) to encourage infiltration and greater capacity for rainwater collection and storage from all roofed areas (especially rainwater tanks and underground storage).

The proponent should develop a WSUD framework that would need to apply to all stages and all activities associated with the development.

The Thompson Creek and outlet often contain large amounts of algal growth due to nutrient loading from intensive agriculture and groundwater drainage. Thus, measures should be adopted to reduce flows into the creek and the amount discharged to the Gulf.

Stormwater channels are also proposed for the western boundary of the site. While the channels would be vegetated this appears to be a standard 'hard engineering' solution that could be improved to, not reduce flow volumes and velocities that would need to be dealt with at the discharge point of the system, but achieve greater environmental benefits. The open channel design should be reconsidered to achieve a system of vegetated swales and basins that progressively slow and capture flows to allow for natural infiltration and/or uptake by plants. This type of system would also enable the establishment of natural habitat that could create a buffer between the urban fringe and coastal communities.

A range of wetland types could be developed, with freshwater communities established near the Gawler River floodplain (such as Lignum swamps) to estuarine/saltwater communities (such as saltmarsh/chenopod shrublands, herblands and Gahnia sedgeland) near the coast and salt pans. This approach could also provide an opportunity to reinstate understory vegetation and ephemeral/annual wetland communities that are now rare in the region (such as still occur on Parafield Airport land).

A more extensive area of natural swales/basins would not only manage stormwater and flooding, but would also provide more habitat and help ameliorate the greenhouse implications/carbon footprint of the proposal.

The proposal provides an opportunity to manage stormwater run-off and flooding from the Gawler River. This means that discharges to the Gulf are not, while at the same time providing additional/complimentary habitat and a buffer for existing coastal and riverine conservation areas. A mosaic of different wetland types could be created, ranging from freshwater along the Gawler River to estuarine/saltwater (i.e. near the coast), similar to the Barker Inlet wetland complex (see EIS page 10-13, RD page 157).

In particular, Lignum shrublands and Gahnia sedgeland were once extensive in the region, but now very few remain due to clearance or modification of hydrological regimes. Reinstatement of such community types would provide beneficial habitat, especially for small birds and butterflies.

Detailed design of a network of stormwater management waterways (including swales and basins), flood channels and a large detention basin at the end of the 'catchment' would need to be carefully designed and constructed to take account of the following factors:

- Shallow groundwater. The EIS (Appendix 18; Figure 1.5) shows that groundwater below the majority of the site is at a depth of two metres or less, especially along the lower reaches of Thompson Creek and in the south-western corner. The groundwater has a high level of salinity and nutrients (mainly nitrogen).
- Acid Sulphate Soils (ASS). The EIS (Appendix 18; Figure 5.3) shows that the south-western corner of the site and the lower reaches of Thompson Creek have a higher risk of ASS being present, while parts of the central and eastern portion of the site have a medium risk.
- Local and regional drainage. The south-western end of the site is the discharge point for the Thompson Creek catchment. It is also the lowest point in the area where surface flows from flooding of the Gawler River terminate.
- Coastal processes. The Thompson Outlet is connected to the Gulf and is influenced by the tide levels/movements and storm surges. The design will need to take into account peak storm events coinciding with high tides.

These matters were considered by the proponent when preparing the storm water management strategy (EIS Appendix 18; EIS Chapter 7; RD page 30; Attachment 1 to letter dated 10 November 2009), but will need further refinement during detailed design.

The EIS does not detail when the major stormwater infrastructure (especially the large detention basin in the south-western corner) would be constructed.

The water quality of discharges from the site will be required to meet the EPA (2003) *Environment Protection (Water Quality) Policy – Aquatic Ecosystem (Marine Waters)* criteria, and so this must be carefully addressed in detailed design.

When designing the proposal's flood management channels, Wallbridge and Gilbert applied the *Floodplain Mapping for the Gawler River Technical Report* prepared by Australian Water Environments (AWE) and adopted by the Gawler River Flood Plain Management Authority (GRFMA) in March 2008.

AWE's flood plain mapping has been accepted by government as a definitive description of flooding in the region.

Flood Management Strategy should be revised to consider the opportunities for providing environmental flows to the Gawler River through gravitational means (via swales/wetlands using natural topography or constructed flow paths) or 'passive' infrastructure using piping. The proponent has committed to investigating provision of the proposal's treated stormwater to Buckland Lake.

The AR considers that further work is required to minimise stormwater runoff, and increase water quality outcomes, as detailed design for each subdivision stage.

6.2.4 Impact of Thompson Outlet Channel Discharges

The EIS (Section 7.1.2) recognises that, while the site is located several kilometres away from the Gulf and is outside the coastal zone, it is linked to the Gulf via the Thompson Outfall

Channel and would be subject to tidal surge. The Outlet is a regional discharge point for stormwater and floodwaters, including the township of Virginia. It is also discharges groundwater from the Virginia Shallow Groundwater Drainage Program, which is saline and has high levels of nutrients and some herbicides/pesticides. Algal blooms are a common occurrence in the Outlet and feeder drains.

The EIS (Section 8.2.1) states that the proposed Stormwater Management Strategy would continue to channel stormwater away from the Gawler River to the Thompson Creek Outfall. Stormwater from the site, and floodwaters when the Gawler breaches its banks, would be directed to the Outlet via a network of constructed channels.

Modelling indicates that stormwater discharged to the Outlet and the Gulf would meet EPA (2003) *Environment Protection (Water Quality) Policy – Aquatic Ecosystem (Marine Waters)* criteria, but as stated in 6.2.3 above, further detailed design work is required with each stage, and the proponent has committed to undertake this work.

6.3 ENVIRONMENTAL ISSUES

6.3.1 Sustainability

The South Australian Government has made a number of commitments through the State Strategic Plan. Its purpose is to express the Government's values as well as reflecting priorities for the state. Objective 3, Attaining Sustainability, is in place to ensure the appropriate use of natural resources, and to minimise the impact of human activity on the existing environment.

As stated within the Plan, 'the challenge of sustainable development requires the focus, commitment and ingenuity of all South Australians'. It is vital that all new developments work to reduce South Australia's ecological footprint and reduce waste through Target 3.7 and 3.8 of the Plan.

6.3.2 Sustainable Construction Methods

Parsons Brinkerhoff produced a report (EIS, Appendix 16), outlining a number of mitigation measures for the period of construction which will be included in the Construction Management Plan (CMP) produced by the proponent prior to commencement if approved. Minimising vegetation clearance where possible, and providing an offset for when this is not possible has been included in a set of Sustainability Guidelines by Parsons Brinkerhoff (Appendix A of Appendix 16). The proponent has stated that the project will also seek to use recycled materials for the building process and construct buildings with materials such as recycled aggregate and replacing cement with fly ash, to the State Government 5 star rated minimum standard.

Waste avoidance, reuse and recycling techniques will be used during the construction period to ensure appropriate resource management.

Measures to minimise or reduce resources used during the construction and operational phases outlined by the proponent in the EIS (Section 9.3.2) are:

- Waste avoidance – not over ordering building materials, use of recycled products, minimising fill materials that need to be moved offsite, retain local roads where possible to minimise the need for paving and using reminder signs for employees for waste minimisation.
- Re use – Methods outlined included mulching of cleared vegetation for reuse on landscaping, using vegetation for sediment control and barriers for the construction site, reusing wooden packaging materials and preserving any topsoil/turf which is removed.

- Recycling of waste during construction – the use of on site rubbish sorting facilities, negotiating with suppliers to return oil/fuel drums, collecting and returning concrete etc to recycling plants where possible, training employees and subcontractors on the Construction Waste Management Plan and recycling of materials from demolition sites.
- Construction Waste Management Plan (CMP) – this includes identification and classification of waste, where the waste is going, what it is stored in, and how it can be recycled etc.
- Methods of Construction – this relates to techniques like the prefabrication of sections of buildings offsite to minimise the impacts on site.
- Use of materials with high recycled content.

Each stage's CMP will include a Construction Waste Management Plan to ensure best practice.

6.3.3 Sustainable Design

The EIS (Chapters 7.3, 9.1, 9.3.2, 9.5) identifies a number of opportunities for energy conservation. Further to those identified, additional measures have been added.

The following is a list of sustainable and mitigation measures that the Walker Corporation proposes to put in place, to avoid, reduce and remedy negative environmental impacts:

Minimisation for demand of electricity resources by:

- Alternative energy use: photovoltaic cells, wind turbines, heat pumps
- Low embodied energy (Energy Efficiencies): insulation and passive design features, sun and shading devices, design features that minimise the need for air conditioning, cross ventilation, north/south orientation of buildings, high performance glazing, increased thermal massing, waterless urinals, solar hot water, energy efficient household appliances, energy efficient lighting, design natural daylighting into building

Maximisation of water efficiency (reduction in water use) by:

- Treating wastewater
- Recycled water: recycled grey water for toilet flushing, garden watering, car washing, and irrigation; in addition where possible it should be used for washing machines.
- Rainwater harvesting: The Walker Corporation has proposed the communal collection from the whole of the site, individual rainwater tanks are compulsory (Part J BCA)
- Water efficient bathroom fittings

Minimising waste generation by:

- Waste recycling, recyclability of building materials
- Methods to minimise construction waste

Maximising reuse of materials where practical:

- Designing flexibility and adaptability into the building design

Landscaping and site impact:

- Promotes drought tolerant plants, native landscaping

Minimisation of pollutants:

- Clean water through wetlands and swales

Sustainable measures for predicted coastal hazards:

- Locate all developments above design flood levels that allow for climate change beyond 100 years.

- Design appropriately (include practical measures to minimise storm damages and losses, flooding)
- Defer designing the lower lying area of the development site until nearer the time of commencement of those stages when there would be more understanding and information regarding the impact of sea level rise

Reduction on car dependencies where this is possible:

- Within the site provide effective systems for cycling and pedestrian movement.

At detailed design stage there is opportunity to consider the following sustainability initiatives:

- Further revegetation as the site is relatively exposed.
- The reuse of excavated soil on site for landscaping
- Use of durable materials. and where practical, using recycled and low greenhouse intensity materials for construction
- Utilisation of a recognised energy rating scheme to assess the environmental impacts of both commercial and residential buildings (i.e. the Green Star Rating system for best practice).
- Choosing environmentally preferred materials to reduce health effects.

6.3.4 Sustainable Operational Methods

The EIS states that greenhouse gas emission reduction measures will be incorporated throughout the proposal. Sources associated with the construction and operations of the project include buildings (residential and commercial), landscapes, vehicles and waste. The proponent has indicated that sustainable transport solutions will be used for operation to reduce greenhouse emissions from the site. The Master Plan for the site will address the connectivity within the site, ensuring bus routes, bikeways and pathways are implemented and integrated into the wider northern region of Adelaide. The proponent has committed to provide a community bus service within the site, connecting to the region from the initial occupation of homes, until a more permanent bus service is connected to the site. The inclusion of such transport systems is aiming to reduce dependency on private cars.

The report produced by Parsons Brinkerhoff (Appendix 16 of the EIS) included an analysis of the existing infrastructure capacity in relation to waste. As a part of this analysis, proposed management and reduction strategies were outlined for the operational period of the proposal.

One of the key ideas under the Waste Management Strategies for households is increasing recycling. The proponent has stated that the City of Playford will be 'encouraged' to provide kerbside recycling boxes, bins and multi compartment containers. Designs of houses will look to provide adequate storage and where possible/appropriate room for on site treatment of household/recyclable waste. Composting facilities would also be 'encouraged' at the household level and could be provided at the neighbourhood level. The preparation of a Waste Management Plan has been proposed to incorporate such strategies. Waste Management Strategies for commercial activities includes the aim to have increased recovery and use of materials from the commercial and industrial sector. The strategies include the Council's kerbside program, the sorting of recyclable materials, working with cleaners and waste collection contractors to support recycling practices and working collaboratively with tenants.

The Buckland Park Sustainability Guidelines developed by the Proponent cover a large range of issues that will be dealt with within the site, such as water use, siting and design, energy, transport, biodiversity, landscaping, materials, resources and waste. The proponent has made

reference to Appendix 5 of the Response Document, the Bluestone Mount Barker Residential Design Guidelines, as an example of what could be put in place for Buckland Park.

The AR concludes that the measures for resource and waste minimisation are appropriate if undertaken as outlined during the construction and operational phase of the project. Negotiations will be necessary with the City of Playford regarding the provision of kerbside recycling, and an agreement should be outlined in the Waste Management Plan.

The provision of suitable and sufficient public transport is necessary to ensure that the development is sustainable. The proponent's commitment to providing a bus service from first resident until such time as the public transport system is connected to the site is sufficient, but will need to adapt as the numbers of residents grows.

The sustainable design strategies outlined in the Buckland Park Sustainability Guidelines should be followed for project's construction and operation. Many of these objectives will also be met through the requirement of five star energy rated for new houses under the Building Code.

6.3.5 Climate Change

This development has the opportunity to address climate change issues in a holistic and effective manner through the Master Plan.

Walker Corporation in creating a subdivision needs to appropriately manage emission resulting from construction and operation of a new development. While the Government is encouraging the provision of more housing, the reduction of greenhouse gas emissions and carbon footprints is considered an important issue as outlined in Objective 3 of the State Strategic Plan. The development should contribute to the State Strategic Plan's Objectives, specifically, Targets 3.5 Greenhouse gas emissions reduction and 3.6 Use of public transport.

The main sources of greenhouse gasses from any new development are the buildings, vehicles, waste, and associated infrastructure for construction and operation. Parson Brinkerhoff created a detailed report (Appendix 16) for the proponent, outlining appropriate measures to be put in place, both during construction and operation. Some of these measures are:

- Minimising vegetation clearance and replant where feasible.
- Purchase accredited renewable energy, such as green power, during construction.
- Ensuring that buildings comply with the State Government's 5-Star rated minimum standard.
- Designing the Master Plan so the layout can ensure appropriately orientated houses and buildings.
- Encouraging residents to purchase 6-Star solar water heaters, gas cookers, and other household appliances.

The greatest impact of climate change on the proposal would be the effect of sea-level rise. A report published by the Intergovernmental Panel on Climate Change (IPCC) (2007) found a trend in more frequent hot days, hot nights and heat waves, with more intense and longer lasting droughts, but more frequent heavy rain events.

The current rate of sea-level rise is 80% faster than projected rates from the previous IPCC report in 2007. A synthesis document of the 2009 Copenhagen Climate Congress concluded that 'updated estimates of the future global mean sea-level rise are about double the IPCC projections from 2007' (Richardson, et al in Allison, et al, 2009).

The proposed site, at its closest point, is less than 3km from the coastline. The City of Playford's Development Plan recognises that the need to consider and have regard to coastal processes for developments is not just confined to land within coastal zones in the following extract:

Coastal Areas

These following broad objectives are for the control of any development which could affect coastal areas or could itself be affected by coastal processes, and as such, may be applicable to areas some distance from the shoreline. Thus they are applicable beyond, as well as within, the boundaries of any coastal zones within the council area.

Section 6.2.2 in this AR has concluded that the project has taken potential sea level rise beyond 2100 into account.

6.3.6 Flora/Fauna

The proposed site is predominantly cleared land that has been extensively modified by primary production activities associated with dryland agriculture (cropping and grazing) and irrigated horticulture. While the site is largely cleared of native vegetation, there are several areas of remnant habitat that remain. In particular, the Department for Environment and Heritage has advised there is significant biodiversity on the site at present, including seven species of bats, two species of possum and 15 bird species listed under the draft *Regional Recovery Plan for Threatened Species and Ecological Communities of Adelaide and the Mount Lofty Ranges, South Australia* (EIS page 5-7).

The EIS (Section 5.6.2, Chapter 10 and Appendices 11, 14 and 15) provides a comprehensive inventory and description of the habitat types, vegetation communities and flora/species that are present on and around the site.

The Response Document (Section 4.9) states that, with a total site of approximately 1.340 ha, there are a total of 316.36 ha of remnant vegetation. Approximately 75.5 ha could potentially be cleared. This was amended from the EIS which originally proposed 98.14 ha (Section 10.2). No vegetation clearance would be required for Stage 1. The amended conceptual Master Plan in the Response Document (Figure 1.4) shows that large patches of remnant woodland along the Gawler River would be retained as open space reserves. Residential development would extend into and around woodland stands on the cleared land in between (or where scattered trees occur) in proximity to the River in places.

The ecological value of woodland habitat within the reserves would be improved through revegetation and better management of degradation factors such as weeds and pest animals.

This would be using measures that would be detailed in Rehabilitation and Revegetation Plans and Vegetation Management Plans for each stage of development. The intention appears to be that housing would be nestled amongst the stands (or with outlooks to wooded areas), with access to the Gawler River for recreation.

The EIS (Section 10.1) acknowledges that less than 4% of the natural vegetation communities remain on the Adelaide Plains, with less than 1% of the original area of terrestrial, dryland vegetation left within the Playford City Council area. Most of the remnant vegetation is located along the coast and mainly comprises saltmarsh and mangrove communities. Much of the River Red Gum and Black Box woodlands along the Gawler River have been cleared, leaving a 'riparian ribbon' of overstorey vegetation along the river and nil or a degraded understorey. Mallee Box woodland is now confined to roadsides. The EIS (Appendix 14;

Section 5.3) acknowledges that all remnant communities have a high conservation priority in the region and that all communities present on the site are now considered to be threatened at a regional level.

The ecosystems of the coastal plain and Gawler River have largely been unaffected by urban encroachment, as residential development has been limited to east of Port Wakefield Road. However, agricultural activities have resulted in extensive clearing and degradation associated with livestock grazing and weed incursion. Thus, a substantial buffer has been the fringe of the Adelaide Metropolitan Area and the coast has existed as a form of ecosystem protection.

6.3.7 Gawler River

On the northern boundary, the Gawler River and adjacent floodplain supports a remnant River Red Gum (+/- Black Box) Grassy Woodland community in patches and as scattered trees. Chenopod low shrubland communities occur in the south-western corner of the site. Thompson Creek also includes remnant vegetation (low shrubland and sedgeland communities).

The Gawler River is recognised as a major biodiversity corridor that crosses the Northern Adelaide Plains, linking the Mt Lofty Ranges with the coast. The river primary passes through agricultural lands and has been relatively unaffected by disturbance from urban encroachment, however, its flood plain has been extensively cleared and remnant vegetation in the riparian corridor is degraded by grazing and weed infestation. The river terminates at the coast and discharges into the Buckland Park Lake. The watercourse, floodplain and wetlands of the Gawler River are important for conservation and landscape health. The EIS (Appendix 14, Section 5.4.3) states that the only relatively large, intact area of forest/woodland in the region occurs along the Gawler River in the northern part of the site. In addition, the River Red Gum Woodland on seasonally inundated flats is considered to be vulnerable in the region.

The EIS (Appendix 15) identified a wide range of fauna species that utilise habitat along the Gawler River, particularly a high number of raptor bird species (that also hunt in the surrounding farmland). There are a significant number of mature trees that provide a food source, shelter and breeding hollows for a wide range of species (especially for birds, bats and possums).

Black Box, which is mainly found along the River Murray, is an uncommon species on the Adelaide Plains that has been extensively cleared from along the Gawler River. For example, River Red Gums along the Gawler River are used for nesting by a large number of birds of prey that require large open areas for hunting. The proposal seeks to protect, as open space reserves, much of the remaining stands of vegetation. This will enable existing trees used as a seed bank for revegetation.

6.3.8 Coastal and Gulf St Vincent – Bird Habitat

The coast line adjacent the western boundary contains important coastal and marine habitats, including the Barker Inlet-St Kilda estuary, St Kilda-Chapman Creek estuary (including the Port Gawler Conservation Park), the Cheetham Salt pans and the Buckland Park Lake. The EIS (Section 5.6.2) acknowledges that these areas provide habitat for bird species that are both common and of conservation significance. In particular, numerous migratory waders and threatened species (such as the Orange-bellied Parrot) occur, which are listed under the EPBC Act. The RD (Section 4.7) acknowledges the Cheetham Salt pans, adjacent to the site's south west corner, are habitat for shorebirds.

6.3.9 Native Vegetation Clearance and Compensation

The proposal has been designed to retain most of the River Red Gum/Black Box woodland areas in accordance with the Native Vegetation Act (Regulations) principles that specify native vegetation should not be cleared if:

- it contains a high level of diversity of plant species;
- it is an important wildlife habitat;
- it includes rare, vulnerable or endangered plant species;
- the vegetation comprises a plant community that is rare, vulnerable or endangered;
- it is a remnant of vegetation in an area which has been extensively cleared;
- it is growing in, or associated with, a wetland environment;
- it contributes to the amenity of the area;
- the clearance of vegetation is likely to contribute to soil erosion, salinity, or flooding;
- the clearance of vegetation is likely to cause deterioration the quality of surface or underground water;
- after clearance, the land is to be used for a purpose which is unsustainable

Given the protection to much of the woodland, clearance of native vegetation would be restricted to:

- scattered trees (mainly River Red Gums, although significant trees could be incorporated into open space reserves or road reserves)
- roadside vegetation (although significant stands could be incorporated into open space reserves)
- Chenopod shrublands

It is considered that vegetation clearance would be adequately compensated for by the protection and environmental enhancement of remnant woodlands (including revegetation using overstory and understory species); the creation of vegetated buffers; the creation of vegetated waterways/swales/basins as part of the stormwater/flooding management network; and plantings within open space reserves and roadsides.

Cleared vegetation like tree trunks and large branches/hollow logs should be reused for habitat restoration and in landscaping (i.e. mulching of tree canopies and shrubs). Viable seed (and where practical cuttings) should be collected for revegetation use. The proposed removal and transplanting of remnants is supported in principle, but may only be successful for certain species.

Mitigation of impacts would be through environmental management principles, including formal review and updated planning mechanism at the detailed design stage of each future stage, prior to approval and commencement of construction. Detailed, specific management actions tailored to the particular characteristics of each stage would be incorporated in an Environmental Management and Monitoring Plan (EMMP) for that stage.

An EMMP would provide general measures aimed at avoiding or minimising adverse environmental impacts, through specific mitigation measures, and for achieving SEB's. Construction Environmental Management and Monitoring Plans (CEMMPs) would include the detailed requirements for construction works. CEMMPs would include the methods and requirements for achieving SEB's. Specific performance criteria would be established. An Environmental Officer would be responsible for ensuring that compliance occurs or if it does not, then establishing remedial requirements, and (if necessary) contract penalties.

Prior to the removal of any area of native vegetation, all approvals would be obtained from all relevant groups. Formal approval would be obtained from the Native Vegetation Council through the submission of a vegetation clearance application. SEB and net gain requirements

would apply to the proposal and each of its future stages. Assessment of trees and native vegetation potentially affected by the proposal along the Gawler River floodplain, Thompson Creek and in the southern section of the site would be undertaken in consultation with the Native Vegetation Council.

Once construction has been completed then a management and maintenance plan would be established for the biodiversity areas of the site. From a biological perspective, this would include management requirements for the conservation and revegetation areas, such as watering and replacement of plantings and maintenance of all areas. Council would be expected to be involved in these activities.

This AR concludes that SEBs will be required before subdivision approval for stages affecting remnant vegetation.

6.3.10 Landscaping

The EIS (Appendix 14; Section 6.7.2) states that only local flora would be used in the landscape design and revegetation. In addition, all storeys of vegetation would be used and the placement of these species in the landscape would accord with what was originally present. Thus, landscaping plans should be based on the location within the site and the types of vegetation communities that would have previously existed.

For example, Grassy Woodland species should be used near the Gawler River, Mallee Scrubland species within the central/eastern part of the site and coastal species along the western boundary. This approach would ensure that inappropriate native plants do not invade remnant vegetation. The proposed Residential Planting Design Guide should be based on the same approach.

It is however, anticipated, some parts of the public domain within new neighbourhoods would include exotic or non-indigenous natives where required to achieve particular objectives, for example, the access of winter sun.

6.3.11 Impact of Urban Encroachment on the Environment

The EIS (Appendix 14; Section 6.5) considers that the most likely adverse off site impact will arise from a large new population in a region that is currently sparsely populated. This would include environmental pressures associated with increased population adjacent to the Cheetham Salt pans, the coastal plain, the Gawler River corridor, Buckland Park Lake and Port Gawler Conservation Park.

Proposed mitigation measures include:

- Fencing off biodiversity areas within the site.
- Educating new residents about the biodiversity around their homes, including creation of wildlife friendly gardens and control of domestic animals. This will be done through the community development manager, through ‘welcome packs’ and activities which focus on biodiversity areas (e.g. community planting days and walks/talks from ecologists).
- Provision of adequate waste management facilities for residents.
- Design Guidelines which include indigenous species in plant specifications for revegetation.
- Appropriate landscape design, including liaison with Country Fire Service and Metropolitan Fire Service authorities to establish fire management requirements.

The EIS (Section 8.2 and Appendix 11) states that most potential risks for impacts on the coast and marine environment are minor and manageable. A risk management study was undertaken, based on the Australian Standard 4360:2004 risk management framework, for

both construction activities (initial sub-division and dwellings) and ongoing occupation. The risks identified were calculated to be at a medium level after mitigation measures are applied to those that relate to human behaviour.

The EIS (Section 8.2.1) states there is significant evidence of deer, feral cats and foxes already damaging the coastal ecosystems and that pets (including dogs, cats, rabbits and other exotic animals) could compete with native animals, disrupt breeding patterns and impact on vegetation. They can roam and hunt over a few kilometres around the residential areas. However, the site is approximately 2 km from the coastal plain. All new residents would be provided with educational literature on their arrival explaining the coastal ecosystem and function, and how they can help to maintain the balance and minimise disturbance of animals particularly during the breeding season.

A component of any significant environmental benefit associated with the proposal may include the removal of feral animals currently impacting on the coastal plain.

However, for this to have ongoing benefit there is an ongoing need to manage feral pests, including cats, foxes and rats.

This AR concludes that a cat trapping and destruction program would need to be instigated for land around the site (especially within important habitat areas) to mitigate this risk. The suggested establishment of buffer areas along the Gawler River and the western boundary should be used as the first 'line of defence'. The Playford Council would need to consider a cat and dog management policy.

Detrimental impacts on nationally listed threatened fauna species and migratory waders could potentially have implications in regard to the Commonwealth *Environment Protection & Biodiversity Conservation (EPBC) Act 1999*. It is noted the proponent has only made a referral to the Australian Government Department of the Environment, Water, Heritage and the Arts (DEWHA), pursuant the Act, for Stage 1.

The outcome being that Stage 1 would not impact on matters of National Environmental Significance and would not require an approval from the Australian Government. However, future stages may require assessment by DEWHA to address the cumulative impact of an increased residential population.

This AR concludes a more detailed feral pest management strategy based on lines of defence should be developed for the later stages if development adjoins the Gawler River and the salt pans.

6.3.12 Regional Significance and Potential Impacts

From a regional perspective, the ecological communities associated with the Gawler River and the Barker Inlet estuary is the most important conservation areas located in the Northern Adelaide Plains. The area is also important due to the habitat types present that support species that are threatened both nationally and internationally. This high conservation value has been achieved primarily as a result of not being directly affected by significant levels of human disturbance, especially urban encroachment.

The Playford City Council advised that the coastal environment adjoining the site has been identified in the final draft *Metropolitan Adelaide Coastal Conservation Assessment & Action Plan* (Department of Environment & Heritage, 2009) as having the highest conservation value in the region. The report also identifies the proposal as being a high priority conservation threat.

The establishment of a substantial residential development near the coast has the potential to impact on the Gulf St Vincent (especially the Barker Inlet estuary) through discharges to the marine environment. The Adelaide Coastal Waters study identified urban run-off a significant cause of seagrass loss along the Metropolitan Adelaide coastline. Nutrients (that promote algal growth that detrimentally affect the health of seagrass and mangroves) and heavy metals (environmental toxicants for ecosystems) can be transported in solution or attached to fine sediments in discharges.

High levels of suspended solids can cause turbidity problems that have also been identified as a factor in seagrass loss. Organic matter and gross pollutants (mainly litter) can also be discharged. Groundwater around the proposed site has been recorded as being high in nutrients and pesticides. This is as a result of primary production activities, which is also discharged via the Thompson outlet. Therefore, it is essential that additional discharges of urban run-off and groundwater to the Gulf be minimised.

The location of a substantial urban area within proximity to where mosquitoes breed may also result in mosquito control measures being implemented in the future. In particular, chemical spraying may be undertaken that could have a detrimental impact on coastal habitat, nursery areas and fauna (including food chains).

The EIS (Appendix 14; Section 6.2.1) states that the potential impacts on the River Red Gum woodlands would include:

- Removal of trees and parts of communities and their buffer areas.
- Fragmentation of communities and associated fauna habitats.
- Placement of buildings and gardens too close to woodlands (i.e. without an appropriate buffer).
- Inappropriate fire regimes (arson and bushfire).
- Damaging trees, especially damaging or removing tree canopies and roots during construction.
- Redirecting stormwater and groundwater away from woodland areas and trees.
- Compaction of soil around trees during construction.
- Introduction and spreading of weeds.

The Proponent is proposing to retain around 70% of stands of significant remnant native vegetation on the site. Residential development is proposed within the remaining 30% of the native vegetation. While subdivision is proposed, a significant proportion of this vegetation could potentially be retained in local open space, road reserves and within larger residential allotments, albeit with less environmental value. Even if vegetation needs to be cleared as part of subdivision works, the Native Vegetation Act will require the Proponent to provide an offsetting Significant Environmental Benefit (SEBs). SEB's for future stages should be negotiated in advance of approval for detailed subdivisions. The SEBs will be negotiated with DEH and the Native Vegetation Council.

It is clear that there is significant potential to retain much of the vegetation in the 30% area proposed for subdivision. Given there will be loss of environmental value, it is critically important to ensure the 70% to be retained is managed in such a way as to ensure its long term ecological sustainability.

Where residential stages incorporate scattered trees into landscape designs there should be adoption of an environmentally sensitive construction approach. This would be detailed in the Construction Management Plans for the stages.

The removal or minimisation of urban intrusion into woodland areas has the benefit of avoiding many of the issues associated with preserving large trees, as outlined in the Response Document (Section 4.9):

- Public safety, from dropped limbs.
- Residents' frustration with being unable to grow lawns because the trees use the water and drop litter.
- Bushfires.
- Residents concerns about spiders, bats, snakes and lizards associated with trees.
- Trees can damage house foundations and buildings.
- Residents and potential residents will not like public open space being fenced off.
- Tree roots or limbs may be damaged by soil compaction or trucks during construction.

This AR recommends that for future stages of the development that Significant Environmental Benefits should be negotiated in advance of approval for detailed subdivision.

It is recommended that where residential stages incorporate scattered trees into landscape designs there should be adoption of an environmentally sensitive construction approach.

This AR concludes the proponents intention to protect 70% of remnant vegetation in open space reserves is acceptable, provided detailed subdivision plans also seek to retain as much of the remaining 30% as possible. In any event, SEB requirements will impose offset benefits with any clearance.

6.3.13 Measures to Protect Environmental Assets Within and Around the Site

From a sustainability and biodiversity perspective, the following objectives need to be adopted:

- Protection of the habitat and wildlife corridor values of the Gawler River and floodplain
- Protection of the habitat value of the Buckland Park Lake
- Protection of the coastal habitats associated with the Barker Inlet-St Kilda Aquatic Reserve, the St Kilda-Chapman Creek Aquatic Reserve, the Port Gawler Conservation Park and the Cheetham Salt pans, especially that which supports migratory waders and threatened species. Some of these areas also form part of the Adelaide Dolphin Sanctuary.
- Maintenance of current population numbers of migratory waders and threatened fauna species.

Consideration for a buffer zone could be made along the western boundary of the site in order to protect nearby coastal habitats. This buffer could be integrated with an extensive network of vegetated swales and wetland basins. The buffer zone would enable the impacts from urban encroachment and human disturbance to be suitably managed (particularly cat and weed control). The stormwater drainage system could also provide a physical barrier to the movement of pest species and people. Ownership of and ongoing management responsibilities for protected vegetation areas would need to be determined. The EIS (Appendix 14; Section 6.3.2) states that ownership of the proposed open space reserves would be the subject of negotiations with the State Government, as the proponent considers that having them part of the formal reserve network would add to the value of the SEBs (and comply with the State Government's Biodiversity Policy).

However, it is standard practice for open space reserves to come under the care and control of Council, as part of the standard land division process. It is uncertain at what stage this measure would be implemented and ownership transferred to another party. The proponent

has undertaken to prepare Vegetation Management Plans which will include ongoing arrangements for ownership and maintenance to be agreed with government (see Infrastructure Schedule submitted 18 November 2009).

6.4 TRAFFIC, PARKING, VEHICLE AND PEDESTRIAN MOVEMENTS

For Stage 1 of the project the main access to the site is proposed be from Port Wakefield Road from what is now Legoe Road. Stage 1 proposes to modify Legoe Road by closing part of the road and creating a 'boulevard' entrance to the development (see Figure 1). This is under the Major Development process which allows for roads to be closed using Part 2 (6A) and Section 7A of the *Roads (Opening and Closing) Act 1991*.

The EIS refers to a traffic and transport assessment (EIS, Appendix 24). The main approach in this report was to define the road hierarchy, prepare an access strategy, assessment of traffic impacts, provision of a staged public transport system and the provision of pedestrian/bicycle pathways in the Master Plan (EIS, p 12-1). The generation of traffic was a concern raised by residents in submissions, since the present traffic volume is minimal within Buckland Park itself.

There are detailed road plans for Stage 1 of the development and the following stages have been provided indicatively as part of the overall Master Plan.

The road network for Stage 1 is based on a 'boulevard' which is a realignment of Legoe Road which runs from Port Wakefield Road. The proposed surrounding road network is configured around parks and stormwater management. The allotments along the main 'boulevard' do not have driveways directly onto the 'boulevard', which reflects this road's future role as the main entrance way to future stages of the proposal. A variety of access arrangements are proposed, including service roads running parallel to the boulevard, but primarily all residential allotments are proposed to have driveways and homes facing into local streets.

There will be the provision of a Community Bus from Stage 1 of the development. This bus will provide a link to the public bus services from Virginia and to schools/ school bus stops. There are more details on this bus provided in Section 6.4 of this document.

In their submission DTEI raised a number of issues in relation to the EIS, which DTEI proposed should be considered as reserved matters in accordance with Section 46(8) of the Act. This included the following:

- A concept plan and indication of timing for the signalised intersection at Port Wakefield Road
- A future access strategy for the intersection of Port Wakefield, Angle Vale and Legoe Roads. In particular consideration of a grade separation (crossing with an overpass).
- Consideration of a signalised access point at Park Road and Port Wakefield Road
- Putting aside land for a grade separation or second access point (which should be at no cost to the Government)
- Concern that the approval of the EIS would result in the need for more Government funding in relation to the planning of the road network and public transport.
- Concern that storm events would cut off access via Port Wakefield Road – given the limited access points to the site the recommendation is for that many of internal channel roads crossings they be flood free to the standard of a 100 year ARI.
- Demonstration that the site can be adequately accessed in the event of an emergency or closure of the main road. Particularly in the context of flooding.

The Response Document has provided more information about planning for transport beyond Stage 1. In particular the proponent committed to addressing the issues raised by DTEI in its

submission (RD Section 4.10), and a timetable was provided in the Infrastructure Schedule for this to occur (Annexure 1 to letter dated 18 November 2009).

The RD (pages 61-66) and the proponent's letter of 10 November 2009 provided additional analysis and information on access to and within the site during a flood event.

It proposes that the following be considered as reserved matters in the approval:

- Design of traffic signals at Port Wakefield Road/Legoe Road intersection
- Requirements for future upgrades – in particular the capacity the traffic signals and when the consideration of a grade separated intersection may be more suitable for Port Wakefield/Legoe Road.
- The possibility of a second set of traffic lights at Park Road/Port Wakefield Road
- Concept plans for the upgrade including the land identified for the grade intersection (Response Document Section 4.10)

The City of Playford has identified that it would prefer the houses to front the 'boulevard' for passive surveillance. The proposal is for the boulevard to have fencing treatment on the back yards of allotments. It has been designed by the Proponent like this in the context of the road having a much larger traffic volume in future stages. In this context of potentially 33,000 people living in Buckland Park at the end of Stage 5 of the project, the Boulevard will be a major access point from Port Wakefield Road. In the broader context the design is not unreasonable.

In the context of the project being in stages over a 25 year period the issue of traffic volumes on local roads is difficult to assess for the entire Master Plan area. Parsons Brinkerhoff (EIS Appendix 24) provided an analysis of the impacts on the local road network, this was summarised in the EIS (Chapter 12.3.2) and discussed in the RD page 175. Local road upgrades, and their timing, have been identified. However, as requested by the DTEI the proponent has committed to further investigations. The Proponent is willing to work with DTEI on addressing traffic issues on an ongoing basis.

In conclusion, this AR considers that traffic impacts will be managed acceptably in Stage 1 of the proposal. The AR recommends that conditions require implementation of an infrastructure agreement. The proponent has been working with DTEI and other agencies on future access to and within the site. Importantly, the land has been put aside to accommodate an at grade separated intersection for when traffic lights become unsuitable due to the growth in traffic volume for the Port Wakefield Road/Legoe Road intersection.

6.5 PUBLIC TRANSPORT

While Buckland Park is not currently part of the metropolitan urban area, it is geographically closer to the centre of Adelaide compared other existing fringe development areas. In addition the State Government is currently upgrading road infrastructure in the northern suburbs to significantly enhance vehicle accessibility.

Access to public transport in the Buckland Park area is presently limited to the 900 bus which leaves from Virginia and provides a loop service to Salisbury and Elizabeth. This service currently runs twice in the morning and twice in the afternoon. From Stage 1 of the development a community bus service is proposed which can be used to link up with the 900 bus. The community bus service will also provide transport to other destinations and internally in Buckland Park.

In Section 6.83 of this report the community bus is discussed in the context of the provision of community services.

Parsons Brinkerhoff provided a report to the Walker Corporation (Appendix 24 of the EIS) which sets out a plan for public transport provision within the stages of the Master Plan. It also examines the possible viability of an electrified train service to Virginia. There is no publicly released plan by DTEI to extend rail services to Virginia. In initial stages the likely increases to services would come from making the 900 bus more frequent to service the broader Buckland Park and Virginia region. The initial population growth proposed for Buckland Park may provide an impetus for improving this existing service.

From the Parsons Brinkerhoff findings and feedback from DTEI the Walker Corporation has designed public transport routes to all stages of the development (see proposal drawing 'Proposed Bus Route Strategy 2031'). It has also provided a staged approach to when these services would have sufficient demand to be feasible. The plan provides bus routes which are walking distance for the majority of residents (Response Document Section 4.10).

The Department for Transport, Energy and Infrastructure – have stated in their response to the draft EIS chapter on transport that 'further information is required regarding public transport service frequencies and implications to Government, including cost, for all stages of the development'. The uptake of housing allotments and consequent residents will dictate the viability of public transport. Concept routes and timing have been provided. The proponent's Infrastructure Schedule commits to ongoing discussions with DTEI regarding the timing of future bus services.

In their submissions to the EIS and Response Document the City of Playford has raised issues about the costs of the community bus. The Council does not run community buses to the region and do not have the ability to take the community bus over when it is stopped by the Walker Corporation. The Council was also of the view that a community bus is inadequate as a means of transport to health services.

Access to transport will be a major concern for the first residents in this proposed development. One car families and households without a car will find options for travel to Elizabeth and Salisbury very limited.

However, once enough houses are built and there is significantly increased demand for the 900 bus service this may lead to the 900 bus service being upgraded for the benefit of the wider Virginia and Buckland Park region.

In conclusion, this AR considers that the Walker Corporation will provide a reasonable community bus service for Stage 1 of the development.

The adequacy of existing public transport would be improved with the extra residents to the Virginia/Buckland Park region in future stages of the proposal.

6.6 MOSQUITO MANAGEMENT

The EIS and Response Document rely on ongoing support from the State Government and/or Local Government to carry out initial and ongoing management and monitoring activities. This assumption focuses on funding for this development as part of the already established South Australian Integrated Mosquito Management Strategy 2007. This funding arrangement can not be assumed, and consultation must occur between the proponent and relevant Councils and State Agencies on the roles and responsibilities of the proposed Integrated Vector Management Strategy.

The report provided by Williams and Kokkinn (2008) relied on results from some trapping exercises in January and February, 2008. This time period collected large numbers above the threshold of 100 individuals, per trap, per night of saltmarsh species, expected to be a

nuisance to future residents. The Environment Protection Authority has stated that without effective management it would expect that the entire Buckland Park site would have ongoing problems with two common saltmarsh mosquitoes species, *Aedes captorhynchus* (September to December) and *Aedes vigilax* (during Summer until March). In addition management will be required for urban species that breed in gutters, water tanks, and any areas where water pools from Spring through to Autumn. The EIS states that 'Information Packs' will be provided to new residents, including information regarding mosquitoes so that individual homeowners can ensure appropriate upkeep of yards and precautionary measures. It would be expected that the new development would add to council's Environmental Health resources requirements. Further research and consultation with relevant agencies is necessary to determine the possible impacts and mitigations methods for the use of larvicides and insecticides in sensitive environments and ecosystems.

The South Australian Integrated Mosquito Management Strategy 2007 outlines a number of principles, aimed to balance health and environmental issues that arise with the need to manage and control the impacts of mosquitoes. These principles include planning controls, administrative controls (legislation, policy, guidelines), engineering and design controls, forward planning, consultation and education and adequate modelling.

The EIS (Chapter 9.10 and Appendices 22 and 23) and Response Document (Section 4.15), and the Sansom Institute (letter dated 17 November 2009, Attachment 1) describe the potential impacts associated with mosquitoes. A localised strategy for the management of potential impacts is included in the proposal:

1. Buffers from the Master Plan's neighbourhoods and mosquito habitat of a minimum 3.1 kilometres.
2. Design of civil works to minimise opportunities for stormwater pooling and silt build up which would create mosquito habitat in or near the site. This is a standard requirement of any WSUD approach. The proposed storm and flood water management channels are not water features intended to hold water for extended periods of time. (RD page 42)
3. Mandatory requirements for insect screens to all new homes (RD page 206, 232).
4. Education on mosquito protection, the creation of insect repellent gardens and the maintenance of those gardens and insect screens (RD page 232).
5. Physical barriers in the landscape on the Master Plan's western edge, if required. The proponent and Sansom Institute acknowledge this form of management requires further research on its efficiency. However, if required, this would be decades away (RD page 246).
6. If required an Integrated Vector Management Strategy (IVMS) involving state and local government.

Notwithstanding this, the proponent has committed to providing more detailed investigation of mosquito numbers prior to commencement of Stages 3, 4 and 5 (RD, p. 246).

The AR concludes that mosquitoes are unlikely to be a significant issue for Stage 1. For the later stages of the development research and trapping would assist in determining the appropriate measures for mitigation.

The use of physical barriers in the landscape, such as treated hedges is not sufficiently discussed in the EIS or Response Document to comment on their suitability. Details of

the expected height, length, width, chemicals to be used on barriers, and documented local trials should be available for assessment of future stages.

It is recommended that an agreement be reached between the proponent, Department of Health, the EPA and the City of Playford before approval is given for Stages 3 to 5, on the details of a management strategy, including monitoring, costs and procedures.

6.7 URBAN DESIGN

6.7.1 Sustainable Measures

Due to climate change, the best practice approach is considered to be to provide for the long term while placing minimum demands on the environment. This means identifying measures that can sustain that view and minimise the proposals ecological footprint. This is discussed in the EIS (Chapters 7.3, 9.1, 9.3.2, 9.5). Sustainable measures are discussed further in Section 6.3.1.

6.7.2 Urban Design

The Master plan provides a framework for the proposed development that appears adequate with varying densities, lifestyle opportunities, sufficient open space/recreational facilities, educational and community facilities. The proposal would also provide a balanced mix of retail, commercial and industry uses. The proposed development is creating a new suburb where new infrastructure would need to be provided.

The proposal envisages 12,000 new dwellings in a range of allotment sizes ranging from 150m² through to 500m² plus. Higher density is proposed closer to the centres and transport routes. The Proponent is proposing new facilities within Buckland Park given its separation from the existing Adelaide urban area.

The proposed development is to be staged over a number of years. Stage 1 incorporates the neighbourhood centre and a proposed 'display village'. The centre and display village would be viewed as a low scale single mass in relation to its flat open landscape surroundings.

Substantial landscaping in Stage 1 to create a positive environment in advance of further stages of the development is built.

6.7.3 Character

The EIS (Chapters 13 and Section 9.10), mentions character and identity as being important to the proposed development, a community with its own distinct character integrated within the natural and rural setting. Furthermore the proposal would provide themed precincts, entry statements, themed landscaping and street furniture to promote a sense of belonging and uniqueness that encourages community ownership. However, detail of the nature of such themes has not been provided in the EIS.

Commercial and residential buildings should use a variety of materials, landscaping, architectural detailing and ameliorated roof forms to avoid visual dullness. Air conditioning plant/mechanical plant would need to be screened or housed within the roof form. The rear of exposed buildings or loading areas should also be screened or a landscape buffer provided. For a large proposal there are benefits in the investment of public art. Entry statements/gateways to the site and the centres, where possible, should include some form of public art.

The proposal needs to provide sufficient places for people to meet. A vibrant place can define its character. Stage 1 provides a small focused activity area in the Neighbourhood centre. However, there needs to be adequate shading devices (pergolas, canopies etc), facilities for stopping, versatile spaces and seating throughout the whole of the development.

Buckland Park's topography is flat with mainly denuded areas of open dry land. It is important that this proposal creates its own value within this landscape through revegetation and landscape corridors. The Master Plan shows sufficient landscaping in the form of wetlands, linear open space corridors, parks and landscaped areas in general.

The interface between the proposed uses and the surrounding is important. The proposal needs to have substantive vegetated buffers that make the transition from rural/horticulture into residential land use contextual.

The AR concludes that future stages could be built by different building companies and as such could create a variety of styles.

Themes would need to be clear in the first instance, if the proponent has a considered vision and wishes to manage the context in which the proposal develops.

6.7.4 Neighbourhood Centre/Display Village

While at this stage it is a concept design, the proposed neighbourhood centre has a contemporary design that is articulated well (see Figure 10 of this document). The building design comprises outward facing shops and a supermarket to rear of those shops. Consideration has been given to community space with an adequately landscaped car park and town square. There are sufficiently articulated frontages to the shopping centre. The built form is low scale with the sales office being the only two storey building at this stage. The orientation of the building's entrances onto the public realm with car parking directly in front allows for passive surveillance. The neighbourhood centre has been designed so it can be expanded at a later stage.

Consideration should be given to glazing on the north eastern side of the community building to allow natural surveillance of the children's playground. Fencing should be provided around the play ground due to its proximity to a main thoroughfare.

Due to the potential heat factor of the location, canopies/shading devices should be provided for pedestrian shelter as an integral part of the shopping centre façades.

The neighbourhood centre is within easy walking and cycling distance from within the residential area allocated for Stage 1 development.

There appears to be a consideration for art in the Stage 1 neighbourhood centre development. Art can make a contribution to the character of a place and the EIS has included theme and character as part of the proposal.

This AR concludes that fencing should occur around the proposed playground and that sufficient shading devices be provided within the neighbourhood centre, parks and integrated within the facades of the shopping centre.

The proposal also includes a display village adjacent to the neighbourhood centre. The proponent has advised that this village will share car parking with the Centre, and the sales office is within the Centre site. The display village will comprise 32 free-standing detached dwellings of one or two stories. They will be set back from the allotment front boundary at a minimum of 4m. Site coverage will be a maximum of 50%.

This AR concludes that the display village is suitably located, and the design parameters outlined above are acceptable. However, detailed dwelling designs have not been submitted, and accordingly this should be a reserved matter.

6.7.5 Linkages/Connectivity

Places need to be easy to get to and need to be physically and visually integrated with their surroundings. In this proposal the visual amenity would need to be created at initial development with a balance between the natural and man made environment. The Master Plan shows adequate connectivity between the different precincts with sufficient pedestrian and cycling links. Off street pedestrian and cycle paths are proposed. These links would ultimately need to connect into public transport or the community bus service proposed. Places with activity need to be linked into the pedestrian and cycle paths. The shopping centres, schools etc and other activity areas (public spaces) proposed are within walking distance to their nearest residential neighbourhood. A network of pathways is proposed that interlinks the open space through the linear open space corridors and along the Boulevard. The road network is integrated with a limited number of culs-de-sac.

The AR concludes that the Master Plan shows adequate manoeuvrability within the site for pedestrian and cyclists. Due to the location of the site it is important a transport system is provided and linked to the nearest public transport service.

6.7.6 Crime Prevention Through Environmental Design

The EIS (Section 13.3) discusses public safety and security issues and creating convenient, safe and pleasant environments. The proposed development seeks to reduce the opportunities for crime in the proposed urban environment through the use of natural surveillance, legible space (space that avoids entrapment), good design, good lighting, convenient permeable routes and the management of well maintained places.

The EIS proposes there will be less vulnerability of a place if the community takes ownership of it and good access is provided. Good access is often determined by the positioning of a building, its design, the activities that occur (day/night) and the public space. The parks are located as such that the residential component fronts onto them.

The layout allows for passive surveillance with the allotments orientated with direct views over the open space areas. The linear open space corridor is abutted by two public roads, again allowing for passive surveillance.

This surveillance is also dependent on the type of landscaping proposed in these areas, that the types of plantings are not too dense to hide potential assailants and at the same time allow for direct lines of sight. The proposal also indicates the use of legible signage that directs people to places effectively.

The proposed road alignment and integrated network of streets appear to provide adequate sight lines, but again, until the development is constructed, plus the use of effective lighting it is difficult to indicate at this stage its workability. Private space and public space would be delineated. Vibrant, lived in urban space, which has integrated streets with informal surveillance, would go a long way to promoting a sense of security.

This AR concludes that at this stage further information is required regarding the built form and the types of activities that would occur to ensure that sufficient safety and natural surveillance have been built in. This will need to be developed through detailed design stages.

6.7.7 Residential Design Guidelines

The proponent has prepared a draft residential design guidelines (Buckland Park Sustainability Guidelines). These guidelines for future residents encompass a range of issues from siting and design through to biodiversity, water use and waste management. Again, themes are mentioned throughout the EIS but detailed themes have not been decided. Adaptable building form is encouraged as well as disability access and the ability to reconfigure buildings for different uses.

The purpose of the document is to help equip potential land owners to achieve a more sustainable building outcome that considers the whole of lifecycle approach to living that is integrated within the whole of the proposed development. An example of this is the proposed communal rainwater harvesting system for the whole of Buckland Park. The proponent has also committed to a number of sustainable objectives including the notion of providing packages to future residents below the current price that provide more energy efficient goods in the form of solar hot waters, gas air conditioning to be incorporated within the new dwelling.

Sustainability measures encouraged are:

- Passive solar energy in the form of placement of windows, orientation of living areas, passive heating and cooling, thermal mass, ventilation and glazing.
- The use of recycled and low greenhouse intensity materials.
- The investigation renewable or alternative energy sources such as solar thermal, photovoltaic, wind turbines
- Solar hot water
- Eaves, verandahs and balconies.
- Optimized roof forms to allow for future photovoltaic cell installation, maximum rainwater collection and shading of outdoor areas.

The Guidelines (Section 2.2) also state that buildings constructed at Buckland Park should have the capacity to accommodate substantial change in physical, social and economic environment over their lifetime.

Having stated that and taking into consideration the above sustainability measures the proposal would go beyond satisfying Part J of the Building Code of Australia.

The proponent notes the Design Guidelines will be implemented by encumbrance on the Certificate of Title of each residential allotment (RD page 231).

WSUD principles will be applied to the design of stormwater management facilities (RD page 249) and in the design of the public domain (RD page 55).

Other themes will be implemented during detailed land division design in Stages 2 to 5, and by compliance with, biodiversity and stormwater management systems included in the proposal.

The guidelines need investment in appropriate residential design that is site specific and climate responsive. WSUD guidelines within the Sustainability Guidelines should be mandatorily applied at all stages of development activities including domestic buildings.

6.7.8 Landscape Design/Open Space

The EIS (Appendix 14; Section 6.7.2) states that only local flora would be used in the landscape design and revegetation. In addition, all storeys of vegetation would be used and

the placement of these species in the landscape would accord with what was originally present. Due to the age and maturity, the river red gum and black box woodland should remain intact and be incorporated into any landscaping plan where possible.

Landscaping plans should be based on the location within the site and the types of vegetation communities that would have previously existed. For example, Grassy Woodland species should be used near the Gawler River, Mallee Scrubland species within the central/eastern part of the site and coastal species along the western boundary.

This approach would ensure that inappropriate native plants do not invade remnant vegetation. The proposed Residential Planting Design Guide should be based on the same approach.

Water efficiency is promoted through application of Water Sensitive Urban Design (WSUD) techniques. Wetlands, bio-filtration beds /rain gardens, vegetated swales and landscaping are proposed to treat stormwater that has been harvested for reuse. The proposed ponding, wetlands and waterways are where the retention of groundwater occurs. This water retentive area would create a buffer immediately that supports trees and shrubs, (EIS Chapter 7.5.2). Irrigation of landscaping would also use recycled water. Landscaping would be incorporated within the stormwater network that includes the existing Thompson Creek. Thompson Creek is an ephemeral shallow creek. Comments regarding the embedding of water sensitive urban design into this proposed development are made in Chapter 3.

Some of the park/open space areas are to be used for detention basins and as such would potentially impact on the amount of open space area that was actually available for recreational use during high rainfall events. This, however, is not a significant issue as high rainfall events are rare and short lived. Generally the parks/open space corridors have sufficient landscaping. Chapter 3.2.1 in the EIS indicates the open space networks that have a provision for cycling/pedestrian paths would be planted with indigenous vegetation. The Boulevard, as the primary road through the development would have formal and generous type landscaping.

There is an adequate amount of open space/parks provided in the Master Plan. Stage 1 provides reasonable access to two parks that are a reasonable size. The town square, a focus within the Stage 1 neighbourhood centre makes use of water features and varied landscaping, including soft and hard paved areas. A mix of deciduous trees and evergreen trees would be used throughout the car parks to reduce the impact of hard paving and provide shelter and shade from the elements, the wind and the sun. Shelters for public transport would need to be provided.

This AR recommends the use of efficient water landscaping and the use of local indigenous species. A landscaping plan should be provided that improves the biodiversity and ecological habitat outcomes for the area. Due to the flatness of the site there is potential to include structured earthworks to create soft undulations for visual interest.

This AR concludes that the landscape plans are conceptual and as such landscaping plans/details would need to be provided. However, it is recommended that water sensitive urban design should be an under pinning principle and requirement in a development of this nature, rather than a option to be encouraged and WSUD guidelines must be included in all landscaping specifications. Street furniture, lighting and shading devices also need to be considered. Due to climate change and the potential impact of rising temperatures, drought tolerant species must be a consideration.

6.8 EFFECTS ON COMMUNITIES

The Response Document has provided further information to the EIS in relation to the existing population in Buckland Park. At the 2006 Census the population of the Buckland Park State Statistical Suburb was 250 people. There were a high proportion of people who spoke a language other than English at home (50%). Other than English, the main languages spoken were Italian, Vietnamese and Greek (based on the ABS 2006 Census, Response Document Section 4.8). The impact of up to 33,000 people into this area is a significant impact. However, this impact would occur over a 25 year time period as the stages of the Master Plan are undertaken. Currently there are no community facilities, health services, schools or shops in Buckland Park, the nearest facilities are in Virginia. Most of the roads in the development area are unsealed and blocked by property gates.

6.8.1 Health

The EIS states that the eventual population size at Buckland Park (approximately 33,000 people) will not be sufficient to support a public hospital. The EIS states that the nearest hospital is 22 km away at the Lyell McEwen Hospital in Elizabeth (EIS Section 14.1.1). A 'GP Plus' facility is being developed in Elizabeth which is due to open in late 2010 (Health SA Fact Sheet). These two facilities would be the main providers of health care for emergency and complex health care.

From Stage 1 of the development the proponent has stated it will provide a community bus which will be available to transport people to health service providers. The Proponent has advised there is some capacity for new patients for the existing GPs in Virginia.

There has been provision in the Master Plan for health facilities to be accommodated in the neighbourhood centres and the district centre. The Response Document has restated the commitment in the EIS that the Walker Corporation will actively search for health providers like GPs and dentists (Response Document Section 4.8). The Proponent has said it will provide projected population numbers to the Department of Health to assist them in planning for public health services in the broader region (Response Document Section 7.13). With likely population growth in Virginia and Two Wells a regional approach to planning health services is important.

In conclusion, this AR considers that the proposed community bus will assist residents with transport to health facilities in Stage 1. The Proponent and the Department of Health will pursue options for health services in Buckland Park in future stages when there is a higher population to support the services locally.

6.8.2 Education

In the EIS the proponent has provided projected numbers of school aged children and possible timing for when schools in Buckland Park would be built in the EIS. The timing of any schools is subject to the timing of population growth, which is subject to when houses are bought in the stages of the development. The Department of Education and Children's Services (DECS) has indicated it is willing to have ongoing discussions on education provision as more houses are occupied and demand increases.

In the Master Plan the number of students projected is 3,762 primary students and 2,046 secondary students in the year 2046 (EIS Section 14.1.3). This is with the peak number of around 33,000 people. The provision of suitable sites for schools is part of the Master Plan and the eventual number of schools is proposed is four primary schools and two secondary schools. This would be provided in a mix of public and private providers. The locations of

these school sites have been determined in consultation with DECS and the present practices in master planning communities.

The City of Playford has advised that there can be challenges in negotiating shared funding arrangements for ovals.

Discussions between DECS and the Walker Corporation have occurred in relation to the provision of primary schooling for the first years of the development. Virginia Primary School (the closest primary school to the site) has the capacity for more students with the use of demountable classrooms. A positive to this could be that student numbers will increase funding and staffing levels to Virginia Primary School (Response Document Section 4.8).

Once student numbers are increased, there may be option for a 'holding school' where a temporary school is built using buildings that could be adapted to other uses (e.g. conventional houses or another community use) until a larger school on the identified school site is developed.

In relation to secondary education, Buckland Park is presently in the zone for Smithfield Plains High, but students in the Buckland Park/Virginia area attend Gawler High School. Gawler High School runs buses to the region as part of their role in serving a broader regional area than the Gawler Township. It is possible that Gawler High School could become a Birth to Year 12 School. This would combine several primary schools, preschool and childcare onto one site.

Smithfield Plains High School is planned to close as part of the 'Education Works' initiative. The location of the planned Munno Para West School (providing for birth to year 12) is about 20 km from Buckland Park and is scheduled to open in Term 2 of 2011. The bus service to the Munno Para West School, Gawler High School and other high schools in the northern Adelaide region will be re-examined by DECS as numbers increase due to new developments in the region.

Non Government schools in the northern region currently run buses in the region based on the demand. Trinity College has a campus near Angle Vale and St Columba College in Andrews Farm may be options for residents. The Walker Corporation will need to work in co ordination with DECS and Non Government school providers to determine the feasibility/timing of Non Government education in the Buckland Park development.

In conclusion, this AR considers that the demand for student places in schools will be met in Stage 1 within existing Government and Non Government School providers.

Strategic planning of school services for future stages will be considered as the population increases. The provision of bus services is essential for high school students and the Proponent will work with DECS and Non Government providers to ensure that services are available.

6.8.3 Community Services

The proponent is proposing to have a community space from Stage 1 of the development. Other facilities and services would be provided as the population increases and the other neighbourhood centres and the district centre are developed. A community worker is proposed to be employed by the Proponent to assist new residents, and this role will be discussed with the City of Playford (Response Document Section 7.8). The Proponent has said it will pay for the community space and the community worker from Stage 1 of the development.

The Walker Corporation has stated in their commitments section of the Response Document that the community space will be suitable for a range of activities. It will also provide the furniture, internet connection and materials required to run the community centre. Anticipated activities include religious worship, playgroups, clubs and the facilitation of the community bus (EIS, Section 14.18.2).

The EIS and its Master Plan include a District Centre which the Walker Corporation has identified as being able to accommodate facilities like a library, community centre, places of worship, health services and emergency services (EIS Section 14.18.1). The District Centre will be located close to Port Wakefield Road.

Eventually the Master Plan proposes to accommodate three neighbourhood centres, to be established by 2036. Provision has been made to provide space for community uses within these neighbourhood centres (EIS Section 14.18.2). The neighbourhood centre proposed in Stage 1 is proposed as being a 'temporary' centre which can be closed or incorporated into another use when the District Centre is developed in the later stages of the development.

Access to services outside Buckland Park is proposed to be provided by a community bus. The community bus will be provided from the first residents occupying their homes. It will be used to link through to the 900 bus which leaves from Virginia. It is also anticipated that this bus will be flexible for providing transport to nearby shopping and medical centres (Response Document, Section 4.10). However the proposed community bus can't service every need.

In conclusion, this AR considers that the Proponent has a commitment to providing the community services outlined for Stage 1 of the development. There will be work required in conjunction with the City of Playford and Virginia residents to ensure that future stages provide services which are suitable for Buckland Park and the broader region.

6.8.4 Recreation

Recreation facilities are proposed in the Master Plan including linear parks, ovals and local parks. Indoor recreation areas are anticipated in the later stages of the development and would be located adjacent to the centres. The ovals, in particular, are planned to be adjacent to school sites to maximise their use (EIS Section 14.1.6).

The Response Document has provided more detail on how the recreation areas would be managed and the anticipated landscaping plan. The proponent is proposing to work closely with the City of Playford on what type of sporting facilities would be needed and provide for existing gaps in the wider region.

Feedback was provided by the City of Playford on recreation areas proposed. The comments included there were issues with the open space not being functional and sufficient to meet community demand. This concern relates to open space being provided as drainage channels or biodiversity areas. The drainage area to the south is within a low lying area which may mean the area is subject to flooding particularly in the winter months. The City of Playford has also stated that it is their experience that shared ovals between schools, council and sporting communities can be difficult to manage. It was also asked if the recreation area in Stage 1 of the development could be moved to be adjacent to the neighbourhood centre.

The Office of Recreation and Sport stated in their submission to support the EIS that it was pleased the proponent is providing recreation areas within a MOSS (Recreation) Zone. The MOSS (Recreation) Zone runs along the Gawler River and incorporates areas of significant trees along and near the River banks.

While there is not a specific commitment in the Response Document in relation to the MOSS (Recreation) Zone, this area has been identified as a 'no go zone' as part of further work done for the Native Vegetation Council and Significant Environmental Benefits (SEB).

In conclusion, this AR considers that the facilities proposed in the Master Plan would substantially increase recreational opportunities for Buckland Park and the Virginia region. Provided it is well maintained for its purpose, the Stage 1 proposal for an oval located next to a school site is considered suitable.

6.8.5 Affordable Housing

The EIS identifies that the cost of land in this proposed development will be achieved by having smaller houses on smaller allotments. The 15% required for the development overall will also be achieved by minimising the construction costs. The distribution of the affordable housing will be predominantly near the planned centres and public transport routes. The EIS states that the provision of new housing in Buckland Park over a 25 year time period will contribute overall to housing affordability (EIS Section 14.5)

With Stage 1 feedback given to the proponent from the Department of Families and Communities (Housing SA) was that the 15% affordable housing should not be limited to smaller allotments. The housing identified as being affordable housing will have an Affordable Housing Land Management agreement placed on their certificates of title. An *Affordable Housing Plan* is proposed in the first stage of this development in consultation with Housing SA.

The proportion of affordable housing is planned to be lower in the earlier sub-stages and higher in the later sub-stages. The later stages of the proposal may include small villas and apartments as part of a retirement or aged care facility.

In conclusion, this AR considers that the requirements of Affordable Housing have been met for Stage 1 of the proposal. The Proponent will be required to enter into Land Management Agreements for future stages of the development.

6.8.6 Effects on Adjoining Area

The adjoining land use to this proposed development area is mostly horticultural land. There are rural living sized allotments to the south of Stage 1 which presently have a combination of glasshouse, crops and hobby/small business activities. The Jeffries Soils facility also lies to the south and the Lewis Nursery lies to the south east of the site. Jeffries Soils located activities in Buckland Park after ongoing complaints from operations in Wingfield.

In response to concerns in relation to Jeffries Soils raised by Jeffries Soils and the EPA the proponent has proposed a 1.7 km buffer. This buffer would be between Jeffries Soils' facility and the nearest residential neighbourhood planned. This buffer is based on modelling done for Appendix 13 – *Air Quality Assessment* undertaken for the Walker Corporation by Connor Holmes. The main reason for the buffer is to ensure an appropriate separation between Jeffries Soils and future residents in relation to odours from the compost making activities at Jeffries Soils. This will minimise potential complaints (Response Document Section 4.12).

Adjacent to Stage 1 to the south is The South Australian Potato Company (SA Potato Company) which grows potatoes on 80.95 hectares of land. Its issues relate to their current activities being potentially restricted as a result of the rezoning.

The activity of growing potatoes requires them to spray chemicals. It is also concerned that the 'jagged' land parcels associated with the development does not provide for future linkages

to the development – the rezoning will only result in orderly and economic development within the site and not the adjoining areas. In Stage 1 there are 18 proposed allotments adjacent to the SA Potato Company land. A Land Management Agreement would be required between the Walker Corporation and the SA Potato Company to allow these allotments to be created, given the proximity to the existing potato operation. The land division proposes deeper blocks to provide some internal buffer between the SA Potato Company’s activities (see Figure 8 which shows an exclusion zone on the 18 blocks).

In their submission, Lewis Nursery raised issues in relation to access to Park Road, flooding, stormwater, ground water and land use interface issues. Currently trucks access the Lewis Nursery site from Park Road on a 24/7 basis. It was concerned about the safety for new users of the road. Also, it was concerned that an appropriate buffer is provided to enable the continued use of agricultural chemicals so it can continue their business unaffected by the proposed development. The Proponent has stated that it believes the proposed development will not impact on Lewis Nursery’s activities. It has stated that the Nursery may benefit in terms of providing landscaping materials.

Windamere Park is adjacent to the proposed development site in later stages to the west. This property has a residential dwelling and olive grove.

The Department of Planning and Local Government held discussions with staff from PIRSA about the impact of rezoning land to residential uses. There are restrictions on horticultural uses on properties adjacent to residential areas. A minimum 20 metre buffer is required between horticultural and residential land uses, if suitable landscaping is provided. Otherwise the buffer required is 40 metres. A rezoning process can investigate options for reducing the likelihood of undesirable horticultural uses being developed adjacent to the proposed residential areas.

An adjacent owner to Stage 1 of the development has requested modifications to the design to address security and visual amenity concerns. The Response Document has amended the design to Stage 1 to include a 20 metre buffer using open space to separate their boundary from the nearest residential development (Response Document Section 4.12)

In conclusion, this AR considers that the Proponent has sought to address concerns of adjoining neighbours. The interface between residential and horticultural uses will be an issue to be addressed into any future rezoning. In addition the AR recommends deletion of 18 allotments in Stage 1 abutting the potato farm.

6.8.7 Effects on Virginia

Virginia is the nearest township to the Buckland Park area. There have been issues raised in relation to shopping in Virginia already being vulnerable to competition. There were also issues raised at the information sessions about the ability of the existing services to cope with additional people from Stage 1 and future stages of the proposed development.

The EIS states that there is room within the existing Virginia Primary School and preschool for additional students in the initial stages of the development (EIS Section 14.11.1). This is likely to be the scenario for Stage 1 of the development, beyond Stage 1 the timing of new facilities would need to be coordinated carefully.

Existing health services within Virginia are GPs and limited specialist facilities (EIS Section 14.11.3). These services may cope with initial increased demand from Stage 1, but is likely to be insufficient for future stages

Indicatively agriculture/horticulture and associated industries were the main industries of employment for people in Virginia. The EIS states that the development will be an opportunity to expand the types of employment available in the Virginia region (EIS Section 14.2). It is noted that construction workers tend to be a highly mobile workforce and subject to a competitive process. Beyond Stage 1 the Master Plan may provide jobs in education, community services and retail.

In conclusion, this AR considers that the initial impacts on Virginia will be positive in terms of employment and additional income for shops. Coordination is required for provision of services beyond Stage 1. The Proponent will need to cooperate with SA Health and DECS in relation to the coordination of health and education in a regional context.

6.8.8 Aboriginal Heritage

The proposed site was inhabited by the Kaurna people prior to European settlement. There are three previously identified Aboriginal heritage sites. Field work undertaken for the EIS has identified six more sites and area with archaeological potential. In the Response Document the proponent has said that applications for a determination under Section 12 of the Aboriginal Heritage Act 1988 will be lodged to the Minister for Aboriginal Affairs and Reconciliation, prior to the lodgement of the Stage 2, 3, 4 and 5 land division plans (Response Document Section 7.14)

6.8.9 Non Aboriginal Heritage

The nearest identified building of interest is the Buckland Park Homestead, which is located to the north of the proposed site on the opposite side of the Gawler River. This Homestead is unlikely to be impacted by the development.

The proposed development site has been a pastoral estate and area for glasshouses. As part of the settlement process native vegetation has been cleared for roads, houses, agricultural/horticultural activities.

6.9 EFFECTS ON INFRASTRUCTURE REQUIREMENTS

The proponent has been in discussions with infrastructure providers in relation the required needs for the proposed development at Buckland Park. A Schedule of Commitments is required to ensure the needs of Stage 1 (in the first instance) are met.

Chapter 15 of the EIS provided information on upgrades needed for Stage 1 and indicatively for Stages 2 to 5. Section 4.6 of the Response Document has given a summary of infrastructure issues for the development. The required infrastructure is shown on proposal drawings 'Buckland Park Regional Electricity Infrastructure', Buckland Park Regional Gas and Telecommunications Infrastructure', Buckland Park Regional Transport Infrastructure', and Buckland Park Regional Water Infrastructure', all dated February 2009, and included in the EIS and attached to the RD at Appendix 7).

Infrastructure providers gave comments on required upgrades in submissions to the EIS.

There are existing electricity substations at Virginia, Angle Vale and Bolivar. In particular the Virginia substation was estimated as operating at 80% of its capacity. ETSA have identified the present capacity of the electricity infrastructure and what the proposal would require. This would include:

- Upgrading transformers in Virginia

- New lines between Angle Vale and Virginia
- Replacement of existing overhead lines between Virginia and Bolivar
- A new Buckland Park substation on the site
- Relevant easements for electricity infrastructure

The APA group and EPIC Energy have assessed the proposed development's need for gas. There is existing infrastructure which would need to be upgraded. Initially the upgrade would be needed to meet the reticulated gas needs for Stage 1 and then further upgrades as the stages of the project progress. It would require a new steel main from an existing Epic Energy gas gate station. The Epic Energy gas gate station would also require upgrading

In relation to telecommunications has been confirmed that telecommunications infrastructure can be upgraded to meet the needs of the proposal. High speed internet access via ADSL 2+ can be made available to the allotments. The Australian Government is proposing to mandate the provision of Fibre to the Premise (optical fibre) networks in new housing developments approved after 1 July 2010.

In relation to waste water and water infrastructure, the Bolivar Waste Water Treatment Plant (WWTP) is approximately 14 km from the development site and Little Para Water Treatment Plant (WTP) is about 20km away. The site presently does not have stormwater or flood water infrastructure. SA Water has assessed the proposal's requirements for potable water and concluded that for Stage 1 and up to 3000 allotments there are a couple of different options requiring up to 9 km of mains pipes. To service the finished development (an estimated 12,000 allotments) SA Water has identified three options. The preferred option identified requires approximately 19.5 Km of water mains from the Little Para WTP with the construction of a 20 mega litre storage facility.

It is considered that the Bolivar WWTP will have sufficient supply to provide recycled water to the development using a 14km mains pipe.

The proposal is planning to capture 50 ML (per year) of stormwater to supplement the recycled water supply. This water would be treated using wetlands to the north of the development site and would be stored in the aquifer for re use.

Stormwater and floodwaters that are not reused are proposed to be managed through a combination of channels and a detention basin

In conclusion, this AR considers that the requirement for infrastructure is significant for the site. The Walker Corporation has already undertaken work towards negotiating agreements with infrastructure providers. It is envisaged that a Schedule of Commitments will provide more certainty on the provision of infrastructure. This AR concludes that final arrangements for infrastructure can be secured as part of the Certificate of Approval stage of the land division process (Section 51 of the *Development Act 1993*).

6.10 IMPACT ON TRUNK INFRASTRUCTURE

The EPIC Gas Pipeline runs from Moomba in the north east of the State through to Torrens Island. This major trunk gas pipe runs near to the site in the vicinity of the proposed district centre. Engineering standards for this pipeline require that hazard/risk impact associated with the pipeline be considered. A review by the proponent of the hazard risk has concluded that only the south eastern corner of the district centre site is within the distance in which hazard risk for sensitive uses should be considered. The Master Plan shows this area as reserve. Accordingly the risk question is dealt with appropriately.

Accordingly, this AR concludes that hazard risk associated with the EPIC Pipeline has been considered appropriately.

6.11 ECONOMIC ISSUES

6.11.1 Economic Activity

The main land use in the Buckland Park area is agriculture, generally grazing, orchards, market gardens and glasshouses, with associated dwellings. The development of a residential neighbourhood within such an existing agricultural area poses several questions, including the loss of agricultural production value of the subject land, and the potential for constraint of adjoining agricultural operations.

Site studies undertaken for the EIS estimated the total farm gate value at \$786,000 for production from businesses operating within the proposed development site for the financial year 2007/2008. Noting that this value would fluctuate annually, this indicative figure represents less than 1% of the Virginia region's total farm gate value (EIS Section 16.1). The economic effect of the change in use will change over time – the immediate reduction in direct and indirect agricultural value creation will be eclipsed as the development leads to local population increases and resultant increases in turnover for businesses operating in the adjacent Virginia and Two Wells areas, as well as further afield in Angle Vale, Munno Para, Gawler and Elizabeth. The staged nature of the development over 25 years, including the introduction of new service facilities, suggests a likely gradual transition in consumer dynamics between centres over the period, allowing time for businesses to respond accordingly.

Overall, modelling prepared for the proponent indicates that by the completion of Stage 5 of the proposed development, residents will contribute \$17m in retail spending annually to the region's economy (EIS Section 16.2).

Both the proposal and several submissions discuss the impacts on adjacent businesses. From an economic perspective, it is considered that the proposal described should not unreasonably hinder these parties from continuing approved operations; in some instances synergies have been identified between the proposed development and those operations.

6.11.2 Employment

The proposed development will result in significant employment opportunities in infrastructure construction, housing construction and a range of service industries, with modelling undertaken by the proponent indicating construction, and other operational employment resulting directly from the development in the order of 10,687 full time equivalent jobs, comprising a mix of full time, part time and casual positions. This level of job creation can be expected to result in additional indirect employment, with the proponent indicating that the project would result in an estimated 15,000 additional jobs (EIS Section 16.3).

This AR concludes there will be significant new employment opportunities coming from the development.

6.11.3 SA Strategic Plan

From an overall economic impact perspective it is considered that both the construction and operational phases of the proposed project will result in positive economic outcomes for the new development, local area, and wider region, with projected average direct and induced value creation of \$185.8m per year across all aspects of the project (EIS Section 16.3). The

additional supply of land for housing will also assist in supporting Adelaide's housing affordability competitiveness which is a critical factor in terms of attracting and retaining population. In delivering these economic benefits, this development would support several SA Strategic Plan targets, including Target 1.5 (business investment), Target 1.10 (jobs) and Target 1.22 (total population).

In conclusion, this AR considers that there will be positive economic impacts from the development at the construction stage. Then, when houses are occupied, there will be positive economic impacts on retail and services to the broader region. The loss of income from agricultural/horticultural activities within the site is small in a regional context.

6.12 RISK/HAZARD MANAGEMENT

6.12.1 Public Safety During Construction

Construction Management Plan (CMP) is proposed to be provided for each stage of the project. This includes a traffic plan, pedestrian management plan and a consultation strategy. The Walker Corporation has said it will address the statutory requirements for management of construction (EIS Section 17.1).

6.12.2 Prevention and Management Procedures

The proposed CMPs for each stage of the proposal will include a Hazardous Materials Management Plan, a Soil and Erosion Management Plan and a Water Management Plan. These plans will aim to manage the temporary services and activities on the construction site. The Walker Corporation also proposed so have fire management processes and procedures for storing hazardous materials (EIS Section 17.2 to 17.4).

6.12.3 Obstacle Limitation Surface for Airfields or Aerodromes

The proposed development does not impeded on the activities at Parafield Airport and does not propose buildings which would exceed the Obstacle Surface Limitations (OLS) in relation to Edinburgh Airport (EIS Section 17.6).

6.13 CONSTRUCTION EFFECTS

The planned stages of the project are proposed to occur over a 25 year period from 2010 to 2036. This is associated with a staging plan which gives details of:

- Existing transport infrastructure and services
- Location of future transport infrastructure, facilities and services
- Minimising construction impacts on earlier stages of the project (EIS Section 3.3.1)

A Construction Management Plan (CMP) is proposed to be prepared for each stage of the development. The aim of the CMP's will be to minimise the impact of transport and storage of construction materials on the existing environment. This includes a construction traffic management plan, measures to protect public safety, noise and air quality management, a consultation strategy, heritage management, flora and fauna management, soil and erosion management, water management (including ground water), acid sulphate soil management and a plan for the provision of utilities to support the construction activities.

The Response Document has provided more information on the Vegetation Management Plan. The aim of this plan is to negate the offsite impacts, monitor impacts and undertake remedial works if impacts occur (Response Document Section 4.9). The Management Plan is

proposed to include fencing to limit access to sensitive areas, watering, replacement plantings and ongoing maintenance. Ongoing maintenance will occur after the development has been completed. As the timing of handover has not been finalised, the City of Playford will need an agreement to plan for their own maintenance once the open space/reserves are handed over from the Proponent.

The proponent has committed to providing an overall Construction Management Plan, as well as more specific plans relating to vegetation and traffic.

6.13.1 Environmental Management and Monitoring Plans

The development of a residential land division would require the avoidance, minimisation and mitigation of potential impacts, during both the construction and operational stages, through an Environmental Management and Monitoring Plan (EMMP) framework.

A Construction Environmental Management and Monitoring Plan (CEMMP) would be prepared prior to the commencement of site works. The purpose of the CEMMP is to manage and mitigate the potential adverse effects related to the construction activities. The EIS (Chapter 18) provides an outline of the CEMMP structure that addresses the main areas of importance. Further details and clarification are included in the Response Document (Section 7.29).

An adequate description of the structure and the elements to be addressed in the CEMMP has been provided which includes:

- Induction procedures for workers and visitors
- Construction zone and staging plan
- Community consultation plan - including meetings with residents and an on site project officer
- Operations Plan – defining hours of work on the construction site.
- Construction Management Plan – will nominate construction routes through the area and planning to maintain access to public roads for residents.
- Pedestrian Management and Public Safety Plan
- Soil Erosion and Water Management Plan
- Noise Management Plan
- Weed Management Plan
- Spoil and Fill Management Plan
- Dust and Air Quality Management Plan
- Waste and Rubbish Management Plan
- Cultural Heritage Management Plan
- Flora and Fauna Management Plan
- Ground Water Management Plan
- Hazardous Material Storage Plan
- Emergency Procedures Management Plan
- Acid Sulphate Soil Management Plan
- Remediation Plan
- Utilities Plan – identifying requirements for sewer, water and electricity to serve construction areas.

A separate Construction EMMP and Operational EMMP would need to be prepared for both the commercial and residential components, to the reasonable satisfaction of the EPA, DWLBC and Council, prior to construction commencing if approval is granted.

In conclusion, this AR recommends that, as stated by the Proponent, a Construction EMMP and Operation EMMP be provided.

7 CONCLUSIONS

The proposal has evolved through the assessment process, to reflect further details submitted by the proponent, and in response to Council, Government Agency and public issues.

Changes made by the proponent and those recommended in this Assessment Report deal with the flooding, stormwater, native vegetation, traffic, community services, open space, waste management and construction and operational impacts.

7.1 STRATEGIC POSITION

In relation to strategic policy issues this Assessment Report concludes that:

- Strategic and legislative requirements have been investigated as part of the EIS and Response Document process. This development proposal does not meet the current Planning Strategy, but is consistent with the *Draft 30 Year Plan for Adelaide*.
- The proposal will assist in meeting the supply of land for future northern metropolitan growth, and will assist in provision of affordable housing
- The requirements of Affordable Housing have been met for Stage 1 of the proposal.

7.2 INFRASTRUCTURE

In relation to policy issues this Assessment Report concludes that:

- A schedule of infrastructure is required for Stage 1 and future stages of the proposal
- The Master Plan shows adequate manoeuvrability within the site for pedestrian and cyclists. Due to the location of this development it is important that a transport system is provided by the proponent and linked to the nearest public transport until the majority of the development is established and more regular public transport services are provided.
- The requirement for infrastructure is significant for the site. The Walker Corporation has already undertaken work towards negotiating agreements with infrastructure providers. It is envisaged that a Schedule of Commitments will provide more certainty on the provision of infrastructure. This AR concludes that final arrangements for infrastructure can be secured as part of the Certificate of Approval stage of the land division process.
- Stage 1 will require timing and funding agreements for traffic lights at the corner of Legoe Road and Port Wakefield Road. Later stages will require an agreement on grade separation. The Super lot land division plan includes an appropriate reserve for a future grade separated intersection if required (part Lots 80 and 81).
- Closure of a portion of Legoe Road is appropriate, at the time new subdivision roads are open.
- Hazard risk associated with the EPIC Pipeline has been considered appropriately.

7.3 ENVIRONMENTAL

In relation to environmental issues this Assessment Report concludes that:

- Future stages of the development that Significant Environmental Benefits should be negotiated in advance of approval for detailed subdivision.
- Where residential stages incorporate scattered trees into landscape designs there should be adoption of an environmentally sensitive construction approach.
- The Proponents intention to protect 70% of remnant vegetation in open space reserves is acceptable, provided detailed subdivision plans also seek to retain as much of the remaining 30% as possible. In any event SEB requirements will impose offset benefits with any clearance.
- Sea level rise risk is adequately dealt with for Stage 1 and for future stages is within the current policy which asks for an allowance for risk beyond 2100.

- The Flood Water Management Strategy should be revised to consider the opportunities for providing environmental flows to the Gawler River through gravitational means (via swales/wetlands using natural topography or constructed flow paths) or ‘passive’ infrastructure using piping.
- Further work is required to minimise stormwater runoff, and increase water quality outcomes, as detailed design for each subdivision stage.
- Measures for resource and waste minimisation are appropriate if undertaken as outlined during the construction and operational phase of the project.
- A more detailed feral pest management strategy based on lines of defence is required for the later stages where development adjoins the Gawler River and the salt pans.
- Mosquitoes are unlikely to be a significant issue for Stage 1. For the later stages of the development, further research and trapping would assist in determining the appropriate measures for mitigation and for funding of this mitigation.
- In conclusion, this AR recommends that, as stated by the Proponent, a Construction EMMP and Operation EMMP be provided.

7.4 DESIGN

In relation to design issues this Assessment Report concludes that:

- The land division design of Stage 1 is appropriate when considered in the broader context of the Buckland Park Master Plan, provided local design and construction standards are met.
- The design of the boulevard with no direct access from residential allotments is acceptable given the likely high volume of traffic this road will accommodate as the project proceeds/
- The proposed development accords with the objectives sought for public open space provided the proponent prepares landscape plans as part of the detailed design for future stages, as well as an overarching Recreation Facilities Strategy.
- The sustainable design strategies outlined in the Buckland Park Sustainability Guidelines should be followed for project’s construction and operation. Many of these objectives will be met, however, though the requirement of five star energy rated for new houses as required by the Building Code.
- Future stages could be built by different building companies and as such could create a variety of styles. Themes would need to be clear in the first instance to provide a consistent vision.
- The Design Guidelines need more investment in appropriate residential design that is site specific and climate responsive.
- Safety and natural surveillance will need to be developed through detailed design stages.
- The use of efficient water landscaping and the use of local indigenous species are recommended. A landscaping plan should be provided that improves the biodiversity and ecological habitat outcomes for the area.
- The landscape plans provided are conceptual and as such landscaping plans/details would need to be provided. However, it is recommended that water sensitive urban design should be an under pinning principle and requirement in a development of this nature, rather than a option to be encouraged and WSUD guidelines must be included in all landscaping specifications.
- The proposed display village is acceptable subject to submission of detailed designs as a reserved matter.

7.5 COMMUNITY

In relation to community issues this Assessment Report concludes that:

- The proponent’s commitment to providing a bus service from first resident until such time as the public transport system is connected to the site is sufficient.

- Traffic impacts will be managed acceptably in Stage 1 of the proposal.
- Land has been put aside to accommodate an at grade separated intersection for when traffic lights become unsuitable due to the growth in traffic volume for the Port Wakefield Road/Legoe Road intersection.
- The frequency of existing public transport is presently limited, but would be improved with the extra residents to the Virginia/Buckland Park region in future stages of the proposal.
- The proposed neighbourhood centre is appropriately located and designed, and should proceed as part of Stage 1 development.
- The proposed display village is appropriately located, and should proceed as part of Stage 1 development.
- The proposed community bus will assist residents with transport to health facilities in Stage 1. The Proponent and SA Health will pursue options for health services in Buckland Park in future stages when there is a higher population to support the services locally.
- The demand for student places in schools will be met in Stage 1 within existing Government and Non Government School providers. Strategic planning of school services for future stages will be considered as the population increases.
- There is a commitment to providing community services for Stage 1 of the development. The Walker Corporation will need to work in conjunction with the City of Playford and Virginia residents to ensure that future stages provide services which are suitable for Buckland Park and the broader region.
- The facilities proposed in the Master Plan would substantially increase recreational opportunities for Buckland Park and the Virginia region.
- The Walker Corporation has sought to address concerns of adjoining neighbours. The interface between residential and horticultural uses will be of concern to be addressed into any future rezoning. A portion of Stage 1 (18 allotments) should not proceed due to the interface with an adjacent horticultural property. An agreement on a buffer is required before the allotments can be created.

7.6 ECONOMIC

In relation to economic issues this Assessment Report concludes that:

- Initial impacts on Virginia will be positive in terms of employment and additional income for shops. Impacts beyond Stage 1 will depend on the types of goods and services provided within the development site.
- There will be positive economic impacts from the development at the construction stage. Then, when houses are occupied, there will be positive economic impacts on retail and services to the broader region. The loss of income from agricultural/horticultural activities within the site is small in a regional context.

8 RECOMMENDATIONS

8.1 STAGE 1

If the proposed development is approved there are a number of issues which need to be resolved before works can commence on the site. The Walker Corporation will need to work closely with the City of Playford, infrastructure providers and SA Government Agencies. Consideration of adjacent land uses would need consideration in relation to access and the impact of construction. The approval of Stage 1 would require a number of reserved matters and a Schedule of Commitments in relation to infrastructure.

If this Major Development is approved, the following would form part of the authorisation:

- Detailed subdivision for Stage 1 (614 residential allotments, including a neighbourhood centre, display village, roads and reserves)
- Construction of a neighbourhood centre as shown in the drawings provided by the proponent
- Identification of the partial closure of Legoe Road, with the actual closure to occur when access to adjoining properties have been maintained. This would be a separate notice in the Government Gazette.
- The Super Allotment plan which shows the pattern of development anticipated for Stages 2 to 5.
- The display village site – subject to further design details.

Issues that need to be resolved and may form part of the authorisation would include:

- Compliance with Building Rules for Stage 1
- The final Landscaping Plan for Stage 1
- Residential Design Details and a Scheme Description and By Laws incorporating all the details as per the Response Document will be provided for any Community Titled and Torrens Titled allotments.
- Provision of Affordable Housing Land Management Agreements.
- A Schedule of Commitments will be required for Stage 1 to be signed by the State Government, City of Playford and the Walker Corporation.
- Final design drawings for the signalised intersection proposed for Legoe Road and Port Wakefield Road to the Satisfaction of the Department for Transport, Energy and Infrastructure. This would include the funding and timing arrangements.
- A Stormwater Management Plan for Stage 1.
- Detailed design of local roads to be constructed and commissioned in accordance with the City of Playford specifications and to the City of Playford's approval
- Agreement between the City of Playford and the Walker Corporation on the timetabling and staffing of the community bus.
- A Land Management Agreement between the SA Potato Company and the Walker Corporation in place before the 18 allotments which adjoin the SA Potato Company land can be created.
- Provision of engineering construction plans for roads, drainage and footpaths and intersections to the satisfaction of the City of Playford
- The Proponent will need to negotiate with DECS on the suitable timing of additional demountable classrooms for Virginia Primary School.
- Layout of the parking area in the neighbourhood/community centre meeting the appropriate standard.
- Further details on signage.
- Construction EMMP and Operation EMMP for Stage 1.
- Meet the requirements of Sections 50 and 51 of the *Development Act 1993* in relation to the land division.

- The approval for the display village should be subject to compliance with the parameters set out in the letter from the proponent dated 17 December 2009, namely that all dwellings are detached, not more than two stories in height, set back a minimum of 4m from the front allotment boundary and not more than 50% site coverage. A reserve matter should be imposed to deal with design of the buildings.

8.2 STAGES 2 TO 5

Detailed land division plans have not been provided for stages 2 to 5 of this proposal. The later stages have been identified as needing further investigation/agreement in relation a number of issues.

The following should be given consideration for subsequent stages:

- Roads – An agreement is required between the Proponent and DTEI on the timing and funding of future intersection upgrades at Legoe Road and Park Road junctions with Port Wakefield Road.
- Public Transport – With DTEI the proponent needs to determine the requirements for upgrading the 900 bus service to Salisbury/Elizabeth (Stage 2). The requirements for a metro ticket service from Buckland Park to Salisbury/Elizabeth would also need consideration during Stage 2.
- Education – Negotiations for the first primary school on the site would need to start planning during Stage 1 with plans for the second primary school underway by Stage 2 or Stage 3. The third and fourth primary schools would be planned for Stages 4 and 5. The first and second planned high school would be planned from Stage 3. Negotiations for childcare/preschool providers would start in Stage 2 and be ongoing as dictated by the demand.
- Affordable Housing – Negotiations for the 15% affordable housing requirement would be ongoing for the life of the development.
- Biodiversity – Future stages of the development that Significant Environmental Benefits should be negotiated in advance of approval for detailed subdivision. Where residential stages incorporate scattered trees into landscape designs there should be adoption of an environmentally sensitive construction approach. The Proponents intention to protect 70% of remnant vegetation in open space reserves is acceptable, provided detailed subdivision plans also seek to retain as much of the remaining 30% as possible.
- Community Services/Facilities - Community centres to be accommodated in land division plans for Stage 3 and Stage 5 of the development. Provision of a library would be identified in Stage 5. The timing and location for a council depot will be identified with the City of Playford. Land and designs for parks, recreation and public domain will be identified as detailed land division for Stages 2 to 5 are designed.
- Mosquitoes – A Management Plan for mosquitoes will be established for Stages 3 to 5 as detailed land division occurs.
- Feral animals - A more detailed feral pest management strategy based on lines of defence is required for the later stages if development adjoins the Gawler River and the salt pans.
- Health – The proponent will liaise with the City of Playford to look at the timing of health services within Buckland Park. Planning to start from Stage 1 of the development but indicatively health services may not be provided within Buckland Park until Stages 2 to 3.
- Potable Water – The Proponent will enter into agreements with SA Water in relation to the timing of water services to the Stages.
- Waste Water - The Proponent will enter into agreements with SA Water in relation to the timing of water services to the Stages.
- Recycled Water – For Stages 2 to 5 of the development the Proponent will prepare a strategy and designs with SA Water for their approval.
- Storm Water – Designs for aquifer recharge (Stage 2) and treatment of stormwater off site (Stage 4) will be done in consultation with the City of Playford and relevant Government

Agencies. The Flood Management Strategy should be revised to consider the opportunities for providing environmental flows to the Gawler River through gravitational means (via swales/wetlands using natural topography or constructed flow paths) or 'passive' infrastructure using piping.

- Electricity – Upgrades to the electricity will occur progressively as the Stages commence. Indicatively plans for a substation would be done with ETSA for Stage 2 and other upgrades would be required for Stages 3 to 5.
- Gas – Services would be upgraded as needed from Stage 1. A new 200mm steel main would be required from the Epic Gas Gate Station. Amplification of the Epic Gas Gate Station would be staged as required. Hazard risk associated with the EPIC Pipeline has been considered appropriately.
- Telecommunications – The Proponent will work with Telstra to identify upgrades as needed.
- Sea level rise – a minimum site level of 4.00 m AHD and building floor level of 4.25 m AHD will be required as part of any rezoning. The long term actual effect of sea level rise will require monitoring to determine whether any additional protective works are required.
- Any rezoning would consider buffer to adjacent horticultural activities and restricting intensification of horticulture.
- Construction EMMP and Operation EMMP will be provided for each stage.

A Schedule of Commitments will be entered into by the Walker Corporation for each stage. This Schedule could be a reserved matter in the current authorisation and future decision making relating to the site. The purpose of the Schedule would be to commit the Proponent into making sure the infrastructure provided for Stages 1 to 5 are timely are appropriate.

8.3 IMPLICATIONS FOR POLICY

The proposed residential development at Buckland Park provides an opportunity to provide additional housing in the northern region of Adelaide. The proposal fits within the *Draft 30 Year Plan for Adelaide* in relation to providing land supply for housing over the next 20+ years. Approval for Stage 1 would need several reserved matters as part of the authorisation. The land requires rezoning prior to the assessment of the dwellings for Stage 1, as under the current policy framework dwellings are non-complying. A separate process in the form of a Development Plan Amendment (DPA) would need to occur to facilitate the rezoning of the land.

Considerations in relation to how this development might be approved include:

- As the detailed land division and works are sequentially approved the declaration on the development (as a Major Development) could be removed from the Stage.
- The need for the Walker Corporation to be committed to working long term with the City of Playford in relation to public roads, parks and community services/facilities.
- A Schedule of Commitments which will indicate the timing and 'who pays' for infrastructure such as gas, electricity and water.

9 REFERENCES

ABS 2006 Census, various profiles

The Advertiser, 'New high school to open in Gawler in 2012' 10 November 2009, p 11

Climate Change Global Risks, Challenges & Decisions Synthesis Report from the IARU conference held in Copenhagen 10 -12 March 2009

Letter dated 24 November 2009 from the Walker Corporation – Additional Information on Flood and Storm Water

Letter dated 18 November 2009 from the Walker Corporation – Schedule of Infrastructure

Letter dated 17 November 2009 from the Walker Corporation – Additional Information on Mosquitoes

Letter dated 17 December 2009 from the Walker Corporation – Additional Information on the display village

Letter dated 12 November 2009 from the Walker Corporation – Redesigned Illustrations of the Super Lot Proposal for the Master Plan

Letter dated 10 November 2009 from the Walker Corporation – Additional Information on Access during a Flood Event

Letter dated 10 November 2009 from the Walker Corporation – Additional Information on Sea Level Rise

Walker Corporation, *Buckland Park Environmental Impact Statement* and Appendices (March 2009)

Walker Corporation, *Response Document* and Appendices (October 2009)

Proposal Drawings Provided by the Walker Corporation

REF	REV	AUTHOR	TITLE	DATE
	Revision 3	Walker Corporation	Cover Sheet	9 November 2009
31495-001-SV-10	Revision 0	Connell Wagner	Survey Compilation	13 May 2008
19000PO1-r6	Issue 6	Fyfe Engineers Surveyors	Super Lot Land Division concept plan - Sheets 1 to 3	05 November 2009
19000PO2-r5	Issue 5	Fyfe Engineers Surveyors	Stage 1 Concept Land Division- Sheets 1 to 4	10 August 2009
VERSION 6	Revision 14	Connor Holmes	Buckland Park Master Plan	9 November 2009
VERSION 6	Revision 12	Connor Holmes	Buckland Park Residential Staging Plan	22 September 2009
		Wallbridge and Gilbert	Buckland Park – Drainage Channel Layout	September 2009
		Wallbridge and Gilbert	Buckland Park – MUSIC Model Layout Diagram	September 2009
VERSION 6	Revision 12	Connor Holmes	Buckland Park Pedestrian and Cycle Network	22 September 2009
2112592A-001		Parsons Brinkerhoff	Proposed Road Hierarchy	1 April 2009
2112592A-002		Parsons Brinkerhoff	Proposed Staged Development of Bus Route Strategy 2020 - 2031	1 April 2009
2112592A-003		Parsons Brinkerhoff	Proposed Bus Route Strategy 2031	1 April 2009
2112592A-004		Parsons Brinkerhoff	Bus Route Catchment Area 2031	1 April 2009
VERSION 1	Revision G	Connor Holmes	Buckland Park Stage 1 Residential Allotment Mix	22 September 2009
VERSION 1	Revision G	Connor Holmes	Buckland Park Stage 1 Land Use Plan	22 September 2009
VERSION 1	Revision G	Connor Holmes	Buckland Park Stage 1 Pedestrian and Cycle Network	22 September 2009
VERSION 1	Revision G	Connor Holmes	Buckland Park Stage 1 Special Fencing Control	22 September 2009
CMS-01	Revision 1	Walker Corporation	Concept Neighbourhood Centre	February 2009
CMS-02	Revision 1	Walker Corporation	Display Village Location	February 2009
071315 SK29	Revision 0	Swanbury Penglase	Stage 1 Neighbourhood Centre Landscape Concept	5 March 2009
	Revision 0	Fyfe Engineers Surveyors and Dr Robert Anderson	Flora Constraints – Sector 1	25 September 2009
	Revision 0	Fyfe Engineers Surveyors and Dr Robert Anderson	Flora Constraints – Sector 2	25 September 2009
	Revision 0	Fyfe Engineers Surveyors and Dr Robert Anderson	Flora Constraints – Sector 3	25 September 2009
	Revision 0	Fyfe Engineers Surveyors and Dr Robert Anderson	Flora Constraints – Sector 4	25 September 2009
		Walker Corporation and ETSA Utilities	Buckland Park Regional Electricity Infrastructure	February 2009
		Walker Corporation and APA and Telstra	Buckland Park Regional Gas and Telecommunications Infrastructure	February 2009
		Walker Corporation and DTEI	Buckland Park Regional Transport Infrastructure	February 2009
		Walker Corporation and SA Water	Buckland Park Regional Water Infrastructure	February 2009

10 GLOSSARY

AHD	Australian Height Datum
AR	Assessment Report
CEMMP	Construction Environmental Management and Monitoring Plan
DECS	Department of Education and Children's Services
DEH	Department for Environment and Heritage
DPLG	Department of Planning and Local Government
DTEI	Department for Transport Energy and Infrastructure
DWLBC	Department of Water, Land and Biodiversity Conservation
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMMP	Environmental Management and Monitoring Plan
EPA	Environment Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
MOSS	Metropolitan Open Space System
RD	Response Document
NRM	Natural Resources Management
SEB	Significant Environmental Benefit(s)
WSUD	Water Sensitive Urban Design
WTP	Water Treatment Plant
WWTP	Waste Water Treatment Plant

11 FIGURES

The following Figures have been provided by the Walker Corporation and have been referred to in this Assessment Report.

FIGURE 1 – Stage 1 Land Use

FIGURE 2 - Master Plan

FIGURE 3 – Super Lots

FIGURE 4 – Proposed Road Closures

FIGURE 5 – Detailed Land Division Drawing 1

FIGURE 6 – Detailed Land Division Drawing 2

FIGURE 7 – Detailed Land Division Drawing 3

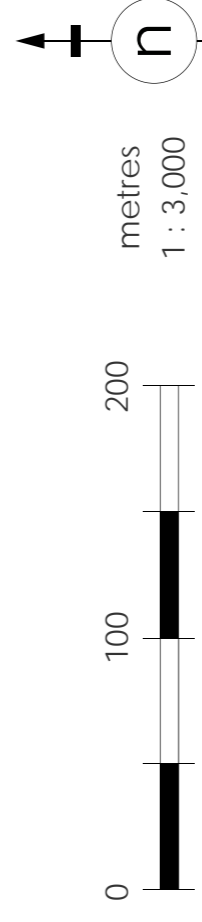
FIGURE 8 - Detailed Land Division Drawing 4

FIGURE 9 – Display Village Location

FIGURE 10 - Stage 1 Neighbourhood Centre Concept Plan

LEGEND

Lot Type	Dwelling Count
Premium	285
Courtyard	177
Large Villa	90
Small Villa	32
Gatehouse	30
TOTAL	614



CLIENT: WALKER CORPORATION

**STAGE 1 RESIDENTIAL
ALLOTMENT MIX**

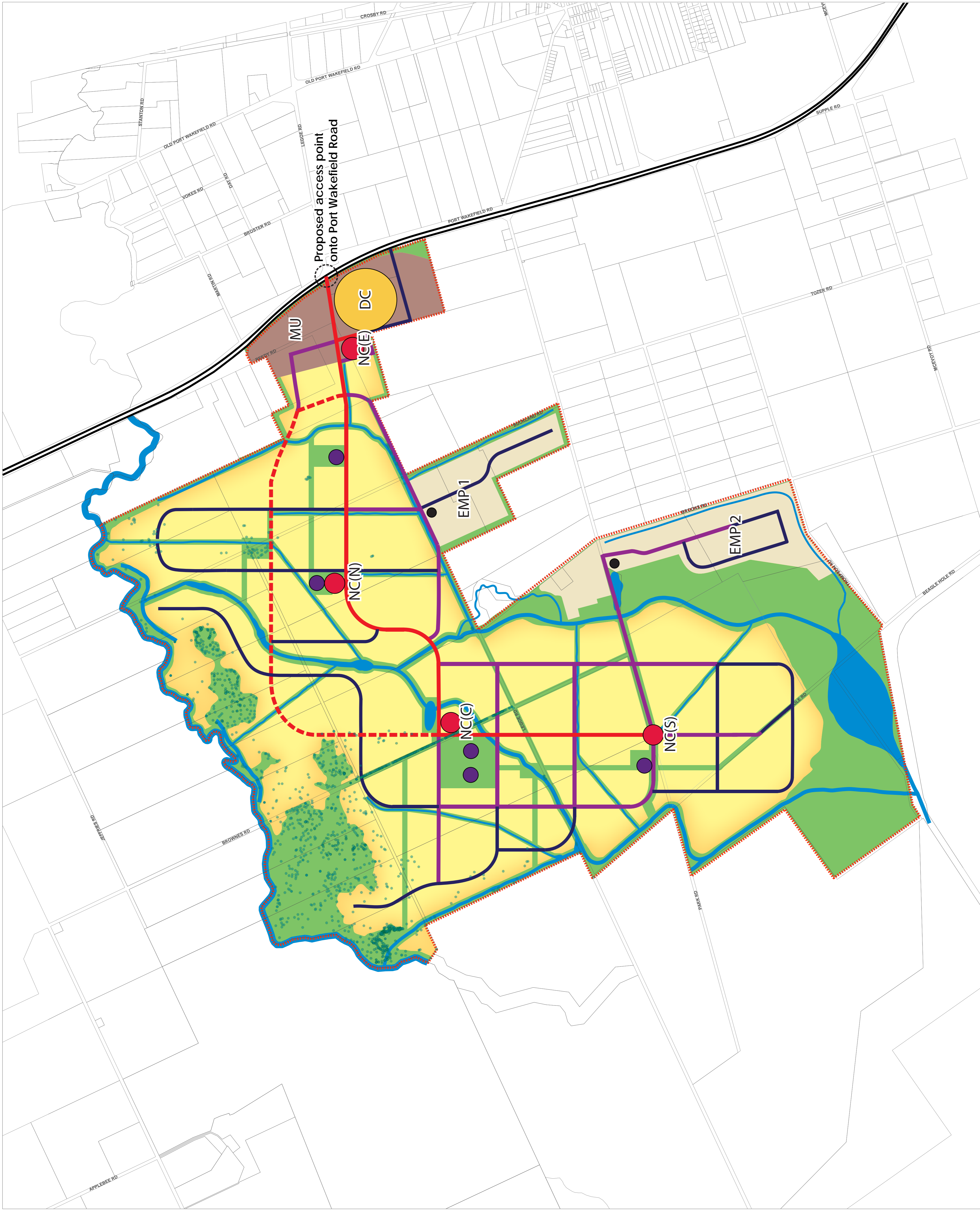
PROJECT: BUCKLAND PARK

DATE CREATED: 27 JULY 2009 PROJECT NUMBER: 992

REVISION: G AMENDMENT DATE: 22 SEPTEMBER 2009

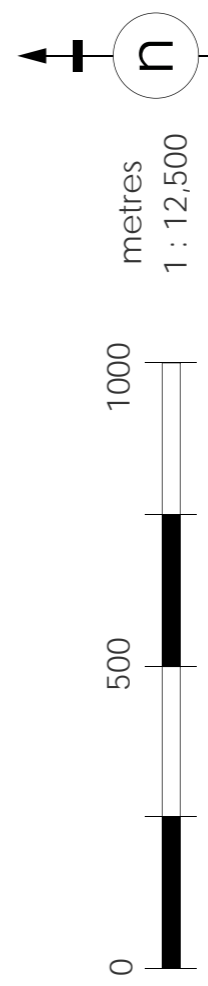
**CONNOR
HOLMES**





LEGEND

- Arterial Road (divided, 2+2)
- - - Sub-Arterial (2 lanes)
- Distributor
- Collector
- District Centre
- Neighbourhood Centre
- Local Centre
- School
- Residential - Traditional
- Mixed Use
- Employment
- Open Space
- Floodways
- Subject Area
- DCBD
- Existing Trees



CLIENT:	WALKER CORPORATION
TITLE:	MASTER PLAN
PROJECT:	BUCKLAND PARK
DATE CREATED:	7 AUGUST 2008
PROJECT NUMBER:	992
REVISION:	v6 r14
AMENDMENT DATE:	9 NOVEMBER 2009



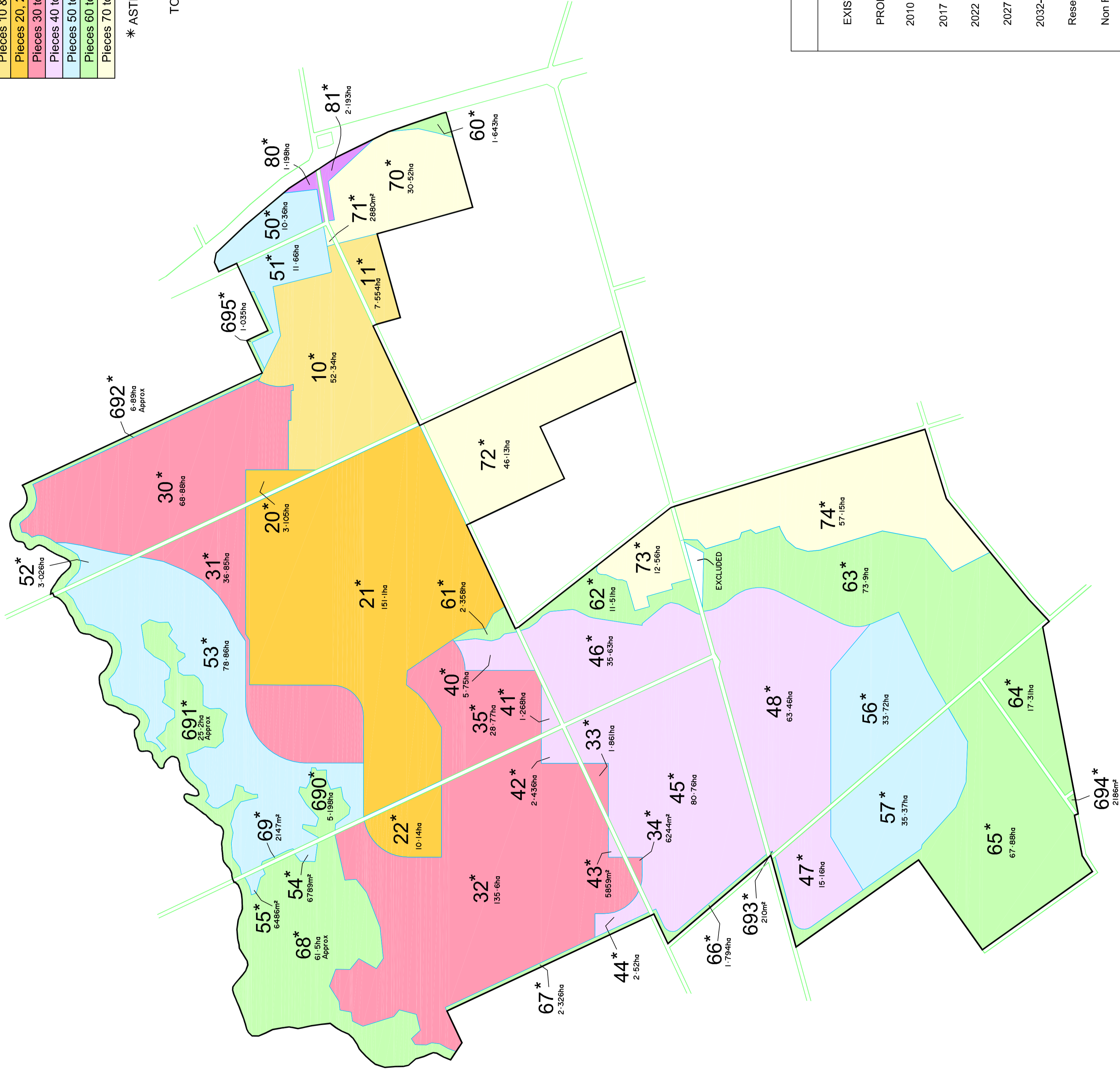
SUBJECT TO SURVEY

PIECES SCHEDULE

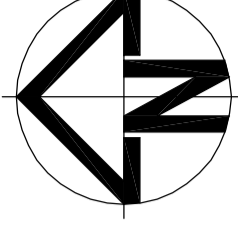
ONE ALLOTMENT COMPRISES	TOTAL AREA
Pieces 10 & 11	59.89 ha
Pieces 20, 21, & 22	164.35 ha
Pieces 30 to 35 incl	272.59 ha
Pieces 40 to 48 incl	207.57 ha
Pieces 50 to 57 incl	174.34 ha
Pieces 60 to 69, 690 to 695 incl	279 ha approx
Pieces 70 to 74 incl	146.65 ha

* ASTERISK DENOTES PIECE IDENTIFIER ONLY

TOTAL RESIDENTIAL AREA 878.7 ha



LEGEND	
EXISTING ROAD	(Green line)
PROPOSED SUPERLOT BOUNDARY	(Blue line)
2010 - 2016	(Yellow)
2017 - 2021	(Orange)
2022 - 2031	(Red)
2027 - 2031	(Purple)
2032-2036	(Light Blue)
Reserve/Recreation	(Light Green)
Non Residential	(Light Yellow)
Proposed Road	(Purple)



CITY OF PLAYFORD

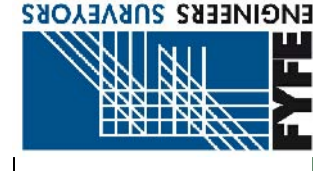
Dev No: ___ / D ___ / 08

Issue	Description	Dwnr/Cld.	Date
6	Redesign		RIT / RAF 05.11.09
5	Redesign		RIT / RAF 20.10.09
4	Access Road 25 & 26 changed		RIT / RAF 10.08.09
3	Superlots 1 & 2 changed		RIT / RAF 02.03.09
2	Road Network deleted, Superlots changed		RIT / RAF 27.02.09
1	Road Network updated		RIT / RAF 19.12.08
0	Road Network updated issued for review		RIT / RAF 11.11.08



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Title
BUCKLAND PARK

Status
CONCEPT PLAN - Superlots

Scale (A1) 1:12500 Datum

Drawn RIT Designed MP

Project Code 19000/1/10

Drawing No. 006

Issue 6

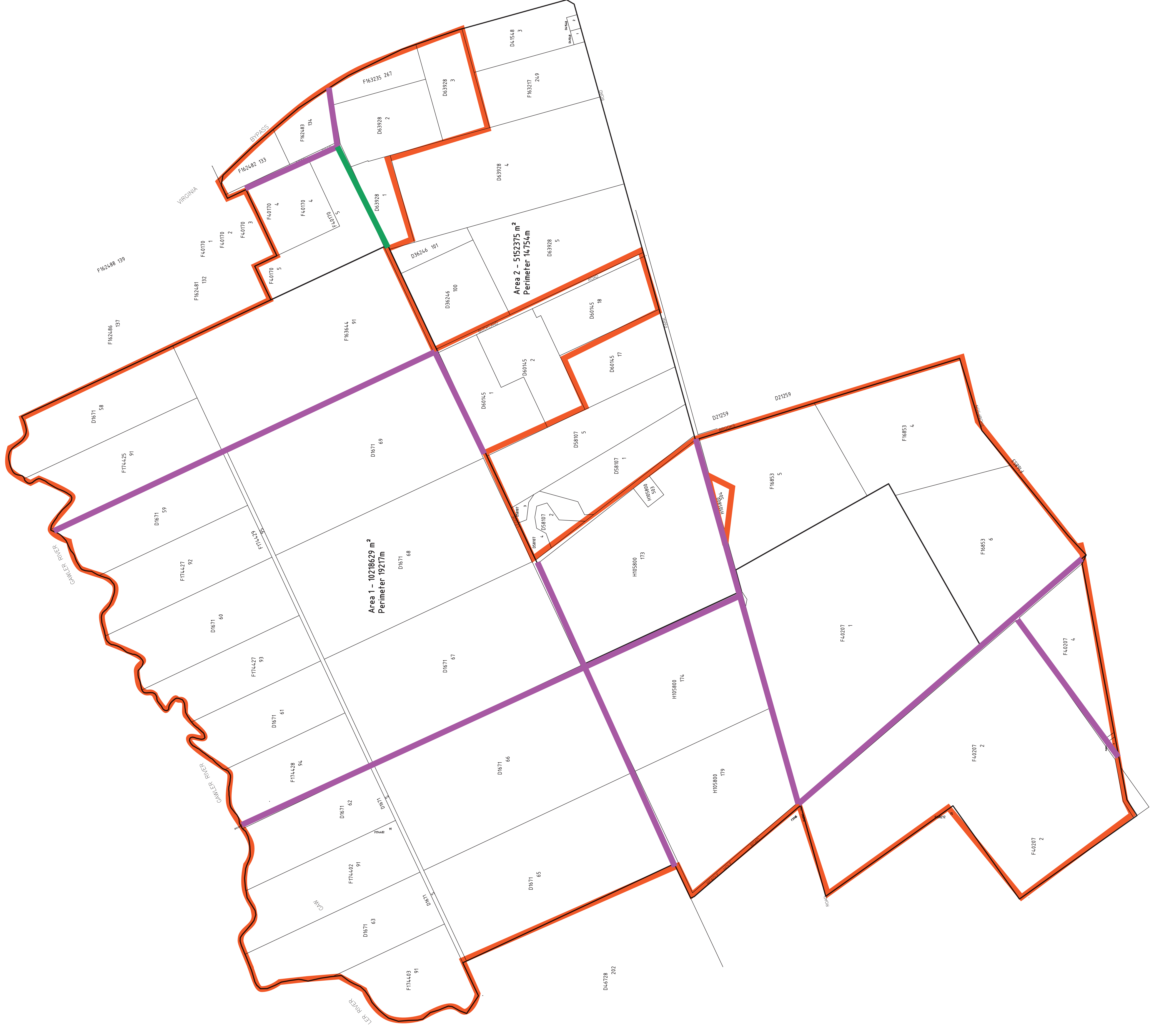
1:100mm On Original A1

BUCKLAND PARK EIS

FIGURE 1.3

Road Closures

February 2009



Key

- Stage 1 closures
- Future Stage closures
- Site

NOTE:
 THIS IS A COMPILATION PLAN MADE UP OF CADASTRAL SURVEY PLANS THAT HAVE BEEN LODGED WITH THE SOUTH AUSTRALIAN LANDS DEPARTMENT. ALL SURVEYS, EACH PLAN HAS AN ACCURACY OF AT LEAST 1:10,000. HOWEVER, THE PLANS MAY VARY IN ACCURACY DUE TO VARYING AGES. SOME OF THE ALLOTMENTS SEARCHED FROM THE LTO ARE OF EARLY IN THE 1900'S. AS A RESULT OF DATA, WHEN COMPARING COMMON BOUNDARIES TO THE LTO, THERE ARE DISCREPANCIES. THESE DISCREPANCIES HAVE BEEN MADE TO MINIMISE THE MISCLOSEURES. THERE ARE MISCLOSEURES WITHIN THE PLAN HAS BEEN LEFT IN THE SOUTH WESTERN DISTRICTS. EVERY EFFORT HAS BEEN MADE WHEN THE CADASTRAL SURVEY FOR THESE MISCLOSEURES IN THE DATA THAT MISCLOSEURES WILL BE RESOLVED. E ALLOTMENTS OF THE SITE. PROJECT COMMENCES, THE

THE PLAN IS MADE UP OF THE FOLLOWING:
 X 10135 DP 1671
 X 15915 DP 60145
 X 15916 DP 31236
 X 16111 DP 63928
 X 9532 DP 58107
 RP 5455 DP 36246
 DP 41548 DP 40170
 DP 46728 FP 16853
 DP 46336 FP 40207
 DP 21259 FP 12814

PRELIMINARY NOT FOR CONSTRUCTION		Project No. 28632.001	
Scale NTS		Sheet Size A0	
Drawing No. SV01		Rev. 02a	
Drawing Title: CADASTRAL COM		PILATION PLAN	
Client: WALKER CORPORATION		Project: BUCKLAND PARK	
Conneil Wagner Pty Ltd 55 Greenhill Street South Australia 5000 Australia Telephone: 81 8227 8773 Fax: 81 8227 8774 Email: cwa@conwag.com		Drawn: AFB Checked: TJB Verified: [] Approved: []	
02a 16/02/2008 Amendment Correction 01 17/02/2009 Amendment Correction		Date: [] Rev: [] App: [] Ver: [] Dm: [] Ver: [] App: []	

CT	Plan Type	Plan No	Parcel Type	Parcel No	Area (ha)
5868/768	D	1671	Block	69	65.3
5868/769	F	163644	Allotment	91	66.58
5916/59	D	63928	Allotment	1	7.487
5228/167	F	40170	Allotment	4	12.6
5424/348	F	40170	Allotment	5	17.3
TOTAL					1307 Approx



CITY OF PLAYFORD
Dev No: ___ / D ___ / 08

LEGEND

EXISTING ROAD TO BE CLOSED

PROPOSED RESERVE

Issue	Description	Drawn/Chkd	Date
5	Layout Revised	RIT	10/08/09
4	Layout Revised	RIT	04/03/09
3	Layout Revised	SRH	23/02/09
2	Layout Revised	SRH	20/02/09
1	Redesign	RIT	17.12.08
0	Issued for review	RIT	17.11.08

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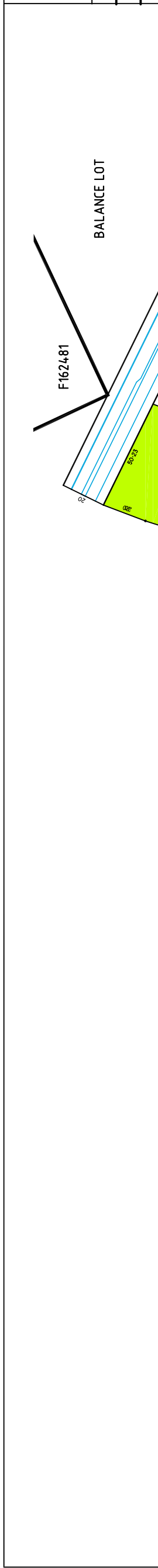
Title
BUCKLAND PARK STAGE 1
Sheet 1 of 4 Sheets

Status
CONCEPT PLAN - DA

Scale (A1) 1:3000 Datum AHD

Drawn	RIT	Designed	MP
Project Code	19000/1/8	Drawing No.	001
Issue	19000PO2-H5	Issue	5

CITY OF PLAYFORD
 Dev No: ___ / D ___ / 08



LEGEND

EXISTING ROAD TO BE CLOSED

PROPOSED RESERVE

Issue	Description	Drawn	Chkd	Date
5	Layout Revised	RIT		10/09/09
4	Layout Revised	SRH		04/03/09
3	Layout Revised	SRH		23/02/09
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1	Redesign	RIT		17,12,08
0	Issued for review	RIT		17,11,08

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Scale (A1) 1:1000 Datum AHD
 Drawn RIT
 Project Code 19000/18
 19000PO2-H5

Scale (A1) 1:1000 Datum AHD
 Drawn RIT
 Project Code 19000/18
 19000PO2-H5

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Scale (A1) 1:1000 Datum AHD
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 Project Code 19000/18
 19000PO2-H5



ENLARGEMENT E2
scale as shown

CITY OF PLAYFORD
Dev No: ___ / D ___ / 08



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Title
BUCKLAND PARK
STAGE 1
Sheet 3 of 4 Sheets

Status
CONCEPT PLAN - DA

Scale (A1)	1:1000	Datum	AHD
Drawn	RIT	Designed	MP
Project Code	19000/1/8	Drawing No.	001
	19000PO2-F5		5

CITY OF PLAYFORD

Dev No: / D / 08

LEGEND

EXISTING ROAD TO BE CLOSED

PROPOSED RESERVE

Issue	Description	Dwnr/Cld.	Date
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Title
**BUCKLAND PARK
 STAGE 1**
 Sheet 4 of 4 Sheets

Status
CONCEPT PLAN - DA

Scale (A1) 1:1000 Datum AHD

Drawn RIT Designed MP

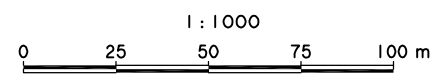
Project Code 19000/1/8
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 Issue 5



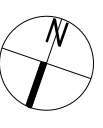
D36246

ENLARGEMENT E1
scale as shown

D63928



100mm On Original A1



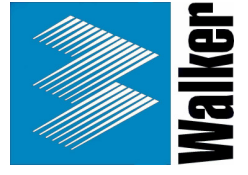
drawn	GC
scale	1:1500 @ A3
date	Feb. 2009
drawing no.	CMS - 02

OPEN SPACE by -
swanbury penglase
architects of human space

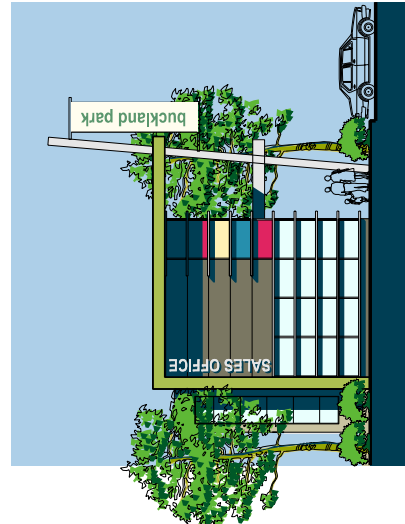
Buckland Park - DISPLAY VILLAGE LOCATION

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ROAD D ELEVATION - SALES OFFICE
1:300 @ A3

SITE ANALYSIS

SITE AREA	3.15 ha
PHASE 1	
SUPERMARKET	1500 sq m
SPECIALTY SHOPS 1-6	600 sq m
COMMUNITY SPACE	200 sq m
CARPARKING - 200 car spaces	6000 sq m
TOWN SQUARE	500 sq m
SALES OFFICE	225 sq m
(2 levels 450 sq m total floor area)	
Sub-total	9,025 sq m
PHASE 2	
SUPERMARKET	1000 sq m
SPECIALTY SHOPS 7-10	400 sq m
COMMUNITY SPACE	200 sq m
Sub-total	1600 sq m
TOTAL	10,625 sq m

NEIGHBOURHOOD CENTRE EXTENSION SITE AREA

-CHILDRENS PLAYGROUND	10,500 sq m
-RESIDENTIAL	10,375 sq m
-PRIVATE RECREATIONAL	31,500 sq m

OPEN SPACE

TOTAL NEIGHBOURHOOD CENTRE	31,500 sq m
-----------------------------------	--------------------



PLAN - NEIGHBOURHOOD CENTRE 1:1000 @ A3



ELEVATION - STAGE 1 & STAGE 2
1:300 @ A3

NEIGHBOURHOOD CENTRE EXTENSION AREA

10,500 sq m
POTENTIAL
-CHILDRENS PLAYGROUND
-RESIDENTIAL
-PRIVATE RECREATIONAL

15.01	45.65	15.01
15.01	68.41	15.01
15.01	45.61	15.01



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Buckland Park - CONCEPT NEIGHBOURHOOD CENTRE

OPEN SPACE by -
swanbury penglase
architects of human space

drawn GC
scale 1:1000 @ A3
date Feb. 2009
drawing no. CMS - 01

