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Environmental Assessment Report

Tallawarra Lands Part 3A Concept Plan Application

Prepared for: TRUenergy Tallawarra
Project No: 6643J
Date: August 2011

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Certification

SUBMISSION OF ENVIRONMENTAL ASSESSMENT
Prepared under Part 3A of the Environmental Planning and Assessment Act 1979

PREPARED BY	Katherine Sheppard, David Kettle, Jillian Sneyd & Rob Player
Name:	Don Fox Planning Pty Ltd
Address:	11 Dartford Road, Thornleigh, NSW, 2120
Applicant Name:	TRUenergy Tallawarra Pty Ltd
Applicant Address:	Level 33, 385 Bourke Street Melbourne
Land to be developed:	Lot 1 in DP109795; Part Lot 501 of DP 1129361; Lot 1 in DP 551658; Lots 21 and 22 in DP 774118; Lot 20 in DP 633211; Lot 102 in DP 716727; Lot 3 in DP 109795; Lot 15 in DP1050255; Lot 151 in DP 628980; Lot 1 in DP 543285; Lots 10 and 11 in DP 552933; Lots 1 and 2 in DP 792664; Lots 7 and 8 in DP1049520.
Proposed development:	Concept Plan Approval
ENVIRONMENTAL ASSESSMENT	An Environmental Assessment (EA) is attached which addresses all matters listed under Part 3A of the Environmental Planning and Assessment Act 1979.
CERTIFICATE	We certify that we have prepared the contents of this EA and to the best of our knowledge: • it contains all available information that is relevant to the environmental assessment of the development to which the EA relates; and • it is true in all material particulars and does not, by its presentation or omission of information, materially mislead.
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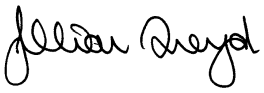
Signature:	
Name:	Rob Player
Qualifications:	BA MTCP MPIA CPP
	
Date:	12 August 2011

Executive Summary

Introduction

On 28 September 2009, the Minister for Planning advised the proponent (being TRUenergy Tallawarra Pty Ltd) that the Concept Plan for a mixed use development on the Tallawarra Lands site comprised a Major Project under Clause 6 of State Environmental Planning Policy (Major Development) 2005.

The Director General issued the Environmental Assessment Requirements for a Concept Plan application under Part 3A of the Environmental Planning and Assessment Act on 28 September 2009, which were subsequently updated on 1 July 2010 to address the operation of the Illawarra Regional Airport within the Environmental Assessment.

This Environmental Assessment (EA) has been prepared to accompany the application for approval of the Concept Plan prepared by Warren Lee Urban Design.

Subject Site

The land the subject of the Concept Plan Application is situated on the western foreshore of Lake Illawarra adjacent to the West Dapto release area, approximately 13 kilometres southwest of the Wollongong Town Centre and is within the Local Government Area of Wollongong.

The land to which the Concept Plan relates is primarily owned by TRUenergy Tallawarra. The following allotments are those owned by TRUenergy Tallawarra:

- Lot 1 in DP109795;
- Part Lot 501 in DP 1129361 (approved to be subdivided to create Lots 1091 and 1092 in preliminary DP 1140369);
- Lot 1 in DP 551658;
- Lots 21 and 22 in DP 774118;
- Lot 20 in DP 633211;
- Lot 102 in DP 716727;
- Lot 3 in DP 109795;
- Lot 15 in DP1050255;
- Lot 151 in DP 628980;
- Lot 1 in DP 543285;
- Lots 10 and 11 in DP 552933;
- Lots 1 and 2 in DP 792664; and
- Lots 7 and 8 in DP1049520.

Upgrades and widening of the Yallah Bay Road reserve to accommodate increased traffic flows associated with development of the Tallawarra Lands site are also proposed. Whilst the proponent commits to carrying out the upgrades at its own expense, TRUenergy does not own this land (the land is owned by Wollongong Council). Accordingly, these works are a commitment and do not form part of the project to which this application formally applies.

Project Description

The land uses proposed in the Concept Plan have been developed to generally align with the zoning provisions of Wollongong LEP 2009, however they have been further refined in response to the opportunities and constraints of the site.

Three residential precincts accommodating 1010 lots are proposed and are referred to as the North Shore Precinct, Central and Lakeside Precincts. In addition, a retirement village comprising 200 dwellings is proposed.

A neighbourhood centre is located in the Central Precinct and is proposed to occupy approximately 4.25ha. The centre comprises two parcels, the smaller being 1.25ha for initial development and the remainder for future development. A maximum retail gross floor area of 1000m^2 - 1500m^2 for the smaller parcel is envisaged which would accommodate a small supermarket and neighbourhood and specialty shops to cater for the short term demand of the incoming population and workforce. The centre could also include medical and/or child care facilities. The Concept Plan allows for expansion in the longer term to increase retail offerings subject to demand.

A primary school site is located centrally within the Concept Plan area for convenience of access to most of the residential areas.

The Lakeside Precinct includes approximately 12ha of land in the B6 Enterprise Corridor zoned land. This site has good accessibility and exposure to the F6 freeway. Low scale one and two storey buildings are envisaged with surface car parking provided around the buildings providing up to 1500 car parking spaces (depending on the mix of land uses).

The Central Precinct contains approximately 14ha of land for industrial and light industrial uses. This initial industrial precinct is located on the northern side of Yallah Bay Road and will accommodate a GFA of some 34,160m^2 of industrial development. Buildings in this precinct are envisaged to be low scale one and two storey buildings.

A future General Industrial development area of 40ha is nominated on the southern side of Yallah Bay Road. This land has geotechnical constraints which could limit its suitability for industrial development and will need to be the subject of further investigation.

At the eastern end of the Central Precinct is a headland area on the Lake Illawarra foreshore. A 2.5ha site is proposed for tourist uses. The specific use has yet to be determined.

The main recreational facilities provided for in the Concept Plan are:

- Sports facilities located in the Central Precinct. The facility is sized to accommodate a playing field, sports courts (such as netball and tennis), playground, amenities and car parking;
- The cycle track with associated amenities and car parking;
- Foreshore open space, walkways and cycle paths;
- Footpaths, cyclepaths and shareways; and
- BBQ and picnic facilities in major open space areas including foreshore parks.

The Concept Plan proposes a significant open space component which is largely an outcome of the environmental constraints of the site. A total of 360ha are proposed which represents approximately 67% of the total site area. The main open space areas are summarised below.

- Mt Brown ridge and slopes which reflects the E3 Environmental Management zoning, vegetation constraints including EECs, slope constraints, scenic values and heritage values.
- Lake Illawarra foreshore areas.
- Open space drainage corridor through the Central Precinct.
- Riparian corridors and riparian open space associated with Duck Creek to reflect the E2 – Environmental Conservation zoning.

- Environmental conservation areas on the southern side of Duck Creek to reflect the E2 – Environmental Conservation zoning.
- Lakes and ponds forming the southern component of the Lakeside Precinct to reflect the E3 - Environmental Management zoning.
- Woodland and open space buffers along the western side of the Concept Plan area to reflect the E2 and E3 zonings and provide a vegetation buffer to the Princes Highway (F6).
- Recreational open space in the form of sports fields in the Central Precinct and cycling facilities on the ash disposal area.

Environmental Assessment

The EA addresses the environmental impacts associated with the key issues detailed in the Director-General's requirements and identifies the proposed mitigation measures which form part of the Statement of Commitments.

The extensive suite of past and current studies of the Tallawarra Lands site, covering a wide range of issues including flooding, climate change, stormwater management, coastal impacts, flora and fauna impacts, heritage impacts, bushfire threats, acoustic impacts, geotechnical and contamination issues, views, economic impacts, traffic impacts and infrastructure servicing have not revealed any uncertainty regarding potential impacts sufficient to adopt a precautionary approach to either delay or prevent the project from progressing.

Implementation of the Concept Plan will enable the impacts of the past activities to be rectified through the reconstruction and revegetation of the creek corridors that will reinstate biological diversity and ecological integrity throughout the site.

Environmental impacts arising as a consequence of the project will be managed by implementing appropriate safeguards to mitigate potential adverse environmental impacts.

Conclusion

The subject site has been identified as having urban potential for a number of years and its suitability for development has been considered in both the Local Environmental Study and rezoning processes which culminated with the gazettal of Wollongong LEP 2009 and facilitated the lodgement of this Concept Plan application. The many studies carried out conclude that the site is suitable to be developed in a manner consistent with the zoning controls applicable under the provisions of Wollongong LEP 2009.

The Concept Plan proposal will facilitate the development of an area of largely degraded and underutilised land adjoining Lake Illawarra and the existing suburbs of Koonawarra and Haywards Bay with a sustainable master planned development.

As demonstrated throughout this EA, development of the Tallawarra Lands site in the manner proposed in the Concept Plan is consistent with the State Government's regional planning policies for the Illawarra that relate to promoting economic growth, delivering new dwellings and protecting high value environments. Economic growth in the Illawarra region will be bolstered by both the large scale of the proposed development and the mix of land uses proposed which are all permissible under the provisions of the various applicable environmental planning instruments as detailed in Table 7. The commercial development envisaged together with the community infrastructure and facilities to be delivered will benefit both the incoming population as well as residents of existing surrounding suburbs.

The Concept Plan provides an opportunity for the site to contribute to the economy of the Illawarra region both within the short term during construction and the long term through the future population and workforce accommodated on the site.

This report has been prepared to assess the potential environmental impacts that could result from the proposal proceeding. Specialist investigations have been carried out and a number of potential environmental impacts have been identified. Mitigation measures to manage and ameliorate potential environmental impacts have been incorporated into the proposal via the Statement of Commitments and every effort has been made in the development of the concept design to incorporate the principles of environmentally sensitive development to minimise the likelihood of adverse environmental impacts occurring.

This EA demonstrates that no adverse impacts associated with flooding and water quality, land stability and contamination, coastal processes, traffic flows, noise, views, flora and fauna, bushfire risk or Aboriginal or European heritage will arise provided that the mitigation measures proposed are adopted and implemented. The measures have been incorporated into the Draft Statement of Commitments.

The Economic Impact Assessment carried out also confirms that the Concept Plan proposal will not adversely impact the ongoing viability of surrounding centres and/or precincts.

The development is considered to be in the public interest as it will facilitate:

- extensive commercial, retail, tourism and industrial development and the associated employment opportunities;
- the provision of new housing near jobs;
- site remediation;
- the restoration and embellishment of large areas of degraded environmentally valuable areas; and
- the bringing of significant additional land around the foreshore of Lake Illawarra into public ownership.

Accordingly, the Concept Plan for which consent is being sought is considered to be an optimal form of development on the Tallawarra Lands site.

Given the assessments that form part of this EA assess all the potential environmental impacts of the proposed development, this report also requests pursuant to the provisions of Sections 75(J) and 75P(1)(c) of the Environmental Planning & Assessment Act that the demolition of structures associated with the former Riding School at Gilba Road Koonawarra be authorised to proceed without the need for any further application or consent.

1 Introduction

1.1 Commission

Don Fox Planning (DFP) has been commissioned by TRUenegy Tallawarra Pty Ltd to prepare an Environmental Assessment report in relation to the Tallawarra Lands Concept Plan application submitted to the Department of Planning (DoP) for assessment pursuant to the provisions of Part 3A of the Environmental Planning & Assessment Act (EP&A Act).

1.2 Purpose of this Statement

The purpose of this report is to provide the Department of Planning, Wollongong Council and the relevant government agencies with all the information necessary to assess and determine the Concept Plan application in accordance with Section 75J of the EP&A Act.

1.3 Project Team

The preparation of the DA has been a collaborative effort by a team of consultants including:

THE PROJECT TEAM	
Urban Design	Warren Lee Urban Design
Landscape Architect	Corkery Consulting
Civil Engineering	Northrop
Town Planning	DFP Planning Consultants
Social Planning	Elton Consulting
Aboriginal Archaeology	Biosis Research
European Heritage	Biosis Research
Traffic Engineers	Gabites Porter
Acoustic Engineers	Sinclair Knight Merz Peter R Knowland & Associates
Coastal Impacts	Worley Parsons
Climate Change	BMT WBM
Flooding	Bewsher Consulting
Flora & Fauna	Eco Logical
Bushfire	Eco Logical
Economic & Retail	Pitney Bowes Business Insight
Employment Strategy	SGS Economics
Geotechnical, Contamination & Groundwater	Coffey Environments Australia
Asbestos Contamination	Douglas Partners
Visual Analysis	Richard Lamb & Associates
Sustainability	Urbis
Surveyors	Land Team
Quantity Surveyor	Rider Levett Bucknall

Table 1: The Project Team.

1.4 Environmental Assessment & Approvals Process

1.4.1 Major Development

The project has a capital investment value in excess of $100 million and, consistent with the Minister's determination, is therefore subject to Part 3A of the EPA Act.

This Environmental Assessment Report (EA) has been prepared to accompany the Concept Plan application to carry out the project described in Section 4 of this EA.

1.4.2 Director Generals Requirements

On 22 June 2009, DFP on behalf of TRUenergy Tallawarra Pty Ltd submitted to the DoP a Preliminary Assessment Report (PAR) for the proposal. This report requested Director General Requirements (DGR's) pursuant to Section 75F of the EPA Act for the preparation of the EA.

The DGR's which were issued on 28 September 2009 and updated on 1 July 2010 are attached at **Appendix 1.**

The Concept Plan application has been prepared in accordance with the Director-General's requirements as detailed in the table attached at **Appendix 2**.

1.4.3 EA Exhibition

In accordance with section 75H(3) of the EPA Act, once "*the environmental assessment has been accepted by the Director-General, the Director-General must, in accordance with any guidelines published by the Minister in the Gazette, make the environmental assessment publicly available for at least 30 days*".

Any person or public authority can make submissions to the Director-General during this 30 day period.

1.5 Consultation

Since purchasing the site in 2003, with the assistance of Elton Consulting, TRUenergy has proactively engaged with key community, government agencies and local authorities to discuss plans for the development of the Tallawarra Lands site through:

- Community information sessions.
- Regular newspaper updates.
- A locally distributed newsletter.
- The Tallawarra Community Liaison Group (CLG) that meets every two months to discuss issues related to the development and operation of Tallawarra. The CLG comprises representatives of a range of community and environmental interest groups, council representatives and government agencies from within the Illawarra. Since April 2010, the CLG met on four occasions to be briefed on specific aspects of the Concept Plan.
- Circulation of the draft concept plan. Correspondence was sent to the following agencies seeking their preliminary comments on the draft concept plan:
    - (i) Department of Planning
    - (ii) Wollongong City Council
    - (iii) Shellharbour Council
    - (iv) Lake Illawarra Authority
    - (v) Department of Environment Climate Change and Water (including NSW Office of Water and National Parks and Wildlife Service)
    - (vi) NSW Rural Fire Service

(vii) NSW Roads & Traffic Authority

(viii) Commonwealth Department of Environment Water Heritage and the Arts

Stakeholder feedback received has been reviewed by TRUenergy and its consultants and has been instrumental in shaping the Concept Plan.

Elton Consulting has prepared a Consultation Outcomes Report which details the consultation undertaken and the comments received. A copy of the report is provided at **Appendix 3.**

1.6 Works Requiring No Further Application / Consent

Pursuant to the provisions of Sections 75(J) and 75P(1)(c) of the EP&A Act and given the detailed environmental assessment included in this application, it is requested that project approval be issued to enable demolition of structures associated with the former Riding School at Gilba Road, Koonawarra without the need for further applications / consents.

The following reports may be referred to for further detailed commentary:

- Statement of Heritage Impact (**Appendix 14A**);
- Historical Archaeological Assessment of TH1 for the Tallawarra Lands Development (**Appendix 14B**);
- Photographic Archive Recording TH1 (Fowler's Farm) Tallawarra (**Appendix 14B**);
- Contamination Assessment North Shore Precinct (**Appendix 22C**); and
- Register of Hazardous Materials Report in Residences in Northern Precinct (**Appendix 22D**).

2 Background

In 1954 a coal fired power station was constructed on the Tallawarra site which operated until 1989. The former plant and many of the ancillary buildings have been demolished and the operational areas of the site remediated. The then owner of the site, Pacific Power, prepared an Environmental Impact Statement in 1998 to support a Development Application for a new combined cycle gas turbine (CCGT) power station. Wollongong City Council granted development consent for the CCGT power station in 1999. The Tallawarra site was purchased by TRUenergy Tallawarra from Pacific Power on 30 April 2003 with the permit to develop a modern, gas fired power station. TRUenergy has fully funded the development of the new Tallawarra Power Station.

2.1 Tallawarra Power Station (Stages A & B)

The 400MW Tallawarra A Power Station is Australia's most efficient gas fired combined cycle power station and was built to address the growing demand for electricity in NSW. It has capacity to produce enough electricity to reliably supply power to 200,000 dwellings. The Tallawarra Power Station produces around 70% less greenhouse gas emissions than traditional coal fired power stations.

To ensure there is a continued secure and reliable supply of energy, TRUenergy intends to deliver a second gas fired power station at Tallawarra (Stage B) on land adjoining Stage A. The scale of Stage B will be similar to Stage A, however Stage B will use much of the existing Stage A infrastructure. The Tallawarra B Power Station received project approval from the Department of Planning on 21 December 2010.

The power station design and materials selection combine to significantly mitigate against any adverse operational noise impacts. In addition, a substantial buffer zone is provided around the power station (Stages A & B) to ensure that existing and future potential surrounding land uses are further protected from potential noise impacts. The buffer area

is being extensively landscaped with native plants. This increases the attractiveness of the site and provides additional natural habitat for flora and fauna.

In order to comply with government regulations which aim to ensure that air, water and noise emissions associated with the operation of the power station do not exceed the relevant environmental standards, TRUenergy is required to regularly report emissions and ambient air quality data to the Department of Environment & Climate Change.

2.2 Zoning History

The land that comprises the Tallawarra site was predominantly zoned 5(a) Special Uses (Power Station) under the provisions of Wollongong Local Environmental Plan 1990. In addition, some parts of the site were zoned 6(b) Private Recreation, 7(a) Special Environmental Protection and 7(b) Environmental Protection - Conservation. In 2005, Wollongong City Council resolved to commence the process for the potential rezoning of Tallawarra Lands. The LES was subsequently undertaken by Willana Associates in association with a range of technical experts on behalf of Council in 2006 following a tender process administered by Council. A LES was overseen by a Project Control Group that included representatives from Council, the Department of Premier and Cabinet, Illawarra regional offices of the Department of Planning and TRUenergy. The purpose of the LES was to determine the suitability and capacity of the site for a range of different land uses. The LES identified preferred categories of development including industrial, commercial, residential and conservation and the appropriate locations for the different land uses. The LES also provided key background information which guided the preparation of proposed zoning controls for the Tallawarra site by Wollongong City Council. At its meeting on 2 April 2007, Council resolved to adopt the LES and to prepare a draft LEP for the Tallawarra site based on the LES. The Tallawarra site was subsequently included by Council in its review of the zoning controls for the Wollongong Local Government Area based on the standard instrument LEP template. Draft Wollongong Local Environmental Plan 2009 (DWLEP) was subsequently prepared. Council endorsed DWLEP at its meeting on 24 June 2008. DWLEP was subsequently certified for public exhibition by the Department of Planning on 28 November 2008 and was initially placed on public exhibition until 13 March 2009. The public exhibition period was subsequently extended to 31 March 2009 and the submission period extended to 17 April 2009. Wollongong LEP 2009 was published on 26 February 2010.

3 The Site

3.1 Location

A site survey plan is attached at **Appendix 5** together with a series of site analysis – constraints summary plans prepared by Corkery Consulting.

The land the subject of the Concept Plan Application referred to throughout this report as Tallawarra Lands is situated on the western foreshore of Lake Illawarra adjacent to the West Dapto release area, approximately 13 kilometres southwest of the Wollongong Town Centre and is within the Local Government Area of Wollongong (refer to **Figure 1**).

Aerial photographs of the subject site are also provided (refer to **Figures 2** and **3**).

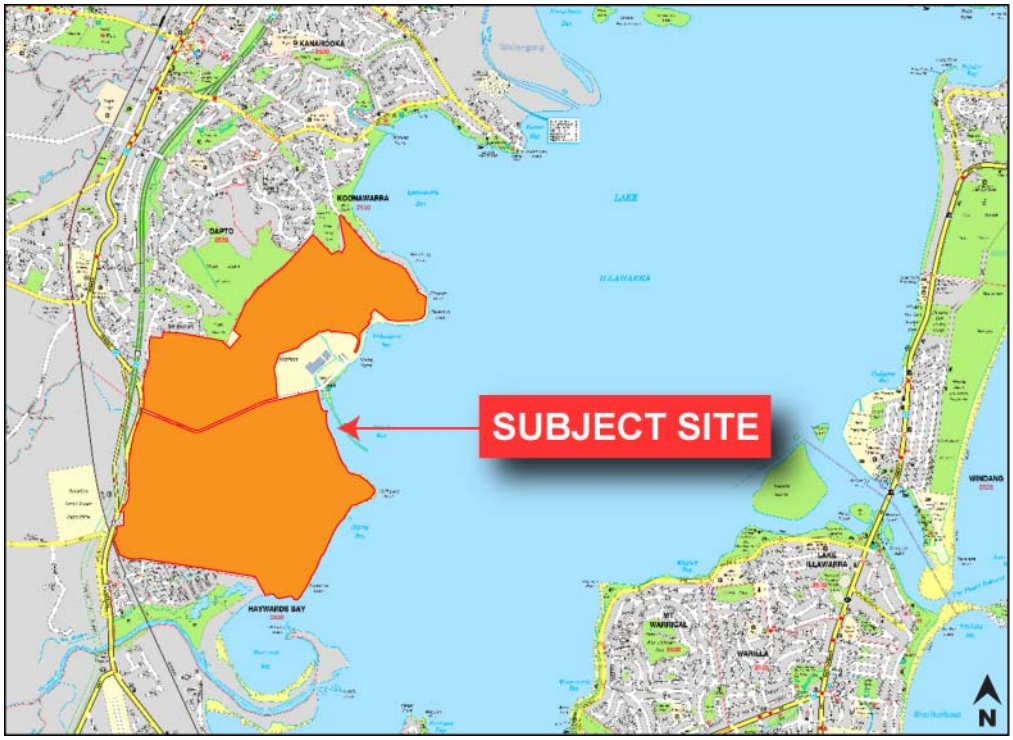


Figure 1: The site location

Figure 2: Aerial Photograph of the Subject Site

Figure 3: Aerial Photograph of the Subject Site

3.2 Land Ownership and Legal Description

Figure 4 is a cadastral plan of the Tallawarra Lands site with information on the lots, easements and encumbrances that affect the site.

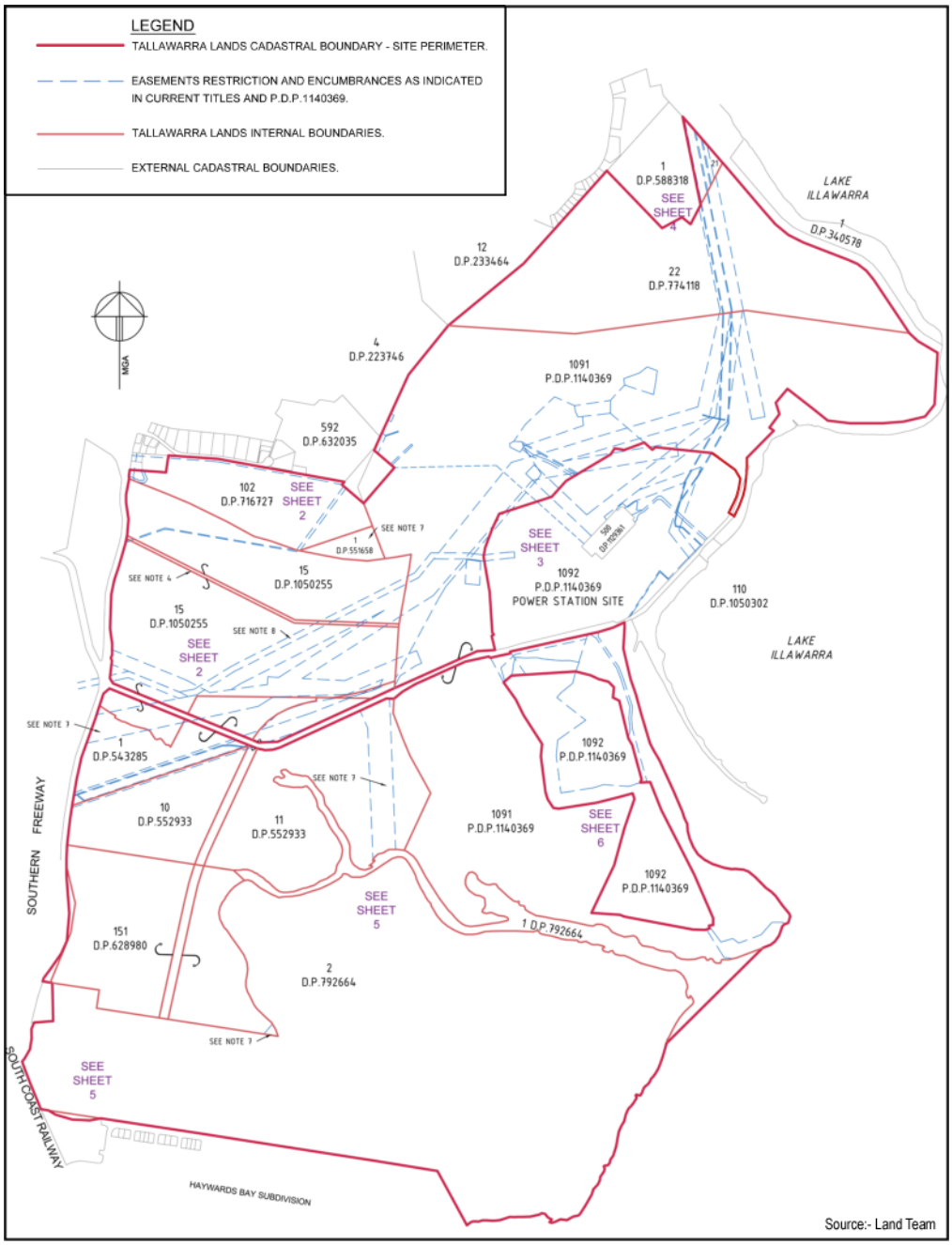


Figure 4: Tallawarra Cadastral Plan

The land to which the Concept Plan relates is primarily owned by TRUenergy Tallawarra. The following allotments are those owned by TRUenergy Tallawarra:

- Lot 1 in DP109795;
- Part Lot 501 in DP 1129361 (approved to be subdivided to create Lots 1091 and 1092 in preliminary DP 1140369);
- Lot 1 in DP 551658;

- Lots 21 and 22 in DP 774118;
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- Lot 151 in DP 628980;
- Lot 1 in DP 543285;
- Lots 10 and 11 in DP 552933;
- Lots 1 and 2 in DP 792664; and
- Lots 7 and 8 in DP1049520.

Yallah Bay Road which bisects the site and extends from the Princes Highway in the west to the foreshore of Lake Illawarra in the east is a Council owned local road and does not form part of the Tallawarra Lands site. Upgrades and widening of the Yallah Bay Road reserve to accommodate increased traffic flows associated with development of the Tallawarra Lands site are proposed. Whilst the proponent commits to carrying out the upgrades at its own expense, TRUenergy does not own this land (the land is owned by Wollongong Council). Accordingly, these works are a commitment and do not form part of the project to which this application formally applies.

The total area of the Tallawarra site is 572.1ha. The Tallawarra Power Station (including the switchyard but excluding the constructed wetlands area south of Yallah Bay Road) is 36.25ha, resulting in the Tallawarra Lands Project Area being 535.9ha.

Landform

The site has a varied topography. Mt Brown in the northern western part the Concept Plan area is the high point of the site. Mt Brown extends to the north beyond the site boundary into the suburb or Koonawarra. Mt Brown has steep slopes in the south eastern section that become gentler on the mid and lower slopes.

The flatter areas of the site form the southern part of the Concept Plan area. The site rises very slightly adjacent to the western boundary.

Vegetation

Eco Logical has mapped the vegetation of the site. Much of the vegetation has been cleared for grazing activities associated with the former power station. Eco Logical has observed that whilst there are native vegetation communities on the site they occur in small patches and have been extensively invaded by lantana. There are several patches of endangered ecological communities present on the site, however these are relatively small patches.

Creeks and wetland

The flatter topography on the southern part of the site is characterised by Duck Creek which traverses the site in an east-west direction and drains into Lake Illawarra. There are several small wetland areas and ponds which adjoin and feed into Duck Creek.

There are also isolated pockets of wetland within the southern half of the site.

A constructed drainage channel extends along part of the southern boundary before heading in a northerly direction through the middle of the site and connecting with Duck Creek.

There are a number of dams on the slopes of Mt Brown and a series of smaller creeks draining from Mt Brown towards Lake Illawarra.

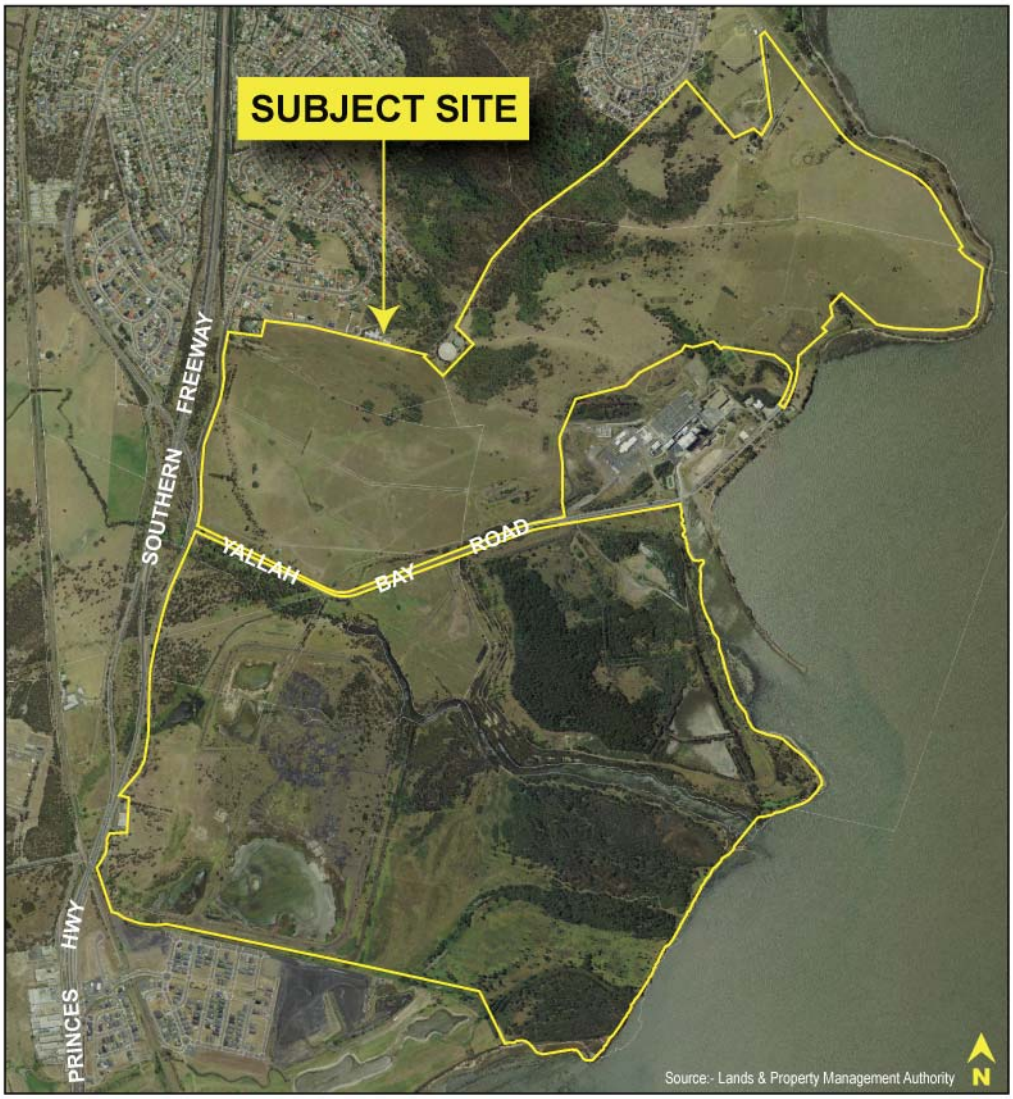


Figure 5: Aerial photograph

3.3 Surrounds

The location of the subject site between the Illawarra Escarpment and Lake Illawarra benefits from close proximity to established transport infrastructure including the South Coast Railway, the F6 Southern Freeway near the western boundary of the site and Illawarra Regional Airport south west of the site.

The Tallawarra Lands site comprises the majority of the Yallah locality. The surrounding area also includes the suburbs of Koonawarra and Dapto to the north, the recently established suburb of Hayward's Bay to the south, Lake Illawarra to the east and the suburbs of Marshall Mount, Penrose and the future West Dapto urban release area to the west. Albion Park Rail and Illawarra Regional Airport are located further to the south of the site.

Figure 6: Aerial photograph of region

3.4 Surrounding Road Network

The surrounding road network is comprised of the following:

- The Southern Freeway which is located just west of the subject site.
- The Princes Highway which forms part of the western boundary of the site
- Cormack Avenue which forms part of the western boundary of the site
- Yallah Bay Road, which is a public road that intersects with the Princes Highway and provides an east-west route through the site to the Tallawarra Power Station and foreshore areas.
- Gilba Road which provides an access point to the northern area of the site via Koonawarra. The road is formed up to the boundary of the site. The unformed

extension of the road adjacent to the northern site boundary has been dedicated to Council.

The Yallah Bay Road is the only public vehicular access point into the site.

Vehicular access directly off the Southern Freeway is not available. South bound traffic on the freeway utilises the exit ramp located further south at Haywards Bay to rejoin the northbound freeway before exiting to the Princes Highway to loop back under the freeway and into the site. Northbound traffic on the freeway uses the same northern exit ramp back to the Princes Highway to access the site.

The Princes Highway is one-way southbound south of the intersection with Yallah Bay Road. The Princes Highway merges with the Southern Freeway. Alternatively, traffic exiting Yallah Bay Road can travel north along the Princes Highway back to Dapto which also provides a connection back to the Southern Freeway.

Cormack Avenue intersects with the Princes Highway just north of the intersection with Yallah Bay Road. Cormack Avenue provides a connection with the suburb of Koonawarra. The collector roads through Koonawarra also provide access back to the Princes Highway at Dapto and then to the Southern Freeway.

4 Project Description

4.1 Capital Investment Value

The Capital Investment Value (CIV) of the project has been estimated by Rider Levett Bucknall as being $184,820,000 excluding GST. For the purposes of defining the project, the scope of works was taken to comprise bulk earthworks, site decontamination, roadworks, stormwater, sewer, water, gas and electrical infrastructure services, landscaping and vegetation management works.

This estimate includes all costs necessary to establish and operate the project, however it excludes land costs, GST, any costs and fees associated with development approval resubmissions, any special or additional contributions sought by authorities for public or other facilities, finance costs and interest charges.

The Indicative Order of Cost Estimate prepared by Rider Levett Bucknall is attached in **Appendix 6**.

4.2 Urban Design Concept

The Concept Plan has been developed to generally align with the land uses zones under Wollongong LEP 2009, but has been further refined in response to the opportunities and constraints of the site. The land uses proposed are considered to be permissible under the various applicable environmental planning instruments.

Tallawarra Lands exhibits significant natural attributes including Lake Illawarra foreshore, Duck Creek, Mount Brown and wetlands. These natural features create a varied topography that gives rise to developmental opportunities and constraints reflected in the proposed land uses shown on the Concept Plan. In addition, there are physical attributes of the site and surrounds such as the Tallawarra Power Station, Princes Highway (F6) and adjoining residential areas of Koonawarra to the north and Haywards Bay to the south which have shaped the Concept Plan design.

The proposed Tallawarra Lands Concept Plan has been prepared by Warren Lee Urban Design and is attached at **Appendix 7** and included in **Figure 7** below.

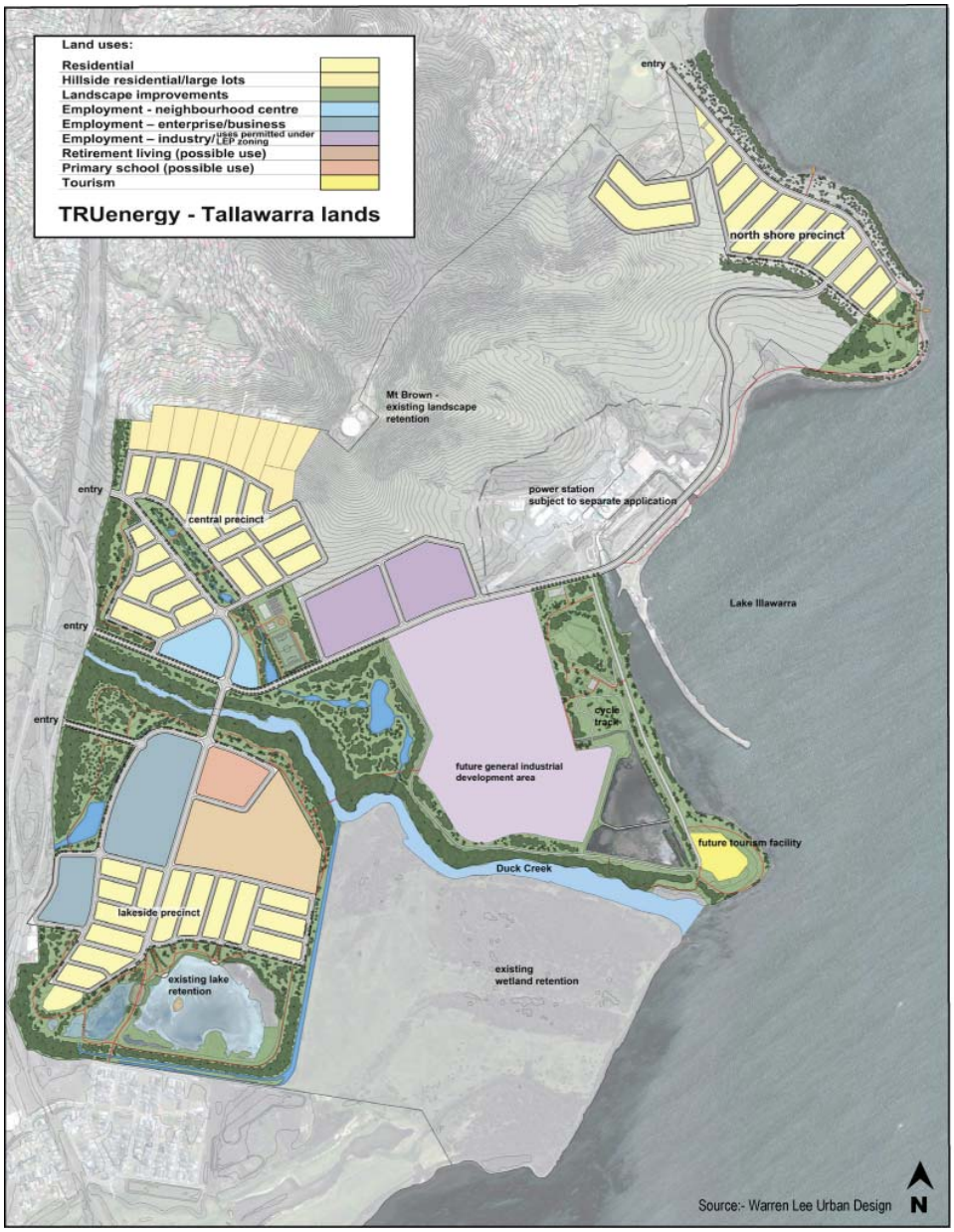


Figure 7: Concept Plan prepared by Warren Lee Urban Design

The Concept Plan details the land uses proposed in this application as set out the following sections. The Concept Plan includes three residential precincts which have been developed in response to the structure, topography and natural features of the site. Table 2 below sets out the area, land uses and key features of each residential precinct.

	Northshore Precinct	*Central Precinct*	*Lakeshore Precinct*
Total Open Space	*87ha*	*109ha*	*164ha*
Total Urban Area	*22.3ha*	*101ha*	*51.2ha*
Total Precinct Area (Approx)	*110ha*	*210ha*	*215ha*
Proposed Land uses	*Residential* *Open space (environmental and foreshore)*	*Residential* *Open space (environmental and recreational)* *Industry* *Neighbourhood and commercial centre* *Tourism*	*Residential* *Retirement living* *Open space (environmental)* *Business/office/large format retail* *Primary school*

Table 2: Character and land uses of each residential precinct

Northshore Precinct

The Northshore Precinct is an elevated precinct dominated by a long ridge leading from Tallawarra Point to Mt Brown and its frontage to Lake Illawarra.

The precinct has been identified as being suited to a residential land use as it connects with the adjoining residential area of Koonawarra. The residential area will accommodate approximately 310 lots and is confined to the lower northern slopes where the topography is manageable for urban development whilst allowing for the upper slopes of Mt Brown to be retained as a green ridge line to address viewing impacts from across the lake.

Open space is proposed on the eastern headland which will connect with the foreshore open space owned by the Lake Illawarra Foreshore Authority.

The urban structure is a simple grid layout with streets running approximately north-east to south-west providing views along each street down to Lake Illawarra. The lot arrangement has also been proposed in this manner to reduce earthworks.

Central Precinct

The Central Precinct is characterised by Duck Creek, Mt Brown slopes and Lake Illawarra foreshore. The precinct adjoins the Princes Highway and the Tallawarra Power Station site. Yallah Bay Road which is proposed as the main collector road in the Concept Plan passes through the Central Precinct.

A mix of land uses are proposed responding to topography and land constraints. On the lower levels, a mixed use hub is proposed comprising local retail, business and community facilities and a sportsground. Industrial land is also proposed off Yallah Bay Road. The Concept Plan proposes one industrial precinct to the north of Yallah Bay Road with land to the south identified as a future General Industrial development area.

The residential land uses are proposed on the elevated land. Approximately 340 conventional lots are envisaged in this precinct with 10 large lots approximately 1ha in size located on the upper slope of the Mt Brown hillside.

Open space comprises the riparian corridor which is to be reinstated through to its connection with Duck Creek, as well as riparian land and wetlands associated with Duck Creek. A recreational sports ground is also proposed adjacent to the neighbourhood centre. Open space is proposed along the western edge of the site area to provide a buffer to the Princes Highway and F6. A cycling track is proposed south of Yallah Bay Road and east of the future General Industrial development site.

A potential tourism site is proposed on the headland of this precinct which is removed from the main activity areas of the site, but has a logical connection with the views over Lake Illawarra, its foreshore and surrounding open spaces.

The urban structure is a simple grid arrangement with streets arranged to minimise earthworks and create vistas down to the reinstated riparian corridor.

Lakeshore Precinct

The Lakeshore Precinct has flatter topography and is characterised by the Duck Creek corridor and wetlands. This precinct also adjoins the Princes Highway to the west and the suburb of Haywards Bay to the south.

A mixed use precinct is proposed in this location. The land will be reformed however the flat topography will be retained. Business, office and bulky goods retail land uses are proposed as the main employment generating land uses. The precinct also makes provision for a possible primary school (subject to demand) and a retirement village, both of which are ideally suited to the flat topography.

Approximately 350 standard residential lots are proposed in this location, with an additional 200 dwellings proposed for the retirement living site.

A simple and legible grid pattern is proposed feeding off one main spine road (which connects with Yallah Bay Road).

The southern and eastern parts of the precinct are predominantly environmental open space areas including lakes to the south and wetlands to the east along the southern side of Duck Creek.

4.3 Proposed Land Uses and Distribution

4.3.1 Residential

Each precinct contains a residential component as summarised in Table 3.

Precinct	Land Area	Approx lot yield	Average density
Northshore	22.3ha	310 lots	14 dwellings/ha
Central	27ha 11ha (large hill side lots)	340 lots 10 large lots	13 dwellings/ha (excluding large lots)
Lakeshore	23.2ha 11.2 ha (retirement)	350 lots 200 dwellings	15 dwellings/ha (excluding retirement village)
Total	94.7 ha	1010 residential lots 200 retirement dwellings	14 dwellings/ha (excluding large lots and retirement village)

Table 3: Proposed residential land uses

4.3.2 Neighbourhood Centre

The neighbourhood centre is located in the Central Precinct and is proposed to occupy approximately 4.25ha. The centre comprises two parcels, the smaller being 1.25ha for initial development and the remainder for future development.

A maximum retail gross floor area of 1000m^2 - 1500m^2 for the smaller parcel is envisaged to accommodate a small supermarket and neighbourhood and specialty shops plus a medical and/or child care centre to cater for the short term demand of the incoming population and workforce. The Concept Plan allows for expansion in the longer term to increase retail offerings depending on demand.

Shop top housing could also be pursued to provide housing choice and diversity subject to market demand for such a product.

4.3.3 Primary School

A primary school site is provided with an area of approximately 3ha. The primary school site is located centrally within the Concept Plan area for convenience of access to most of the residential areas. The school site is sufficiently large to accommodate playing fields but is also close to the playing fields proposed within the Central Precinct

The primary school site is located within Business zoned land. Should demand for a primary school not arise, then the zoning provides sufficient flexibility for alternate commercial uses.

4.3.4 Enterprise/Business (B6 zoned land)

The Lakeside Precinct includes approximately 12ha of land in the B6 Enterprise Corridor zoned land. This site has good accessibility and visibility to the F6 freeway.

An initial site of approximately 6ha is proposed to accommodate up to 20,000m^2 which is suitable for large form retail (such as bulky goods) depending on demand. A further area of 3ha is also proposed to cater for future development.

A second 3ha site is also proposed to accommodate a small business park providing a GFA of up to 15,000m^2.

Low scale one and two storey buildings are envisaged for both sites with surface car parking provided around the buildings providing up to 1500 car parking spaces (depending on the mix of land uses).

4.3.5 Industry/Business (IN1 and IN2 zoned land)

The Central Precinct contains approximately 14ha of land for industrial and light industrial uses. This initial industrial precinct is located on the northern side of Yallah Bay Road and can accommodate a GFA of up to 34,160m^2 of industrial development.

Buildings in this precinct are envisaged to be low scale one and two storey buildings.

A future General Industrial development area of 40ha is nominated on the southern side of Yallah Bay Road. This land has geotechnical constraints which could limit its suitability for industrial development and will need to be the subject of further investigation.

4.3.6 Tourism

At the eastern end of the Central Precinct is a headland area on the Lake Illawarra foreshore. A 2.5ha site is proposed for tourist uses. The specific use has yet to be determined.

4.3.7 Community and Recreation Facilities

The main recreational facilities provided for in the Concept Plan are:

- Sports facilities located in the Central Precinct. The facility is sized to accommodate a playing field, sports courts (such as netball and tennis), playground, amenities and car parking;
- The cycle track with associated amenities and car parking;
- Foreshore open space, walkways and cycle paths;
- Footpaths, cyclepaths and shareways; and
- BBQ and picnic facilities in major open space areas including foreshore parks.

4.3.8 Open Space

The Concept Plan proposes a significant open space component which is largely an outcome of the environmental constraints of the site. A total of 360ha are proposed which represents approximately 67% of the total site area. The main open space areas are summarised below.

- Mt Brown ridge and slopes which reflects the E3 Environmental Management zoning, vegetation constraints including EECs, slope constraints, scenic values and heritage values.
- Lake Illawarra foreshore areas.
- Open space drainage corridor through the Central Precinct.
- Riparian corridors and riparian open space associated with Duck Creek to reflect the E2 – Environmental Conservation zoning.
- Environmental conservation areas on the southern side of Duck Creek to reflect the E2 – Environmental Conservation zoning.
- Lakes and ponds forming the southern component of the Lakeside Precinct to reflect the E3 - Environmental Management zoning.
- Woodland and open space buffers along the western side of the Concept Plan area to reflect the E2 and E3 zonings and provide a vegetation buffer to the Princes Highway (F6).
- Recreational open space in the form of sports facilities in the Central Precinct and cycling facilities on the ash disposal area.

4.4 Project Staging

A definitive staging plan has not been prepared however it is envisaged at this preliminary stage of the project that development will commence in the north of the site to optimise efficiencies with existing infrastructure and minimise earthworks and progress in a southerly direction.

4.5 Landscape Concept

A Landscape Plan report has been prepared by Corkery Consulting and attached at **Appendix 8**. The landscape vision for the Concept Plan as described in the Landscape Plan is "*to create an open space network that is strategically planned to function at the regional and local scale. The vision aims to preserve and enhance the existing landscape character of the Tallawarra Lands as a distinguishing feature of the new community. This vision is underpinned by landscape design that will create an engaging, delightful, safe and enjoyable public domain incorporating the principles of sustainability through water sensitive urban design, crime prevention through environmental design and enhancement of biodiversity.*"

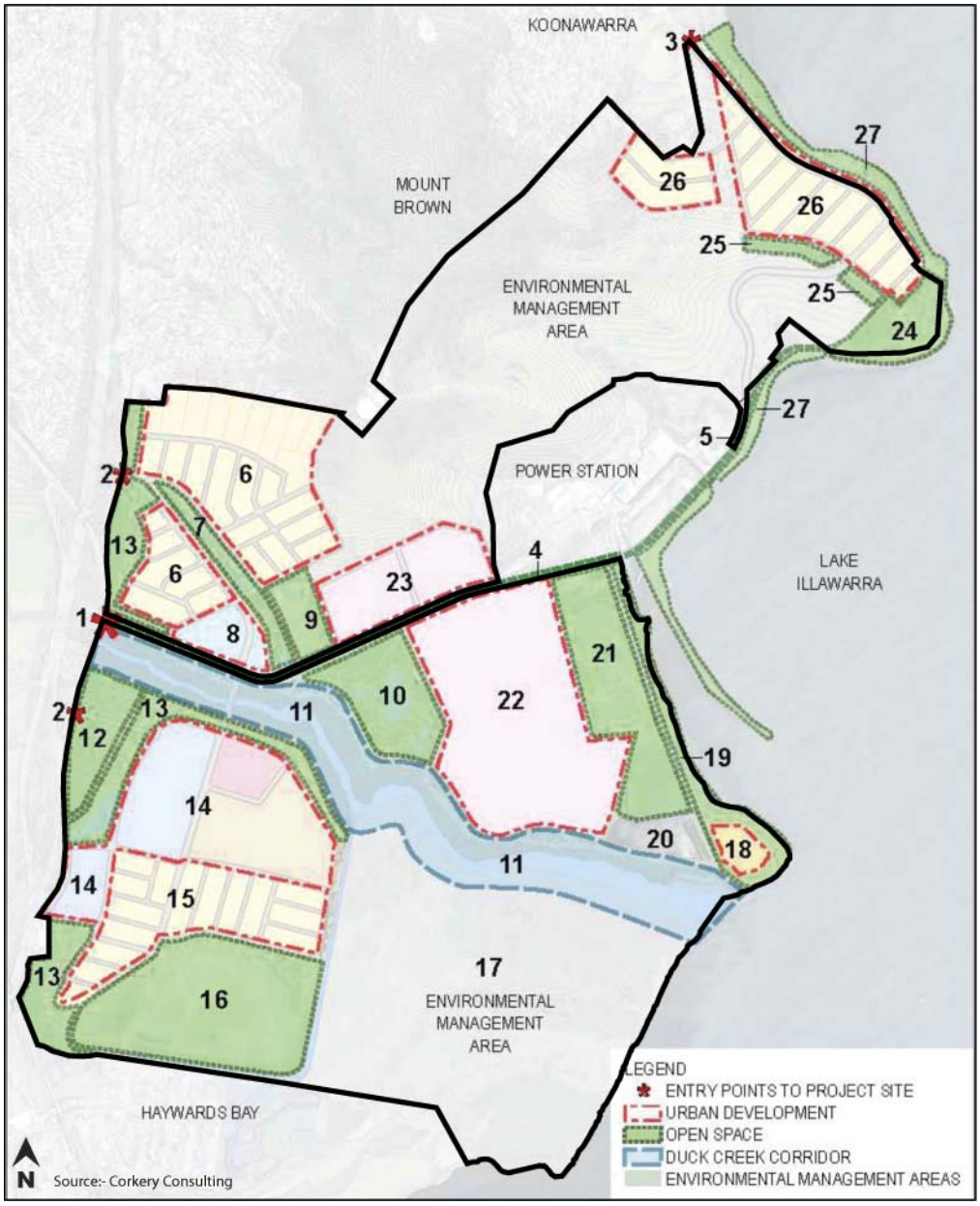


Figure 8: Landscape Plan Summary

The Landscape Plan corresponds with the Concept Plan prepared by Warren Lee Urban Design, and the key components of the Landscape Plan include:

- An integrated network of open space and recreation opportunities incorporating foreshore parks, a playing field and other sports facilities;
- A network of pedestrian paths, share ways and cycle lanes;
- A hierarchy of streetscapes that incorporate street trees and other planting with water conservation measures;
- A neighbourhood centre with public spaces;
- A school with recreation facilities;
- Rehabilitated environmental conservation areas; and
- Stormwater treatment ponds and constructed wetlands.

The landscape plan has been developed in line with the urban structure developed by Warren Lee Urban Design and responds to the landscape including landform, drainage, vegetation, landscape character and the ecological values of the site. Furthermore, it incorporates opportunities for water sensitive urban design and crime prevention through environmental design.

The Landscape Plan has developed landscape strategies for the open space network, circulation network, streetscape, and landscape principles for urban development.

Open space network

Four landscape precincts have been identified which align with the Concept Plan prepared by Warren Lee. The four precincts are:

- Central Precinct – incorporating residential development, industrial employment, the Neighbourhood Centre and areas of open space.
- Southern Precinct – incorporating a combination of residential development, commercial employment, a primary school, retirement living and areas of open space.
- Northern Precinct – proposed residential development and areas of open space along the foreshore of Lake Illawarra.
- Lake Illawarra Foreshore Precinct – areas of open space along the foreshore of Lake Illawarra and Duck Creek.

Each precinct has been further divided into open space zones (for instance, boundary zones, riparian zones, drainage lines, stormwater quality ponds and recreational areas). A recommended planting schedule has been developed for the open space in each precinct which is documented in the Landscape Plan and can form the basis for the landscape treatment at subsequent stages of the planning process.

Circulation Network

The Landscape Plan has applied the RTA's *NSW Bicycle Guidelines 2003* in planning the pedestrian and cycleway network. A range of pedestrian and cycle paths will be provided that includes:

- Cycle lanes – 1.5m wide cycle lanes provided on the road pavement between traffic and parking lanes, defined by line marking.
- Shareways – 2.5m wide pedestrian and cycle shared pathways that are either provided along the edge of the road reserve or within adjoining open space and recreation areas.
- Footpaths – 1.5m wide pedestrian paths provided along the edge of the road reserve or within open space and recreation areas.

These service all residential, business, retail, community and recreational areas proposed in the Concept Plan as well as foreshore areas and a potential link to Haywards Bay. The characters envisaged for each of these are detailed in the Landscape Plan report.

Streetscapes

Four road types are proposed for the Concept Plan including collector road (12m carriageway); industrial commercial road (11.4m carriageway); local street (10.6m carriageway) and minor local street (7.5m carriageway).

The Landscape Plan report has developed a street tree planting strategy that is consistent with key principles of Landcom's *Street Tree Design Guidelines,* as follows:

- Draw from the existing vegetation that occurs on the site to create an individual character for each Precinct.

- Design the street tree planting to unify individual streetscapes and street networks, through the layout, scale and character to create visual cohesion to the street corridor.
- Select tree species to achieve the overall design intent and take account of the site specific physical conditions.
- Optimise passive watering of plants as much as possible through the location and planting detail of street trees.
- Minimise conflicts between street trees and infrastructure, including underground and above ground services.
- Apply Water Sensitive Urban Design initiatives where appropriate, such as bio-swales and bio-retention tree pits that are integrated with street tree plantings.

Street Tree Schedules for each of the precincts are illustrated in the Landscape Plan report including recommended species suitable for use in each road type. The planting schedules in the Landscape Plan report are intended to guide more detailed landscape design at the next stage in the project.

Landscape principles for urban development

The Landscape Plan report has also developed landscape principles for the residential and employment lands and neighbourhood centre components of the Concept Plan. These principles are focused around visual amenity, function, sustainability principles and biodiversity. These principles can be carried forward to future applications.

4.6 Access and Street Hierarchy

Four main Vehicular access points are proposed including:

- The main entry which utilises the existing Yallah Bay Road entrance to the site on the western edge of the site.
- An entry north of the main entry on the western edge of the site from Cormack Avenue into the Central Precinct.
- An entry south of the main entry on the western edge of the site into the Enterprise/Business zone.
- An entry at the north of the site into the Northern Precinct connecting with Koonawarra.

An internal street hierarchy has been developed as part of the Concept Plan which is illustrated in the Landscape Plan prepared by Corkery Consulting and shown in **Figure 9**.

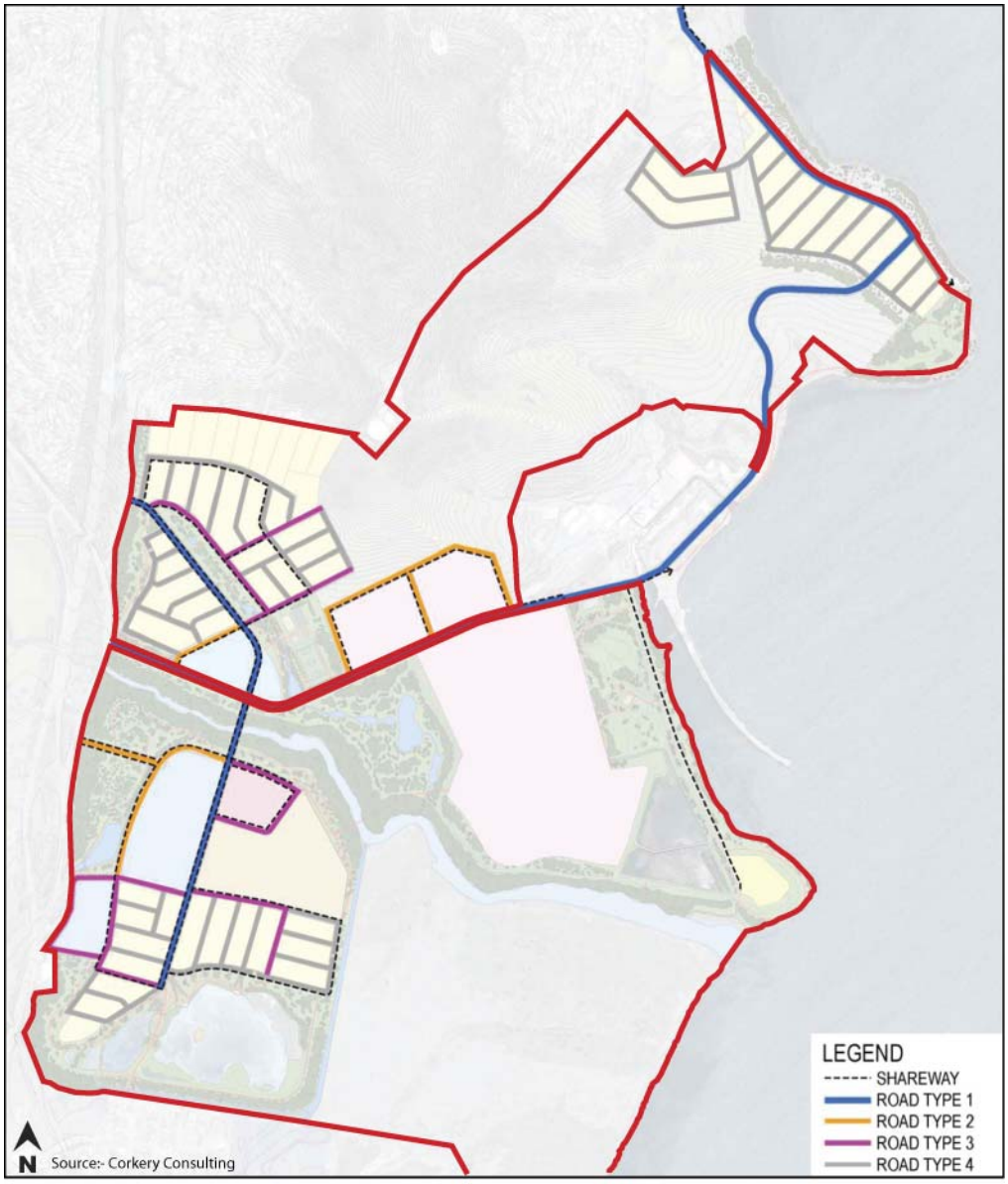


Figure 9: Street hierarchy

The street hierarchy has been developed based on the Landcom *Street Design Guidelines*. The Landscape Plan contains road sections to illustrate the composition and future character of each road type.

4.7 Future Super Lot Subdivision

Figure 10 is an indicative plan illustrating the likely super lots proposed for the Tallawarra Lands. These super lots are generally aligned with the land uses within each precinct and logical groupings of the major environmental lands.

It is proposed that a super lot subdivision will be the subject of a separate Project application under Part 3A of the EP&A Act, or alternatively a Development application under Part 4 of the EP&A Act.

It is also proposed that pursuant to section 75P(1)(c) of the EP&A Act that no further environmental assessment be required for this particular stage of the project in relation to the range of matters already addressed as part of this Concept Plan application. The future application will include more detailed plans of the proposed super lot subdivision. The assessment of the future super lot subdivision application would be confined to matters

such as final lot dimensions and sizes, access requirements, creation of easements and rights of way required for access, provision of services and consistency with the Concept Plan.

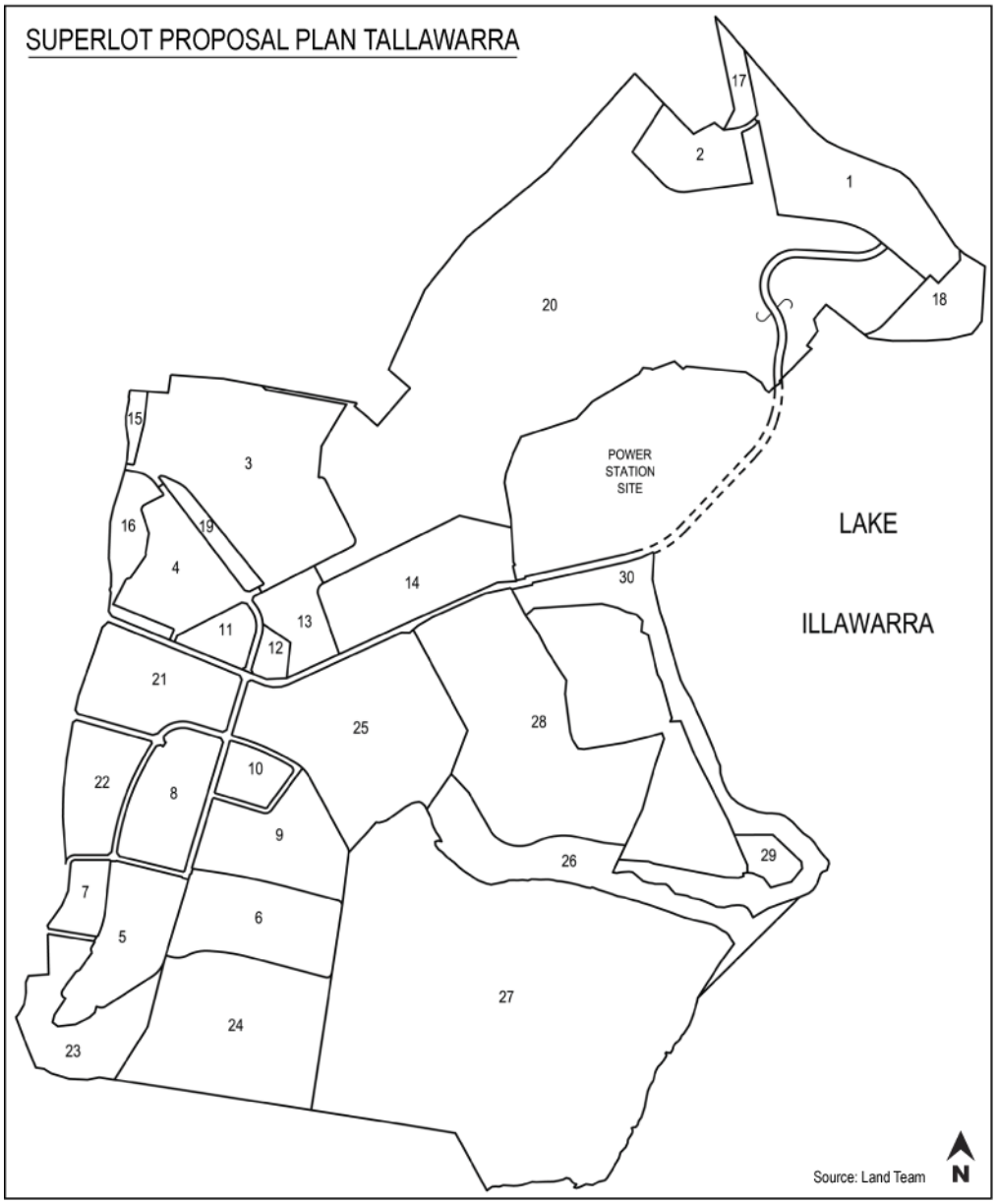


Figure 10: Tallawarra Super Lot Proposal Plan

5 Planning Provisions

5.1 Illawarra Regional Strategy

The Illawarra Regional Strategy applies to the local government areas of Kiama, Shellharbour and Wollongong. It is one of a number of regional strategies that have been prepared by the DoP for high growth areas in NSW. The primary objective of the Regional Strategy is to ensure that adequate land is available and appropriately located to accommodate projected housing and employment needs over the 25 years from 2006 to 2031.

The Regional Strategy provides a plan for long term economic growth within the Illawarra Region, whilst identifying and protecting natural resources including biodiversity assets and

agricultural lands. Implementation of the Regional Strategy is primarily through local environmental plans, development control plans, the State Infrastructure Strategy and funds collected as development contributions. As anticipated within the Regional Strategy, Wollongong City Council has prepared a new LEP. The provisions of Wollongong LEP 2009 have been prepared taking into account the Regional Strategy. The matters concerning environmental impact and biodiversity have been addressed within the specialist reports prepared and detailed in this EA.

The Strategy identifies the land as being within an existing urban area. Discussion of the main objectives of the Strategy and the Project's consistency with those objectives follows:

Economic Development and Growth

The Strategy identifies that 30,000 new jobs are required in the Region to cater for population growth and to achieve a reduction in commuting times. While the Tallawarra Power Station site is not identified as one of the key employment lands for the Region, it is identified as key infrastructure for the Region. The Actions in this section of the Strategy require Councils to maintain supply and protect regionally significant employment lands including the Tallawarra Power Station site which is noted as an investigation area. The rezoning of the land under Wollongong LEP 2009 has established a number of business and industrial zones on land surplus to the power station's needs whilst retaining the land required by the power station for this use. The proposal makes use of the commercial, business and industrial zonings applying to the land. This will provide employment opportunities for the incoming population and for the region as the population grows.

The Concept Plan proposes a mix of employment generating land uses. The main employment generating land uses comprise 72.75ha including:

- 4.25ha in the B1 – Neighbourhood centre zone.
- 2.5ha in the SP3 - Special Use (Tourism) zone.
- 12ha in the B6 – Enterprise Corridor zone.
- 54ha in the IN1 – Industrial and IN2 – Light Industrial zones.

The Concept Plan also makes provision for a retirement living village and primary school which will generate local jobs.

The Strategy notes that 270ha of employment lands need to be secured. The proposal will make a significant contribution to that target. The Strategy also recognises a high demand for larger employment land parcels in the range of 2-3ha and 10-15ha. The parcel sizes proposed in the Concept Plan can accommodate this demand if required.

Accordingly, the Concept Plan is considered to be consistent with the Strategy.

Regional Transport

The main public transport services in the immediate area are trains running along the South Coast railway line with the nearest stations being Albion Park and Dapto and local bus services that currently operate on the fringe of the Concept Plan area.

The Concept Plan and subdivision/road layout has been designed to enable future bus services to connect the proposed development with existing regional transport networks, particularly the South Coast railway line.

Housing and Settlement

The Strategy identifies that 38,000 new dwellings are required to cater for population growth and declining occupancy rates. The proposal provides approximately 1200 lots for detached housing and seniors living housing that will assist in meeting this target.

A mix of housing is provided including detached housing on a diverse range of allotment sizes to respond to changing demographics and household sizes. The zoning provisions also allow for other forms of housing such as attached dwellings, semi-detached dwellings or shop top housing in the B1 Neighbourhood Centre zone which will enable a mix of housing to be delivered subject to market demand.

Natural Environment

Part of the site including Mt Brown, Lake Illawarra Foreshore, Duck Creek and associated wetland areas are identified as containing significant native vegetation and coastal wetlands. Mt Brown also forms part of the habitat corridor which connects with the Illawarra Escarpment to the west. These areas of the site have been zoned E2 – Environmental Conservation or E3 – Environmental Management consistent with the Strategy. The uses proposed for these areas in the Concept Plan are consistent with both the zoning and the Strategy.

The proposal also incorporates significant works in the riparian corridors to rehabilitate the degraded and disturbed natural environment with measures to protect the re-created and downstream environments.

The ecological attributes of the site are detailed in the ecological and riparian assessment reports prepared by Eco Logical attached at **Appendices 9 & 10**. The reports also provide an assessment of the potential impacts development envisaged in the Concept Plan will have on the environmentally significant areas and detail the measures that will be implemented to mitigate against any such impacts.

Water sensitive urban design (WSUD) will be utilised to support the ecological values of the site. The measures proposed to be adopted are detailed in the Drainage report by BMT WBM attached at **Appendix 11**.

Natural Hazards

Natural hazards such as flooding, coastal inundation, climate change impacts and bushfire threat have been taken into account as part of the LES which guided the zonings applying to the site. Further assessment has been undertaken as part of the Concept Plan to locate land uses appropriately having regard to the zoning and natural hazards.

Water, Energy and Waste

The Sustainability Report prepared by Urbis establishes a framework that can be applied to future applications to require consideration of a range of ESD initiatives including methods to share energy assets, stormwater harvesting and re-use, WSUD measures, BASIX (including committing future residential development to an equivalent of NSW BASIX water target +10%), committing future commercial and retail developments to target a 40% reduction in potable water use in comparison to similar standards of development in NSW, management and recycling of spoil and green waste during excavation and clearing for use in the landscape works. The full range of ESD measures that form part of the ESD framework for future applications are documented in **Appendix 12**.

Rural Landscape and Rural Communities

The site has been recently rezoned and does not contain rural zones or primary production land. The E2 - Environmental Conservation and E3 – Environmental Management zones are not proposed to form part of the proposed urban footprint.

Cultural Heritage

The Strategy requires that heritage impacts are considered in the future land use planning and management. Consistent with the Strategy, the Concept Plan application is supported by an Aboriginal Archaeological Assessment and Statement of Heritage Impact Assessment both of which have been prepared by Biosis Research and are attached at

Appendices 13 & 14. These reports identify the Aboriginal and European heritage values of the site and detail the management measures required to ensure the heritage values of the site are not adversely impacted.

5.2 Illawarra Regional Environmental Plan No. 1

Illawarra REP No 1 was gazetted on 11 April, 1986 and applied to the City of Wollongong. At the time the DGR's were issued, Illawarra REP No 1 was an applicable environmental planning instrument. The commencement of Wollongong LEP 2009 on 26 February 2010 repealed Illawarra REP by operation of Clause 1.9(2).

5.3 SEPP 14 – Coastal Wetlands

State Environmental Planning Policy 14 (Coastal Wetlands) aims to ensure that coastal wetlands are preserved and protected in the environmental and economic interests of the State. Works including clearing, construction of a levee, draining and filling cannot be undertaken except with the consent of the Council and the concurrence of the Director.

Two SEPP 14 wetlands are located on the subject site as illustrated in **Figure 11**. One is on the southern side of Duck Creek and the other in the south-eastern part of the site on the northern foreshore area to Haywards Bay.

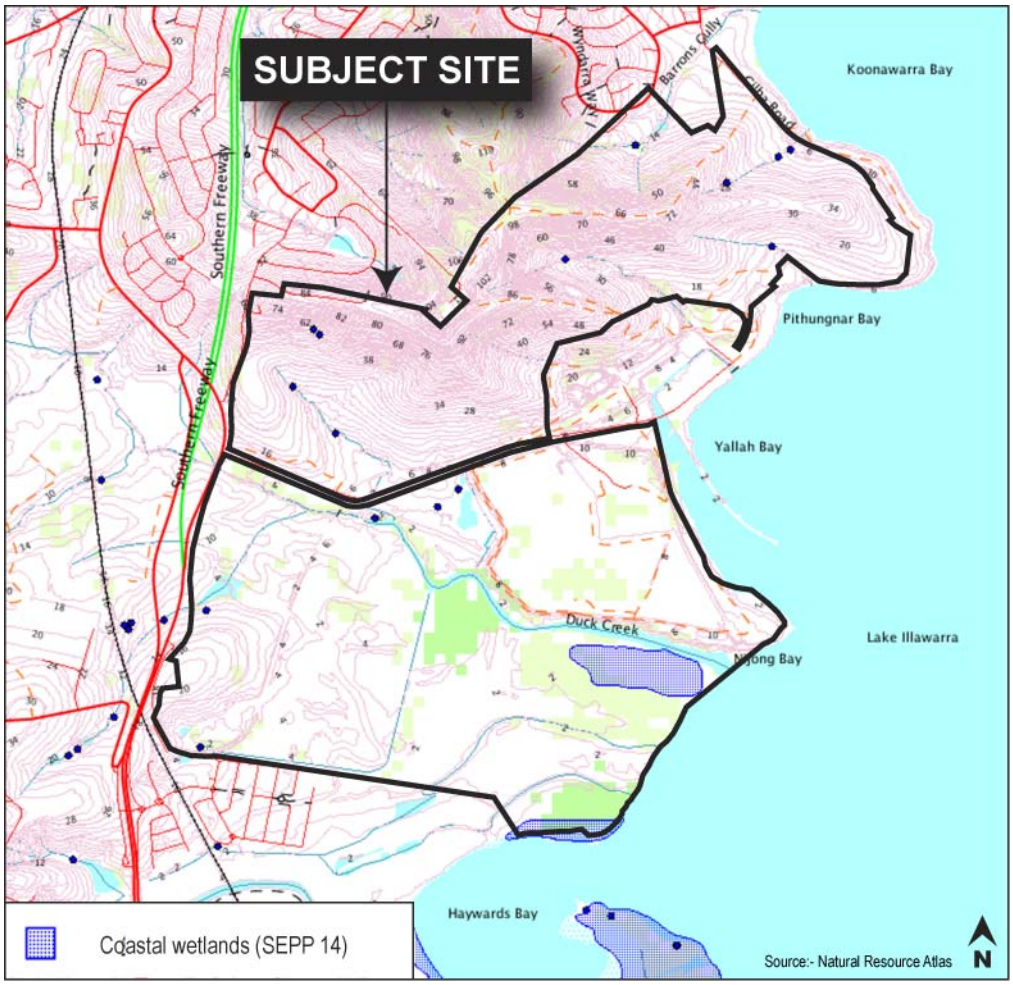


Figure 11: SEPP 14 Coastal Wetlands

The ecological assessment prepared by Eco Logical notes that a 50m buffer around these wetlands is readily achievable as the wetland areas are to be conserved within a 95.98 ha reserve zoned for environmental conservation. Accordingly, the Concept Plan is considered to be consistent with the SEPP.

5.4 SEPP 71 – Coastal Protection and NSW Coastal Design Guidelines

State Environmental Planning Policy 71 – Coastal Protection (SEPP 71) applies to land within the "coastal zone" of NSW. The land is included within the Coastal Zone Maps for the Greater Sydney Metropolitan area and consequently is subject to the provisions of SEPP 71 – Coastal Protection.

Clause 8 of SEPP 71 outlines the matters for consideration by the consent authority when preparing a Draft LEP or determining a DA. Table 4 below provides commentary on these matters for consideration having regard to the Concept Plan proposal.

Clause 8 Consideration	Comment
(a) the aims of the Policy set out in Clause 2	The EA details how the proposal will achieve consistency with the aims of SEPP 71 particularly by: • protecting and managing the natural and cultural attributes of the site; • improving public access to the coastal foreshore; • implementing interpretative measures to preserve Aboriginal cultural heritage; • providing a predominantly low scale development to protect the visual amenity of the coast; • implementing stormwater mitigation and water quality measures to protect the beach environment; and • protecting and enhancing the coastal vegetation, particularly ecological communities.
(b) existing public access to and along the coastal foreshore for pedestrians or persons with a disability should be retained and, where possible, public access to and along the coastal foreshore for pedestrians or persons with a disability should be improved, (c) opportunities to provide new public access to and along the coastal foreshore for pedestrians or persons with a disability,	Existing public access along the foreshore is limited to the foreshore immediately adjacent to the Tallawarra Power Station site. This comprises a cycle/pedestrian path, seating and picnic shelters which have been recently constructed. These facilities and pathway do not extend into the Concept Plan area, but are readily capable of doing so. The flat topography along much of the foreshore area will facilitate access for persons with a disability. This is more appropriately documented as part of future project or development applications for public improvements to the foreshore areas.
(d) the suitability of development given its type, location and design and its relationship with the surrounding area,	The suitability of the site for development has been considered through the LES process which informed the current zonings of the site. The location of the land uses proposed in the Concept Plan have been determined having regard to the zoning and to the constraints and opportunities of the various areas of the site such as topography, geotechnical, flooding, ecological,

Clause 8 Consideration	Comment
	heritage values, views to and from the site and compatibility with surrounding development.
(e) any detrimental impact that development may have on the amenity of the coastal foreshore, including any significant overshadowing of the coastal foreshore and any significant loss of views from a public place to the coastal foreshore,	The developable footprints are set well back from the Lake Illawarra foreshore minimising visual impacts and avoiding overshadowing impacts. The provision of significant foreshore areas in the Concept Plan ensures that views to the foreshore and the Lake from future public places will be available. The link road connecting the central and northern precincts will also provide a scenic route.
(f) the scenic qualities of the New South Wales coast, and means to protect and improve these qualities,	The majority of development is well removed from the coast and the provision of significant foreshore areas in the Concept Plan protects the scenic qualities of the coastal areas of the lake. A Visual, Landscape and Scenic Resource Management Considerations report has been prepared by Richard Lamb and Associates (RLA). A copy of this report is attached at **Appendix 15**. This report examined the visual aspects of future development on the slopes of Mt Brown that will be visible from the Lake and other foreshore areas. Generally the impacts are found to be acceptable and similar to the surrounding built form context. Urban design guidelines have also been proposed by RLA which form part of the Statements of Commitment.
(g) measures to conserve animals (within the meaning of the *Threatened Species Conservation Act 1995*) and plants (within the meaning of that Act), and their habitats,	Eco Logical Australia Pty Ltd (ELA) has prepared an ecological assessment report which is included in **Appendix 9** of this EA. This assessment addresses the Threatened Species Conservation Act and the Fisheries Management Act. Generally the Concept Plan retains large areas of environmental and conservation land which together with management and mitigation measures ensures that the objects of these Acts are capable of being achieved.
(h) measures to conserve fish (within the meaning of Part 7A of the *Fisheries Management Act 1994*) and marine vegetation (within the meaning of that Part), and their habitats	
(i) existing wildlife corridors and the impact of development on these corridors,	Wildlife corridors have been considered and addressed by Eco Logical Australia Pty Ltd (ELA) in their ecological assessment report which is included in **Appendix 9** of this EA.
(j) the likely impact of coastal processes and coastal hazards on development and any likely impacts of development on coastal processes and coastal hazards,	Coastal process and coastal hazards has been addressed by Worley Parsons in their Coastal Processes and Hazards Study which is included in **Appendix 16** of this EA.

Clause 8 Consideration	Comment
(k) measures to reduce the potential for conflict between land-based and water-based coastal activities,	The Concept Plan generally provides separation between the land based (developable areas) and potential water based activities so as to avoid conflicts between these land uses. The Concept Plan provides for a tourist facility on the foreshore, consistent with the zoning. Details of the possible use(s) are not yet known.
(l) measures to protect the cultural places, values, customs, beliefs and traditional knowledge of Aboriginals,	Biosis Research has prepared an Aboriginal Archaeological Assessment report which is included in **Appendix 13**.
(m) likely impacts of development on the water quality of coastal waterbodies,	WSUD measures are to be employed throughout the drainage networks which will assist in managing water quality from the site. The Environmental Management Strategy prepared by Eco Logical Australia also contains measures to maintain and improve water quality and hydrological regimes.
(n) the conservation and preservation of items of heritage, archaeological or historic significance,	Biosis Research has prepared a Statement of Heritage Impact for the subject site and a copy of their report is attached at **Appendix 14A**. This report assesses known and potential items of heritage, archaeology or historic significance both within and adjoining the site.
(o) only in cases in which a council prepares a draft local environmental plan that applies to land to which this Policy applies, the means to encourage compact towns and cities,	The land has recently been rezoned and this provision is not applicable to the Concept Plan.
(p) only in cases in which a development application in relation to proposed development is determined: (i) the cumulative impacts of the proposed development on the environment, and (ii) measures to ensure that water and energy usage by the proposed development is efficient.	The Tallawarra Lands site has been recently rezoned which has identified areas of the site suitable for future development and those areas which are to be protected as environmental management or conservation areas. The Concept Plan is consistent with the zonings. The retention of significant areas of environmental land will minimise potential cumulative impacts. Improvements to the natural environments are also proposed particularly to the riparian corridors and the future installation of WSUD measures will improve water quality. The specialist reports accompanying the EA also document the range of management measures that can be carried forward to future applications to mitigate potential future impacts.

Table 4 – Matters for Consideration under Clause 8 of SEPP 71

Clause 14 of the policy requires assessment of an application to ensure it does not impede or diminish the right of access of the public to or along the coast or foreshore. The Concept Plan proposes publicly accessible land along the foreshores of Lake Illawarra which will

connect with the existing foreshore land owned and managed by the Lake Illawarra Authority enhancing the public access opportunities to the foreshore consistent with SEPP 71.

Clause 15 requires special consideration of development that proposes the disposal of effluent by means of a non-reticulated system. The proposed development will be connected to the reticulated sewerage system, and accordingly the provisions of this clause will not be relevant.

Clause 16 of the policy requires that no untreated stormwater be discharged from the development into the sea, coastal creek or similar body of water. As detailed in the Drainage report attached at **Appendix 11**, the water sensitive urban design (WSUD) strategy proposed for the Tallawarra Lands site and developed by BMT WMB will detain, retain, harvest, filter, infiltrate and biologically treat surface runoff to reduce the concentrations and loads of pollutants discharged into receiving waterways. Wollongong DCP 2009 contains stormwater quality performance targets. In order to comply, it is necessary to demonstrate that a particular development with treatment measures in place will achieve the targeted reductions for Total Nitrogen, Total Phosphorus, Total Suspended Solids and Gross Pollutants when compared to the development without treatment. The WSUD strategy aims to achieve reductions that exceed Council targets.

The provisions of **Part 5** of SEPP 71 provide for the preparation of 'master plans' as part of a DA process for certain residential subdivisions. In accordance with **Clause 18**, a master plan is required to be prepared in accordance with the provisions of the policy and to be considered by the consent authority in the determination of a DA.

A master plan is defined in the SEPP "*as being a document consisting of written information, maps and diagrams that outlines proposals for development of the land to which the master plan applies*." In this instance the proposed Concept Plan which includes detailed layout plans of each of the precincts would serve the same purpose as a master plan and no further master planning should be necessary. Accordingly, pursuant to Clause 18(2) of SEPP 71, the Minister is requested to waive the need for master plan(s) to be prepared and adopted for the Tallawarra Lands site.

Coastal Design Guidelines for NSW

The guidelines of Part 2 set out design principles for coastal settlements which are addressed in Table 5 below.

Design Principle	Commentary
Defining the Footprint and Boundary	The boundary of the footprint of the developable land is consistent with the current zoning applying to the land under Wollongong LEP 2009, which has been established through the LES process. This Concept Plan application has further developed the proposal by detailed assessment of the constraints and opportunities available within the site.
Connecting Open Spaces	Open space areas have been identified to protect the natural attributes of the site. The open space is designed to create a connected network linking the creek corridors with existing and proposed regional open space adjoining the site. This will contribute to the character of the locality and also creates a separation between the future urban areas improving their amenity and visual quality both within and external to the site.

Design Principle	Commentary
Protecting the Natural Edges	The natural edges of the site are protected in the following manner: • The developable areas of the Concept Plan are consistent with the zoning • The developable areas are well removed from the coastal foreshore which is proposed to be retained as open space area. • The Duck Creek corridor is protected with large vegetated buffers retained to ensure development is separated from the riparian corridor • APZs are contained within the property boundaries and where land adjoins E2 or E3 zoned land, the APZs do not extend into that land. • WSUD measures are to be employed that will manage water quality impacts and reduce edge effects from water runoff where roads adjoin open space and environmental zoned land.
Reinforcing the Street Pattern	Yallah Bay Road is nominated as a collector road and provides the main spine road through the Concept Plan area. Each precinct is accessed off Yallah Bay Road and each contains its own collector road which then provides access to the local streets that are arranged in a logical and legible grid pattern. The road hierarchy including carriageway widths and landscape treatment as documented in the Landscape Plan has been designed to create a network that is connected, legible and easy to use.
Appropriate Buildings for a Coastal Context	The current application is for Concept Plan approval and does not provide for any specific built form. This will be a matter for future project or development applications.

Table 5: Design Principles of Coastal Design Guidelines for NSW

5.5 SEPP Major Development 2005

SEPP (Major Development) 2005 was introduced to nominate projects of State or regional environmental planning significance to be assessed and determined by the Minister under Part 3A of the Act. Extensive amendments have been made to the SEPP since the Minister's Declaration and Director General's Requirements were sought in 2009.

The project was declared a major project pursuant to Clause 6 of SEPP (Major Development) 2005.

The listings in Schedules 1 and 2 of the SEPP that applied to the project when the Minster's declaration and Director General's Requirements were sought were stated in the Preliminary Assessment Report as being:

Schedule 1

Group 4 Other manufacturing industries, distribution and storage facilities

11 Other manufacturing industries

Development that employs 100 or more people or with a capital investment value of more than $30 million for the purpose of:

(a) laboratory, research or development facilities, or

(b) medical products, or

(c) printing or publishing, or

(d) textile, clothing, footwear or leather manufacturing, or

(e) furniture manufacturing, or

(f) machinery or equipment manufacturing, or

(g) the vehicle, defence or aerospace industry, or

(h) vessel or boat building.

Group 5 Residential, commercial or retail projects

13 Residential, commercial or retail projects

(1) Development for the purpose of residential, commercial or retail projects with a capital investment value of more than $50 million that the Minister determines is important in achieving State or regional planning objectives.

Group 6 Tourism and recreational facilities

17 Tourist, convention and entertainment facilities

Development for the purpose of tourist related facilities, major convention and exhibition facilities or multi-use entertainment facilities that:

(a) has a capital investment value of more than $100 million, or

(b) employs 100 or more people, or

(c) has a capital investment value of more than $5 million and is located in an environmentally sensitive area of State significance.

Schedule 2

1 Coastal areas

(1) Development within the coastal zone for any of the following purposes:

(f) recreational or tourist facilities (other than internal refits of, or minor alterations or minor additions to existing facilities or a change of use of a building by which the building becomes a recreational or tourist facility):

(ii) in the case of facilities wholly or partly in a sensitive coastal location in the metropolitan coastal zone—that provide accommodation (or additional accommodation) for 100 persons or more

(g) buildings or structures (other than minor alterations or minor additions to existing buildings or structures) that are:

(i) greater than 13 metres in height, in the case of buildings or structures wholly or partly within a sensitive coastal location, or

(j) subdivision for residential purposes of land that is not in the metropolitan coastal zone (unless it is wholly or partly in a sensitive coastal location):

(i) into more than 25 lots, or

(ii) into 25 or fewer lots, if the land proposed to be subdivided and adjoining or neighbouring land in the same ownership as that land could be subdivided into more than 25 lots

The project has a capital investment value in excess of $100 million and, consistent with the Minister's determination, is therefore subject to Part 3A of the EPA Act.

On 22 June 2009, DFP on behalf of TRUenergy Tallawarra Pty Ltd submitted to the DoP a Preliminary Assessment Report (PAR) for the proposal. This report requested Director General Requirements (DGR's) pursuant to Section 75F of the EPA Act for the preparation of the EA.

The DGR's were issued on 28 September 2009 and updated 1 July 2010, a copy of which is included in **Appendix 1.**

The Concept Plan application has been prepared in accordance with the Director-General's requirements.

5.6 SEPP Infrastructure 2007

The Concept Plan application does not seek approval for any infrastructure works associated with the project. Accordingly, the provisions of SEPP Infrastructure 2007 will be a consideration for the future stages of the project.

Notwithstanding, in relation to "Clause 104 – Traffic Generating Developments", the Traffic Impact Assessment prepared by Gabites Porter (**Appendix 17**) provides commentary on the RTA's "*Guide to Traffic Generating Development*".

5.7 SEPP 65 – Design Quality of Residential Flat Development

This policy applies to development proposals for residential flat buildings as defined by the policy. The concept plan does not seek approval for any residential flat buildings and therefore SEPP 65 is not a relevant matter for this EA.

5.8 Wollongong LEP 1990

At the time of the issuing of the DGR's Wollongong LEP 1990 applied to the subject site. Under the provisions of the Wollongong LEP 1990, the Tallawarra site was predominately zoned 5(a) Special Uses (Power Station), with portions of 6(b) Private Recreation, 7(a) Special Environmental Protection and 7(b) Environmental Protection – Conservation.

Wollongong LEP 1990 was repealed by Wollongong LEP 2009 which was published on 26 February 2010. Accordingly, Wollongong LEP 1990 is not a relevant matter for consideration in this EA.

5.9 Wollongong LEP 2009

The following section details the relevant controls contained within Wollongong LEP 2009 applicable to Tallawarra Lands.

An extract of the applicable zones under Wollongong LEP 2009 is provided in **Figure 12** below.

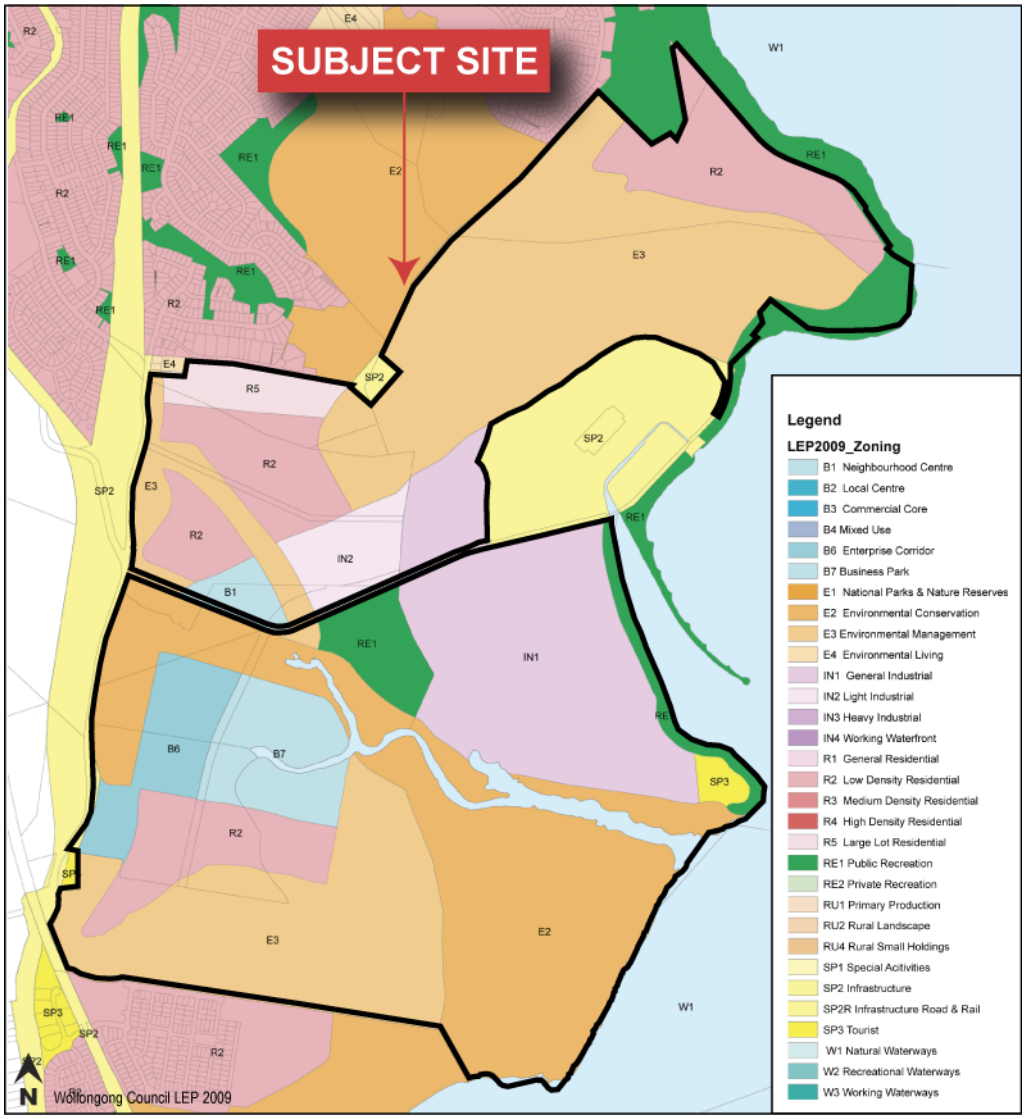


Figure 12: Zoning Extract Wollongong LEP 2009

The zoning provisions applicable to the site are detailed within Table 6 below

Zone	*Objectives of zone*	*Permitted without consent*	*Permitted with consent*	*Prohibited*
B1 Neighbourhood Centre	• To provide a range of small-scale retail, business and community uses that serve the needs of people who live or work in the surrounding neighbourhood. • To allow for residential accommodation and other uses while maintaining active retail, business or other non-residential uses at the street level.	Building identification signs; Business identification signs	Advertisements; Advertising structures; Amusement centres; Backpackers' accommodation; Bed and breakfast accommodation; Boarding houses; Business premises; Car parks; Child care centres; Community facilities; Entertainment facilities; Hotel or motel accommodation; Information and education facilities; Landscape and garden supplies; Neighbourhood shops; Office premises; Places of public worship; Recreation areas; Recreation facilities (indoor); Registered clubs; Retail premises; Roads; Seniors housing; Service stations; Shop top housing; Timber and building supplies; Veterinary hospitals	Any other development not permitted without consent or with consent.
B6 Enterprise Corridor	• To promote businesses along main roads and to encourage a mix of compatible uses. • To provide a range of employment uses (including business, office, retail and light industrial uses) and residential uses (but only as part of a mixed use development). • To maintain the economic strength of centres by limiting retailing activity. • To encourage activities which will contribute to the economic and employment growth of Wollongong. • To allow some diversity of activities that will not: (a) significantly detract from the operation of existing or proposed development, or (b) significantly detract from the amenity of nearby residents, or	Building identification signs; Business identification signs	Advertisements; Advertising structures; Bulky goods premises; Business premises; Car parks; Child care centres; Community facilities; Depots; Entertainment facilities; Environmental facilities; Hotel or motel accommodation; Industrial retail outlets; Landscape and garden supplies; Light industries; Office premises; Passenger transport facilities; Places of public worship; Recreation areas; Recreation facilities (indoor); Recreational facilities (outdoor); Registered clubs; Roads; Service stations; Serviced apartments; Sex services premises; Shop top housing; Storage premises; Take away food and drink premises; Timber and building supplies; Transport depots; Truck depots; Vehicle sales or hire premises; Veterinary hospitals; Warehouse or distribution centres	Any other development not permitted without consent or with consent.

Zone	*Objectives of zone*	*Permitted without consent*	*Permitted with consent*	*Prohibited*
	(c) have an adverse impact upon the efficient operation of the surrounding road system.			
B7 Business Park	• To provide a range of office and light industrial uses. • To encourage employment opportunities. • To enable other land uses that provides facilities or services to meet the day to day needs of workers in the area.	Building identification signs; Business identification signs	Advertisements; Advertising structures; Business premises; Child care centres; Community facilities; Helipads; Hotel or motel accommodation; Kiosks; Light industries; Neighbourhood shops; Office premises; Passenger transport facilities; Recreation facilities (indoor); Roads; Warehouse or distribution centres	Any other development not permitted without consent or with consent.
IN1 General Industrial	• To provide a wide range of industrial and warehouse land uses. • To encourage employment opportunities. • To minimise any adverse effect of industry on other land uses. • To facilitate and encourage appropriate forms of industrial development which will contribute to the economic and employment growth of Wollongong. • To allow some diversity of activities that will not: a) significantly detract from the operation of existing or proposed manufacturing and service industries, or b) significantly detract from the amenity of nearby residents, or c) adversely impact upon the efficient operation of the	Building identification signs; Business identification signs	Advertisements; Advertising structures; Community facilities; Crematoria; Depots; Freight transport facilities; Heavy industries; Helipads; Industrial retail outlets; Kiosks; Light industries; Liquid fuel depots; Mortuaries; Neighbourhood shops; Places of public worship; Recreation areas; Recreation facilities (indoor); Roads; Service stations; Take away food and drink premises; Transport depots; Vehicle body repair workshops; Vehicle repair stations; Vehicle sales or hire premises; Warehouse or distribution centres	Any other development not permitted without consent or with consent.

Zone	*Objectives of zone*	*Permitted without consent*	*Permitted with consent*	*Prohibited*
	surrounding road system.			
IN2	• To provide a wide range of light industrial, warehouse and related land uses. • To encourage employment opportunities and to support the viability of centres. • To minimise any adverse effect of industry on other land uses. • To enable other land uses that provides facilities or services to meet the day to day needs of workers in the area. • To encourage appropriate forms of industrial development which will contribute to the economic and employment growth of Wollongong.	Building identification signs; Business identification signs	Advertisements; Advertising structures; Agricultural produce industries; Animal boarding or training establishments; Boat repair facilities; Community facilities; Crematoria; Depots; Freight transport facilities; Helipads; Industrial retail outlets; Kiosks; Landscape and garden supplies; Light industries; Mortuaries; Neighbourhood shops; Places of public worship; Recreation areas; Recreation facilities (indoor); Roads; Self-storage units; Service stations; Sex services premises; Take away food and drink premises; Tank-based aquaculture; Timber and building supplies; Transport depots; Vehicle body repair workshops; Vehicle repair stations; Vehicle sales or hire premises; Veterinary hospitals; Warehouse or distribution centres; Waste or resource management facilities; Water treatment facilities	Any other development not permitted without consent or with consent.
SP3 Tourist	• To provide for a variety of tourist-oriented development and related uses	Building identification signs; Business identification signs	Advertisements; Advertising structures; Amusement centres; Boat repair facilities; Boat sheds; Caravan parks; Cellar door premises; Charter and tourism boating facilities; Child care centres; Community facilities; Entertainment facilities; Food and drink premises; Function centres; Information and education facilities; Kiosks; Marinas; Markets; Moorings; Neighbourhood shops; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor);	Any other development not permitted without consent or with consent.

Zone	*Objectives of zone*	*Permitted without consent*	*Permitted with consent*	*Prohibited*
			Registered clubs; Roads; Tourist and visitor accommodation; Water recreation structures	
RE1 Public Recreation	• To enable land to be used for public open space or recreational purposes. • To provide a range of recreational settings and activities and compatible land uses. • To protect and enhance the natural environment for recreational purposes. • To cater for the development of a wide range of uses and facilities within open spaces for the benefit of the community.	Nil	Boat sheds; Caravan parks; Child care centres; Community facilities; Environmental facilities; Environmental protection works; Extensive agriculture; Helipads; Information and education facilities; Kiosks; Markets; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreational facilities (outdoor); Restaurants; Roads; Signage; Take away food and drink premises; Water recreation structures	Any other development not permitted without consent or with consent.
R2 Low Density Residential	• To provide for the housing needs of the community within a low density residential environment. • To enable other land uses that provide facilities or services to meet the day to day needs of residents	Home occupations	Attached dwellings; Bed and breakfast accommodation; Boarding houses; Boat launching ramps; Child care centres; Community facilities; Dual occupancies; Dwelling houses; Environmental facilities; Exhibition homes; Exhibition villages; Group homes; Health consulting rooms; Hospitals; Hostels; Information and education facilities; Jetties; Multi dwelling housing; Neighbourhood shops; Places of public worship; Recreation areas; Recreation facilities (indoor); Recreation facilities (outdoor); Residential flat buildings; Roads; Semi-detached dwellings; Seniors housing; Shop top housing; Signage; Veterinary hospitals	Any other development not permitted without consent or with consent.
R5 Large Lot Residential	• To provide residential housing in a rural setting while preserving, and minimising impacts on, environmentally sensitive	Home occupations	Animal boarding or training establishments; Bed and breakfast accommodation; Business identification signs; Child care centres; Community facilities; Dwelling houses; Exhibition homes; Farm buildings; Places of public worship; Recreation	Any other development not permitted without consent or with consent.

Zone	*Objectives of zone*	*Permitted without consent*	*Permitted with consent*	*Prohibited*
	locations and scenic quality. • To ensure that large residential allotments do not hinder the proper and orderly development of urban areas in the future. • To ensure that development in the area does not unreasonably increase the demand for public services or public facilities. • To minimise conflict between land uses within the zone and land uses within adjoining zones		areas; Roads; Roadside stalls	
E2 Environmental Conservation	• To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values. • To prevent development that could destroy, damage or otherwise have an adverse effect on those values. • To retain and enhance the visual and scenic qualities of the Illawarra Escarpment. • To maintain the quality of the water supply for Sydney and the Illawarra by protecting land forming part of the Sydney Catchment Authority's hydrological catchment to enable the management and appropriate use of the land by the Sydney Catchment Authority	Nil	Environmental facilities; Environment protection works; Extensive agriculture; Recreation areas	Business premises; Hotel or motel accommodation; Industries; Multi dwelling housing; Recreation facilities (major); Residential flat buildings; Retail premises; Seniors housing; Service stations; Warehouse or distribution centres; Any other development not permitted without consent or with consent.
E3 Environmental Management	• To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values.	Home occupations	Animal boarding or training establishments; Bed and breakfast accommodation; Building identification signs; Business identification signs; Community facilities; Dwelling houses; Earthworks;	Industries; Multi dwelling housing; Residential flat buildings; Retail premises; Seniors housing; Service stations; Warehouse or distribution

Zone	*Objectives of zone*	*Permitted without consent*	*Permitted with consent*	*Prohibited*
	• To provide for a limited range of development that does not have an adverse effect on those values.		Environmental facilities; Environmental protection works; Extensive agriculture; Farm buildings; Farm stay accommodation; Forestry; Recreation areas; Roads; Secondary dwellings	centres; Any other development not permitted without consent or with consent.

Table 6: WLEP 2009 Zoning Provisions

5.9.1 Proposed Land Uses

All development proposed in the Concept Plan will be the subject of future applications which will provide specific details of the works to be undertaken and buildings constructed.

Table 7 below provides an assessment of the proposed uses against the uses permitted in the relevant zone. The assessment highlights that the land uses proposed are permissible under the provisions of the various applicable environmental planning instruments.

Zone	Proposed Development	*Permissibility*
B1 Neighbourhood Centre	Local Retail Centre	Yes with Development Consent
B6 Enterprise Corridor	Business Office/Large Retail	Yes with Development Consent
B7 Business Park	Primary School	Yes with Development Consent under the provisions of Clause 28(1A) of SEPP (Infrastructure). However Clause 28(1B) notes that Clause 28(1A) ceases to have effect from 20 February 2012.
	Retirement Living	Yes with Development Consent under the provisions of SEPP (Infrastructure) and SEPP (Housing for Seniors or People with a disability) 2004
IN1 General Industrial	Cycling Track Industry	Permissible as Recreation Area Yes with Development Consent
IN2 Light Industrial	Sportsground Industry	Permissible as Recreation Area as defined Yes with Development Consent
SP3 Tourist	Future Tourism Facility	Subject to future application
RE1 Public Recreation	Possible recreation areas, environmental facilities and/or environmental protection works	Yes with Development Consent
R2 Low Density Residential	Residential Development	Yes with Development Consent
R5 Large Lot Residential	Residential Development	Yes with Development Consent
E2 Environmental Conservation	Possible recreation areas, environmental facilities and/or environmental protection works	Yes with Development Consent
E3 Environmental Management	Possible recreation areas, environmental facilities and/or environmental protection works	Yes with Development Consent

Table 7: Proposed land uses and applicable zones.

5.9.2 Minimum Subdivision Lot Sizes

Clause 4.1 provides the minimum subdivision lot size. The objectives of the standards are:

> *"(a) to control the density of subdivision in accordance with the character of the location, site constraints and available services, facilities and infrastructure,*
>
> *(b) to ensure lots are of a sufficient size and shape to accommodate development."*

The minimum allotment areas are indicated on **Figure 13** below:

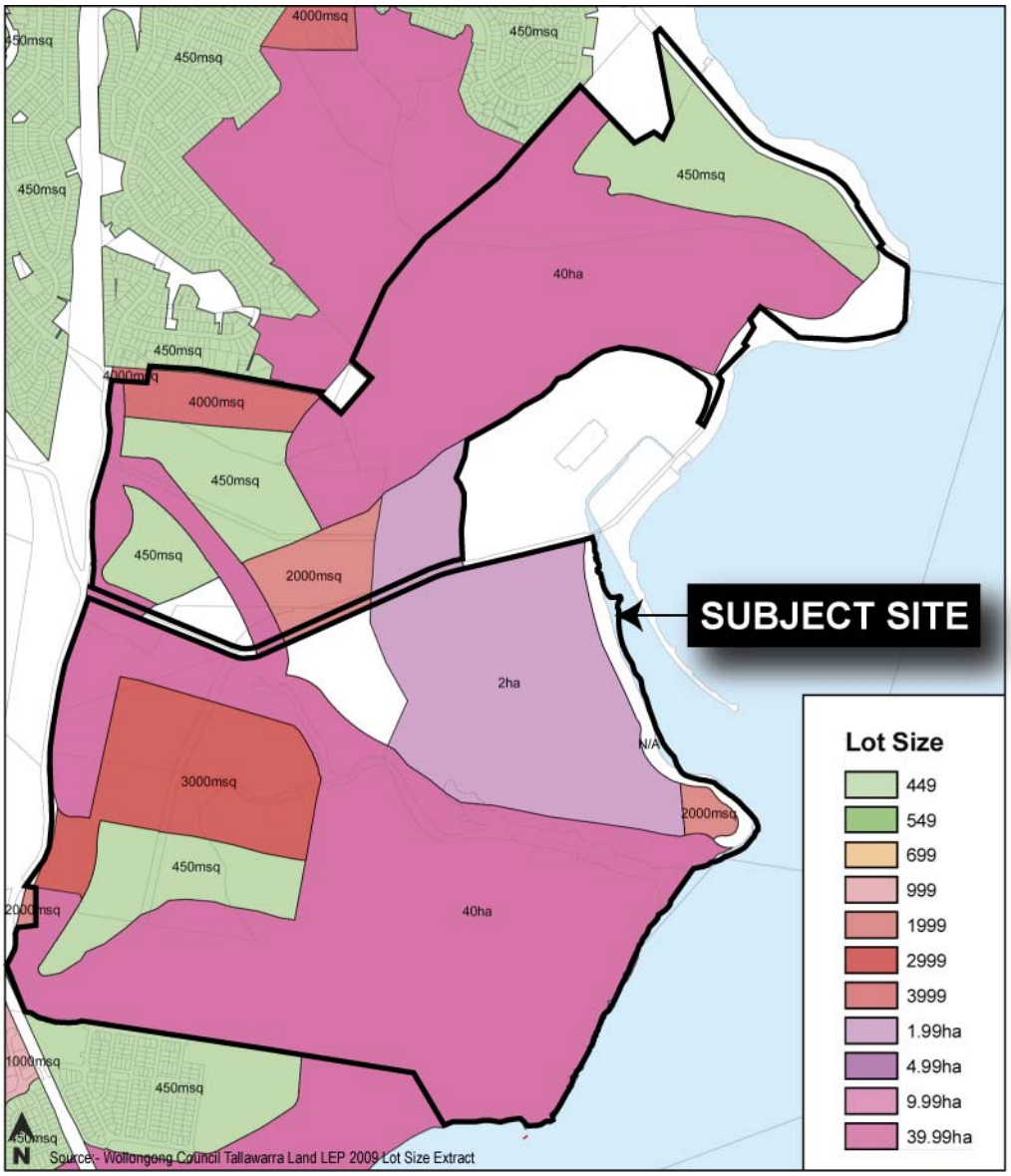


Figure 13: Minimum allotment areas under Clause 4.1 WLEP 2009.

The applicable minimum lot areas are summarised in **Table 8** below:

Zone	Minimum Lot Area
B7 Business Park and B6 Enterprise Corridor	3000m^2
IN1 General Industrial	2ha
IN2	2000m^2
SP3 Tourist	2000m^2
RE1 Public Recreation	Not Applicable
R2 Low Density Residential	450m2
R5 Large Lot Residential	4000m^2
E2 Environmental Conservation	40ha
E3 Environmental Management	40ha

Table 8: Minimum allotment areas under Clause 4.1 WLEP 2009.

The minimum allotment areas do not apply in relation to the subdivision of individual lots in a strata plan or community title scheme.

As noted previously, a superlot subdivision application will be submitted for assessment as a separate application.

5.9.3 Height

The maximum permissible height of developments is determined by Clause 4.3 of WLEP 2009. The objectives of the standards are:

"(a) to establish the maximum height limit in which buildings can be designed and floor space can be achieved,

(b) to permit building heights that encourage high quality urban form,

(c) to ensure buildings and public areas continue to have views of the sky and receive exposure to sunlight.

The maximum heights are indicated on **Figure 14** below:

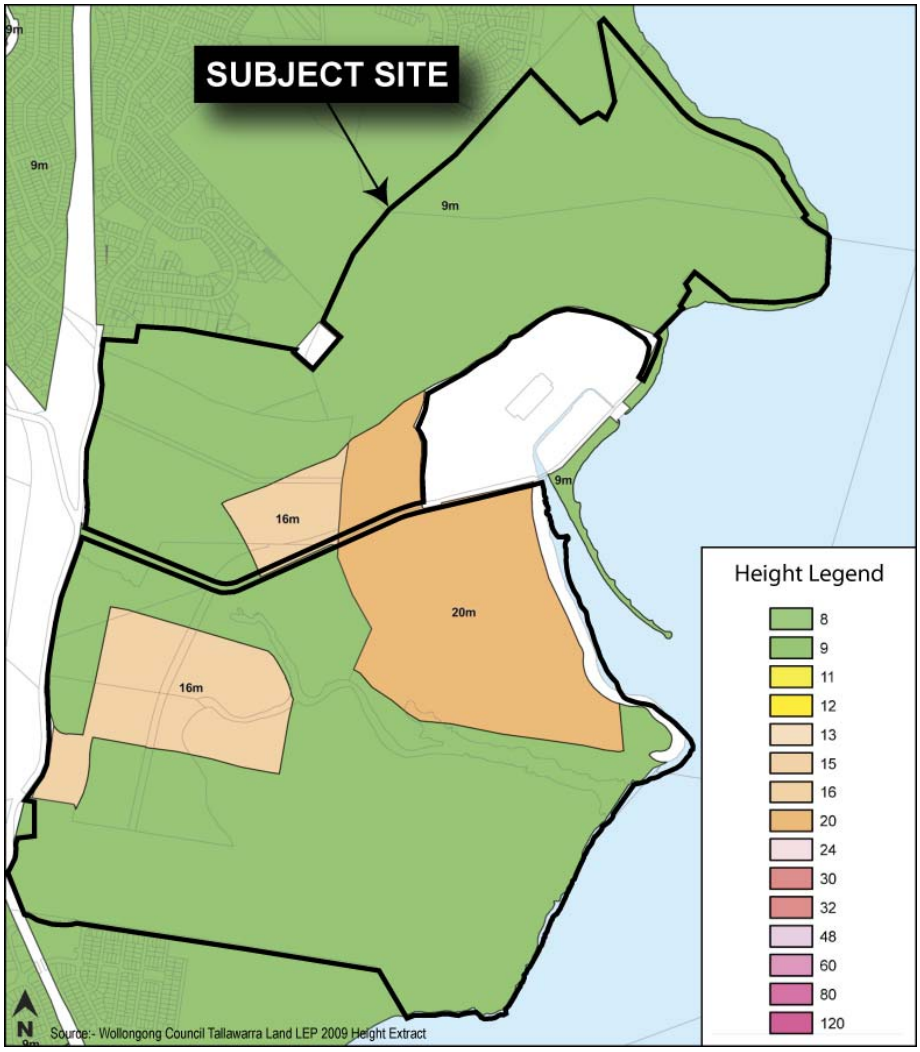


Figure 14: Maximum Height under Clause 4.3 WLEP 2009.

The applicable Maximum Height limits are summarised in Table 9 below:

Zone	Maximum Height
B1 Neighbourhood Centre	9m
B6 Enterprise Corridor	16m
B7 Business Park	16m
IN1 General Industrial	20m
IN2	16m
SP3 Tourist	9m
RE1 Public Recreation	9m
R2 Low Density Residential	9m
R5 Large Lot Residential	9m
E2 Environmental Conservation	9m
E3 Environmental Management	9m

Table 9: Maximum Height under Clause 4.3 WLEP 2009.

This concept plan application does not provide for any building works, which will be the subject of future applications.

5.9.4 Maximum permissible FSR

The maximum permissible FSR for development is determined by Clause 4.4 of WLEP 2009. The objectives of the standards are:

"(a) to provide an appropriate correlation between the size of a site and the extent of any development on that site,

(b) to establish the maximum development density and intensity of land use, taking into account the availability of infrastructure to service that site and the vehicle and pedestrian traffic the development will generate,

(c) to ensure buildings are compatible with the bulk and scale of the locality.

The maximum FSR applicable is indicated on **Figure 15** below:

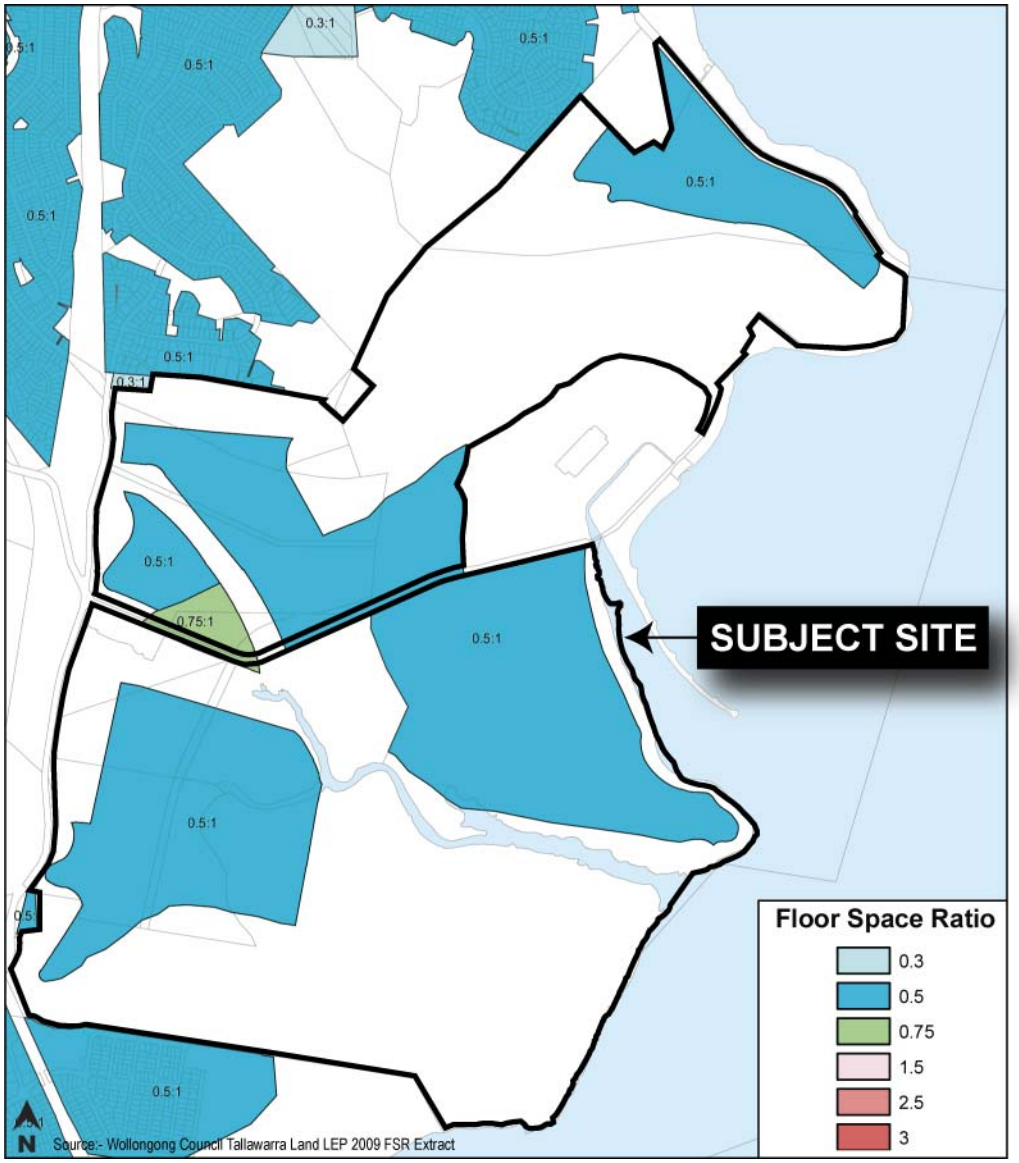


Figure 15: Maximum FSR under Clause 4.4 WLEP 2009.

The applicable Maximum FSR is summarised in Table 10 below:

Zone	Maximum FSR
B1 Neighbourhood Centre	0.75:1
B6 Enterprise Corridor	0.5:1
B7 Business Park	0.5:1
IN1 General Industrial	0.5:1
IN2	0.5:1
SP3 Tourist	0.5:1
RE1 Public Recreation	Not Applicable
R2 Low Density Residential	0.5:1
R5 Large Lot Residential	Not Applicable
E2 Environmental Conservation	Not Applicable
E3 Environmental Management	Not Applicable

Table 10: Maximum FSR under Clause 4.4 WLEP 2009.

This concept plan application does not provide for any building works, which will be the subject of future applications.

5.9.5 Relevant acquisition authority

Clause 5.1 identifies for the purposes of section 27 of the EPA Act, the relevant authority to acquire land reserved for certain public purposes if the land is required to be acquired under Division 3 of Part 2 of the Land Acquisition (Just Terms Compensation) Act 1991 (the owner-initiated acquisition provisions). The table below indicates the relevant authority.

Land Zoned	Acquisition Authority
Zone RE1 Public Recreation and marked “Local open space”	Council
Zone RE1 Public Recreation and marked “Regional open space	The corporation constituted under section 8 of the Act

Table 11: Relevant acquisition authority

The proposed concept plan, does not seek to vary the obligations of any public authority under the terms of Clause 5.1.

5.9.6 Development near zone boundaries

Clause 5.3 seeks to provide “*flexibility where the investigation of a site and its surroundings reveals that a use allowed on the other side of a zone boundary would enable a more logical and appropriate development of the site and be compatible with the planning objectives and land uses for the adjoining zone.”*

This clause applies to land that is within 20m of a boundary between any 2 zones. This clause does not apply to land zoned SP2 Infrastructure, RE1 Public Recreation, and

Nature Reserves, E2 Environmental Conservation, E3 Environmental Management or W1 Natural Waterways.

The Concept Plan does not provide for any specific building works which will be the subject of future applications and as such Clause 5.6.5 is not relevant to the assessment of the Concept Plan application.

5.9.7 Development within the coastal zone

The objectives of clause 5.5 in relation to development within the coastal zone are:

"(a) to provide for the protection of the coastal environment of the State for the benefit of both present and future generations through promoting the principles of ecologically sustainable development,

(b) to implement the principles in the NSW Coastal Policy, and in particular to:

(i) protect, enhance, maintain and restore the coastal environment, its associated ecosystems, ecological processes and biological diversity and its water quality, and

(ii) protect and preserve the natural, cultural, recreational and economic attributes of the NSW coast, and

(iii) provide opportunities for pedestrian public access to and along the coastal foreshore, and

(iv) recognise and accommodate coastal processes and climate change, and

(v) protect amenity and scenic quality, and

(vi) protect and preserve rock platforms, beach environments and beach amenity, and

(vii) protect and preserve native coastal vegetation, and

Table 23 *protect and preserve the marine environment, and*

(ix) ensure that the type, bulk, scale and size of development is appropriate for the location and protects and improves the natural scenic quality of the surrounding area, and

Table 24 *ensure that decisions in relation to new development consider the broader and cumulative impacts on the catchment, and*

(xi) protect Aboriginal cultural places, values and customs, and

(xii) protect and preserve items of heritage, archaeological or historical significance."

Each of the abovementioned matters to the extent that the current planning enables has been considered in the development of the Concept Plan. A central component of the concept design undertaken has focused on consideration of the constraints and opportunities for development within Tallawarra Lands. As more detailed plans are developed in subsequent stages more detailed assessment of the proposals will be undertaken.

5.9.8 Preservation of trees or vegetation

The objective of clause 5.9 is to preserve the amenity of the area through the conservation of trees and other vegetation. Assessments relevant to the preparation of the Concept Plan have been undertaken (refer to **Appendix 8**). More detailed consideration of trees will be undertaken in subsequent stages of the development when construction works are proposed.

5.9.9 Heritage conservation

Biosis Research has prepared Aboriginal Archaeological Assessment and European Heritage reports for the Tallawarra Lands Part 3A Concept Plan Application which are included in **Appendix 13**, **Appendix 14A and Appendix 14B** of this report. The objectives of Clause 5.10 have been considered and addressed within the specialist heritage reports. The stated objectives are as follows:

"(a) to conserve the environmental heritage of Wollongong, and

(b) to conserve the heritage significance of heritage items and heritage conservation areas including associated fabric, settings and views, and

(c) to conserve archaeological sites, and

(d) to conserve places of Aboriginal heritage significance."

5.9.10 Urban Release Areas and Arrangements for designated State public infrastructure

The Tallawarra Lands are identified as an Urban Release Area under WLEP 2009. Clause 6.1 seeks to ensure that satisfactory arrangements are made for the provision of designated State public infrastructure before the subdivision of land in an urban release area to satisfy needs that arise from development on the land, but only if the land is developed intensively for urban purposes. This application does not seek approval for any works but seeks to provide a framework for future development of the Tallawarra Lands in accordance with the Concept Plan.

TRUenergy has prepared a Draft Statement of Commitments to inform future VPA discussions. The intent is that the VPA will form part of the future superlot subdivision application.

5.9.11 Development control plan

Clause 6.2 requires that a number of matters be addressed within a DCP prior to the granting of development consent to ensure that development on land in an urban release area occurs in a logical and cost-effective manner. Wollongong Council has adopted Wollongong DCP 2009 which applies to the Tallawarra Lands site.

5.9.12 Public utility infrastructure

Clause 7.1 seeks to ensure that sufficient infrastructure is available to service development specifically the supply of water, electricity and the disposal and management of sewage. Northrop has prepared a report on the Siteworks and Utilities Infrastructure which is attached at **Appendix 18**.

5.9.13 Natural resource sensitivity—biodiversity

The objective of clause 7.2 is "*to protect, maintain or improve the diversity and condition of the native vegetation and habitat, including:*

(a) protecting biological diversity of native flora and fauna, and

(b) protecting the ecological processes necessary for their continued existence, and

(c) encouraging the recovery of threatened species, communities, populations and their habitats."

This clause applies to land that is identified as "Natural resource sensitivity—biodiversity" on the Natural Resource Sensitivity— Biodiversity Map.

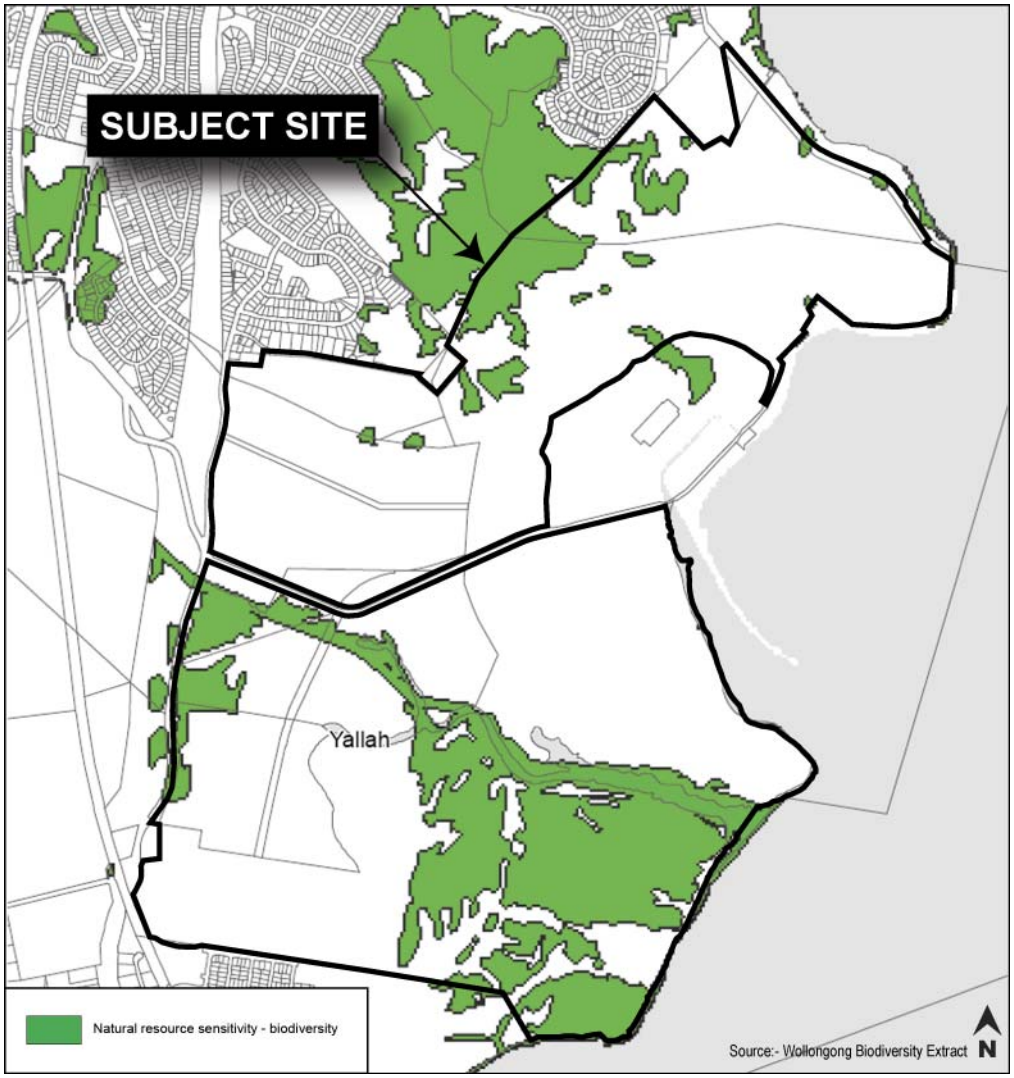


Figure 16: Natural resource sensitivity—biodiversity

The portion of the site identified as "Natural resource sensitivity—biodiversity" is predominately located within the E2 Environmental Conservation zone. The terms of the clause require that the impact of the development must be considered against the following:

"(a) native terrestrial flora and fauna and its habitat, and

(b) native aquatic flora and fauna and its habitat, and

(c) the ecological role of the land, waterways, riparian land or wetland, and

(d) threatened species, communities, populations and their habitats."

Each of the matters above have been addressed in the specialist reports submitted with the Concept Plan application. The consideration of these matters within the context of the Concept Plan preparation informed and enabled the development of the design to be consistent with the identified areas of natural resource sensitivity. This application does not seek approval for the construction of any buildings or works which will be the subject of future applications. Accordingly, consent must not be granted to future applications involving works unless the consent authority is satisfied that the development is consistent with the objectives of this clause being:

"(a) the development is designed, sited and managed to avoid potential adverse environmental impact, or

(b) if a potential adverse environmental impact cannot be avoided, the development:

(i) is designed and sited so as to have minimum adverse environmental impact, and

(ii) incorporates effective measures so as to have minimal adverse environmental impact, and

(iii) mitigates any residual adverse environmental impact through the restoration of any existing disturbed or modified area on the site."

5.9.14 Flood planning area

Clause 7.3 in relation to flood planning levels provides the following objectives and applies to land at or below the flood planning level:

"(a) to maintain the existing flood regime and flow conveyance capacity,

(b) to enable evacuation from land to which this clause applies,

(c) to avoid significant adverse impacts on flood behaviour,

(d) to avoid significant effects on the environment that would cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses,

(e) to limit uses to those compatible with flow conveyance function and flood hazard."

Development consent must not be granted for development on land at or below the flood planning level unless the consent authority is satisfied in relation to all the following matters:

"(a) all habitable floor levels of the development will be above the flood planning level,

(b) the development will not adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties,

(c) the development will not significantly alter flow distributions and velocities to the detriment of other properties or the environment of the floodplain,

(d) the development will not affect evacuation from the land,

(e) the development will not significantly detrimentally affect the floodplain environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses,

(f) the development will not result in unsustainable social and economic costs to the community as a consequence of flooding,

(g) if located in a floodway area—the development will not be incompatible with the flow conveyance function of, or increase a flood hazard in, the floodway area."

A detailed flood planning assessment has been undertaken by Bewsher Consulting and is contained in **Appendix 19**. More specific assessments will be undertaken in future applications as construction works are proposed.

5.9.15 Riparian lands

A detailed assessment of the Riparian Lands has been undertaken by Eco Logical Australia (ELA) contained within **Appendix 10**. The objective of clause 7.4 is to ensure that development does not adversely impact upon riparian lands as identified on the Riparian Land Map shown in **Figure 17** below.

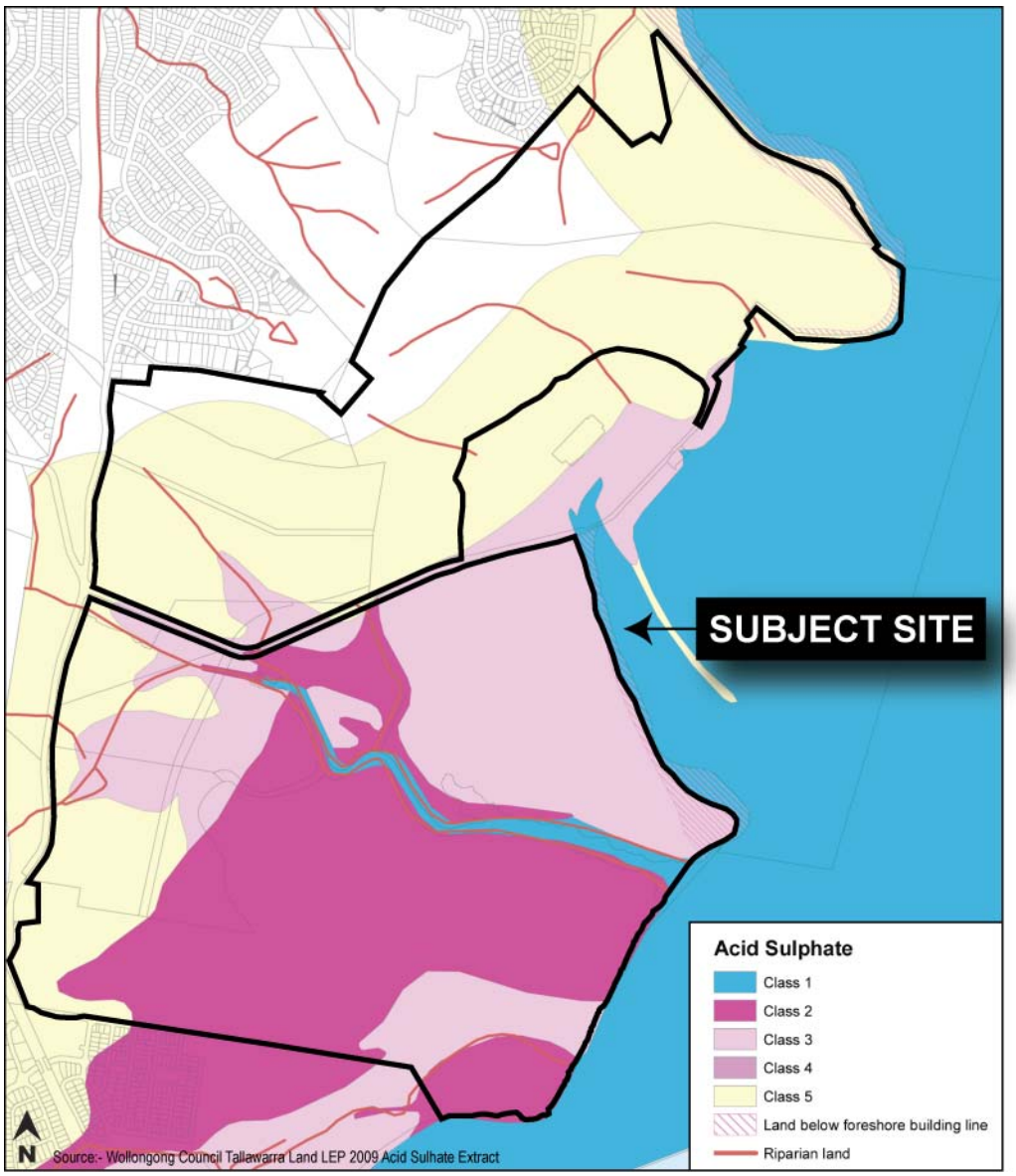


Figure 17: Riparian Lands, Acid Sulphate Soils and Foreshore Building Line Map Extract

The clause provides that development consent must not be granted for development on land identified as riparian lands unless the consent authority has considered the impact of the proposed development on the land and any opportunities for rehabilitation of aquatic and riparian vegetation and habitat.

The riparian assessment of the Tallawarra Lands proposal by ELA documents the characteristics of the aquatic vegetation and assesses its condition, recovery potential, habitat value and general significance. The ELA report also provides a description of the condition of the waterways, artificial wetlands and SEPP 14 wetlands found on the Tallawarra Lands site.

5.9.16 Acid Sulphate Soils

Clause 7.5 of WLEP 2009 provides in relation to Acid Sulphate soils that the objective is to ensure that development does not disturb, expose or drain acid sulphate soils and cause environmental damage.

Development consent is required for the carrying out of works described in the Table to this subclause on land shown on the Acid Sulphate Soils Map.

Development consent must not be granted for the carrying out of works unless an acid sulphate soils management plan has been prepared for the proposed works in accordance with the *Acid Sulfate Soils Manual* and has been provided to the consent authority.

Detailed assessment of all geotechnical matters including Acid Sulphate Soils has been undertaken in the Coffey Environments Australia reports. The geotechnical assessments undertaken include consideration of Acid Sulphate Soils and have informed the development of the Concept Plan. Specific assessment of development will be required and undertaken in future applications.

Both Coffey Environments Australia and Ecological Australia recommend that an Acid Sulphate Soil Management Plan should be developed and implemented for all development activities that may disturb acid sulphate soils. This recommendation is made in the Groundwater Dependent Ecosystems Risk Assessment Report which is attached at **Appendix 24**. The Draft Statement of Commitments table provided at Section 9.2 of this report includes a commitment that TRUenergy will implement the recommendations of the report, including preparing an Acid Sulphate Soil Management Plan where required.

5.9.17 Earthworks

Clause 7.6 of WLEP 2009 seeks "*to ensure that any earthworks will not have a detrimental impact on environmental functions and processes, neighbouring uses or heritage items and features surrounding land".* Throughout preparation of the concept plan, consideration was given to the effects of the proposed development upon the environment, adjoining land, heritage items and features of the surrounding land. As this application seeks approval of the Concept Plan and not specific building works, detailed assessment of the proposal cannot be undertaken against the requirements of Clause 7.6 at this stage of the assessment process.

5.9.18 Foreshore building line

The foreshore building line as is applicable to the Tallawarra Lands is indicated in **Figure 17**, Riparian Lands, Acid Sulphate Soils and Foreshore Building Line Map Extract, above. Within the Concept Plan there is no development contemplated on land affected by the application of the foreshore building line with the exception of the land zoned for tourism. The objective of Clause 7.7 is to ensure that development in the foreshore area will not impact on natural foreshore processes or affect the significance and amenity of the area.

Clause 7.7 further provides that:

> *"(2) Development consent must not be granted for development on land in the foreshore area except for the following purposes:*
>
> *(a) the extension, alteration or rebuilding of an existing building wholly or partly in the foreshore area,*
>
> *(b) the erection of a building in the foreshore area, if the levels, depth or other exceptional features of the site make it appropriate to do so,*
>
> *(c) development for the purposes of boat sheds, sea retaining walls, wharves, slipways, jetties, waterway access stairs, swimming pools,*

fences, cycleways, walking trails, picnic facilities or other recreation facilities (outdoor).

(3) Development consent must not be granted under subclause (2) unless the consent authority is satisfied that:

(a) the development will contribute to achieving the objectives for the zone in which the land is located, and

(b) the appearance of any proposed structure, from both the waterway and adjacent foreshore areas, will be compatible with the surrounding area, and

(c) the development will not cause environmental harm such as:

(i) pollution or siltation of the waterway, or

(ii) an adverse effect on surrounding uses, marine habitat, wetland areas, flora or fauna habitats, or

(iii) an adverse effect on drainage patterns, and

(d) the development will not cause congestion of, or generate conflicts between, people using open space areas or the waterway, and

(e) opportunities to provide continuous public access along the foreshore and to the waterway will not be compromised, and

(f) any historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance of the land on which the development is to be carried out and of surrounding land will be maintained, and

(g) in the case of development for the alteration or rebuilding of an existing building wholly or partly in the foreshore area, the alteration or rebuilding will not have an adverse impact on the amenity or aesthetic appearance of the foreshore."

As the concept plan does not include details on the future development of the tourism site, further consideration of the matters outlined above will be carried out at a later stage of the assessment process.

5.9.19 Development in flight paths

The objectives of Clause 7.9 are:

"(a) to provide for the effective and on-going operation of the Illawarra Regional Airport, and

(b) to ensure that any such operation is not compromised by proposed development within the flight path of the airport."

Clause 7.9 requires that development consent must not be granted for the construction of a building on land in the flight path of the Illawarra Regional Airport if the proposed height of the building would exceed the obstacle height limit determined by the relevant Commonwealth body.

Before granting development consent to the erection of a building on land in the flight path of the Illawarra Regional Airport, Clause 7.9 requires consultation with the relevant Commonwealth body. Land is located within the flight path of the Illawarra Regional Airport if the relevant Commonwealth body has notified the consent authority that the land is in such a flight path. The Concept Plan Application does not propose the construction of any buildings. Such works will be the subject of future applications at which time the application of Clause 7.9 may be clarified.

5.9.20 Development in areas subject to airport noise

The DGR's for the Concept Plan Application were amended to require that "the EA shall demonstrate that the development has had regard for the operation of Illawarra Regional Airport.

Detailed consideration of the noise related issues associated with the operation of the Illawarra Regional Airport have been addressed within the Noise Assessment Report contained in **Appendix 25A**.

5.9.21 Ground floor development on land within business zones

Clause 7.13 seeks to ensure that active uses are provided at the street level to encourage the presence and movement of people and applies to the B1 Neighbourhood Centre zone. In granting development consent, the consent authority must be satisfied that the ground floor:

"(a) will not be used for the purpose of residential accommodation, and

(b) will have at least one entrance and at least one other door or window on the front of the building facing the street other than a service lane."

This concept plan application does not seek approval for the construction of any buildings within the B1 Zone. Consideration of these design related matters will occur at the detailed DA stage.

5.9.22 Tallawarra Power Station buffer area

Clause 7.16 applies to land shown hatched on the Tallawarra Power Station Buffer Area Map as indicated on **Figure 18** below. Clause 7.16 states as follows:

"Development consent must not be granted for the purposes of a building within the buffer area unless the consent authority is satisfied that adequate measures have been, or will be in place to minimise the adverse impact on persons using the building from noise and odour produced by the Tallawarra Power Station."

As the current Part 3A Application the subject of this EA is for concept plan approval, the detailed application of the clause is not applicable. Assessment of future applications will consider the application of Clause 7.16 against specific development proposals where necessary.

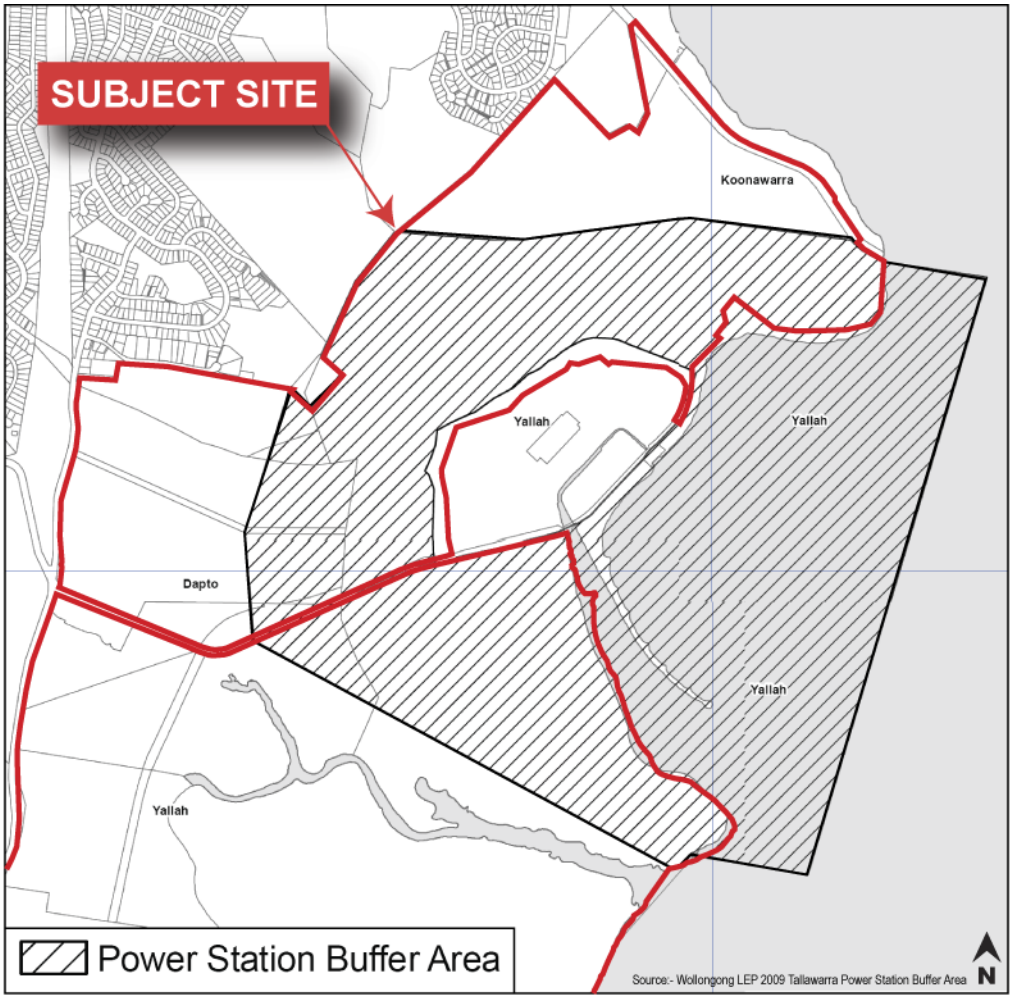


Figure 18: Tallawarra Buffer Area

5.9.23 Wollongong Development Control Plan 2009

In support of the Wollongong LEP 2009, Wollongong Council has adopted Wollongong Development Control Plan 2009 (WDCP 2009), which applies to Tallawarra Lands and has been effective since 3 March 2010. The following table provides details of the provisions relevant to the Tallawarra Lands Development.

Chapter of WDCP 2009	Application of Provisions
Chapter B1 Residential Development	Provisions will apply at a future stage when residential development is proposed.
Chapter B2 Residential Subdivision	Provisions will apply at a future stage when subdivision is proposed.
Chapter B3 Mixed Use Development	Provisions may apply at a future stage if mixed use development is proposed.
Chapter B4 Development in Business Zones	Provisions will apply at a future stage when development within the Business Zones is proposed.
Chapter B5 Industrial Development	Provisions will apply at a future stage when Industrial development is proposed.
Chapter B6 Development in the Illawarra Escarpment	Not Applicable

Chapter of WDCP 2009	Application of Provisions
Chapter B7 Development in Rural Zones	Not Applicable
Chapter C1 Advertising Signage and Structures	Applicable if landuse proposed..
Chapter C2 Bed and Breakfast Accommodation	Applicable if landuse proposed.
Chapter C3 Boarding Houses	Applicable if landuse proposed.
Chapter C4 Caravan Parks, Camping Grounds and Manufactured Home Estates	Applicable if landuse proposed within RE1 Public Recreation and SP3 Tourist zones
Chapter C5 Child Care Centres	Applicable if landuse proposed.
Chapter C6 Events Management	Applicable if landuse proposed.
Chapter C7 Exhibition Villages and Exhibition Homes	Applicable if landuse proposed.
Chapter C8 Extractive Industries	Not applicable
Chapter C10 Home Businesses	Applicable if landuse proposed.
Chapter C11 Home Industry	Applicable if landuse proposed.
Chapter C12 Outdoor Restaurants and Footpath Trading (Street Vending) Activities	Applicable if landuse proposed.
Chapter C13 Places of Public Worship	Applicable if landuse proposed.
Chapter C14 Firearms and Weaponry Stores	Applicable if landuse proposed.
Chapter C15 Retail Markets	Applicable if landuse proposed.
Chapter C16 Sex Services Premises and Restricted Premises (Sex Shops)	Applicable if landuse proposed.
Chapter C17 Telecommunications and Radiocommunications Facilities	Applicable if landuse proposed.
Chapter D1 Character Statements	Applicable to future stages of development.
Chapter E1 Access for People with a Disability	Applicable to future stages of development.
Chapter E2 Crime Prevention through Environmental Design	Applicable to future stages of development
Chapter E3 Car Parking, Access, Servicing/Loading Facilities and Traffic Management	Applicable to future stages of development. A high level traffic network assessment accompanies the Concept Plan application. Refer **Appendix 17**
Chapter E4 Development near Railway Corridors and Major (Busy) Roads	Applicable to future stages of development

Chapter of WDCP 2009	Application of Provisions
Chapter E5 BASIX	Preliminary comments are provided in the Sustainability report **(**refer to **Appendix 12)**. Applicable to future stages of development
Chapter E6 Landscaping	Applicable to future stages of development
Chapter E7 Waste Management	Applicable to future stages of development
Chapter E8 Onsite Sewage Management Systems	Applicable to future stages of development
Chapter E9 Hoardings and Cranes	Applicable to future stages of development
Chapter E10 Aboriginal Heritage	Refer to **Appendix 13**. Specific Provisions appropriate for future applications when consent is being sought for construction works.
Chapter E11 Heritage Conservation	Refer to **Appendix 14A**. Specific Provisions appropriate for future applications when consent is being sought for construction works.
Chapter E12 Geotechnical Assessment	Refer to **Appendix 20**. Specific Provisions appropriate for future applications when consent is being sought for construction works.
Chapter E13 Floodplain Management	Refer to **Appendix 19**. Specific Provisions appropriate for future applications when consent is being sought for construction works.
Chapter E14 Stormwater Management	Refer to **Appendix 11**. Specific Provisions appropriate for future applications when consent is being sought for construction works.
Chapter E15 Water Sensitive Urban Design	Refer to **Appendix 11**. Specific Provisions appropriate for future applications when consent is being sought for construction works.
Chapter E16 Bush Fire Management	Refer to **Appendix 26**. Specific Provisions appropriate for future applications when consent is being sought for construction works.
Chapter E17 Preservation and Management of Trees and Vegetation	Refer to **Appendix 27**. Specific Provisions appropriate for future applications when consent is being sought for construction works.
Chapter E18 Threatened Species	Refer to **Appendix 9**. Specific Provisions appropriate for future applications when consent is being sought for construction works.

Chapter of WDCP 2009	Application of Provisions
Chapter E19 Earthworks (Land Reshaping Works)	Refer to **Appendix 18**. Specific Provisions appropriate for future applications when consent is being sought for construction works.

Table 12: WDCP 2009 Provisions

5.10 Tallawarra Lands Local Environmental Study 2006

The Tallawarra Lands Local Environmental Study 2006 (Tallawarra LES) was prepared for Wollongong City Council, TRUenergy, the Premiers Department and the Department of Planning by Willana Associates, Northrop Engineers, Eco Logical and Kellegher Nightingale Consulting in December 2006.

The findings of the Tallawarra LES are summarised as follows:

- The Tallawarra Lands are surplus to the existing power station development, which represents a development opportunity to provide employment and accommodation for the community in the Illawarra.
- The single ownership of the site facilitates future development of the site.
- The areas of high conservation value within the Tallawarra Lands should be protected by rezoning of the land.
- The site is accessible by public and private transport, being in close proximity to the F6 freeway, Albion Park airport and the South Coast Railway.
- The Tallawarra lands were recognised by strategic planning documents as a valuable opportunity to provide employment land uses, particularly industrial development.
- The land is located in an area identified as the “Yallah-Calderwood Corridor”, linking the Illawarra Escarpment with Lake Illawarra.
- There is a strategic direction for sustainable growth in the Illawarra that supports the development of tourism sites that contribute to economic growth.
- Future development of the site needs to be undertaken in accordance with the various planning controls that apply throughout the Wollongong area, which support sustainable development that meets the needs of the growing community without compromising the natural attributes and ecology of the area.
- Future zoning of the land is required to be consistent with new zonings contained within the standard template prepared by Wollongong Council.
- Development of the land should be accompanied by a master plan and planning controls that provide a greater level of detail about how the proposed land uses are to be implemented.
- The site has a high level of natural attributes including significant conservation areas. The conservation areas include several SEPP 14 Wetlands and large areas containing Endangered Ecological Communities (EEC’s). These areas require particular conservation and any future zoning of the land must recognise the need to conserve and regenerate areas of such significance.
- The site is highly visible from the Lake Illawarra area. This includes Marshall Mount Road (and the valley) to the west and Shellharbour to the south. The residents in existing suburbs to the north also commented heavily on the natural scenic qualities of the site given it prominence around the Lake. This includes high levels of visibility from the eastern edges of Lake Illawarra.

- Wildlife habitat, particularly in the riparian corridor, requires conservation and regeneration. The future development of the site needs to recognise the value of these corridors by providing for conservation zones along the main creek lines, such as Duck Creek.
- The power station, represents a significant investment in infrastructure. There is an ongoing need to ensure that future land uses on the residue parts of the site preserve the ability for the power station to expand, if required, over the longer term.
- There are a number of engineering issues on the site which will require resolution prior to development in certain parts of the site.
- Future development will be required to protect identified heritage and archaeological sites.
- Future development will have to consider master plan design outcomes that reduce the traffic circulation both within the site and entering and leaving the land.
- Development of the upper slopes or areas with high visibility shall be avoided.
- Development of Tallawarra will strongly influence the future F6 interchange to provide direct access to/from the site.
- Matching site resident status with employment opportunities will encourage “self-sufficiency” and maximise the amount of internal site trips – alleviating effects to the surrounding road network.
- Provide a suitable range of all services (education, retail, entertainment, etc) on-site to maximise the proportion of internal trips – alleviating effects to the surrounding road network.
- The main site road network will need to be designed to accommodate large commercial vehicles to service industrial/employment lands.
- Detailed assessment of existing local roads will be required to ascertain improvement works to support additional traffic generated by the Tallawarra development.
- Early negotiations with rail and bus service providers are essential to ensure new services direct to the Tallawarra development.
- Detailed planning work needs to be undertaken with public transport providers to maximise uptake of public transport.
- The Lake Illawarra Authority has plans for a continuous foreshore link around the Lake. Linkage through the Tallawarra Lands is essential to complete this circuit.
- The internal transport network needs to provide good, safe and direct footpaths and separated cycleways to encourage internal trips and links to key attractors outside Tallawarra.
- A fully functioning public transport system will be required to provide maximum opportunities for access to employment generating land uses and to minimise reliance on private transport.
- Noise assessment will be required for accommodation based land uses to ensure impacts from freeway noise and future land uses in the proposed employment lands are acceptable.
- Future housing should be provided across a range of dwelling types to cater for households of varying sizes, income levels, and age groups.

- Support services, in the form a neighbourhood shopping centre, should be provided to meet the needs of the community.
- Future development should provide a range of open space facilities, notwithstanding the high level of passive recreation provided in conservation areas.
- Access to the foreshore by the general community is to be supported in future zoning of the land.

The findings of the Tallawarra LES informed the development of the planning provisions adopted in WLEP 2009 and the development of the Concept Plan the subject of this EA.

Table 13 below, together with commentary, provides the details of the key recommendations of the Tallawarra LES.

Recommendations	Response
Rezoning required in standard template LEP format	WLEP 2009 took effect on 26 February 2010 and is supported by WDCP 2009.
Consistent width for foreshore area	Considered in preparation of WLEP 2009.
Riparian Corridors – masterplan to establish setbacks for future development	Addressed in E2 and E3 Conservation Zoning under WLEP 2009, further supported by Riparian Assessment by Eco Logical Australia refer **Appendix 10,** which resulted in adjustments to the Concept Plan to reflect riparian considerations.
Water quality treatment devices to minimise urban runoff impacts into Lake Illawarra	Refer to the Drainage report.
Management Plans Conservation Management Plan (CMP) be prepared for land zoned for conservation Other management plans (e.g. soil and water management plans, vegetation management plans) will be required for land that is not zoned for conservation Management Plans will be required by Council in accordance with the development approval process	An Environmental Management Strategy and Vegetation Management Plan has been prepared by Eco Logical Australia, refer to **Appendix 27** and **28.** Further more detailed management plans will be required as the development of the Tallawarra Lands progresses either as a requirement of approvals or as necessary supporting documentation to future applications.
Conservation areas should have adequate funding resources to provide for management of their values in-perpetuity	To be addressed during VPA negotiations.
Responsibility for management and funding needs to be determined	To be addressed during VPA negotiations.

Recommendations	Response
Passive recreation is desirable within conservation areas to assist people in 'connecting' with their environment. However this must be managed to ensure public safety (e.g. near the ash dams) and maintain the environmental integrity of the site	Development of recreation areas considered in development of Concept Plan and in discussions with Lake Illawarra Authority. Specific details to be further refined and developed prior to future applications.
Optimising biodiversity values within the development areas through maximising retention of existing trees and utilising local provenance, native species in any landscaping or revegetation works.	Detailed environmental assessments, including vegetation, flora & fauna and riparian considerations have been undertaken as part of this EA. VMP submitted with EA for consideration.
Management of fuel loads will need to consider the sensitivity of species and communities to fires. It is recommended that bushfire management be incorporated into the Conservation Management Plan and that mosaics of fire regimes be implemented across the site	Bushfire Assessment undertaken and submitted with the EA. Bushfire management will continue to inform future applications.

Table 13: Recommendations of Tallawarra LES

The findings and recommendations of the Tallawarra Lands LES have informed and supported the rezoning of the land and the development of the Concept Plan. The reports prepared and submitted with this EA further inform the development and conservation potential of the site and in this way have shaped the Concept Plan design.

5.11 NPWS Wollongong LGA Bioregional Assessment Studies

This bioregional assessment covers the escarpment and foothills of the Wollongong Local Government Area and was completed by the NPWS in August 2002, the assessment includes:

- habitat maps and species profiles for 51 threatened animals in the region
- mapping of all threatened ecological communities in the Wollongong Local Government Area
- details of wildlife corridors stretching from Macquarie Pass to Royal National Park, and from Lake Illawarra to the Illawarra Escarpment
- classifications, descriptions and photographs of 54 different plant communities, from coastal grasslands to subtropical rainforests.

The Conservation Assessment of Wollongong Local Government Area – Bioregional Assessment Study Part III assesses the conservation values of the Wollongong LGA. It builds on the Native Vegetation of the Illawarra Escarpment and Coastal Plain (NPWS 2002a) and Fauna of the Illawarra Escarpment, Coastal Plain and Plateau (NPWS 2002b). A framework for broadly assessing the conservation values and conservation significance of vegetation and habitat throughout the Wollongong LGA is provided.

5.12 Estuary Management Plan for Lake Illawarra

An estuary process study of Lake Illawarra was undertaken and subsequently a strategic plan prepared. The Plan outlines how the estuary will be managed, gives recommended

solutions to management problems and details a schedule of prioritised activities for the implementation of the recommendations (WBM Oceanics Australia 2006).

A number of estuarine management objectives were identified. Those relevant to the Tallawarra Lands include:

• Water quality

Reduce the impacts of stormwater and sewer overflows on Lake Illawarra from existing and future urban developments and achieve the recommended water quality criteria for discharges.

• Erosion and sedimentation

Remediate areas within the Lake and its tributaries that are subject to foreshore and bank erosion and minimise susceptibility to future erosion.

Reduce sediment loads entering the Lake from both rural and urban catchments to pre-European levels.

• Catchment Inputs (Catchment Management)

Protect estuarine habitats from detrimental impacts resulting from any future urban development within the catchment.

Prevent future development from increasing runoff volumes and pollutant loads.

• Ecology and the Fishery

Protect and enhance existing areas of valuable terrestrial and aquatic habitat and preserve communities and species of particular significance.

Encourage recovery of threatened species that utilise Lake Illawarra for food and / or shelter.

Improve knowledge of the status of estuarine communities and monitor any changes to the ecology in the future.

• Riparian Zones

Develop, a contiguous riparian zone along streams entering the Lake and around the foreshore. Wherever possible, this riparian zone should exist in conjunction with appropriate facilities for shared pathways and maintenance equipment.

• Commercial opportunities

Investigate opportunities for sustainable tourism ventures on foreshore areas around the Lake.

5.13 Riparian Corridor Management Study (2004)

The Riparian Corridor Management Study covers the Wollongong Local Government Area and Calderwood Valley, which spans both the Wollongong and the Shellharbour Local Government Areas.

Three categories of riparian environmental objectives were developed for the streams in the study area that reflect their relative environmental significance. These categories, in order of importance, are:

- Category 1 – Environmental Corridor – provide biodiversity linkages ideally between one key destination to another (the coast and the escarpment or large nodes of vegetation).
- Category 2 – Terrestrial and Aquatic Habitat – provide basic habitat and preserve the natural features of a watercourse (not necessarily linking key destinations).

- Category 3 – Bank Stability and Water Quality – limited (if any) habitat value but contributes to the overall basic health of a catchment

For each of the above categories, the recommended minimum width of the riparian zone varies in order to achieve the function identified.

The methods developed in this study have been applied to the riparian areas throughout the study area documented in the Tallawarra Lands Riparian Assessment (ELA 2010a).

5.14 NSW Groundwater Policies

It is the policy of the NSW Government to encourage the ecologically sustainable management of the State's groundwater resources, so as to:

- slow and halt, or reverse any degradation of groundwater resources;
- ensure long term sustainability of the systems ecological support characteristics;
- maintain the full range of beneficial uses of these resources; and
- maximise economic benefit to the Region, State and Nation.

Coffey Environments and Eco Logical have undertaken detailed groundwater investigations to inform the Concept Plan application.

5.15 NSW State Rivers and Estuaries Policy

The NSW State Rivers and Estuaries Policy aims to "*encourage the sustainable management of the natural resources of the State's rivers, estuaries and wetlands and on the adjacent riverine plains, so as to reduce, or which possible halt:*

- *Declining water quality;*
- *Loss of riparian vegetation;*
- *Damage to river banks and channels;*
- *Declining natural productivity;*
- *Loss of biological diversity, and*
- *Declining natural flood mitigation."*

The Policy encourages projects that "*will restore the quality of the river and estuary systems such as:*

- *Rehabilitating natural habitats;*
- *Re-establishing vegetation buffer zones adjacent to streams and wetlands,*
- *Restoring wetland areas;*
- *Rehabilitating of estuary forests; and*
- *Ensuring adequate streamflows to maintain aquatic and wetland habitats."*

The Policy sets out six principles (below). The suite of specialist reports accompanying the EA demonstrate how the principle and core objectives of the Policy have been considered. A summary of the proposals consistency with the principles of the Policy and the aims identified above are set out in Table 14:

Principle	Comment
Those uses of rivers and estuaries which are non-degrading should be encouraged.	The rivers traversing the site are not proposed to be used as a resource. They are to be retained, rehabilitated or revegetated where necessary to improve their environmental quality.

Principle	Comment
	The land use zones which have been applied across the site have located the future urban footprint away from the rivers and estuaries to reduce impacts.
Non sustainable resource uses which are not essential should be progressively phased out.	The majority of the land is not currently being put to a productive use. Areas altered by past land uses (e.g. ash dams) will be restored. These restored areas will improve the environment within the catchment of Duck Creek and Lake Illawarra.
Environmentally degrading process and practices should be replaced with more efficient and less degrading alternatives	There are no environmentally degrading activities taking place on the subject land. The land use zones for future urban development have been located away from the rivers and estuaries to reduce impacts. The Concept Plan further refines the future urban footprint and incorporates buffers where appropriate providing an additional protection measure.
Environmentally degraded areas should be rehabilitated and their biophysical functions restored. Remnant areas of significant environmental values should be accorded special protection.	The suite of reports prepared by Eco Logical including the Environmental Management Strategy, Riparian Assessment and Vegetation Management Plan identify the attributes of the Concept Plan and specific management measures that will operate to improve degraded riparian and wetland areas on the site. These include: • The creation of open space along Yallah Creek with selective riparian revegetation and water quality and soil erosion management works including removal of concrete channel lining. • Duck Creek will receive substantial targeted revegetation and extensive noxious weed control. • The Concept Plan provides for a 50m buffer to Lake Illawarra and proposes to manage this area for environmental and open space uses. • Currently degraded riparian and wetland areas are integrated into the existing zoning and measures are established through buffers and vegetation management to protect and promote hydrological and habitat values. • Two artificial wetlands that provide limited hydrological and habitat value are proposed to be removed in order to better align and manage water flows and quality on site.

Principle	Comment
	Further details are provided in each of the Eco Logical reports.
An ethos for the sustainable management of river and estuarine resources should be encouraged in all agencies and individuals, who own, manage or use these resources.	The management of the environmental lands, which incorporate the watercourses in the Concept Plan area is set out in the Vegetation Management Plan (VMP) prepared by Eco Logical. The VMP notes that the proponent envisages that most riparian zones will ultimately be held under the ownership of a public authority such as Wollongong City Council or the Lake Illawarra Authority. This change in tenure would be managed via a Planning Agreement. The VMP sets the management framework for the first 5 years, after which time the management of vegetation on the lands should be able to be maintained with less intensive investment.

Table 14: Consistency with the principles of the NSW State Rivers and Estuaries Policy

5.16 NSW Wetlands Management Policy

The subject site contains significant areas of wetlands to which the NSW Wetlands Management Policy would apply. The Policy is intended to promote the conservation, sustainable management and wise use of NSW wetlands by all stakeholders for the benefit of present and future generations. The stated goal of the Policy is to assist in the protection of wetlands in good condition, rehabilitate degraded wetlands where feasible, and support appreciation of wetlands by:

- protecting wetland biodiversity, functions and services;
- protecting social and economic benefits of wetlands;
- providing flow regimes that mimic natural conditions, where possible;
- providing wetlands with water of appropriate volume and quality;
- limiting further fragmentation and reconnecting wetland systems;
- preventing or limiting catchment activities that impact upon wetlands;
- protecting the cultural heritage and spiritual significance of wetlands;
- rewarding wetland managers who improve the condition of wetlands; and
- promoting the importance of wetlands to the community.

One of the principle mechanisms that protects the existing wetlands is the E2 – Environmental Conservation zone which applies to the wetland areas of the site. This zone limits the range of permissible uses. The Concept Plan located the proposed urban footprint outside of the wetlands.

Eco Logical has carried out an assessment of the wetlands and notes that there are a number of management measures proposed to assist in protecting the wetlands from the proposed development. These measures include:

- the use of WSUD measures in the landscape treatments in the public domain including the likes of vegetated swales and filter strips, bio-retention systems, permeable pavements, infiltration trenches and basins, rainwater tanks and landscape works that minimise irrigation water requirements.

- Restoration of the riparian corridor leading into Duck Creek to improve the ecological values, water quality and water flows along this watercourse.
- An intention to transfer the lands to Wollongong Council or the Lake Illawarra Authority.

The catchment leading into the wetlands extends well beyond the subject site towards the West Dapto area. The upper catchment is therefore not capable of being managed through this Concept Plan application. However, a significant portion of the lower catchment will be capable of being managed on a broad scale.

In light of the management measures proposed, the proposal is considered to be consistent with the goals and principles of the NSW Wetlands Management Policy.

5.17 Draft Illawarra Floodplain Risk Management Study and Plan 2009

The Draft Lake Illawarra Floodplain Risk Management Study and Plan 2009 is not currently a publicly available document. It is understood that the document is likely to be released publicly once drafting is finalised by the Lake Illawarra Authority.

6 Planning Assessment

6.1 Ecological Assessment

Eco Logical Australia Pty Ltd (ELA) has prepared an ecological assessment report for the Tallawarra Lands Part 3A Concept Plan application which is included in **Appendix 9**. The report states:

The ELA ecological assessment report on the Tallawarra Lands development proposal provides the following Executive Summary:

> *"The study area has undergone extensive past disturbance particularly in the south and east where a number [of] former ash settling ponds used by the former coal fired Tallawarra Power Station now remain. Extensive vegetation clearance has also previously occurred across much of the remainder of the site, mostly for grazing purposes, resulting in large areas of exotic grassland. The most intact vegetation occurs in the south eastern corner of the site with smaller areas in the north, adjoining a large stand of vegetation in Mount Brown Reserve, as well as along the south western boundary.*
>
> *Despite this history of disturbance, the site retains ecological values in the form of remnant native vegetation, habitat for a number of threatened fauna species, potential habitat for a number of threatened flora species, riparian and wetland features, and a regional corridor linkage.*
>
> *A number of vegetation types are present throughout the study area including natural remnants, Endangered Ecological Communities (EECs) and areas that have been planted as part of past revegetation works.*
>
> *The proposal will result in the clearance of 51.63 ha of vegetation of which 4.37 ha are EECs. The EEC clearance is comprised of a number of very small areas of differing communities ranging from 0.17 ha to 2.54 ha in size. The remaining 117.23 ha of EEC vegetation (96.41%) will be preserved much of which will be incorporated into the proposed environmental reserves across the study area. In addition to the retention of EEC vegetation is the retention of a number of artificial wetlands (18.00 ha) that provide habitat for various species."*

The vegetation types within the Tallawarra Lands site are shown in Figure 9 of the ELA ecological assessment report which is reproduced as **Figure 19** below in this report.

Figure 19: Vegetation types

A total of 142 flora species were recorded by ELA across the vegetation types present throughout the Tallawarra Lands site. Of these, 86 were native species, 55 were exotic species and 1 Digitaria species could not be identified to species level and therefore it could not be confirmed if this species was native or exotic. In addition, some natives were either planted endemics or native species occurring outside the natural range for the area. Nine weeds listed as noxious in the Wollongong LGA (NSW DPI 2010) under the Noxious Weeds Act 1993 were recorded within the Tallawarra Lands site. Six weed species of National Significance (DEWHA 2010b) were also recorded. Given the highly disturbed nature of the site, there is the potential for other weed species to occur across the

Tallawarra Lands site but they were not detected during the ELA study. ELA indicate that it is unlikely this is a comprehensive list of all species present within the Tallawarra Lands site but an indication of the flora species diversity and dominant species within each of the vegetation communities.

One threatened species (*Chorizema parviflorum*) listed as an endangered population in the Wollongong and Shellharbour LGA's on the *Threatened Species Conservation Act* was identified as occurring within the study area.

No other threatened flora species listed under the *Threatened Species Conservation Act* (TSC Act) or the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) were identified as occurring within the Tallawarra Lands site and any regionally significant species were considered in the ELA ecological assessment report.

A list of regionally significant species for the area was included in the Illawarra Biodiversity Strategy by Wollongong Council (2010). No species listed as regionally significant were observed in the surveys undertaken by ELA.

Figure 12 of the ELA ecological assessment report identifies the threatened flora habitat areas within the Tallawarra Lands site and is reproduced below as **Figure 20** in this report.

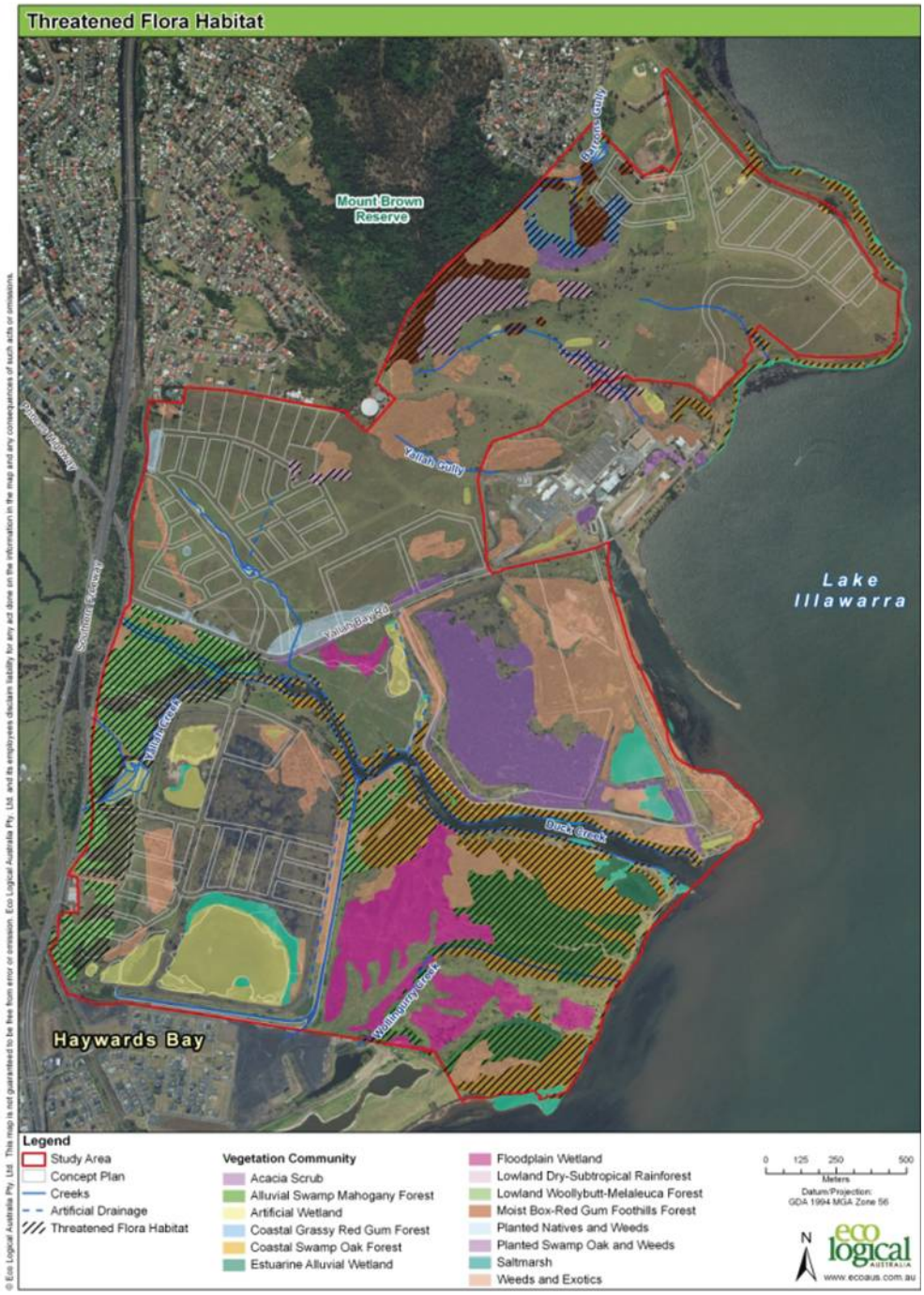


Figure 20: Threatened Flora Habitat

76 fauna species were recorded by ELA during the field survey, the majority of which were birds.

A number of fauna species listed as migratory under the EPBC Act, were recorded by ELA flying over or adjacent to the Tallawarra Lands site over Lake Illawarra.

Fauna habitat across the site is patchy due to extensive past disturbance and current land uses. Duck Creek, the artificial wetlands and the larger stands of vegetation in the south east, along the site boundaries in the west and the north east provide the most valuable potential habitat for a variety of fauna species and in particular a wide variety of bird species, particularly waterbirds.

The overhanging Casuarina branches along the watercourses provide roosting sites for many waterbirds and a variety were seen using this habitat during the field surveys. The mudflats and foreshores of Lake Illawarra also provide important habitat for birds as do reeds on the edges of the waterbodies.

Areas of high, moderate and low quality habitat for both waterbirds and the Green and Golden Bell Frog have been mapped by ELA across the Tallawarra Lands site and are shown in Figure 13 – Key Fauna Habitat of the ELA ecological assessment report which is reproduced below as **Figure 21**. Areas identified as providing the greatest fauna habitat value for waterbirds included:

- Duck Creek;
- Artificial wetlands in the south-west of the site;
- Lake Illawarra foreshore; and
- SEPP 14 Wetland in the east of the site.

Figure 21: Key Fauna Habitat

A number of large hollow-bearing trees were recorded within the Tallawarra Lands site and these are also shown on Figure 13 – Key Fauna Habitat reproduced as **Figure 21**. These trees provide habitat for a variety of birds, mammals (including bats) and reptiles. In addition, those trees that contain hollows large enough to provide potential habitat for owls have been identified in the ELA report. The majority of these trees are likely to be retained within the Tallawarra Lands development proposal, although there is the potential for one known hollow-bearing tree to be removed in the south-west of the site for the Lakeside residential precinct.

The ELA ecological assessment report notes that a number of threatened fauna species have been recorded within the Tallawarra Lands site. Those fauna species for which the

site is likely to provide habitat and their conservation status are listed in Table 11 of the ELA report which is reproduced below as **Table 15**.

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Likelihood of Occurrence
AMPHIBIANS				
Litoria aurea	Green and Golden Bell Frog	E	V	Potential
BIRDS – Diurnal				
Botaurus poiciloptilus	Australasian Bittern	V	-	Potential
Calidris alba	Sanderling	V	M	Potential
Calidris tenuirostris	Great Knot	V	M	Potential
Charadrius leschenaultii	Greater Sand-plover	V	M	Potential
Charadrius mongolus	Lesser Sand-plover	V	M	Potential
Circus assimilis	**Spotted Harrier**	**V**	**-**	**Recorded**
Ephippiorhynchus asiaticus	Black-necked Stork	E	-	Potential
Haematopus fuliginosus	**Sooty Oystercatcher**	**V**	**-**	**Recorded – onsite 2010**
Haematopus longirostris	**Pied Oystercatcher**	**V**	**-**	**Recorded – onsite previously & 2010**
Hieraaetus morphnoides	**Little Eagle**	**V**		**Recorded**
Ixobrychus flavicollis	**Black Bittern**	**V**	**-**	**Recorded**
Lathamus discolour	Swift Parrot	E	E	Potential
Limicola falcinellus	Broad-billed Sandpiper	V	M	Potential
Limosa limosa	Black-tailed Godwit	V	M	Potential
Lophoictinia isura	Square-tailed Kite	V	M	Potential
Neophema pulchella	Turquoise Parrot	V	-	Potential
Oxyura australis	Blue-billed Duck	V	-	Potential
Pandion haliaetus	**Osprey**	**V**	**M**	**Recorded**
Petroica boodang	**Scarlet Robin**	**V**	**-**	**Recorded**
Petroica rodinogaster	Pink Robin	V	-	Potential
Rostratula benghalensis australis	Painted Snipe (Australian subspecies)	E	E	Potential
Sterna albifrons	Little Tern	E	M	Potential
Sterna fuscata	Sooty Tern	V	-	Potential
Stictonetta naevosa	**Freckled Duck**	**V**	**-**	**Recorded**
Thinornis rubricollis	Hooded Plover	E	M	Potential
Xanthomyza phrygia	Regent Honeyeater	E	E, M	Potential

Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Likelihood of Occurrence
Xenus cinereus	Terek Sandpiper	V	M	Potential
BIRDS – Nocturnal				
Ninox connivens	Barking Owl	V	-	Potential
Ninox strenua	Powerful Owl	V	-	Potential
Tyto novaehollandiae	Masked Owl	V	-	Potential
MAMMALS (BATS)				
Chalinolobus dwyeri	**Large-eared Pied Bat**	**V**	**V**	**Recorded**
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	Potential
Miniopterus australis	Little Bentwing-bat	V	-	Recorded – onsite 2010
Miniopterus schreibersii oceanensis	Eastern Bent-wing Bat	V	-	Recorded – onsite previously & 2010
Mormopterus norfolkensis	Eastern Freetail Bat	V	-	Recorded = onsite 2010
Myotis macropus	Large-footed Myotis	V	-	Recorded – onsite previously & 2010
Pteropus poliocephalus	Grey-headed Flying-Fox	V	V	Recorded
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	Recorded
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	Potential
	Species recorded onsite during ELA 2010 survey			
V = Vulnerable, E = Endangered, M = Migratory, **Bold =** Threatened species				

Table 15: Threatened fauna known or potentially occurring within the study area

The ELA ecological assessment report states that 18 migratory bird species are known to occur on site at Tallawarra as they have either been observed by the Illawarra Bird Observers Club and/or recorded on the DECCW database records. These include:

- Bar-tailed Godwit (*Limosa lapponica*)
- Black-faced Monarch (*Monarcha melanopsis*)
- Caspian Tern (*Sterna caspia*)
- Cattle Egret (*Ardea ibis*)
- Curlew Sandpiper (*Calidris ferruginea*)
- Double-banded Plover (*Charadrius bicinctus*)
- Eastern Curlew (*Numenius madagascariensis*)
- Great Egret (*Ardea alba*)
- Latham's Snipe (*Gallinago hardwickii*)
- Marsh Sandpiper (*Tringa stagnatilis*)
- Osprey (*Pandion haliaetus*)
- Pacific Golden Plover (*Pluvialis fulva*)

- Red-necked Stint (*Calidris ruficollis*)
- Rufus Fantail (*Rhipidura rufifrons*)
- Sharp-tailed Sandpiper (*Calidris artilage*)
- White-bellied Sea-Eagle (*Haliaeetus leucogaster*)
- White-throated Needletail (*Hirundapus caudacutus*)

The ELA report notes that a number of additional migratory species have the potential to utilise the Tallawarra Lands site although they have not been recorded within the area in surveys to date. These species include:

- Black-tailed Godwit (*Limosa limosa*)
- Broad-billed Sandpiper (*Limicola falcinellus*)
- Fork-tailed Swift (*Apus pacificus*)
- Great Knot (*Calidris tenuirostris*)
- Greater Sand-plover (*Charadrius leschenaultiil*)
- Grey-tailed Tattler (*Heteroscelus brevipes*)
- Hooded Plover (*Thinornis rubricollis*)
- Lesser Sand-plover (*Charadrius mongolus*)
- Little Curlew (*Numenius minutes*)
- Little Tern (*Sterna albifrons*)
- Painted Snipe (*Rostratula benghalensis s. Lat.*)
- Rainbow Bee-eater (*Merops ornatus*)
- Red Knot (*Calidris canutus*)
- Regent Honeyeater (*Xanthomyza Phrygia*)
- Sanderling (*Calidris alba*)
- Satin Flycatcher (*Myiagra cyanoleuca*)
- Square-tailed Kite (*Lophoictinia isura*)
- Terek Sandpiper (*Xenus cinereus*)
- Whimbrel (*Numenius phaeopus*)

The Koala is listed as a threatened species under the TSC Act. The ELA ecological assessment report also considered the Tallawarra Lands development proposal having regard for the provisions of SEPP 44 – Koala Habitat. The ELA report notes that URS (2006) recorded Koala scratch marks in woodland to the west of the Tallawarra Lands site but states that there are no records of this species occurring on the site (DECCW 2010). The nearest database record (DECCW 2010b) for the Koala species is located more than 10 kilometres from the Tallawarra Lands site within the Cordeaux Nepean-Avon Dam Catchment. The ELA report considers it unlikely that the Koala species would occur within the Tallawarra Lands site for the following reasons:

> *"• The nearest record for this species is over 10 kilometres to the west of the study area;*
>
> *• Vegetation between the nearest record and the study area is highly fragmented;*

- *Vegetation on the site is fragmented and therefore is less likely to be used by this species; and*
- *It is difficult to definitively identify scratch marks given the number of species that can create scratch marks and therefore it is possible that the record from URS is a misidentification."*

The ELA report states that as there are no known resident populations of Koalas on the Tallawarra Lands site or indeed in the locality, the area does not support core Koala habitat as defined under SEPP 44.

The ELA ecological assessment report notes that there are natural and artificial wetlands present across the Tallawarra Lands site including two that are protected under SEPP 14. The ELA report states:

> *"The two SEPP 14 wetlands and the artificial wetlands in the south-east and south-west of the site are considered the most valuable wetland habitat within the study area and as such are to be conserved as part of the current concept. A 50 metre buffer will be provided around all SEPP 14 wetlands. This is easily achieved as both SEPP 14 wetlands are to be conserved within a 95.98 hectare reserve zoned for environmental conservation."*

ELA state that the two SEPP 14 wetlands are likely to constitute Groundwater Dependent Ecosystems (GDEs) and that the moist vegetation types present in the south east of the site are also likely to be dependent on groundwater to some degree. ELA note that it is unlikely that significant changes to groundwater in this area will occur as a consequence of the proposal. Impacts on groundwater have been assessed in a separate report prepared by Coffey (in prep). A supplementary report on GDEs has been prepared by Eco Logical (refer to **Appendix 24**), the findings of which are detailed later in this report.

The ELA report notes that the Bioregional Assessment of the Wollongong LGA (2003) identified the Yallah Calderwood Corridor as one of two regionally significant corridors that provides a "stepping stone" connection between the escarpment and the plateau lands and the coastal plain. The ELA report states:

> *"The Yallah-Calderwood Fauna Linkage connects the escarpment and plateau to Lake Illawarra. This corridor is comprised of a closely spaced linkage of remnant patches of vegetation within 550 metres of each other (NPWS 2003). Current "stepping stone" linkages throughout the section of the Yallah- Calderwood corridor will not become further isolated by the proposal as the vegetation along Duck Creek and the consolidated stands of vegetation in the north-east and south-east of the study area will be retained."*

Local scale corridors throughout the Tallawarra Land site are currently highly fragmented and consist primarily of east-west linkages. However, the drainage line running from Duck Creek in the centre of the site across pasture areas and beneath Yallah Bay Road through box culverts provides potential movement paths to northern areas for some fauna species. Similar north-sought connection is possible using the foreshore environmental reserve between Duck Creek and the power station buffer lands. Duck Creek provides a dispersal pathway for fauna species to move from the Tallawarra Lands site to the foreshore of Lake Illawarra and hence to the north and south of the site. In the south-western part of the Tallawarra Lands site, corridors for movement are also formed through the creek and drainage lines and the artificial wetlands also provide "stepping stone" habitat.

The ELA report states:

> *"Based on the current masterplan, most of the habitat connectivity across the study area would be maintained and the conservation of the south eastern portion of the study area means linkages from the most consolidated areas of habitat and Lake Tallawarra [*sic*] will be preserved."*

The ELA ecological assessment report outlines the anticipated impacts from the Tallawarra Lands development proposal on the ecological values of the site. A number of mitigation measures have been formulated to minimise any such impacts. The residual direct and indirect impacts are outlined in the ELA report and cumulative impacts and key threatening processes have been considered. ELA state that this approach is consistent with the Director General's requirements (ie. Description of actions that will be taken to avoid or mitigate impacts or compensate for unavoidable impacts of the project on threatened species and their habitat). For any impacts that cannot be avoided or mitigated, offsets have been provided.

The ELA report identifies the following avoidance measures which will be implemented to minimise impacts on the ecological integrity of the Tallawarra Lands site:

"• Development has primarily been restricted to the disturbed parts of the study area or areas of small, isolated and degraded vegetation/habitat except where impacts are unavoidable due to road design and engineering constraints such as the entry road location;

- *The vegetation in the south east of the site including the SEPP14 Wetlands and a number of coastal EECs under the current concept plan will be conserved as an environmental reserve;*
- *Areas of known breeding habitat for the White-Bellied Sea Eagle will be conserved within an environmental reserve;*
- *Areas of known nesting habitat for the Osprey have been avoided;*
- *The Duck Creek riparian corridor will be established and restored due to the important function this area plays in connectivity not only across the site but also within the context of potential regional corridors;*
- *Ash pond 3, the largest artificial wetland (AW3) in the south-west of the site, will be conserved and incorporated in to the landscape design as this area is known to support habitat utilised by a variety of waterbirds and migratory species;*
- *The removal of hollow-bearing trees has been minimised as much as possible. Based on the current concept plan, it is likely that one hollow-bearing tree would be impacted in the south-west of the site. All other known hollow-bearing trees have been avoided; and*
- *Riparian features are protected through avoidance and improvement through the provision of riparian zone vegetation, buffer setbacks and vegetation management (ELA 2010, 2010b and Figure 17)."*

The Tallawarra Lands proposal has been designed to avoid impacts on riparian and aquatic habitat area and further, to provide riparian buffer zones, revegetation, vegetation management and WSUD to protect and improve these areas.

Based on the Tallawarra Lands concept plan there are no areas where a significant loss of native riparian vegetation is likely, conversely the riparian assessment and VMP propose extensive riparian zone revegetation and improvements.

Minor impacts to riparian vegetation may occur in specific and restricted areas such as with the upgrading of the bridge crossing over Duck Creek, however this will be minimal and will need to conform to appropriate WM Act requirements.

Some aquatic vegetation fringing some of the artificial wetlands will be impacted, however, this will mostly be minimal and will primarily concern non-natural and non-native vegetation.

The Tallawarra Lands site provides a variety of fauna habitat features including many that would provide habitat for threatened species. A number of threatened bats have been recorded across the Tallawarra Lands site and it is likely that small areas of potential habitat for bats will be impacted. Areas of potential foraging and roosting habitat for bats will remain across the site.

The Tallawarra Lands proposal will impact on a number of artificial wetlands that provide potential habitat for amphibians, reptiles and a large variety of waterbirds. All areas identified as supporting high value habitat for waterbirds have been avoided and either incorporated into open space areas or protected within environmental reserves.

Although potential habitat for woodland birds will also be impacted, the most consolidated stand of habitat will be conserved and the amount of clearance triggered by the Tallawarra Lands concept plan is small with respect to the amount of potential habitat retained within the site and locality.

Records of the Green and Golden Bell Frog (GGBF) from the west of Lake Illawarra are noted in the ELA report as always low in number and none have been positively identified for decades, the most recent being from around Albion Park in 1973/4. The Tallawarra Lands proposal will remove some areas of moderate and low condition habitat for amphibians including the GGBF, although areas of high value habitat and most areas of moderate habitat have been retained.

The ELA ecological assessment report also identifies the following indirect impacts of the Tallawarra Lands proposal:

- Runoff, sedimentation and erosion;
- Hydrological changes to the site;
- Edge effects including increased weed invasion;
- Disturbance to fauna due to increased site utilisation;
- Predation of fauna species including waterbirds particularly from dogs and cats;
- Fragmentation associated with the development of the site; and
- Wild fire during construction and maintenance works or through arson.

Whilst the Tallawarra Lands proposal will result in additional clearance of some vegetation, the protection and management of the large parcel of land (95.98 hectares) in the south-east, incorporating a number of coastal EECs and two SEPP 14 wetlands will assist in protecting areas of coastal vegetation and habitat for threatened species throughout the LGA.

Furthermore, the proposed restoration of Duck Creek will assist in enhancing connectivity and the condition of the Yallah Corridor and enhance habitat values for threatened fauna.

The ELA ecological assessment report on the Tallawarra Lands proposal identifies the following key threatening processes:

- "Alteration to the natural flow regimes of rivers, streams, floodplains and wetlands (TSC Act)"

  The Tallawarra Lands concept plan has been designed such as to not impact on major creek and drainage lines throughout the site given the sound approach to riparian management and the WSUD proposed for the site.

  It is unlikely that the Tallawarra Lands proposal would have adverse impacts on the naturally occurring wetlands across the site as they are to be conserved within the environmental reserves and mitigation measures will be implemented to prevent indirect impacts on waterbodies across the site.

- "Clearing of native vegetation (TSC Act) / Land clearance (EPBC Act)"

  Whilst some vegetation removal is unavoidable, vegetation clearance has been avoided wherever possible and offsets will be provided to compensate for vegetation loss.

- "Competition and grazing by the feral European Rabbit (TSC Act) / competition and land degradation by rabbits (EPBC Act)"

  The European Rabbit currently inhabits the Tallawarra Lands site. Given that the proposal would not create additional conditions that would favour the European Rabbit it is unlikely that it would exacerbate this key threatening process.

- "Human-caused climate change (TSC Act) / loss of terrestrial climate habitat caused by anthropogenic emissions of greenhouse gases (EPBC Act)"

  The Tallawarra Lands proposal incorporates an employment precinct which may include industrial and other activities that may create greenhouse gas emissions. However, it is anticipated that all businesses would be expected to work within the current enforced emissions limits.

- "Invasion and establishment of exotic vines and scramblers (TSC Act)"

  A number of exotic vines are present across the woodland areas. A VMP has been prepared to manage weeds across the Tallawarra Lands site.

- "High frequency fire resulting in the disruption of lifecycle processes in plants and animals and loss of vegetation structure and composition (TSC Act)"

  The potential for fire during the construction phase of the proposal is considered low. There is the potential for accidental fires once the development has been completed or through arson. As such, a package of mitigate measures have been proposed to reduce the likelihood of fire during these phases.

- "Invasion, establishment and spread of *Lantana camara"*

  Lantana has been identified as a threat to endangered ecological communities within the Tallawarra Lands site. A VMP has been prepared for the Tallawarra Lands site and incorporates measures to control and manage Lantana within the site.

- "Invasion of native plant communities by exotic perennial grasses (TSC Act)"

  There is the potential for the proposal to result in the spread of exotic perennial grasses. However, a number of mitigation measures have been proposed to prevent the spread of weeds and exotic perennial exotic grasses.

- "Loss of hollow-bearing trees (TSC Act)"

  Based on the current footprint of the Tallawarra Lands proposal, one hollow-bearing tree will be removed within the Lakeside Residential Precinct. A number of hollow-bearing trees will be preserved throughout the Tallawarra Lands site and it has been recommended that the hollow-bearing tree proposed for removal is checked for resident fauna prior to its removal.

- "Predation by feral cats (TSC Act and EPBC Act)"

  Feral cats are likely to be present within the Tallawarra Lands site. The inherent open nature of the landscape allows this species to move relatively unrestricted across the site. It is unlikely that the proposed roads would increase the activity of feral cats across the site. The use of fauna-proof bins throughout the Tallawarra Lands site are likely to assist feral cat activity.

- "Predation by the European Red Fox (TSC Act and EPBC Act)"

  The European Red Fox is present across the Tallawarra Lands site. Given the inherent open nature of the landscape allows this species to move relatively unrestricted across the site, it is unlikely that the proposed roads would increase the activity of this species across the site.

- "Removal of dead wood and dead trees (TSC Act)"

  Dead wood is limited across the site and is restricted to only small parts of the open woodlands. Removal of dead wood is not proposed.

- "Instream structures and other mechanisms that alter natural flow regimes (FM Act)"

  The proposal involves the upgrading of the Duck Creek crossing to allow access to the south-west of the site from Yallah Bay Road. However, the proposed upgrades would need to meet the requirements of the Department of Water & Energy for watercourse crossings under the Water Management Act 2000.

- "Degradation of native riparian vegetation along NSW watercourses (FM Act)"

  The riparian areas in proximity to the Duck Creek crossing that will need to be upgraded are heavily degraded with the riparian zone comprised of a grassed area with limited canopy cover. Therefore, impacts on native riparian vegetation are likely to be minimal. Furthermore, this area will be revegetated and enhanced in accordance with the VPM.

The ELA ecological assessment report states in relation to the "maintain and improve" test as follows:

> "*Given the past rezoning process and suite of avoidance, mitigation and conservation measures outlined in this report, it is considered that the proposal would meet the "maintain and improve" test as it:*
>
> - *Will conserve all key habitat areas across the site through zoning for environmental protection;*
> - *Will conserve the largest and most consolidated stand of vegetation in the south-east of the site;*
> - *Will conserve the largest and most valuable wetland in terms of habitat for threatened and migratory birds in the south-east of the site and mitigation measures will be implemented to prevent indirect impact;*
> - *Implement a Vegetation Management Plan that will reduce the weed invasion in remnant vegetation across the study area and include the rehabilitation of the Duck Creek corridor;*
> - *Improve connectivity of the Duck Creek and regional corridors and will not fragment any current corridors;*
> - *Result in approximately 187.63 hectares of vegetation (excluding the disturbed environmental reserve near the power station) including a number of EECs and two SEPP 14 wetland being protected across the study area;*
> - *Undertake significant improvement works through the VPM including a substantial amount of revegetation; and*
> - *Is unlikely to have a significant impact on any EPBC listed species."*

The ELA ecological assessment report on the Tallawarra Lands concept plan provides the following conclusion:

"*Under Part 3A of the EP&A Act, the DGRs call on the DECCW Part 3A assessment guidelines, which require the EA to provide details of the measures to avoid, mitigate or offset impacts associated with the development. That is, to meet the principles of the 'maintain and improve' test. Whilst complete avoidance of all impacts on habitat for threatened species and EECs will not be achieved by the concept plan, the most significant areas of vegetation and habitat have been avoided and stringent mitigation measures will be implemented as part of the proposal which will further reduce potential impacts. Areas of vegetation and habitat impacted are primarily highly degraded given the history of disturbance and landuse at the site.*

To compensate for those impacts that cannot be avoided, the most valuable areas of land in terms of ecological values have been afforded protection within the concept plan and are covered by a VMP which aims to restore/improve the values of retained vegetation and habitat.

Provided the recommended mitigation measures are implemented and the environmental conservation areas are managed, it is unlikely that the proposal would result in a significant impact on any Matters of National Environmental Significance (NES) listed under the Environment Protection and Biodiversity Conservation Act 1999."

6.2 Groundwater Dependent Ecosystems

TRUenergy commissioned ELA to undertake further assessment of Groundwater Dependent Ecosystems (GDEs) to document the presence of GDEs on site and to assess the potential impacts the proposed development could have on the identified GDEs. The outcomes of the report are presented in a risk assessment framework. The report also contains mitigation and management measures along with recommendations for the collation of additional information to better inform the development and implementation of a CEMP. The risk assessment report is attached at **Appendix 24**.

The GDEs at Tallawarra are predominantly wetland ecosystems concentrated in the southern areas of the site including artificial wetlands in the ash ponds, SEPP 14 wetlands, saltmarsh, forested wetlands and adjacent aquatic ecosystems (seagrass). ELA identified the potential impacts as including alterations to the groundwater recharge system, contamination and release of acid sulphate soils.

Alterations in groundwater recharge may occur as a result of the increased area of impervious surfaces and vegetation clearing. However as the degree of groundwater dependency of the GDEs is thought to be minimal with higher dependency on the surface water and also tidal water, the impacts to GDEs from a potentially altered groundwater regime are not expected by ELA to be significant.

GDEs may also be impacted by the release of contaminants or acid sulphate solids caused by construction. While the risk to GDEs from contamination is difficult to quantify, ELA opine that the development is unlikely to exacerbate contamination issues provided that appropriate mitigation and management measures are implemented through a CEMP. On this basis, ELA conclude that any impacts to the GDEs (from contamination or direct development impacts) are not expected to be significant. However, there is a significant underlying threat to most of the GDEs on site from climate change effects, primarily sea level rise.

ELA developed a framework to assess the risk of significant impacts to GDEs from the proposed development in the absence of specific and determinative information.

The risk to GDEs posed by most development actions was found by ELA to be low as potential impacts can be adequately mitigated and managed. The risk posed by contamination to GDEs was found to be moderate to high, largely because the potential

impacts of contaminants on GDEs are not fully understood and there is also uncertainty about whether adequate mitigation and management measures such as those proposed by ELA can indeed be developed and implemented.

In addition to those mitigation measures outlined by Coffey Environments to protect the identified GDEs, ELA recommend that the following management and mitigation measures be implemented:

2. Preparation of a Construction Environmental Management Plan (CEMP) incorporating a Soil and Water Management Plan (SWMP).
3. Inclusion (in the CEMP) of additional mitigation or management measures following collation of further information.
4. Review of measures in the CEMP by experts in contamination management whilst giving due regard to the proposed construction type, location and other detail.
5. Implementation of the Vegetation Management Plan and riparian corridor rehabilitation and improvement works recommended by Eco Logical Australia in their Riparian Assessment (**Appendix 10**) and Vegetation Management Plan (**Appendix 27**).
6. Implementation of the WSUD measures aimed at maintaining the pre-development hydrological regime recommended by BMT WBM.
7. Development and implementation of an Acid Sulphate Soil Management Plan for all development activities that may involve disturbance of acid sulphate soils. Further geotechnical investigations into the extent of acid sulphate soils may be required to support this plan.

6.3 Riparian Impacts

ELA has prepared a Riparian Assessment report for the Tallawarra Lands Part 3A concept plan application which is included in **Appendix 10**. The ELA riparian assessment report responds to the Director General's requirements in respect to riparian impacts as follows:-

> *"(a) The EA shall identify the appropriate location and width of riparian areas and buffers to wetlands, foreshore and riparian areas (including SEPP 14 wetlands, other wetlands, salt marsh and mangroves), other important aquatic habitats, other significant and ecologically sensitive areas. The buffer zones and any other safeguards to mitigate any impacts aquatic environments and riparian habitats, should include full details and maps, identification of all waterways, conservation area dedications, foreshore wetland rehabilitation and vegetation plans for the site. Vegetated buffers to protect wetlands are to allow for cyclic and successional change in the wetland boundaries including provision for upslope migration of estuarine wetland due to possible sea level rise.*
>
> *(c) The EA shall identify current riparian zone areas and proposed rehabilitation, including details of where native vegetation will be retained and replanted and how any current and future areas will be rehabilitated. The EA shall incorporate a sufficient vegetated riparian zone along the lake."*

It is noted that Part 4(b) of the Director General's requirements in relation to riparian impacts is addressed in the Drainage report by BMT WBM which is included in **Appendix 11**. Part 4(b) of the Director General's Requirements states:

> *"(b) the EA shall assess the effects of potential changed nutrient and sediment transport from the proposal on the nearby wetlands and the vegetation communities as well as the lake itself. Develop scenarios and mitigation*

measures for managing potential increase sediment and nutrients as a result of the increased urbanisation of the wetland and lake catchments."

The ELA report on the riparian impacts of the Tallawarra Lands proposal also takes into consideration matters raised by the NSW Office of Water (NoW) in its correspondence to the Department of Planning (DoP) dated 15 September 2009. NoW specifically recommended that:

"• *The Regional Corridor Management Study (RCMS) methodology (DIPNR 2004) for mapping of streams, categorisation and riparian buffer widths (CRZ and ZB) be applied;*

- *Duck Creek requires a corridor of at least 100 metres width each side of the waterway for provision of a regional corridor;*
- *Provision of buffer setbacks to wetlands (including SEPP 14); and*
- *A 50 metre wide vegetated setback be provided along the Lake Illawarra foreshore."*

The methodology adopted by ELA for the riparian assessment of the Tallawarra Lands proposal was to document the characteristics of aquatic features and also to assess their condition, recovery potential, habitat value and general significance. The ELA report also provides a description of the condition of the waterways, artificial wetlands and SEPP 14 wetlands found on the Tallawarra Lands site.

Duck Creek is considered a Category 1 Riparian zone by RCMS (DIPNR, 2004) due to the link it provides between Lake Illawarra and lowland woodlands west of the freeway. In general, the Duck Creek riparian zone is in moderate to good condition. Although weeds are present along much of the core riparian zone, there is generally a moderate to high recovery potential for most reaches.

In addition to the detailed work undertaken for Duck Creek, all other waterways found within the Tallawarra Lands site were assessed by ELA for condition and validation of their RCMS categorisation. Figure 2 in the ELA report shows the riparian features for Duck Creek, all other waterways as well as the artificial wetland and SEPP 14 Wetland areas within the Tallawarra Lands site and is reproduced below as **Figure 22**.

Figure 22: Riparian features

Natural and artificial wetlands are present across the Tallawarra Lands site including two that are protected under SEPP 14. The SEPP 14 wetlands occur in the south eastern portion of the site and are in good condition with limited weed invasion. The SEPP 14 Wetlands support the vegetation associations of Estuarine Alluvial Wetland, Saltmarsh and Coastal Swamp Oak Forest (ELA 2010b). These wetlands provide potential habitat for a variety of species including birds, reptiles, mammals and amphibians. An inventory of flora species present within each of the SEPP 14 Wetlands is provided in an ecological assessment for Tallawarra Lands (ELA 2010b) which is included in **Appendix 9**.

A number of artificial wetlands are also present across the Tallawarra Lands site with the largest occurring in the south west. Some of these artificial wetlands provide habitat for

waterbirds, reptiles and amphibians, although they vary in the quality of habitat provided (ELA 2010b).

The Lake foreshore provides the eastern boundary of the site for approximately 5.2 kilometres. The foreshore is distinguished by three broad areas (zones) being Northern Hill Slope Foreshore, Central Foreshore and Southern Floodplain Foreshore.

The ELA report describes the means by which riparian zones will be protected and managed at the Tallawarra Lands site. The riparian protection and management strategy for the site entails:

"
- *Provision of a regional linkage from the Ocean to the Escarpment in the form of a large Duck Creek corridor;*
- *Provision of a series of secondary riparian corridors to support important waterways; and*
- *Provision of sufficient CRZs (Core Riparian zones) for remaining riparian zones to provide for bed and bank stability."*

Figure 3 in the ELA report shows the recommended riparian zone and wetland management areas proposed for the Tallawarra Lands site and is reproduced as **Figure 23**.

Figure 23: Riparian Zones and Wetland Management

The ELA riparian assessment report on the Tallawarra Lands development proposal provides the following conclusion:

> *"This section assesses the extent to which this report meets the DGRs and the extent to which riparian zone management is consistent with State Government policy, which is largely embodied in SEPP14 and the RCMS for this site.*
>
> *In terms of consistency with SEPP 14, both SEPP 14 wetlands are to be retained in an Environmental Reserve that will ultimately be held in the ownership of a public authority (ELA 2010c). As no development is planned within the wetlands and the upstream riparian zones protected, there is anticipated to be no negative effects on*

the SEPP 14 wetlands. Further the fringing vegetation will be managed to limit the impact from edge effects.

In terms of consistency with the RCMS, the following tables summarise the planning and management approaches for each riparian zone and wetland.

Summary of Proposed Riparian Zone Management Approach

Feature	***RCMS Buffer zone protected***	***Proposed landuse within buffer zone***	***Rehabilitation***
Duck Creek	*Yes*	*Environmental Reserve. Open space landuses consistent with the objectives of the corridor sighted outside the RCMS buffer zone.*	*Extensive weed control. Full structural native revegetation of currently cleared buffer zone areas.*
1. (Wollingurry)	*Yes*	*Environmental Reserve*	*Weed control*
2. (Un-named)	*Yes*	*Environmental Reserve*	*Weed control*
3. (Yallah Creek)	*Yes*	*Riparian zone*	*Reconstruction of currently modified waterway to a more natural system including geomorphic works, creation of instream habitat, riparian zone revegetation and weed control.*
4. (Un-named)	*Yes, requires spot rezoning to align zoning to actual waterway alignment*	*Riparian zone*	*Riparian zone revegetation and weed control*
5. (Yallah Gully)	*Yes*	*Open Space*	*Weed control*
6. (Brooks Creek)	*Yes*	*Environmental Reserve and Open Space*	*Weed control, assisted natural regeneration*
7. (Un-named)	*Yes*	*Open Space*	*Weed control*
8. (Barrons Gully)	*Yes*	*Environmental Reserve*	*Native revegetation of riparian zone and weed control*
9. (Un-named)	*NA – man made channel*	*Residential*	*n/a*
10. (Un-named)	*NA – man made channel*	*Local park*	*Weed control*
11. (Un-named)	*NA – man made channel*	*Residential and open space*	*Weed control*

Summary of Proposed Wetland Management Approach

Feature	*Retained*	*Proposed landuse*	*Rehabilitation*
SEPP 14 (282)	*Yes*	*Environmental Reserve*	*Weed control*
SEPP 14 (381B)	*Yes*	*Environmental Reserve*	*Weed control*
AW1	*Yes- partially modified*	*Riparian zone*	*Weed control and buffer revegetation*
AW2	*No*	*Employment*	*n/a*
AW3	*Yes*	*Open Space, environmental protection and management*	*Buffer revegetation and weed control*
AW4	*Yes*	*Open Space, environmental protection and management*	*Buffer revegetation including fringing aquatic vegetation and weed control.*
AW5	*Yes*	*Power station*	*n/a – offsite*
AW6	*Yes*	*Open Space*	*Weed control*
AW7	*Yes*	*Open Space, WSUD*	*Weed control and target revegetation*
AW8	*No*	*Employment*	*n/a*
AW9	*Yes*	*Open Space*	*Weed control*
AW10	*Yes*	*Riparian zone*	*Weed control, riparian zone revegetation*
AW11	*Yes*	*Retained, for current power station use*	*Weed control*
AW12	*Yes*	*Retained, for current power station use*	*Weed control*
AW13	*Yes*	*Open Space, WSUD*	*Weed control and target revegetation*

The approach taken with the concept plan with regard to management of the existing natural riparian features on site generally exceeds the prescriptive requirements established under SEPP 14 and RCMS. Further, the approach adopted recognises the hierarchy and significance of Duck Creek and the SEPP 14 wetlands and will establish both land tenure and management controls to enhance their viability and resilience in the future.

Currently degraded riparian and wetland areas are integrated into the existing zoning and measures are established through buffers and vegetation management to protect and promote hydrological and habitat value.

One waterway, Yallah Creek, is proposed to receive some physical restoration in order to meet hydrological and geomorphic requirements and to enhance the quality of water to receiving environments.

Two artificial wetlands that provide limited hydrological and habitat value are proposed to be removed in order to better align and manage water flows and quality on site.

A sound approach to WSUD (BMT WBM, in prep.) has been developed for the concept plan which integrates drainage matters with riparian management covered in this riparian assessment and in the VMP (ELA 2010c).

This report has demonstrated that the concept plan for development at Tallawarra Lands meets the requirements of the DGRs for Riparian Impacts and the requirements of the NSW Office of Water."

6.4 Environmental Management Strategy

Eco Logical Australia Pty Ltd (ELA) has prepared an Environmental Management Strategy (EMS) which outlines the proposed environmental management intent for the Tallawarra Lands site. The EMS is included in **Appendix 28**.

The aim of the EMS is to integrate the approach for management in non-development areas within the Tallawarra Lands site to ensure continued protection, maintenance and improvement of recognised values. The objectives are to:

"1. Protect the biodiversity of the site including the diversity of species and habitats.

2. Enhance high conservation riparian areas

3. Improve the condition of remnant native vegetation.

4. Manage the bushfire risk

5. Provide habitat connectivity within the site and to adjacent areas."

These five objectives summarise the legislative and best practice requirements for the Tallawarra Lands site and can be used as a platform for consideration against ecological sustainable development (ESD) principles.

The EMS for the Tallawarra Lands site outlines a range of specific development control actions that will assist in delivering the strategy. These development control actions include:

- Site Management;
- Revegetation;
- Weed control;
- Urban/Environmental Interface;
- Riparian Management; and
- Bushfire Risk Management.

Table 12 of the ELA ecological assessment report outlines a number of management and mitigation measures which are recommended to protect the ecological values of the Tallawarra Lands site together with the project stage during which each recommendation should be implemented. Table 12 – Recommended Mitigation Measures in the ELA report is reproduced below as Table 16.

Impact/Threat	Values	Mitigation Measure	Timeframe	Prior to construction	During construction	Post construction
General construction and operational impacts	All	Preparation of Construction Environmental Management Plan (CEMP) incorporating a Soil and Water Management Plan (SWMP)		✓		
		Preparation of Vegetation Management Plan (VMP)		✓		
Spread of weeds						
Spread of noxious and environmental weeds	Ecological	Noxious and environmental weeds present within the study area should be controlled in accordance with the provisions of the VMP (ELA 2010b).		✓	✓	✓
Spread of weeds through soil disturbance and vegetation clearance	Ecological	Piling of soil that may contain seeds of exotic species at least 50m away from the creeklines, drainage lines and other areas of native vegetation, where possible, to prevent spread of weeds into adjacent areas of ecological significance during rainfall or wind events. Soil will not be piled within riparian and wetland buffer areas nor vegetated areas.			✓	
Spread of weeds through movement of vehicles and machinery between sites	Ecological	All machinery, equipment and vehicles are to be washed down before entering and leaving the site.	Wash down area locations to be identified during the detailed design phase and CEMP		✓	

Impact/Threat	Values	Mitigation Measure	Timeframe	Prior to construction	During construction	Post construction
Spread of weeds through topsoil removal	Ecological	Topsoil re-use should only be undertaken within construction areas and top soil is not to be relocated to areas retained for environmental reservation unless required for engineering purposes. Where topsoil is relocated weed control is likely to be required.			✓	✓
Spread of noxious weeds through soil disturbance and vegetation clearance	Ecological	All onsite staff and contractors will be made aware of noxious weeds present at the site and ways to prevent their spread.	Prior to commencement of construction works	✓		
Spread of weeds through importation of soil, rubble etc.	Ecological	It should be ensured that any soil, rubble etc. Imported to the site is certified that it is free of weeds and weed seed.			✓	✓
Spread of weeds through revegetation	Ecological	Revegetation using local native endemic species characteristic of the native vegetation types present.	Species should be sourced prior to construction to ensure availability.	✓		✓
Sedimentation, Erosion and Runoff						
Sedimentation and soil erosion	Riparian/Wetlands and Ecological	Before any remediation works that will disturb the soil, grazing will be removed to allow grasses to regenerate to minimise any areas of bare soil. Jute matting or similar should be used to stabilise bare areas of soil where grass is not present.				✓

Impact/Threat	Values	Mitigation Measure	Timeframe	Prior to construction	During construction	Post construction
Sedimentation and soil erosion	Riparian/Wetlands and Ecological	All soil stockpiles will be covered to prevent the loss of material during high wind and rain events. Where practicable soil stockpiles will be placed in areas sheltered from the wind.	Location to be determined during detailed design phase.		✓	✓
Sedimentation and soil erosion	Riparian/Wetlands and Ecological	Implement provisions of SWMP.	Prior to the commencement of construction.	✓		
Sedimentation and erosion	Riparian/Wetlands and Ecological	All erosion and sedimentation control devices will be regularly monitored, cleared and repaired, particularly after periods of heavy rainfall.	Monthly and after heavy rainfall.		✓	✓
Sedimentation and soil erosion through soil disturbance	Riparian/Wetlands and Ecological	All disturbed soil surfaces shall be stabilised as soon as practicable after works have ceased in the area.				✓
Reduced water quality through uncontrolled runoff and sedimentation	Riparian/Wetlands and Aquatic species	Management measures implemented to prevent sediment and runoff entering the watercourse in accordance with SWMP.	Prior to the commencement of construction.	✓		
Spread of pesticides through runoff	Riparian/Wetlands and Aquatic species	Management measures implemented to prevent sediment and runoff entering the watercourses and artificial wetlands in accordance with the SWMP.		✓	✓	✓
Increase nutrient loads	Riparian/Wetlands and Aquatic species	Stormwater and sewer infrastructure will need to be constructed to perform at a high environmental standard, with the aim being for no increase in nutrient loads received by Lake Illawarra.		✓ - design phase	✓	✓

Impact/Threat	Values	Mitigation Measure	Timeframe	Prior to construction	During construction	Post construction
Vegetation Clearance/Disturbance						
Loss of local genetic integrity	Native vegetation	Prior to clearing – collect native seed from vegetated areas for use in revegetation works and landscaping throughout the study area.	During the appropriate seed collection season for target species.	✓		
Disturbance/degradation of EECs and reserves due to edge effects	Reserves and EECs	A vegetation buffer should be maintained between the development area and environmental reserves/EEC to prevent indirect impacts due to edge effects. VMP to minimise the opportunity for edge effects.			✓	
Disturbance from the movement of vehicles and machinery between sites	Ecological	All vehicles are to remain on formed roads or tracks designed specifically for the purposes of the construction, except where required for the implementation of the VMP.			✓	
Damage to surrounding tree roots	Ecological	Care is to be taken when working near treed areas to prevent direct damage to adjacent tree roods, or from soil compaction or smothering			✓	
		Where possible, construction is to be undertaken at least 15m away from the base of trees.			✓	
Smothering of vegetation by dust	Vegetation	Minimise dust during construction via the use of water carts where required.			✓	

Impact/Threat	Values	Mitigation Measure	Timeframe	Prior to construction	During construction	Post construction
Temporary removal of fauna habitat/dead wood	Ground-dwelling species	All logs and large rocks removed from within the proposed development areas are to be relocated to the proposed environmental reserves to provide fauna habitat augmentation.			✓	
Roost/Hollow disturbance						
Disturbance of nests, dens and roosts through hollow-bearing tree removal	Hollow-dependent species	Pre-clearing surveys will be undertaken to determine if there are roosts, nests or dens present in any trees proposed for clearing				
Disturbance to roosts through bridge or culvert alterations	Micro chiropteran bats	Surveys will be undertaken to determine if there are roosts present in any bridges or culverts present within the study area.				
Waterbird Habitat – disturbance/clearance						
Disturbance of waterbird habitat through changes to water levels	Waterbirds/amphibians	The pre-development hydrological regime of the site is to be sought to be replicated through the WSUD.		✓	✓	✓
Discharge from construction area	Waterbirds/amphibians	Runoff from the construction area will not be discharged into artificial wetlands that are to be retained. Appropriate controls to be established in the SWMP and work practices in the CEMP.			✓	✓
Disturbance/clearance of potential breeding habitat	Waterbirds	Areas around the artificial wetland that provide potential breeding habitat for waterbirds should not be impacted by the proposal and any trails will be placed well outside these areas. Works in these areas according to the VMP (ELA 2010b)		✓		

Impact/Threat	Values	Mitigation Measure	Timeframe	Prior to construction	During construction	Post construction
Disturbance to waterbirds due to increased noise from construction	Waterbirds	IF any waterbirds are known to breed on the site, construction around/within the vicinity of their breeding habitat will be undertaken outside the key breeding period for the species to prevent disturbance to these species There are no records to date of waterbirds breeding on the site in areas of direct impact.			✓	
Disturbance of waterbird habitat through indirect impacts	Waterbirds/amphibians	Buffers between the development and areas of waterbird habitat should be maintained to minimise indirect impacts. Resident education is encouraged to facilitate community awareness and protection of these values. Sensitive landscape treatments and management approaches to minimise impacts from noise. Lighting and human interaction.			✓	
The use of herbicides and pesticides near aquatic environments	Waterbirds/amphibians	Where herbicides are to be used near waterways, these will be suitable for use near aquatic environments (as detailed in ELA 2010b).				✓

Impact/Threat	Values	Mitigation Measure	Timeframe	Prior to construction	During construction	Post construction
Predation						
Predation from dogs	Fauna and particularly waterbirds	Barriers (fencing, vegetative screens or other landscape treatments) will be erected between residential areas and areas of potential fauna habitat to minimise opportunities for predation by dogs on native fauna. Dog free areas should be considered for higher significance fauna habitat.	To be further developed at detailed design stages		✓	✓
	Fauna and particularly waterbirds	It must be a requirement of trail use (for walking trails through sensitive areas) that dogs must be kept on a lease) Signage indicative of this and of the significance and value of the vegetation and habitat will be erected to inform and educate users. In areas where fencing of the trail may restrict fauna movement, the trail should be raise dup 0.6m – 1m from the ground in parts to allow fauna to pass beneath.			✓	✓
Predation from cats	Fauna and particularly waterbirds	It should be a requirement that all cats have a collar with a bell as it is difficult to contain cats within residential areas.				✓
Increased feral animal activity	Fauna and particularly waterbirds	A feral animal management plan should be implemented to reduce feral animal activity across the site.				✓

Impact/Threat	Values	Mitigation Measure	Timeframe	Prior to construction	During construction	Post construction
Rubbish dumping						
Dumping of rubbish in ecologically sensitive areas	Vegetation, Habitat and Riparian	Landscape masterplan seeks to integrate open space utilisation whilst restricting opportunities for adverse open space outcomes including rubbish dumping.				
		The CEMP and the SWMP will avoid these impacts during periods of construction. Installation of fauna proof rubbish bins at strategic locations to prevent rubbish disposal within environmental reserve areas.			✓	✓
Riparian Areas						
Disturbance to vegetation protected under the WM Act	Riparian	Any works that may be carried out within a riparian corridor will need to be in accordance with Water Management Act guidelines.			✓	
Impacts on riparian areas	Riparian	Vegetated riparian buffers are to be established according to the Riparian Assessment (ELA 2010a) and in consultation with DECCW. Appropriate measures implemented to ensure bed and bank stability is maintained to prevent soil erosion and impacts of water quality and habitat.		✓	✓	✓
Encroachment on buffer areas	Riparian	Buffer areas will be clearly identified and/or fenced to prevent encroachment from construction or other activities.		✓		

Impact/Threat	Values	Mitigation Measure	Timeframe	Prior to construction	During construction	Post construction
Fire						
Accidental fire resulting in loss of property, life, vegetation and injury to fauna	All	Adherence to all regulations. Development of a Bushfire Management Plan and implementation of relevant fire prevention measures.	BMP to be prepared prior to construction.	✓		✓
Inappropriate fire regimes resulting in vegetation and habitats being over or under burnt	All	Development of a BMP to advise on bushfire biodiversity thresholds of relevance to vegetation communities and threatened flora and faun species.		✓		✓
Hazardous Materials						
Spills of hazardous material (eg. Fuel, oil, chemicals)	All	Hazardous materials be stored on or off-site in specific lay-down/storage areas, and will be handled and stored according to regulatory requirements and Australian Standards AS1940			✓	
Others						
Boundary encroachment	All	The boundaries of the construction area will be clearly marked and/or fenced to prevent construction works breaching the boundaries and extending into environmental areas.	Prior to commencement of construction works	✓	✓	

Table 16: Recommended mitigation measures

6.5 Vegetation Management Plan

ELA has prepared a Vegetation Management Plan (VMP) which is included at **Appendix 27**. The VMP provides the following Executive Summary:

> *"The Director General's Requirements for the development of the Tallawarra Lands (the lands) require that a Vegetation Management Plan (VMP) be developed for all of the lands which will be retained as part of the proposed development. This includes lands set aside for both environmental and open space uses. Across the Tallawarra Lands there is approximately 362 hectares of retained land that will require native vegetation and weeds to be managed as part of the development proposal. This Vegetation Management Plan (VMP) addresses requirements identified in the Tallawarra Lands Riparian Assessment (ELA 2010c), the Tallawarra Lands Ecological Assessment (ELA 2010b) and the Tallawarra Lands Bushfire Assessment (ELA 2010a) and with regard to the first 5 years of management. It has also sought integration with a Landscape Masterplan (Corkery Consulting, in prep) and plans for Water Sensitive Urban Design (WBM BMT, in prop).*
>
> *The Tallawarra Lands have been split into 11 different management zones as described below and represented in Figure 6.*

Zone	***Zone Name***	***Proposed Management Approach***
1	*Duck Creek*	• *100-metre buffer either side of the creek with targeted revegetation* • *Control of noxious and environmental weeds*
2	*Wetlands Environmental Reserve*	• *Woodland area – noxious and environmental weed control* • *Grassland area – noxious weed control*
3	*Southern Lakes*	• *Buffer provided from waterbodies to development* • *Targeted revegetation including aquatic habitat* • *Noxious and environmental weed control*
4	*Yallah Creek*	• *Riparian management (water quality and soil erosion management works) with revegetation, habitat creation and open space plantings* • *Noxious weed control*
5	*Western Edge – Southern Area*	• *Control noxious and environmental weeds* • *Maintain remnant native vegetation*
6	*Western Edge – Central Area*	• *Noxious and environmental weed control* • *Revegetation may be required depending on response of native vegetation to management works*
7	*Western Edge – Northern Area*	• *Open space with amenity plantings using native overstorey species, as part of the Landscape Masterplan (Corkery Consulting, in prep)* • *Noxious weed control*

Zone	*Zone Name*	*Proposed Management Approach*
8	*Central Riparian Open Space Corridor*	• *Riparian management (water quality and soil erosion management works) with revegetation, habitat creation and open space plantings* • *Noxious weed control*
9	*Mt Brown Reserve*	• *Control of noxious and environmental weeds* • *Provision of stock proof fencing and vehicle access* • *Targeted revegetation, including Barron Gully riparian zone*
10	*East & West Mid slopes*	• *Noxious weed control* • *Maintain existing open space with amenity plantings provided. (Corkery Consulting, in prep) and some targeted fencing of vegetation remnants*
11	*Foreshore Reserve*	• *Noxious and environmental weed control* • *Targeted open space revegetation*

The main focus of vegetation management works will be on the control of noxious weeds, particularly Lantana camera (Lantana), although in areas protecting important environmental features environmental weeds will also be targeted for control.

Duck Creek has been identified as an area to be managed for conservation and therefore is a focus of this plan. Works will include fully structured native vegetation to be restored through the statutory 50m buffer either side of Duck Creek, including areas that are currently cleared of native vegetation. Remnant native vegetation within the remaining areas of the Duck Creek corridor (areas outside the statutory 50m buffer) will be treated with extensive weed control to improve their condition. Currently unvegetated areas outside the statutory 50m buffer will also receive weed control along with targeted native revegetation to support the restoration of the 50m riparian zone. Targeted revegetation along the Duck Creek corridor adjacent to development will integrate bushfire asset protection zones in line with RFS requirements (RFS 2006) and low key open space/informal recreation uses.

A number of other minor waterways require revegetation works along their riparian zones, including Yallah Creek, Barrons Gully and creek 4 within the central open space area. These works will focus on the provision and maintenance of bed and bank stability and water quality through revegetation of currently cleared riparian zones. These revegetation works will be complemented by noxious weed control.

The large wetlands in the south of the lands will be managed to maintain their current form due to the utilisation of migratory and threatened bird species. The wetlands have been setback from the development and this setback will be revegetated with native species to buffer this interface and also to integrate open space/informal recreation landuses. Fringing aquatic vegetation (including saltmarsh species) will be protected and improved (where needed) through weed control and targeted revegetation.

All other management zones will require weed control works, primarily targeting noxious weed species, with some landscape plantings using native overstorey and

midstorey species, except in areas where the existing landuse (ie. Horse agistment) will be continued, where only weed control will be undertaken.

The cost to implement the VMP has been estimated at $3,913,038 over a five year period. This includes all costs for a team of four bush regenerators, site supervisor, herbicides, equipment (including vehicles) and the cost of revegetation works."

Figure 6 in the ELA report on the VMP shows the location of management zones and revegetation works within the Tallawarra Lands site and is reproduced below as **Figure 24**.

Figure 24: Location of Management Zones across the Tallawarra Lands

6.6 Noise Assessment

Sinclair Knight Merz (SKM) have prepared a Noise Assessment report which is included at **Appendix 25A**.

The objective of the SKM Noise Assessment report is to meet the Director General's requirements in relation to providing a land use compatibility analysis to determine what environmental noise and vibration controls/measures may need to be incorporated into the development to ensure, to the greatest extent practicable, that noise related land use conflicts are designed out of the development.

To meet this objective, the following tasks have been undertaken by SKM as outlined in the Noise Assessment report:

> *"• Overview of noise issues: identify potential land use conflicts that may arise within the development. Conflicts that could arise in the absence of careful planning include: the proximity of development areas to the existing Tallawarra A and proposed Tallawarra B power stations; residential development in proximity to the Southern Freeway and Illawarra Rail Line; and the proximity of proposed industrial precincts to residential receivers (both existing and future).*
>
> *• Development of noise criteria: noise criteria for each of the development precincts. The criteria considers existing and future land uses both within and external to the Tallawarra Lands development site.*
>
> *• Compatibility Analysis: having established the potential for noise related land use conflicts and quantified noise criteria for each of the development precincts, a noise compatibility analysis would be undertaken that identifies noise controls/measures that may need to be incorporated into the development so as to minimise noise conflict in the future."*

In order to obtain information on the existing levels of ambient noise, a baseline noise survey was undertaken at six locations throughout the site, each representative of a different development area. The results of this noise monitoring are presented in Table 2-1 of the SKM Noise Assessment report.

Road traffic noise monitoring statistics were taken at two locations adjacent to the Southern Freeway, the results of which are presented in Table 2-2 of the SKM Noise Assessment report.

The SKM Noise Assessment report outlines relevant noise criteria for the Tallawarra Lands development proposal in accordance with relevant government legislation and policies including:

- The Industrial Noise Policy (INP) (EPA 2000).
- Tallawarra Power Station noise criteria under the INP.
- Road traffic noise criteria under the Environmental Criteria for Road Traffic Noise (ECRTN) (DECC 1999).
- NSW Interim Construction Noise Guideline (2008).
- State Environmental Planning Policy (Infrastructure) 2007.
- Development Near Rail Corridors and Busy Roads – Interim (2008).
- Noise Guide for Local Government (DECC 2007a).
- AS2107-2000 – Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors.

- AS2021-2000 – Acoustics – Aircraft Noise Intrusion – Building Siting and Construction.

The SKM Noise Assessment report provides an assessment of noise impacts associated with the Tallawarra Lands development proposals which are summarised below:

Table 23 Noise generation from within the Tallawarra Lands associated with the following:

- Tallawarra A and B Power Station.
- Internal traffic.
- Noise from industrial and commercial areas.

(b) External noise impacting on the Tallawarra Lands associated with the following:

- Southern Freeway traffic.
- Rail noise.
- Illawarra Regional Airport.

In relation to aircraft noise impacts from Illawarra Regional Airport, the SKM Noise Assessment report notes that the Tallawarra Lands site is outside of the ANEC 20 contour and noise impacts are considered acceptable for the proposed development types. Additional noise modelling results indicate that the Tallawarra Lands site may experience between 20 and 50 aircraft noise events per day above an L_{Aeq} noise level of 60 dB(A), and up to 20 events per day above 70 dB(A) with the more frequent exposure occurring in the south-west corner of the site.

The SKM Noise Assessment report provides a consideration of the potential effectiveness of noise management options in reducing noise levels to within the relevant guidelines as part of the development of the Tallawarra Lands. The SKM report identifies passive and active noise mitigation methods for the site development. Passive mitigation refers to noise reductions obtained through the consideration of noise in site planning and building design, whereas active mitigation sets out methods to reduce noise through the inclusion of noise reducing materials or specific construction such as noise walls or mounds.

The SKM Noise Assessment report recommends two methods of passive noise mitigation for the Tallawarra Lands development proposal as outlined below:

- **Building row screening** – Where residential properties are constructed, successive rows of buildings will create a substantial shield for subsequent properties. It is expected that buildings located more than three rows away from adjacent noise sources will experience a reduction due to building screening in excess of 7 dB(A), thereby complying with the relevant noise guidelines or criteria.
- **Internal building layout** – Where sleeping areas in residential buildings can be positioned at the furthest point from the noise source, substantial screening and distance attenuation benefits can be obtained and as such reduce the impacts of noise for these sensitive internal building uses. Given the potential screening and distance attenuation reduction that may be gained where sleeping areas are placed at the opposite end of houses, compliance in these areas with the 35 dB(A) guidelines is expected at most properties.

The SKM Noise Assessment report indicates that if the passive noise mitigation options referred to above are incorporated into building and site design, it is expected that noise from all sources would comply with relevant guidelines and criteria at most proposed residential locations. Sites where noise impacts may still occur are expected to be:

- Properties in the first row of houses adjacent to the southern boundary of the Northern Residential Precinct;

- Properties in the first row of houses adjacent to the northern and western boundaries of the Central Residential Precinct; and
- Properties in the first row of houses adjacent to the western boundary of the Southern Residential Precinct, in addition to numerous properties in the south-western area.

For these properties, SKM recommend further active noise mitigation measures may need to be considered.

- **Noise barriers** – Given the terrain of both the Southern Freeway road corridor and the residential areas, noise barriers are unlikely to be an effective mitigation measure for road and rail noise impacts in the Southern and Central Residential Areas. However, a wall or mound constructed along the top of the northern ridge may provide an effective option for mitigating noise from the power station for Northern Precinct receivers.

  Boundary fences may also provide noise attenuation through features such as increased height, placement on top of mounds and/or the consideration of more substantial construction materials. This technique is also expected to be especially effective for properties adjacent to the southern boundary in the Northern Residential Precinct.

- **Building design**

  Where the application of other noise mitigation methods fail to achieve the minimum noise reductions required to meet applicable noise criteria/guidelines, consideration may need to be given to acoustic building designs.

  Where these are considered necessary, building facades facing the dominant noise source should be constructed of substantial materials such as brick or masonry, or include sound insulation materials in their design.

  Where façade noise reductions are undertaken, all noise transmission routes on the targeted façade need to be considered. This will likely include the use of solid core doors on the impacted façade. In addition, as windows on this façade will generally be closed to reduce interior noise levels, consideration should be given to some form of mechanical air ventilation.

SKM make the following conclusions and recommendations in the Noise Assessment report on the Tallawarra Lands development proposal:

> *"Noise generated by road traffic on the Southern Freeway and rail traffic on the Illawarra Line is expected to result in exceedances of noise guidelines of up to 5 dB(A) at residential properties located along the northern and western boundary of the Central Residential Precincts and the western boundary of the Southern Residential Precinct. In addition an exceedance of up to 5 dB(A) has been predicted for properties located on the southern boundary of the Northern Residential Precinct as a result of operational noise from the Tallawarra Power Station.*
>
> *Properties located in the south western corner of the Southern Precinct may experience rail noise levels up to 9 dB(A) above the relevant guidelines.*
>
> ***Recommendations***
>
> *The impacts of various passive and active influences on noise transmission were considered, and have been shown to allow noise levels at residential locations to comply with relevant guidelines or criteria.*
>
> *After the consideration of likely noise reductions as a result of passive noise mitigation methods, it is expected that noise levels at most properties would comply with the relevant guidelines/criteria. The only properties still requiring noise*

mitigation are expected to be located along boundary areas adjacent to noise sources. These properties were expected to exceed the relevant noise criteria/guidelines by approximately 5 dB(A)."

A supplementary acoustic report has also been prepared by PKA Acoustic Consulting specifically in relation to the northern residential precinct. A copy of the report is attached at **Appendix 25B**. PKA Acoustic Consulting was commissioned to review the SKM report and the documented expected noise levels and to nominate typical building measures for the northern residential precinct to control internal noise to within satisfactory limits. The primary focus of the report was to address noise from the power station.

6.7 Flooding

Bewsher Consulting Pty Ltd has prepared a Flood Risk Assessment which is attached at **Appendix 19**. The Flood Risk Assessment has been prepared to respond to the DGR's which require:

"(a) Provide an assessment of any flood risk on site in consideration of any relevant provisions of the NSW Floodplain Development Manual (2005) including the potential effects of climate change, sea level rise and an increase in rainfall intensity. This assessment shall also include but not be limited to:

(i) A flood study report for existing conditions.

(ii) A flood study risk management assessment report for development related issues including an assessment of the potential implications of climate change on flooding identifying increases in design flood levels over time on the site.

(b) An assessment of the expected changes in hydrology from the proposed development (runoff, tidal movement, flood flows and groundwater regime) and their impact on the environmental lands within and surrounding the development."

The flood risk assessment notes that the flood issues for the site principally relate to the runoff generated by the Duck Creek catchment. The report also addresses the issues for the site development areas within small gullies which lie to the north of the Duck Creek catchment and drain to Lake Illawarra. A review of the earlier 2007 Cardno Forbes Rigby (CFR) Flood Study was undertaken and was supplemented by site inspections and further modelling. **Figure 25** below which is Figure 2 extracted from the flood risk assessment report indicates the worst 100 year flood levels based on blocked and unblocked catchment storm events and the maximum Lake Illawarra 100 year flood level.

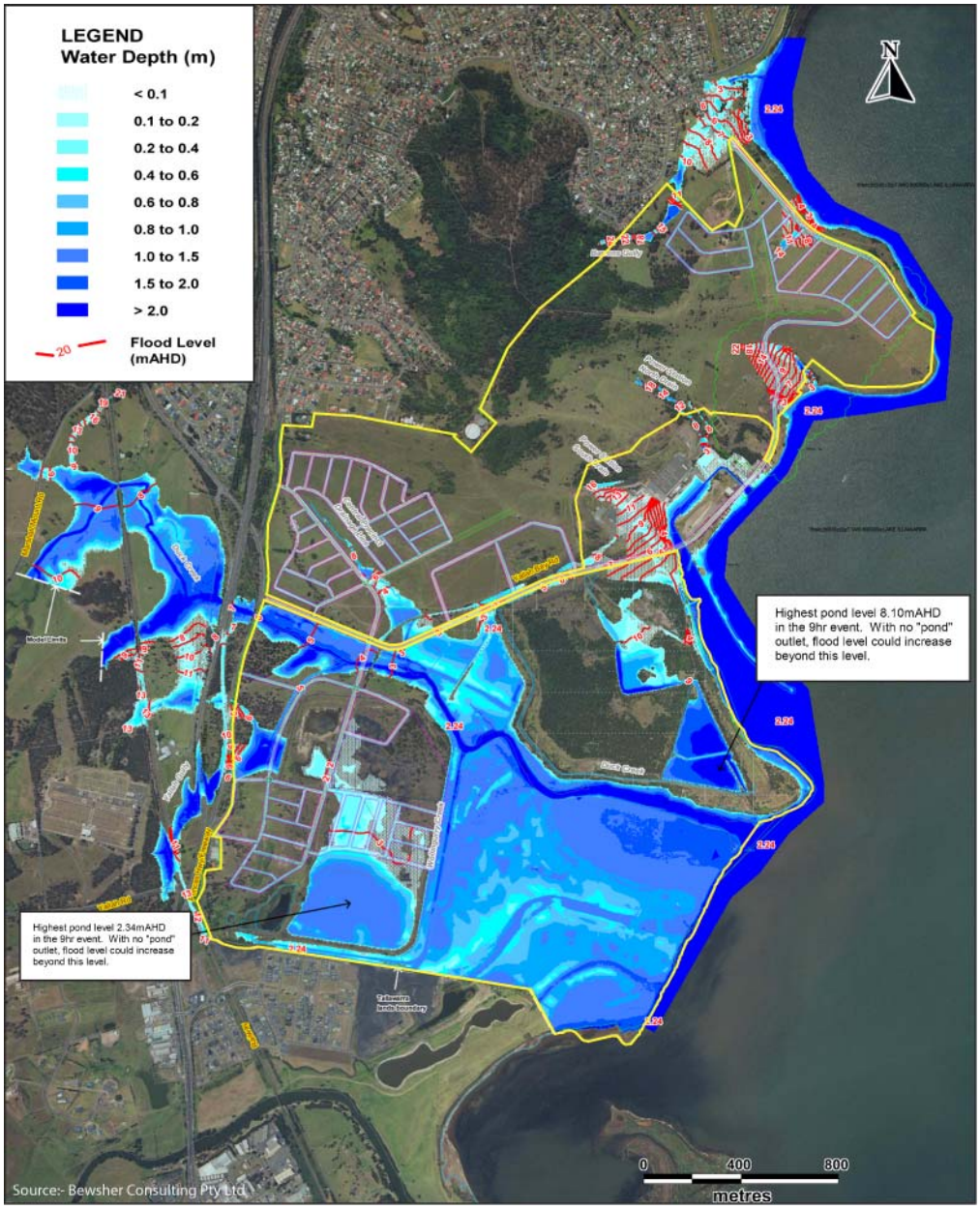


Figure 25:- Tallawarra Lands Project Existing Conditions 100 Year ARI Flood Envelope

Figure 24 includes two bunded areas that lie either side of the Duck Creek watercourse. When these areas are developed, drainage design in accordance with Wollongong City Council's trunk drainage system will need to be provided. The design drainage conditions will more properly define the drainage patterns and peak water levels in those bunded areas. In mapping the 100 year flood scenario in accordance with the *NSW Floodplain Development Manual (2005),* the bunded areas have been excluded as the drainage conditions of those areas are not relevant to the assessment of flood risk. **Figure 26** below indicates the Floodplain Hydraulic Hazard Zones.

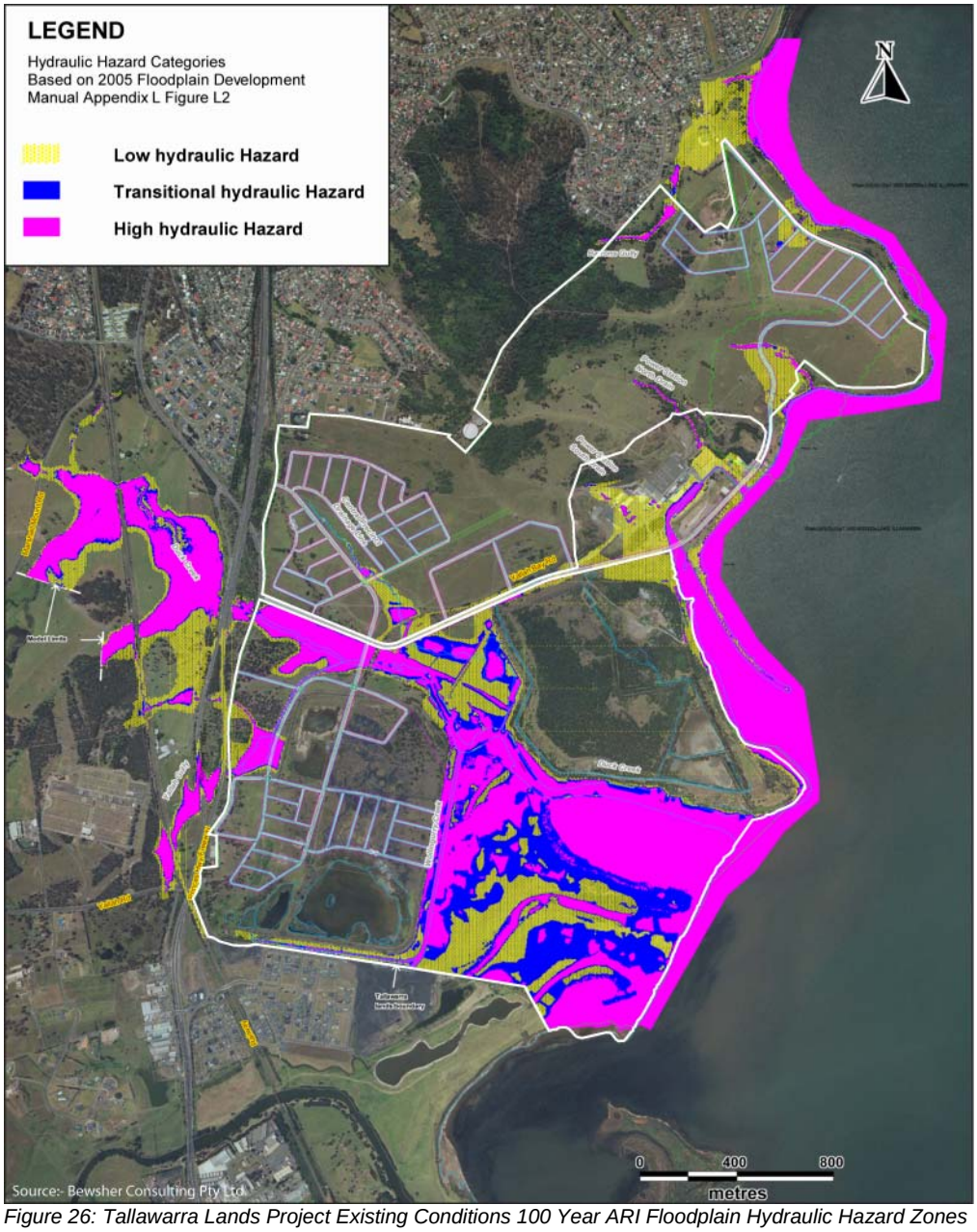


Figure 26: Tallawarra Lands Project Existing Conditions 100 Year ARI Floodplain Hydraulic Hazard Zones

There are only minor areas where the development would encroach into the 100 year floodplain, which are as follows:

> *"Northern Precinct: Residential development within an area of overland flow associated with an unnamed gully in the northern precinct;*
>
> *Central Precinct:*
>
> *(i) Road Reserve encroachment into the flow path associated with the Central Precinct Drainage Line; and*
>
> *(ii) The Employment Area fronting Yallah Bay Road having a flowpath passing through it adjacent to its Yallah Bay Road frontage;*
>
> *Southern Precinct: Minor encroachments into the Yallah Gully and Wollingurry Creek flowpaths on the respective western and eastern sides of the precinct"*

The flood risk assessment concludes that the flow depths in the northern and central precincts are minor and constitute local overland flow regimes not flood prone areas.

These areas can be assessed further at the detailed design stage in accordance with Council's requirements. The areas within the southern precinct have been determined to have little impact upon the flowpaths or any impact on the flood level where located within the maximum lake water level.

The development of the Tallawarra Lands will introduce new residential and worker populations to the currently undeveloped areas which necessitates the need to consider flood time access. This has been a major consideration in the flood risk assessments for the West Dapto Release Area and it has been determined that it would be desirable to have one or more roads that enable continuous access to emergency services personnel during a 100 year flood event.

The flood events are the result of two flood mechanisms, being the local catchment based runoff and Lake Illawarra catchment based inundation. There are timing differences with the two events being within the site in 2 hours, Duck Creek within 6 to 9 hours and 36 hours for the Lake Illawarra catchment. The runoff events will be short 'flash' flooding events whereas the inundation from Lake Illawarra will be a longer event. In considering these events in relation to each of the precincts for development the issues of climate change have been incorporated and flood time access can be accommodated.

The expected changes in hydrology on the Tallawarra Lands site have been considered and are summarised as follows:

- The increase in total major storm runoff draining to Lake Illawarra is considered to have insignificant impacts on the levels of Lake Illawarra when considered in the context of the catchment and other development areas such as West Dapto.
- Worley Parsons detail the Lake Illawarra tidal regime characteristics in their Coastal Processes and Hazards Study attached at **Appendix 16**. They determined that the tidal high water level for the lake was effectively 0.36m AHD and hence lake levels higher than that value correspond to freshwater flooding. Since the proposed development will not include any filling of lands which are within the tidal zone it follows that it will have nil impact on the local tidal regime.
- No impacts are anticipated to the peak flows being discharged to the Duck Creek Catchment by the Southern and Central Precincts. The Northern Precinct will discharge stormwater directly into Lake Illawarra and the increase in volume is considered to be insignificant in terms of the total runoff to the Lake.

Groundwater has been considered in the Coffey Australia reports attached at **Appendices 20 and 21.** The area of most significant concern was the former ash ponds. The concern related to general civil works and not to runoff regime impacts. Development in the Southern Precinct within the vicinity of the former ash ponds will need to be designed carefully so that civil works avoid the migration of ground water into adjoining areas. This requirement has been incorporated into the Draft Statement of Commitments.

6.8 Stormwater and Drainage

BMT WBM has prepared a Drainage Assessment which is found in **Appendix 11**. The Drainage Assessment has been prepared to respond the DGR to "*address drainage issues associated with the development/site, including stormwater, drainage infrastructure and incorporation of Water Sensitive Urban Design measures."*

BMT WBM notes that future urban development within the site has the potential to significantly increase the quantity of pollutants and runoff volumes to Duck Creek and Lake Illawarra. If potential impacts are not mitigated, the increase in loads has the potential to adversely impact on stream stability and water ecology.

The Drainage Assessment considers three key water management principles including water quality management, water quantity management and water conservation. The

provision of water sensitive urban design (WSUD) measures is one component of the water management principles.

Water Quality Management

Chapter E13 of the Wollongong DCP 2009 contains default stormwater quality performance targets. The DCP provides that Council may adjust the targets for large development located in sensitive catchments such as Lake Illawarra. In this instance, BMT WBM has consulted with Council and ascertained that Council would apply the following stormwater quality targets for the Tallawarra Lands:

- Total Nitrogen (TN) 45% - 50% reduction
- Total Phosphorous (TP) 60% - 65% reduction
- Total Suspended Solids (TSS) 85% - 90% reduction
- Gross Pollutants (GP) 90% - 95% reduction.

The first target value is the Council's default target and the second value is the target that would exceed the Council's default target.

The WSUD strategy for Tallawarra Lands includes 'major' and 'minor' WSUD measures.

The 'major' measures are the key measures proposed to manage water quality and quantity. The size and location of these key measures have been incorporated into the Concept Plan. BMT WBM notes that the ability of the WSUD strategy to protect the receiving waters is reliant upon these measures being in place.

The 'minor' measures are additional measures that are recommended for inclusion the development precincts to enhance the performance of the 'major' measures. These measures include biofiltration basins, gross pollutant traps, rainwater tanks and stream rehabilitation (as proposed by Eco Logical).

The targets are compared against modelled post development (without WSUD) and post development (with WSUD) conditions. BMT WBM has used the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) to estimate the performance of various WSUD strategies against the above targets for each catchment (northern, central and southern). These include reducing directly connected impervious areas, permeable paving, rain gardens, biofiltration swales and stormwater harvesting basins.

The MUSIC results have established that the WSUD strategy is capable of exceeding the Wollongong DCP default targets and approaching the more ambitious upper range of Council's targets.

In terms of soil and sedimentation management, Northrop (**Appendix 18**) has prepared a Concept Erosion and Sediment Control Plan in accordance with the NSW Department of Housing 'Managing Urban Stormwater – Soils and Construction' (also known as the Blue Book). This is only provided at conceptual level and more detailed sediment and erosion control plans would more appropriately accompany future applications for physical construction works.

Water Quantity

Duck Creek is the main water course on the site which drains into Lake Illawarra. There are a number of ephemeral creeks that also drain into Duck Creek or directly into Lake Illawarra. BMT WBM notes that the majority of the streams have been modified.

The Drainage Assessment sets targets for:

- Environmental flows (watercourses). The WSUD measures such as rainwater tanks and biofiltration) assist in controlling flows.

- Environmental flows (wetlands). The Concept Plan ensures that surface waters do not discharge directly into the wetlands. BMT WBM notes that a portion of the Southern Precinct drains to an existing constructed wetland that will be retained and currently supports saltmarsh species. They note that the strategy should ensure that changes to hydrological regime, inundation frequency and salinity are minimised to mitigate potential impacts.
- Stream forming flows. BMT WBM proposes a critical stream forming flow target for the Concept Plan that is equivalent to 50% of the 2year ARI pre-development flows. This will mitigate impacts of stream stability and erosion.
- Drainage flows. Wollongong DCP 2009 sets the design standards for drainage systems for residential commercial and industrial subdivisions. These are detailed design matters that would be considered in future applications.
- Overland flows. BMT WBM recommend that WSUD measures should either be located outside overland flow paths or designed to cater for the flows.

BMT WBM considers that the majority of the WSUD measures typically have some impact in reducing stormwater runoff rates and volumes.

Water Conservation

The main objectives for the Tallawarra Lands are aimed at reducing potable water consumption and providing controls for water harvesting to ensure water flows to natural watercourses are maintained (by reducing or controlling water loads within the drainage system).

The sustainability strategy for Tallawarra Lands sets a target that future residential development will achieve a 50% reduction in potable water use which exceeds the target of 40% under BASIX. The opportunities for reducing potable water consumption for industrial and business land uses will vary depending on the nature of the business involved which is not known at this Concept Plan stage and will be a matter for further consideration, however a target of a 40% reduction has been set. This has been incorporated in the ESD Framework Strategy developed by Urbis and included in the Draft Statement of Commitments.

6.9 Geotechnical

Coffey Environments has carried out numerous assessments of the subject site. The investigations are detailed in the reports attached at **Appendices 20, 21, 22 and 23**.

6.9.1 Geotechnical characteristics of the site

Coffey Environments identified four broad geotechnical zones which categorise the geotechnical constraints of the land. These zones are illustrated in **Figure 27** below.

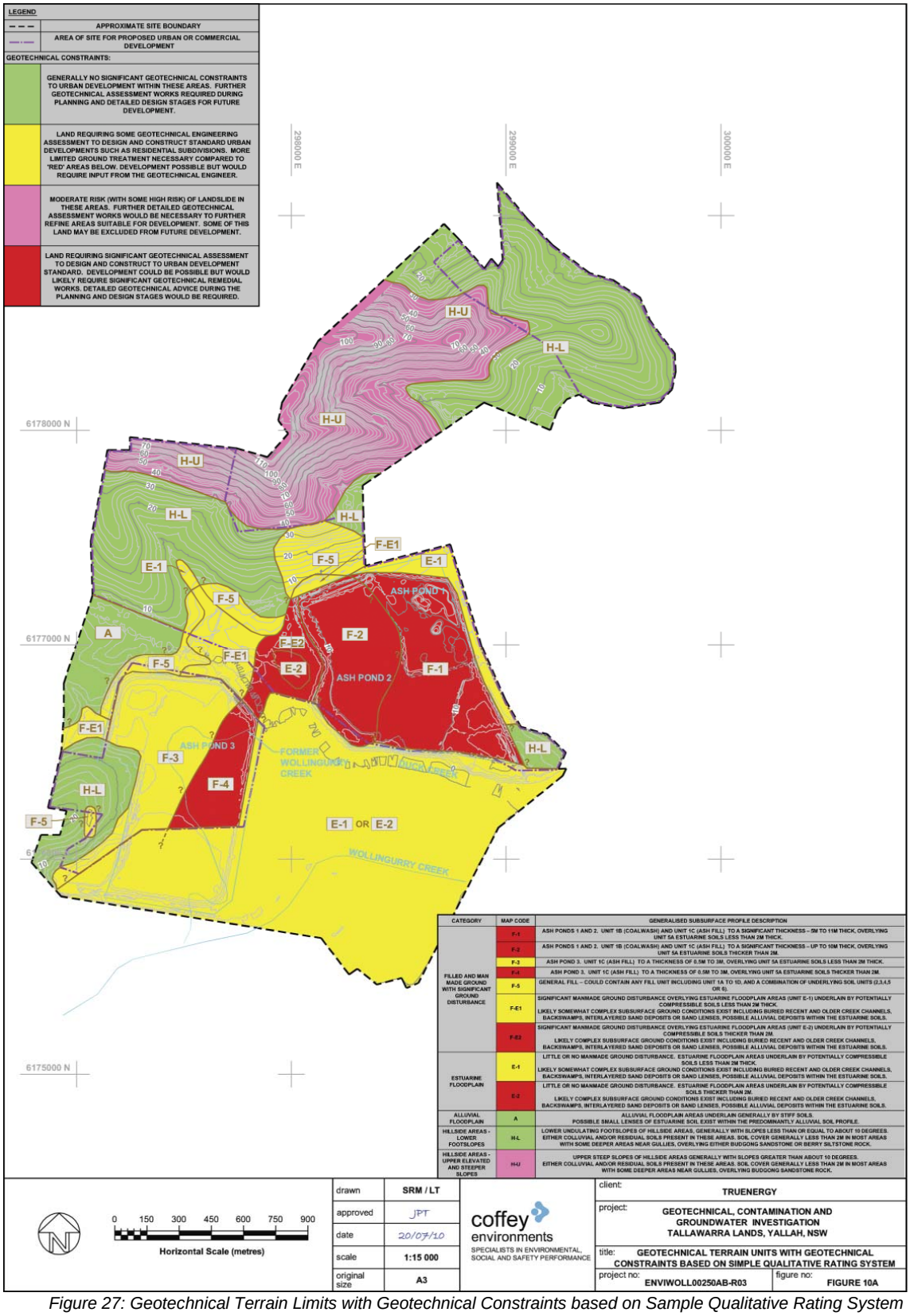


Figure 27: Geotechnical Terrain Limits with Geotechnical Constraints based on Sample Qualitative Rating System

The four zones are:

Green shading	Generally no significant geotechnical constraints to urban development within these areas. The 'A' (Alluvial) and 'H-L' (Hillside – Lower) terrain units are included in this category. These areas of the site are more suited to either residential single or two storey housing or commercial type developments.
Yellow shading	Land requiring some geotechnical engineering assessment to design and construct standard urban developments such as residential subdivisions. More limited ground treatment necessary compared to 'Red' areas below. Development possible but would require input from the geotechnical engineer.
Purple shading	Moderate risk (with some high risk) of landslide in these areas. Further detailed geotechnical assessment works would be necessary to further refine areas suitable for development. Some of this land may be excluded from future development.
Red shading	Land requiring significant geotechnical assessment to design and construct to urban development standard. Development could be possible but would likely require significant geotechnical remedial works. Detailed geotechnical advice during the planning and design stages would be required.

The further investigation identified by Coffey Environments can be undertaken in association with future Project or Development applications.

The above findings have guided the areas of the site deemed suitable for development as well as the types of development deemed appropriate. The areas that Coffey Environments consider are generally feasible for development are:

- Zone 1 – The North Shore Residential Precinct.
- Zone 2 – The Central Residential Precinct and the Neighbourhood Centre, the northern sections of the Employment Lands, and the Tourism area.
- Zone 3 – Some areas of the Employment Lands and the western portions of the Lakeside Residential Precinct.

The areas that Coffey Environments consider are more technically challenging are:

- Area 2 – the remainder of the Employment Lands generally south of Yallah Bay Road and the central recreation zoned land.
- Area 3 – The Primary School and Retirement Living area and the remainder of the Employment Lands near the Primary School and Retirement Living, and the central and eastern parts of the Lakeside Residential Precinct.

Coffey Environments recommended that future investigations be approached in a staged manner to allow optimisation of geotechnical design solutions for the various areas of the site.

6.9.2 Contamination

Coffey Environments carried out a review of previous investigations, site history and observations during site inspections and identified the following nine potential Areas of Environmental Concern (AEC):

- AEC 1 – Ash Ponds;
- AEC 2 – Other Fill Sources of Unknown Origin and Quality;

- AEC 3 – Weathering of Hazardous Building Materials, Pesticide Use, Chemical Storage;
- AEC 4 – Former Heggies Contractor Area;
- AEC 5 – Small Testing Laboratory and Coal Fired Oven;
- AEC 6 – Filling and Disposal of Waste in Farm Dams or Other Areas;
- AEC 7 – Weed Control;
- AEC 8 – Oil Skimmer Area; and
- AEC 9 – Access Road and Grassed Area.

These nine areas are illustrated in **Figure 28**.

Figure 28: Potential Areas of Environmental Concern

Coffey Environments identified soil contamination within AEC2, AEC3, AEC4, AEC8 and AEC9. The contaminants identified exceeded human health investigation levels for residential land with accessible soils and included asbestos and lead (arising from hazardous building materials), arsenic, petroleum hydrocarbons and aldrin (pesticides). However, on the basis of the location of the proposed land uses in the Concept Plan and the location of the contaminant exceedences, Coffey Environments concluded as follows:

> *"the potential for soil contamination to constrain the proposed concept master plan is low. It is considered that further investigation of the identified AECs that fall within proposed development areas (including any requirements for remediation and management) can be addressed at the time of (or just prior to) any earthworks for subdivision works in these areas."*

Accordingly, a statement of commitment is proposed to require the further investigation and remediation (if necessary).

The exceedances have been reported in accordance with the requirements of Section 60 of the Contaminated Land Management Act 1997. DECCW advised by letter dated 3 May 2011 of their determination that there is no reason to believe that the groundwater contamination is significant enough to warrant regulation for the following reasons:

- There has been no identified impact of contaminants in groundwater to the surface waters of Duck Creek; and
- The contaminant concentrations measured in the surface waters of Duck Creek are consistent with background contaminations.

Coffey Environments also carried out slag testing and sampling to assess the potential for widespread contamination of the slag material that was brought to the Tallawarra Lands site for use in the Ash Pond areas. A copy of the report is attached at **Appendix 22A**. Based on the sampling and analysis undertaken, Coffey Environments found that the slag did not record evidence of potential contamination, with results below criteria for both recreational open space and commercial/industrial land use. Accordingly, they concluded that the likelihood of the slag stockpile having widespread contamination that would preclude it from being used in the ash pond areas for use on access roads is low. Notwithstanding, Coffey Environments noted that some steel making slag products can be alkaline in nature and should be used with caution in sensitive areas if there is potential for them to impact on the pH of receiving waterways or water bodies. Accordingly, they suggested TRUenergy contact slag suppliers such as ASMS regarding advice in relation to these issues.

Douglas Partners has also considered potential asbestos contamination on the Tallawarra Lands. Asbestos containing material was found on land within the power station site when it was redeveloped for the current power station. Douglas Partner was therefore engaged to provide information on the presence of asbestos fibre potentially deposited during the demolition of the former power station on the Tallawarra Lands. Douglas Partners analysed 536 surface sample locations and *"no detection were recorded at the limit of reporting of 0.1g/kg (0.01% w/w) in any of the samples. Additionally, the laboratory did not find any trace amounts of asbestos in the form of fibres."*

The following supplementary reports were also prepared by Coffey Environments:

- Contamination Assessment North Shore Precinct (attached at **Appendix 22C**); and
- Register of Hazardous Materials Report Residences in Northern Precinct (attached at **Appendix 22D**).

6.9.3 Acid Sulphate Soils

Coffey Environments' assessment found that acid sulphate soils are present predominantly in the southern part of the site around the current/former lower lying alluvial/estuarine environments, as illustrated in **Figure 29**.

Coffey Environments note that the majority of these areas where the concept plan shows building zones coincide with the former ash ponds and/or lower lying areas located south of Yallah Bay Road. The ash pond areas have either already been filled or will most likely require filling to raise ground levels due to flooding issues and therefore significant disturbance to underlying acid sulphate soils (if any) is unlikely.

Accordingly, Coffey Environments concluded as follows:

> *Disturbance of acid sulfate soil materials is unlikely in these areas as part of future developments and not considered to pose a major constraint for redevelopment of the site under the current concept master plan. Specific developments within areas where acid sulfate soils have been assessed likely to occur would need to be assessed individually based on the proposed construction methods and types of disturbance. Developments in these areas that are likely to disturb underlying natural soils or have an impact which lowers the water table would trigger the need further specific assessment and where necessary, development of acid sulfate soil management plans.*

Consistent with the above recommendation, Eco Logical Australia has recommended that an Acid Sulphate Soil Management Plan should be developed and implemented for all development activities that may disturb acid sulphate soils. This recommendation is made in the Groundwater Dependent Ecosystems Risk Assessment Report which is attached at **Appendix 24**. The Draft Statement of Commitments table provided at Section 9.2 of this report includes a commitment that TRUenergy will implement the recommendations of the report, including preparing an Acid Sulphate Soil Management Plan where required.

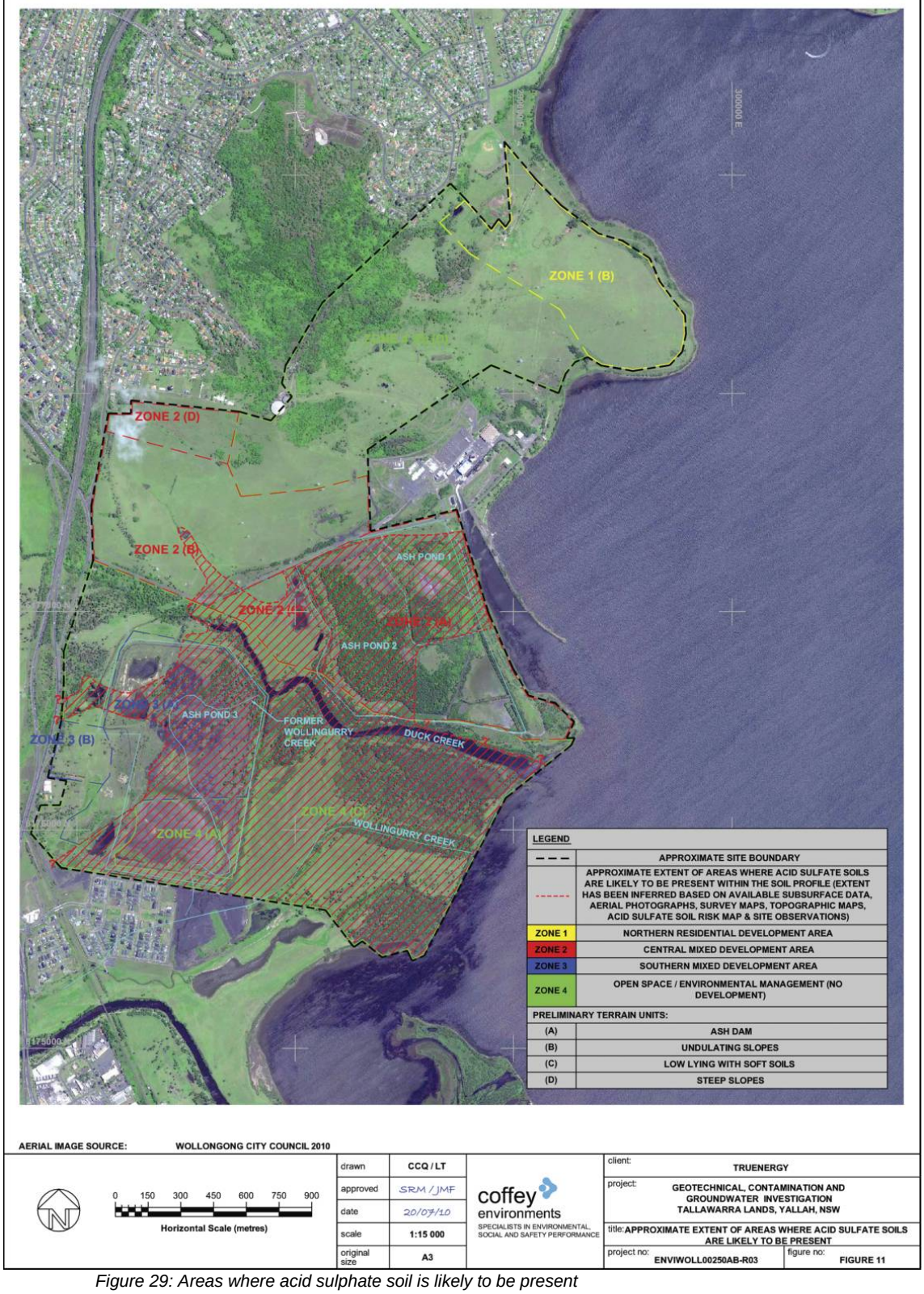


Figure 29: Areas where acid sulphate soil is likely to be present

6.9.4 Groundwater Quality Assessment

Following their first round of investigations, Coffey Environments has undertaken subsequent investigations into groundwater quality at the Tallawarra Lands site. The investigations identified elevated concentrations of heavy metals (including arsenic, copper, nickel and zinc) and ammonia above the adopted investigation levels for protection of aquatic ecosystems.

At the end of their second round of investigations, Coffey Environments concluded that "*background groundwater and surface water have a base load of heavy metals and ammonia, with metal concentrations which exceed the adopted trigger values (ANZECC 2000). Heavy metal and ammonia concentrations in groundwater within and downslope of the ash ponds were generally higher than background concentrations. However, these exceedances [sic] do not appear to be translating to the receiving surface water environment where concentrations are generally within background ranges. Based on the age of the ash ponds, it is considered unlikely that there would be significant changes in surface water quality into the future.*"

At the end of their second round of investigations, Coffey Environments recommended "*that any future disturbance to the ash ponds should take into consideration the groundwater issues and ensure that the disturbances avoid creating preferential pathways for groundwater to discharge directly into the surrounding receiving environment.*"

The objective of the third round of investigations carried out by Coffey Environments was to gain a preliminary understanding of the hydrogeological conditions in the vicinity of the ash ponds. The methodology included;

- Assessing groundwater flow directions and likely preferential pathways in the vicinity of the ash ponds;
- Assessing potential groundwater volumes flowing from the ash ponds; and
- Carrying out a qualitative assessment of potential impacts to groundwater levels as a result of the proposed development.

At the end of the third round of investigations, Coffey Environments reached the following conclusions:

- Groundwater flow south of Duck Creek is to the north east towards Duck Creek, to the east towards Lake Illawarra and to the south east towards Macquarie Rivulet. Groundwater flow north of Duck Creek is radial from the elevated Ash Pond 1 and 2 area, towards Duck Creek and Lake Illawarra.
- Groundwater flow from the ash ponds to the surrounding environment is assessed as being predominantly vertical flow through the base of the ponds rather than horizontal flow through the bund walls.
- Vertical hydraulic conductivity values were assessed as similar for the ash material (0.0007 m/day) and alluvial/estuarine sediment (0.0009 m/day).
- The potential volumes of groundwater flowing from the ash ponds were assessed as a total flow of 328 ML/year. In the long term the maximum seepage rate would be limited by the rate of rainfall recharge to the ash.
- During construction excavation it will be important not to create preferential pathways for the groundwater to discharge directly to receptors such as Duck Creek and Lake Illawarra. Mitigation measures would include limiting excavation in ash pond bund walls, and if excavation is to take place, engineering controls such as sheet piles to provide a barrier to groundwater flow.
- Increased hardstand and buildings across the site will locally reduce rainfall recharge.

- Clearing of approximately 27 hectares of vegetation will decrease evapotranspiration rates in the local area and therefore groundwater levels may rise.
- There may be a net increase in groundwater levels within the Ash Pond 2 area due to clearing of trees and a potential decrease in groundwater level within the Ash Pond 3 area due to impermeable surfaces. The amount of change will depend on rainfall recharge rates, evapotranspiration rates, and for Ash Pond 3, the amount of recharge infiltrating from the lake to the groundwater system.
- Development of an impermeable surface on Ash Pond 2 and Ash Pond 3 will result in less rainfall infiltration through the ash material and will also act to minimise the conduit effect of previous boreholes drilled within the ash ponds. This is considered as a benefit as less groundwater flow from the ash ponds may result. To quantify such changes in groundwater flow numerical groundwater simulation would be required.

Based on the outcomes of the third round of investigations, Coffey Environments made the following recommendations:

- Short term dewatering licence requirements will need to be considered and consultation with the NSW Office of Water is recommended.
- Groundwater inflow and drawdown be monitored during construction activities and dewatering pumping options be revised accordingly as necessary.
- The proposed sewer pump station excavation within Ash Pond 3 may require further specific assessment. Groundwater drawdown is assessed as being a maximum of 4m at the excavation. It is recommended that monitoring bores be established in the vicinity of this excavation and the excavations for the other two pump stations to monitor groundwater levels during construction and a contingency plan be developed to respond to development of adverse impacts. The use of sheet piling for excavations for the pump stations should be considered if drawdown is excessive.
- If a more detailed and quantitative hydrogeological assessment is required assessing the changes in groundwater levels as a result of changes in recharge and evapotranspiration rates, numerical groundwater modelling would be recommended. Such an assessment would also require additional collection of groundwater field data for model calibration such as logging of groundwater levels for at least a period of a few months to assess the response of groundwater levels to rainfall recharge and seasonal variations and field assessment of hydraulic conductivity (targeting the ash ponds). This would require pump testing and installation of additional monitoring wells.

A more detailed and quantitative hydrogeological assessment was subsequently undertaken by Coffey Environments including numerical groundwater modelling in order to provide more information for the GDE study and risk assessment undertaken by Eco Logical Australia, including assessing groundwater levels and quality in areas away from the ash ponds such as the wetland area to the east of Ash Pond 3. The resultant report (attached at **Appendix 21B**) presents additional hydrogeological data collected between December 2010 and April 2011 (groundwater levels, quality and permeability data) as well as laboratory leachate results for coal wash, ash and natural clay material to assess the potential sources of the ammonium and heavy metal concentrations recorded in the groundwater prior to commencement of groundwater flow and transport modelling.

The report contains the following conclusions:

- Based on hydrograph analysis of groundwater level rises for the main rainfall event in March 2011, groundwater recharge is estimated to range between approximately 8% and 10%.
- Groundwater flow from the ash ponds to the surrounding environment is assessed as being predominantly vertical through the base of the ponds rather than horizontal through the bund walls.
- Vertical hydraulic conductivity values were assessed for the ash material and are around 1 m/day.
- In the long term the maximum seepage rate from the ash ponds would be limited by the vertical hydraulic conductivity of the clay. Movement of groundwater from the base of the ash ponds to receptors such as Duck Creek will be limited by the aquifer properties of the alluvial/estuarine sediments.
- Based on leachate results, the coalwash appears to have elevated TKN concentrations, similar to the clay.
- Ash has the potential to release arsenic as a result of weathering and/or saturation. Further detailed study will be conducted as part of numerical flow and transport modelling to assess the impact of such release because the chemical load of arsenic in ash is low.
- It is likely that natural processes within the clay sediment are an important factor influencing ammonium and TKN concentrations on site.

6.10 Coastal Processes

Worley Parsons have prepared a Coastal Processes and Hazards Study for the Tallawarra Lands Part 3A Concept Plan Application which is included in **Appendix 16**.

Lake Illawarra is a coastal barrier estuary located between the Illawarra escarpment and the Pacific Ocean. The lake is connected to the ocean through a narrow entrance channel which is located approximately midway along the lake's extent. Lake Illawarra is in an advanced state of infilling. Despite its large size, the lake is relatively shallow with a maximum depth of 3.5 m relative to Port Kembla Harbour Datum (PKHD). The average lake depth is now only 1.9 m PKHD and is infilling at a rate of 2-3 mm / year. A large proportion of the lake has a depth of less than 1 m PKHD. NSW Maritime's Boating Map for Lake Illawarra notes water depths of less than 2 m PKHD around the foreshore of the site. The average depth to bed rock in the lake is 10-20 m.

The Report examines the key coastal processes identified as operating in the study area as:

Tides and notes that the behaviour of tides in Lake Illawarra is different to that in the ocean. Lake Illawarra is connected to the Pacific Ocean by a long shallow entrance channel which has limited tidal flow capacity and acts as a friction device that slows or limits tidal exchange. As a result there is very little tidal variation in the lake. Tidal exchange determines water levels in the Lake and the constricted entrance channel causes the mean lake level to be higher than the mean sea level.

Entrance stability has been influenced by construction of the entrance training walls and whilst the long term behaviour of the lake entrance and channel morphology is unclear, given the limited amount of time since the construction works at the entrance. However, it is thought that the narrow width of the channel limits instability and it is thought that once adjusted, the lake entrance will continue shoaling and further closures of the entrance will occur unless dredging continues.

Wind generated wave climate the constricted nature of the entrance and channel means that ocean swell waves do not move into the main body of the lake.

Elevated still water levels which may cause inundation of the foreshore within Lake Illawarra are a result of a combination of the following potential factors, tides, storm surge, wind driven waves, flooding and climate change effects.

Flooding it is concluded that inundation from catchment flooding has the potential for greater impact on the Tallawarra Lands site than oceanic inundation. Flooding has been assessed within Report prepared by Bewsher Consulting which is included in **Appendix 19**.

Potential sediment transport and foreshore stability within the accuracy of the historical photo analysis it concluded that it is unlikely that the foreshore investigated is experiencing long term recession due to net sediment loss.

Impacts of climate change may affect water levels within Lake Illawarra through sea level rise, and also through changes in the intensity and frequency of extreme wind and rainfall events.

Worley Parsons make the following conclusions in respect to risks from coastal hazards in the Tallawarra Lands development proposal:

> *"The foreshore of the Tallawarra Lands site is not at significant risk from coastal hazards. The low wave and tidal energy in the lake, the shallow depths surrounding the site, the rocky nature of much of the foreshore and the steep slopes at the northern part of the site limit its vulnerability to foreshore erosion and coastal inundation."*

The immediate, 2050 and 2100 year coastal hazard zones have been considered for coastal inundation and the 2050 and 2100 year coastal hazard zones have been presented for coastal recession. The coastal inundation anticipated does not include catchment flooding, which is addressed in the report prepared by Bewsher Consulting included in **Appendix 19** of this report.

In terms of the immediate hazards, storm erosion and shoreline recession are not considered to pose a risk. Oceanic inundation and shoreline recession may become more of a concern as sea level rises although catchment flooding is considered to pose a greater risk to the site.

Development proposed within the Concept Plan Masterplan is located well behind the hazard lines. It is recommended that vegetation be maintained or restored along the northern foreshore in order to limit erosion (and subsequent recession) and maintain bank stability. Vegetation maintenance and restoration has the additional impact of improving visual amenity, and environmental values of the site and adjacent waterway.

The portion of the Tallawarra site to the south of Duck Creek is vulnerable to impacts due to sea level rise (inundation and foreshore recession) and is set aside as an environmental reserve. The residential and commercial development proposed is unlikely to be at risk in the planned locations. It is identified that catchment flooding is likely to pose a significantly higher risk to development at the site and provisions to allow for catchment flooding inundation will be more than adequate to allow for mitigation of coastal hazards.

6.11 Climate Change

The Director General's requirements for the Tallawarra Lands proposal provide that the environmental assessment *require "a risk management assessment of climate change impact to be undertaken using the latest available information from the International Panel on Climate change (IPCC), Dept of Environment, Climate change and Water (DECCW) and the CSIRO. This should include sensitivity analysis for low level mid range and high level ocean impacts as set out in relevant DECC Guideline (Floodplain Risk Management Guideline: Practical Consideration of Climate Change, 2007)."*

A Climate Change Assessment report has been prepared by BMT WBM for the Tallawarra Lands Part 3A Concept Plan Application which is included in **Appendix 29**. The assessment identifies the key climate change parameters and timing for the Illawarra area based on the latest science projections and uses this as the basis for assessment. The key dates used are:

- 2010: present day – immediate;
- 2030 – 2050, medium term; and
- 2070 – 2100, long term.

Table 3.1 of the BWT WBM report included in **Appendix 29** provides the scenarios and projections adopted for the risk assessment. The projections describe a climate which is generally warmer, drier, subject to more frequent and intense storms and a rising sea level.

The Climate Change Assessment report considered the sensitivity of the site to:

- Increasing temperatures;
- Changes to the rainfall regime;
- Sea level rise; and
- Increased storminess.

The risk assessment considered environmental risks, risks to community and risks to infrastructure and BMT WBM's report includes risk response recommendations which have either been adopted during the preparation of the proposed Concept Plan or will need to be considered at the detailed design stage. The Statement of Commitments have been updated accordingly.

6.12 Bushfire Assessment

The Director General's requirements for the Tallawarra Lands proposal require that the environmental assessment must demonstrate compliance with the relevant provisions of Planning for Bushfire Protection (PBP) 2006.

A Bushfire Planning Assessment report has been prepared by Eco Logical Australia (ELA) for the Tallawarra Lands Part 3A Concept Plan Application which is included in **Appendix 26** of this report.

Wollongong City Council identifies the Tallawarra Land site as containing "bushfire prone land". Development on bushfire prone land requires an assessment against the NSW Rural Fire Service (RFS) document *"Planning for Bushfire Protection 2006"* (NSW RFS 2006), referred to as PBP within this report.

The assessment of bushfire protection for the Tallawarra Lands proposal in the ELA report was based on specific objectives for each development type addressed within PBP (ie. Residential subdivision and development, special fire protection purposes and employment), taking into account the Standards for Bushfire Protection Measures and compliance with the Acceptable Solutions of PBP.

The location of Asset Protection Zones (APZ) is indicatively shown on Figure 5 in the ELA report which is reproduced as **Figure 30** below in this report. The location of the APZs as shown on **Figure 30** below are at areas of likely bushland/development or bushland/open space interface. The actual placement of the APZ will depend on the nature of the specific development type at that particular interface segment and its actual siting. Refinement of the APZ location should be undertaken at the detailed design stage in future subdivision applications.

Figure 30: APZ Locations and Dimensions

Table 1 in the ELA report lists the development interface locations within the Tallawarra Lands site potentially affected by APZs and is reproduced as **Table 17** below:

Interface segment No. *	Slope class of most influence [1]	Predominant vegetation community [2]	Residential APZ [3]	SFPP AZP [4]	Comment
1	Downslope >0-5°	Low hazard vegetation	10m (OPA not allowed)	40m (OPA not allowed	The residential APZ may be contained within a combination of the managed portions of the Tallawarra Foreshore Reserve and the perimeter road surrounding proposed residential development in this area.
2	Downslope >0-5° and cross slope (flat land)	Forest	20m – 25m (OPA 10m)	60m – 70m (OPA 20m)	The residential APZ may be located within the perimeter road and front yard setbacks surrounding proposed residential development in the area.
3	All upslopes and flat land	Managed	N/A	N/A	N/A
4	Downslope >0-5°	Grassy woodland	15m (OPA not allowed)	50m (OPA not allowed)	The managed plantings with the Tallawarra Power Station buffer will most closely approximate 'grassy woodland'. APZ/minimum defendable space for employment development may be located within the adjacent perimeter road and within the development allotments.
5	Downslope >0-5°	Low hazard vegetation	10m (OPA 10m)	40m (OPA 20m)	APZ/minimum defendable space for the adjacent 'employment' development may predominantly be located within perimeter roads and within the development allotments.
6	Downslope >0-5°	N/A	N/A	N/A	All vegetation adjacent to the 'tourism' development will be 'managed' and a formal APZ will not be required (outside that provided by this arrangement). Other bushfire mitigation and emergency measures may need to be considered.

Interface segment No. *	Slope class of most influence [1]	Predominant vegetation community [2]	Residential APZ [3]	SFPP AZP [4]	Comment
7	Downslope >0-5° Low hazard vegetation	Forest	25m (OPA 10m) 10m (OPA not allowed)	70m (OPA 20m) 40m (OPA not allowed)	The APZs on the northern side of Duck Creek may be located within perimeter roads, areas of open space and setbacks on large sized employment allotments. On the southern side of Duck Creek, the majority of the interface will be managed using techniques to allow the classification of this area as non hazard vegetation. APZs will thus extend from the unmanaged vegetation closer to Duck Creek itself.
8	All upslopes and flat land	Forest	20m (OPA 10m)	60m (OPA 20m)	APZ/minimum defendable space for the adjacent 'employment' development may predominantly be located within perimeter roads and within the development allotments.
9	Downslope >0-5°	Low hazard vegetation	10m (OPA not allowed	40m (OPA not allowed)	APZ for residential development may be located within the adjacent perimeter roads. The APZ /minimum defendable space for the 'neighbourhood centre' will need to be located within the 'neighbourhood centre' allotment or within the open space corridor.
10	Not applicable	Manager land (reserve)	N/A	N/A	N/A
11	Downslope >0-5°	Low hazard vegetation	10m (OPA not allowed)	40m (OPA not allowed)	APZ for residential development and the APZ/minimum defendable space for the 'employment' development may be located within adjacent perimeter roads and within large lot allotment setbacks.

Interface segment No. *	Slope class of most influence [1]	Predominant vegetation community [2]	Residential APZ [3]	SFPP AZP [4]	Comment
12	Downslope >0-5°	Low hazard vegetation	10m (OPA not allowed	40m (OPA not allowed)	APZ for residential development may be located within perimeter roads and open space areas. The majority of this area will be managed vegetation and will not require an APZ.
		Managed	N/A	N/A	
13	All upslopes and flat land	Grassy woodland	10m (OPA not allowed)	40m (OPA not allowed)	APZs/minimum defendable spaces for surrounding development will be located within perimeter roads.
14a	Downslope >0-5°	Freshwater wetlands	10m (OPA not allowed)	25m (OPA not allowed)	APZ for adjoining residential development will be located within the adjacent perimeter road. The vegetation with 14b and c is forested wetland and grassland respectively however this vegetation is located well over 140m from the nearest proposed development interface.

Table 17 : APZ calculation, location and dimensions

* To determine interface segment number, refer to vegetation zone shown on Figure 3.

[1] Slope class most significantly influencing fire behaviour where the vegetation (bushfire hazard) is found over 100m from the development boundary.

[2] Predominant vegetation is the most predominant and problematic vegetation over 140m from the development boundary.

[3] PBP required setback for residential subdivision.

[4] PBP required setback for Special Fire Protection Purpose (SFPP) development.

The management of an APZ is to be considered in three ways. Firstly, the separation of a building from the bushfire source; secondly, the provision of access or defendable space between the building (asset) and bushfire source; and thirdly, the continual maintenance of fuels within the APZ.

APZs can contain managed vegetation and may be utilised as areas of public open space, recreational areas such as sports grounds, access ways such as roads, and ancillary parts of development such as yards and car parks.

The APZ is to be measured from the edge of the unmanaged bushland to the most external point of a building. Landscaping within the APZ may differ between the Outer Protection Area (OPA) and Inner Protection Area (IPA). The dimension of the OPA depends on the type of development and effective slope. These OPA dimensions are indicated for specific development interface locations in Table 1 of the ELA report (reproduced as **Table 16** in this report).

The ELA report outlines the following APZ fuel management specifications which can be used as a guide and are deemed as the Acceptable Solutions for APZ management:

"
- *No part of a building is to be within the APZ;*
- *Mature canopy trees may be within the OPA providing crowns and canopies (which may include small clumps of crowns or a single grove of trees) do not overlap and have an overall canopy cover of less than 30%;*
- *Mature canopy trees may be within the IPA providing crowns and canopies (eg. A small clump of crowns or a single grove of trees) are separated and have an overall canopy cover of less than 15%;*
- *Understorey saplings, shrubs and ground covers within both the OPA and IPA are to be managed in the following manner:*
  - *The saplings provide a sparse scatter of individuals useful for the long term replacement of canopy species typically retained within the APZ;*
  - *The saplings and shrubs are limited and well spread out so as not to form a contiguous pathway from the bushfire source to a building; and*
  - *A minimal ground fuel is to be maintained to include either mown or slashed grass, mulch, managed ground covers, organic matter, bare or sealed ground, providing the final ground cover does not exceed 4 tonnes per hectare of fine fuel (ie. Material less than 6 millimetres in diameter). The OPA may have up to 8 tonnes per hectare of fine fuel."*

The management responsibility of the APZ is to be designated to a responsible party whom can ensure the maintenance of the APZ in perpetuity. For the Tallawarra Lands development proposal, this will likely consist of:

- Individual allotment owners or managers (if leased) for those portions of the APZ within private residential allotments;
- Wollongong City Council and/or Lake Illawarra Authority where an APZ occurs within a road reserve, parkland or open space transferred to Council; and
- TRUenergy Pty Ltd (or other land owner/manager) where an APZ occurs within parkland, open space or a temporary APZ until such time that construction and landscaping are completed and the ownership/management of the land is transferred over to Wollongong City Council.

The bushland/development interface areas may require perimeter access roads depending on the level of the bushfire threat.

The building construction standard for future buildings is based on the separation distance between the building and the bushfire source, and the vegetation type and slopes, as determined for the APZ.

The assessment of building construction standard in accordance with AS3959-2009 is to be undertaken at the development application stage for a particular building as aspects of the building, its location with respect to the bushfire hazard, the nature of the bushfire hazard, and surrounding development can alter the required level of construction.

The ELA report recommends that public roads within the Tallawarra Lands proposal achieve the Acceptable Solutions within the PBP. The ELA report also provides recommended standards for perimeter fire trails and perimeter roads, as well as specifications for internal roads servicing SFPP developments. Emergency evacuation plans for SFPP developments are also required to be prepared as these developments proceed.

The ELA report on the Tallawarra Lands proposal provides the following summary and conclusion:

> *"In the author's professional opinion, the recommendations within this report will provide an appropriate standard of bushfire protection for the Tallawarra Lands Concept Plan application consistent with "Planning for Bushfire Protection 2006".*
>
> *Key bushfire protection features of (the) Concept Plan include:*
>
> 1. *Development areas consolidated and simplified such as to minimise the perimeter of the area of the land interfacing the hazard;*
> 2. *Perimeter access provided to all development types;*
> 3. *Alternative access and egress provided to development precincts should one be cut by fire;*
> 4. *Required APZs afforded to all development types;*
> 5. *APZs to be provided in most parts by perimeter roads;*
> 6. *APZ siting in areas with larger APZs has been informed by an Ecological Assessment, Vegetation Management Plan, Riparian Assessment and Landscape Strategy to ensure APZs avoid potential conflict with other objectives and that long term management can be appropriately provided for;*
> 7. *Sensitive siting of SFPP developments that affords these developments siting away from high risk areas, appropriate setbacks, emergency access and egress provisions (including alternatives should primary routes be cut) and recommendation for the development of emergency evacuation plans as the development proceeds;*
> 8. *Service supply including water according PBP requirements; and*
> 9. *A site that presents a low risk to development and is well serviced by existing emergency services infrastructure."*

6.13 Scenic Quality

A Visual, Landscape and Scenic Resource Management Considerations report has been prepared by Richard Lamb and Associates (RLA). A copy of this report is attached at **Appendix 15**. This report addresses the DGRs relevant to potential visual and landscape character impacts. In particular, it addresses Key Issues 7(a and b) part, 8(b), 16(a) part and Plans and Documents (view analysis) of the DGRs.

Visual opportunities and constraints

The visual opportunities and constraints of the site were identified in terms of the existing scenic resources of the site, the scenic quality of different parts of the site and the visual exposure of the site. The major scenic resources of the site have been identified as follows:

- The Mount Brown hills and its associated prominent slopes;
- Lower slopes and parts of low lying lands;
- Creeklines, drainage lines and its associated vegetation;
- Lake Illawarra foreshore edge ; and
- Pockets of riparian and swamp forest vegetation and some significant strands of native vegetation including the ecologically endangered communities of vegetation.

Scenic quality zones have been mapped by RLA and illustrated in **Figure 31**. These zones are identified on the basis of their visual exposure from external viewing locations, physical and natural features and their spatial arrangement with the immediate surrounding context.

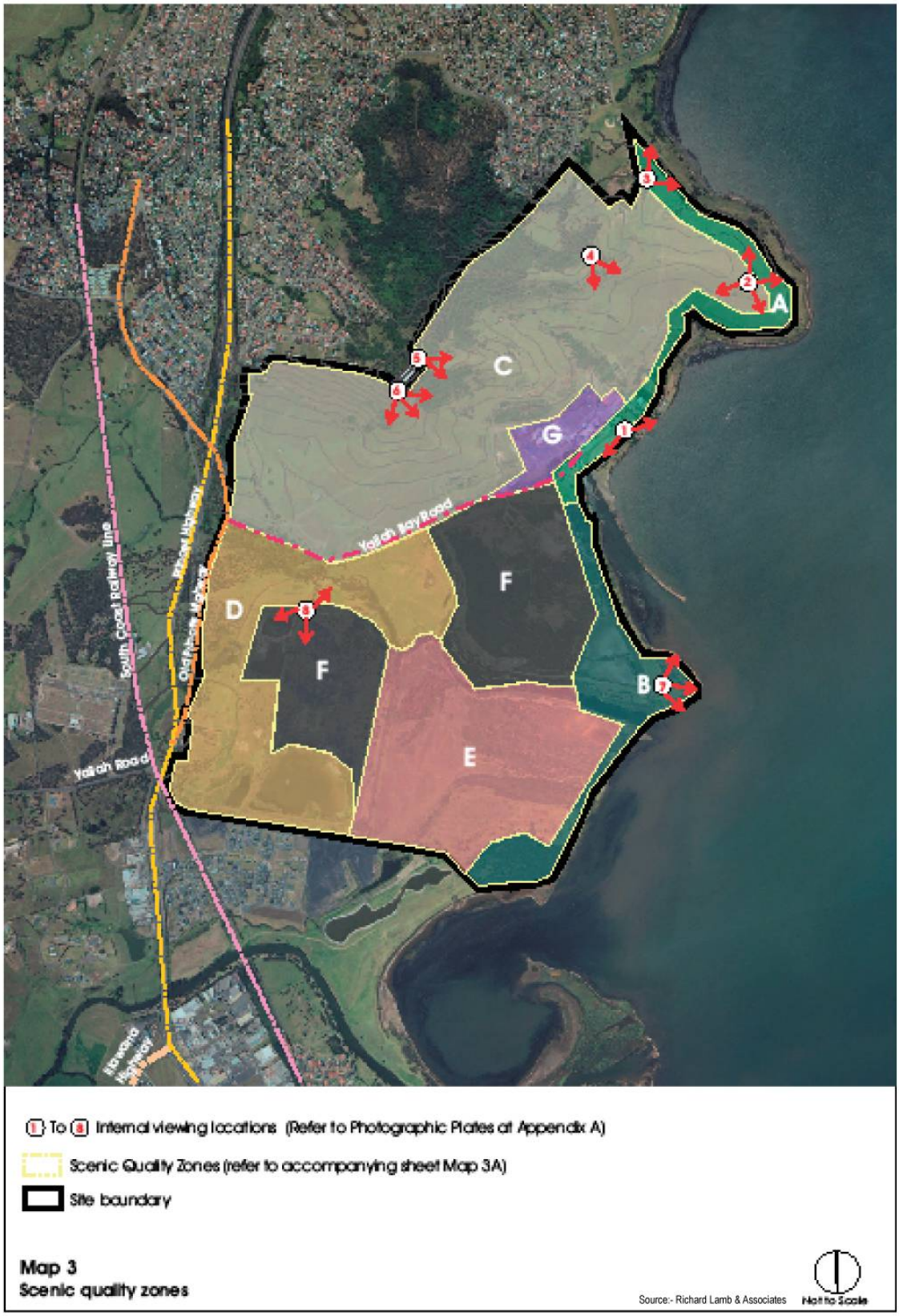


Figure 31: Scenic quality zones mapped by Richard Lamb & Associates

RLA have determined that the effective visual catchment for the site is relatively large due to the elevated parts of the site associated with Mount Brown prominent slopes and the location of part of the site adjacent to the Lake Illawarra foreshore. Only parts of the site are visible from individual external view directions. The viewing opportunities have been considered in terms of close view, middle distance and distant views.

- Close viewing locations include Yallah Bay Road, a section of the Princes Highway, the public recreation area along the Lake foreshore in the vicinity of the inlet channel to the power station and the northern parts of Haywards Bay.
- Middle distance viewing locations are found within the suburbs immediately Koonawarra and Kanahooka from locations close to the Lake foreshore and from a section of Carlyle Close, Illawarra Highway, Yallah Road and Marshall Mount Road.
- Distant views are available from locations close to the lake foreshores in Albion Park, Oak Flats, Shellharbour, Mt Warrigal, Windang, Primbee, Lake Heights and Berkeley. Visibility of the site is mainly from along the lake foreshore, reserves and beaches. Parts of the site are also visible from some high points in Shellharbour, Mt Warrigal, Lake Heights and Berkeley which includes some residential streets and residences.

The DGRs (Key Issue 8(b)) requests a view analysis in the context of the existing landscape and from across Lake Illawarra. The main viewing opportunities in a broader regional context are the more distant views noted above. These are mapped by RLA as illustrated in **Figure 32** below.

Figure 32: Distant views as identified by RLA

Visual Assessment and Findings

A series of photomontages are included in the RLA assessment which illustrate indicative future development in the surrounding context. RLA have found that *the proposed concept plan is responsive to the topography of the site and to the important view lines from the external domain.* The main observations drawn from their assessment of visual impacts are:

- The heavily screened views of the south western part of the site and across it to the interior will continue to be available from close and medium range viewing locations to the west, southwest and south.
- Views of the southeast part of the site will be retained as is from the external domain.
- Views of the foreshore edge of the site will also be retained.
- There would be a marked change in the character of the view of parts of the site from Yallah Bay Road (within the site), however, views of high scenic values such as prominent slopes, creeklines and groups of vegetation will be maintained.
- Views of the important ridgelines, high points and prominent slopes will be maintained by strategic location of residential development below the visual horizon at the finer grain.

Overall, it is considered that there would not be any significant interruption of existing views from the external domain. The view composition of part of the site may alter, but the overall visual experience will not be affected. In most views the residential developments on the site will be seen in the context of the residential developments of the lakeside suburbs and/or the suburbs of Dapto and Kanahooka.

RLA has assessed the Concept Plan against the viewing opportunities and constraints of the site. The assessment has also taken into account the potential built form in terms of height, scale, form, number of storeys and some general urban design principles including landscaping. In this regard the material provided in the Urban Design Masterplan prepared by Warren Lee Urban Design and the Landscape Plan prepared by Corkery Consulting has been taken into account by RLA. Generally, RLA found that the proposed concept plan is compatible with the scenic resource management principles. The main findings of RLA's analysis are:

- In most views the residential developments on the site will be seen in the context of the residential developments of the lakeside suburbs such as Koonawarra, Haywards Bay, Oak Flats, Shellharbour, Mt Warrigal and others and/or the suburbs of Dapto and Kanahooka.
- The employment uses (industry/business) are proposed on parts of the site with low external visual exposure and will not have any significant visibility from the external domain with the exception of some views from the south and southwest of the site.
- Other employment uses (neighbourhood centre and enterprise/business) are also proposed on parts of the site with limited external visual exposure.
- The proposed concept plan appropriately retains, adapts and enhances the scenic resources of the site which include Mount Brown slopes, ridgelines, creek lines, and Lake foreshore edge and waterbodies.
- It provides for new visual and physical linkages and internal road networks that provide increased and improved access to internal scenic resources as well as externalises the site with the surrounding context.

- Views of the important ridgelines, high points and prominent slopes will be maintained by strategic location of residential development below the visual horizon at the finer grain.
- There would not be any significant interruption of existing views from the external domain. The view composition of part of the view comprising of the site may alter, but the overall visual experience will not be affected.

Urban design strategies

A number of urban design strategies have been recommended by RLA including strategies for the following proposed elements of the Concept Plan:

- large lot and central residential precinct in Visual Exposure Zone A and north shore residential precinct in Visual Exposure Zone B
- lakeside residential precinct in Visual Exposure Zone D
- employment in Visual Exposure Zones A and D

The recommended urban design strategies are detailed in the RLA report and are more detailed design considerations that will be relevant for Project applications or development applications.

6.14 Traffic and Accessibility (Construction and Operational)

The DGRs require the preparation of a Traffic and Accessibility Study prepared in accordance with the RTA's *Guide to Traffic Generating Developments.* Gabites Porter has prepared a Traffic Impact Assessment and a copy of their report is attached at **Appendix 17**.

The traffic and parking requirements of the DGRs are summarised as follows:

- Traffic Generation in accordance with the RTA's Guide to Traffic Generating Developments
- Road/intersection upgrades
- Access
- Loading dock(s)
- Car parking arrangements
- Impacts upon public transport (including school bus routes)
- Measures to promote public transport usage
- Measure to promote pedestrian and cycle linkages
- Staging and funding of road/intersection upgrades
- Adequacy of parking.

Gabites Porter has considered the above requirements in the context of the application being a Concept Plan and has therefore addressed the requirements at a reasonably high level. They also note that it is not appropriate at the Concept Plan stage to identify where loading docks are to be located, or the layout of a particular car park. However, it is appropriate to give general guidelines.

Traffic Generation

Gabites Porter has considered the RTA's *Guide to Traffic Generating Developments*, as well as the transportation model developed for Wollongong City and Shellharbour City Councils which Gabites Porter regard as a much more useful tool for this analysis. The model used was recently updated using the latest (2006) census data. Traffic expected to

be generated by the development using the Wollongong/Shellharbour transportation model, and the RTA's *Guide to Traffic Generating Developments* yield similar results. Gabites Porter has calculated that about 2200 vehicles per hour are generated in the morning peak and 1850 vehicles per hour in the evening peak.

Road and Intersection Upgrades

The demands that the development will place on the road system was investigated by Gabites Porter at two levels; the wider Wollongong network and the roads within the Tallawarra lands.

Wollongong Network

The impact the development will have on the wider Wollongong network, and in particular the Freeway, the Princes Highway, the roads through Koonawarra, and the nature of the principal access points servicing the development has been considered using the modelling and various assumptions made by Gabites Porter in their Traffic Impact Assessment. They have found that in the wider network, there are works that are required irrespective of whether or not Tallawarra Lands proceeds. Gabites Porter note that once the required works are in place, no additional link capacity is required and at worst, an additional 100 vehicles per lane per hour will be added to the F6.

The Concept Plan has removed the link through to Haywards Bay which was included in earlier models. Due to the removal of the link, Gabites Porter has found that the following changes to the base network are required:

1. A two lane circulating roundabout at the intersection of the northbound off ramp and the Princes Highway to provide additional capacity at the intersection of the northbound off ramp and the Princes Highway as a result of the development. Gabites Porter note that the base network has the Princes Highway as two lanes southbound and one lane northbound;
2. Conversion of the intersection of Cormack Ave and the Princes Highway into a two lane circulating roundabout, which has been identified in part for reasons of consistency;
3. Two lane circulating roundabouts at the two access points to the site from Princes Highway; and
4. A roundabout at the access point to the site from Cormack Avenue.

Gabites Porter notes that all of these changes will need to be agreed by the RTA as the appropriate authority controlling these roads.

Internal Network

The traffic generation modelling in the Traffic Impact Assessment has found that the predicted traffic flows on the proposed internal road network do not require any particular intersection treatment and no internal roads need to have four lanes.

Gabites Porter recommends an appropriate hierarchy of roads and intersections be developed to cater for the demands that will be placed on them.

Access

Four access points are proposed, as illustrated on the Concept Plan including:

- Two off the Princes Highway;
- One off Cormack Avenue; and
- One to the north east from Gilba Road linking into Koonawarra.

Gabites Porter has determined that the southernmost intersection off the Princes Highway will be the most important access point as it links directly into the main employment areas of the development. The improvements to the base network discussed above, including the two roundabouts to the Princes Highway are required due to the removal of the access to Haywards Bay.

Staging and Funding of Road and Intersection Upgrades

The road and intersection upgrades identified above have also been considered by Gabites Porter in their Traffic Impact Assessment. They have identified three groups of traffic improvements.

The first group of improvements relates to the wider context (notable the F6 freeway) and in this regard they note that "*the staging of road and intersection upgrades will, to a large extent, depend on the rate of development of West Dapto, and the infrastructure requirements of that development in relation to the rate of development of Tallawarra."* In particular, they note that given current expectations of the rate of growth, road improvements that are required independent of any development at Tallawarra will be required by 2021. These improvements will require both Local Authority and State funding.

The second group of road infrastructure requirements are those internal to the site, and will be the responsibility of the proponent. They will be installed at a rate determined by the rate of development in that the roads will be required before development can proceed in each precinct.

The third group of improvements "*are those required on the Princes Highway from Huntley Road to Haywards Bay. These include two-laning of the Princes Highway southbound and roundabouts at the northbound freeway off ramp, Cormack Avenue, Yallah Bay Road and the new access south of Yallah Bay Road."* Details regarding the apportionment and timing of these works are provided in the Northrop report.

Loading Docks and Car Parking

Chapter E3 of the Wollongong Development Control Plan specifies the number, location and size of the loading docks and car parking requirements for different land use types. Car parking and loading dock provision and design is a more detailed matter which is relevant to future Project applications or development applications for specific sites or buildings.

Public Transport

The main public transport services in the immediate area are trains running along the South Coast railway line with the nearest stations being Albion Park and Dapto and local bus services. **Figure 33** illustrates local bus routes and the location of the South Coast Railway line. The bus services currently operate on the fringe of the Concept Plan area.

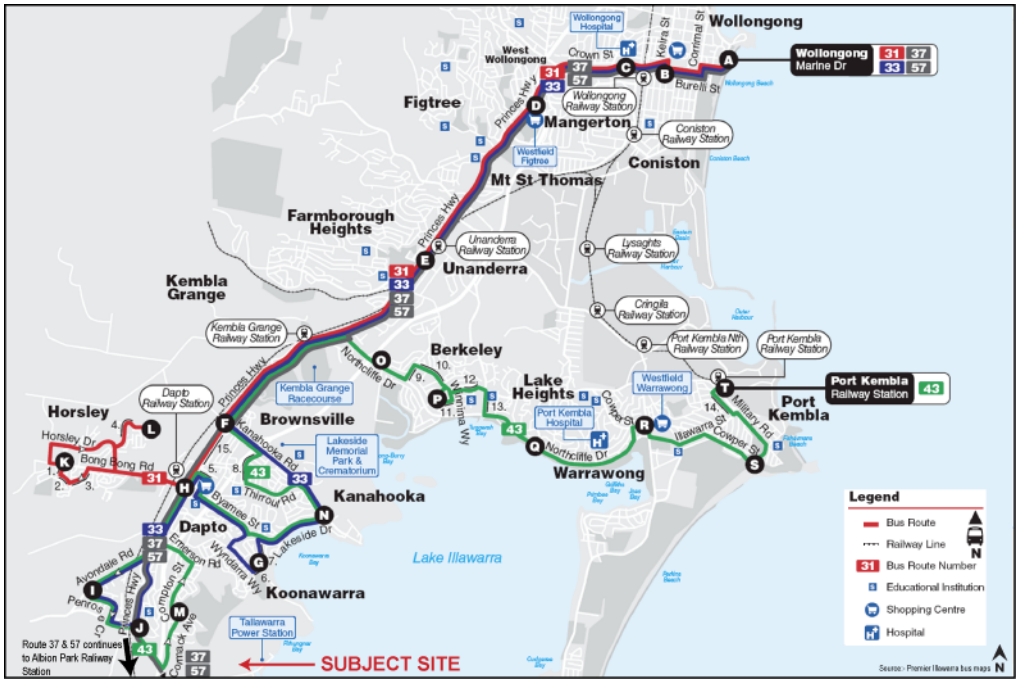


Figure 33: Existing bus services and railway station locations

Gabites Porter's Traffic Impact Assessment has considered public transport as part of their assessment. In particular they note that it will be important for the area to be serviced by public transport linking the residential areas with the neighbourhood centre, and later to the business employment areas. They also note that the site needs to be linked by public transport to the nearby rail stations of Albion Park and Dapto. Gabites Porter observes that ideally, these services should lead development rather than follow it. However, the commencement of bus services is dependent upon when local bus operates chose to extend existing services or introduce new services into the local area. Figure 16 of the Traffic Assessment Report illustrates indicative bus routes and how these might connect to surrounding areas and railway stations.

In this regard the Sustainability Report prepared by Urbis (**Appendix 12**) notes that TRUenergy is currently investigating opportunities to extend the local bus network to run through the site to enable regional trips to be made via public transport. Further, Urbis also note that TRUenergy is currently identifying opportunities to extend existing local school bus routes to include the Tallawarra Lands when the local student population demand is sufficient.

Further discussions with Premier Illawarra can be undertaken to identify the opportunities for provision of local bus routes to service the area as development occurs. This will take place beyond the time frame of this Concept Plan application.

Walking and Cycling

The road network has been designed to accommodate a wide range of opportunities for walking and cycling. Shared-ways throughout the site are illustrated in the Landscape Plan report prepared by Corkery Consulting attached at **Appendix 8**. In summary a range of pedestrian and cycle paths will be provided including:

- Cycle lanes – 1.5m wide cycle lanes provided on the road pavement between traffic and parking lanes, defined by line marking.
- Shareways – 2.5m wide pedestrian and cycle shared pathways that are either provided along the edge of the road reserve or within adjoining open space and recreation areas.

- Footpaths – 1.5m wide pedestrian paths provided along the edge of the road reserve or within open space and recreation areas.

These service all residential, business, retail, community and recreational areas proposed in the Concept Plan as well as foreshore areas. A potential pedestrian / cycle link to Haywards Bay is also proposed.

6.15 Economic Impact Assessment

The Director-General's Requirements state:

> *"17. Economic Impact Assessment (retail/commercial development only)*
>
> *The EA shall address the economic impact of the proposal and include an investigation into the impact upon the retail, commercial and residential industry within the locality and having regard to the hierarchy of centres in the relevant regional strategy."*

An Economic Impact Assessment has been undertaken by Pitney Bowes (PB) which is included in **Appendix 30**. The PB report presents an independent economic impact assessment of the trade area likely to be served by the proposed neighbourhood centre and large form retail (such as bulky goods) facilities.

The PB report reviews the relevant strategic planning and policy documents released by the NSW Government and Wollongong City Council to guide future development within the Illawarra region. The report provides an analysis of the current and forecast resident and worker population levels as well as the socio-demographic profile and retail spending capacity of trade area residents.

Figure 34 below is a copy of Map 3.1 from the PB report which illustrates the extent of the trade area likely to be served by the proposed retail facilities. The trade area is defined to include a primary sector and two secondary sectors, described as follows:

- The **primary sector** comprises the entirety of the Tallawarra Lands site, and is determined by the Southern Freeway and the Princes Highway to the west.
- The **secondary north sector** contains a large portion of the suburb of Koonawarra. This sector is restricted to the north and west by competitive retail facilities at Dapto Mall.
- The **secondary south sector** incorporates the growing suburb of Haywards Bay.

The PB report estimates that the retail convenience centre main trade area resident population is projected to increase to 5,995 by 2021. In addition to the resident population expected to move into the Tallawarra Lands site (2,800), provision is also made in the Concept Plan for significant employment generating land. It is reasonable to assume that a certain portion of this worker population would use the proposed retail facilitates, particularly at lunch time and on their way to and from work.

The PB report provides an analysis of the total estimated retail expenditure for the main trade area population in 2010 and projected increases in retail spending to 2021. The current retail expenditure of the main trade area population for the retail convenience centre in the Tallawarra Lands site is estimated at $26.1 million and is projected to increase by 10.8% per annum over the forecast period to exceed $80 million in 2021.

The PB report provides a discussion of the existing and future competitive retail environment within which the proposed retail facilities would operate, providing the framework for an assessment of the trading impacts. Competitive traditional retail facilities in the surrounding region are shown on Map 3.1 of the PB report which is reproduced as **Figure 34**. These include:

- 31 Four sub-regional shopping centres at Dapto, Shellharbour, Figtree and Warrawong; and

- A number of supermarket based shopping centres serving the immediate populations in their respective localities.

There are currently no major competitive retail facilities located within the Tallawarra Lands retail convenience centre main trade area, as the surrounding area is underdeveloped. The only significant retail facility located within the main trade area is a 350m^2 IGA food store at Parkside Plaza in Koonawarra (secondary north sector).

Dapto Mall is the most relevant sub-regional facility to the Tallawarra Lands retail convenience centre, and is located approximately 4.5 kilometres north-west of the Tallawarra Lands site. The Dapto Mall comprises some 21,000m^2 of retail floor space and is anchored by a Big W discount department store, Woolworths and Coles supermarkets. The Dapto Mall also contains over 50 specialty shops including a high representation of national brand tenants. An ALDI supermarket is also located directly opposite Dapto Mall..

Stockland Shellharbour is located approximately 9.7 kilometres to the south-east of the Tallawarra Lands site. The Stockland Shellharbour shopping centre currently incorporates some 36,100m^2 of retail with K Mart and Target discount department stores as well as a Coles supermarket. A development application for the redevelopment and expansion of Stockland Shellharbour has been approved by Council which will increase the total size of the shopping centre to over 70,000m^2. This project, which would also involve some 220 new specialty stores, has an anticipated completion date of late 2012. A 1,200m^2 ALDI supermarket is located adjacent to Stockland Shellharbour, on the southern side of New Lake Entrance Road. There is also a Woolworths supermarket which anchors the Stockland Retail Park and also includes a substantial provision of bulky goods retailing.

The two Westfield Shopping Centres at Warrawong and Figtree are located well over 10 kilometres from the Tallawarra Lands site, and are therefore of negligible competitive relevance to a convenience-based retail centre proposed at the Tallawarra Lands site.

Presently, there are only two existing supermarket based facilities in the area which are of competitive relevance to the proposed Tallawarra Lands retail convenience centre. These are:

- The Dandaloo shopping centre, which is anchored by a Foodworks supermarket of around 800m^2.
- Albion Park shopping centre, which is anchored by a Woolworths supermarket of 3,200m^2.

There are other supermarket based facilities located beyond the defined trade area, however these are of virtually no competitive relevance to the proposed Tallawarra Lands retail convenience centre, as they serve different trade area catchments.

Proposed retail facilities in the Tallawarra region are currently limited to two supermarket facilities being:

- An ALDI supermarket of 1,200m^2 and three speciality shops which have been approved to be constructed at the Albion Park Rail, some 6.3 kilometres to the south of the Tallawarra Lands site. This project has an anticipated completion date in late 2010.
- The NSW Department of Planning and Wollongong City Council are in early planning stages for a new Town Centre development at Bong Bong Road, as part of Stage 1 of the West Dapto Release Area. This Town Centre is initially expected to be some 6,000m^2 in size (to be anchored by a 4,000m^2 supermarket). However, the Town Centre has the potential to be expanded to 15,000m^2 over the longer term, to service the strong population growth planned for the West Dapto area. A second Town Centre is also likely to be constructed at Darkes Road, to the north-east of the Bong Bong Road facility.

The PB report considers the sales potential for the proposed convenience retail centre as well as the likely trading and other impacts that can be associated with the development proposal. The PB report notes that the key drivers of demand (and hence of the sales performance) for convenience retail facilities are the size of the resident and worker populations of the trade area, and the extent to which their convenience retail needs are met by existing convenience retail facilities in the area.

The PB analysis concludes that a full line supermarket would not be supportable on the Tallawarra Lands site within the forecast period as the trade area population would be likely to conduct their major weekly grocery shopping at higher order convenience retail facilities in Dapto, Albion Park and Shellharbour.

The PB report states that:

> *"The convenience retail centre that could be provided at the Tallawarra Lands site would therefore play a "top up" shopping role, providing convenience and amenity for residents and workers, and complementing the supermarket offers of nearby facilities. Therefore, in our opinion, a convenience retail centre incorporating a small supermarket/food stall (of around 500m^2) and supporting specialty retail, would be appropriate …."*

The PB report indicates that the proposed convenience retail centre at the Tallawarra Lands site would result in a range of economic benefits, particularly for nearby residents and workers. These key positive impacts include the following:

- **Convenience** – The provision of retail facilities at the Tallawarra Lands convenience retail centre would benefit local residents as well as the worker population in the Tallawarra area, by meeting their convenience shopping needs.
- **Reduced costs, travel times and escape expenditure** – Currently in the Tallawarra locality there are no conveniently located retail facilities, with the closest alternative facilities located at least a 9 kilometre round trip away, at Parkside Plaza. The proposed Tallawarra Lands convenience retail centre would provide a convenient shopping destination which is located in close proximity to the growing local population, resulting in time and fuel cost savings for the local residents.
- **Additional employment** – Once fully operational, the Tallawarra Lands convenience retail centre would be likely to employ 52 people. The construction phase of the project would also generate employment opportunities for the region.

The PB Economic Impact Assessment report provides an indicative projection of the anticipated impacts of the proposed Tallawarra Lands convenience retail centre which states:

> *"*
> - *Projected sales levels for existing retailers throughout the trade area in 2016, assuming that the Tallawarra Lands convenience retail centre goes ahead, would be on average 32.7% higher than the current estimated 2009/2010 sales.*
> - *As compared with the sales volume which all other retailers in the main trade area are projected to achieve in 2016 if the Tallawarra Lands convenience retail centre development does NOT proceed, the post-development sales volume would be on average 2% lower.*

Accordingly, the PB report concludes that the Tallawarra Lands convenience retail centre proposal would likely have limited trading impacts on other retailers throughout the main trade area (as mentioned previously, predominantly Parkside Plaza). Generally, the levels of impact projected (on retail facilities both within and beyond the main trade area) will not threaten the ongoing viability of existing retail centres or precincts throughout the area, or the future potential for expansion of retail facilities in the region. All facilities in the region

would continue to trade viably after the opening of the proposed Tallawarra Lands convenience retail centre.

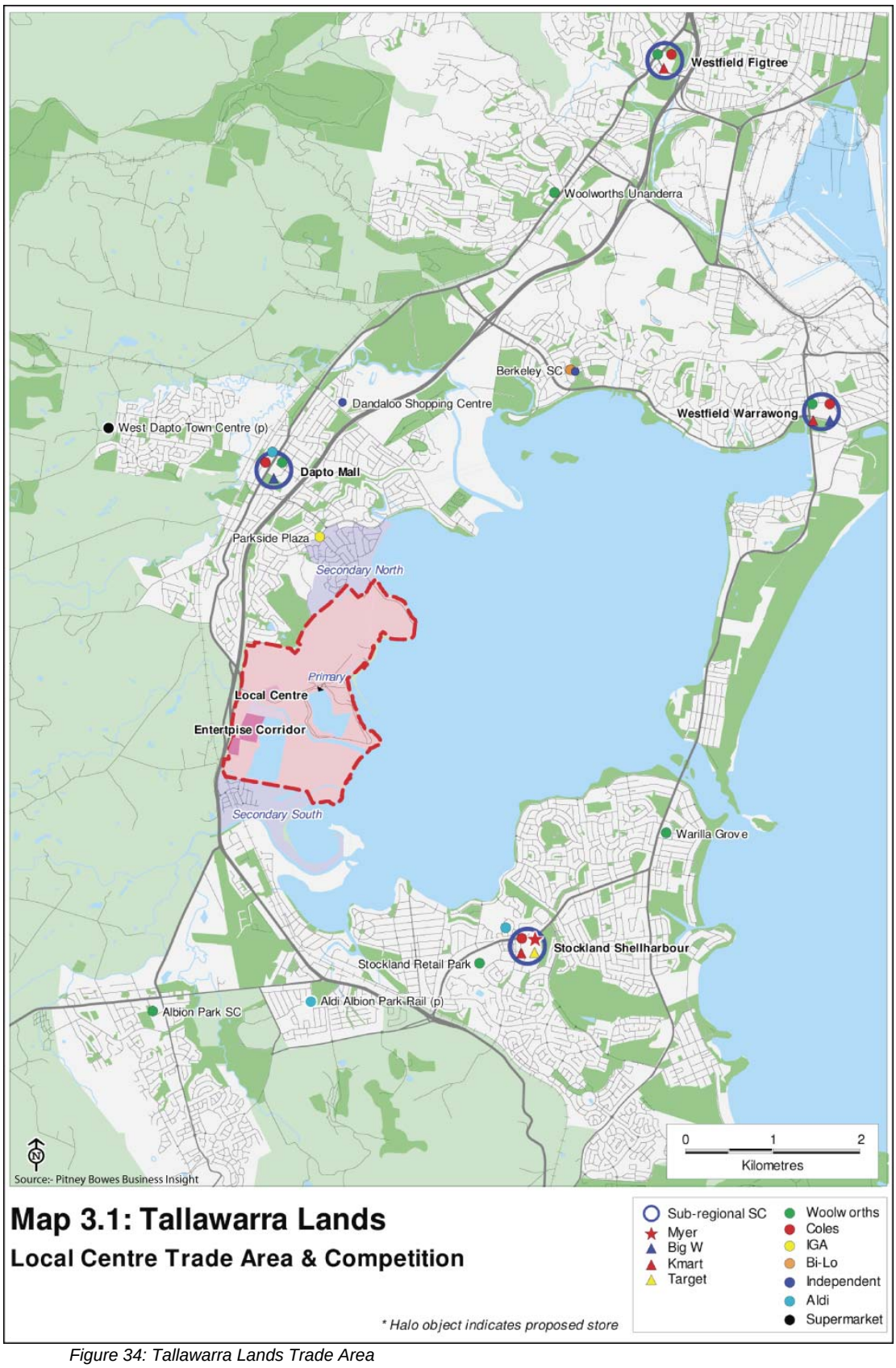


Figure 34: Tallawarra Lands Trade Area

The trade area which is likely to be served by the bulky goods facilities is shown on Map 3.2 of the PB report which is reproduced as **Figure 35** below. The trade area likely to be served by the bulky goods facilities includes a primary sector and two secondary sectors described as follows:

- The **primary sector** contains the future growth precincts at West Dapto, Calderwood and Tullimbar. This sector is limited by Lake Illawarra to the east and rural areas to the west.
- The **secondary north sector** is determined to the north by competitive bulky goods facilities at Wollongong and incorporates many suburbs including Warrawong, Unanderra and Port Kembla.
- The **secondary south sector** encompasses the residential areas focussed around Shellharbour, including the developing suburb of Shell Cove.

In general, the main trade area defined for the bulky goods facilities at the Tallawarra Lands site incorporates a substantial region, extending from Figtree in the north to Curramore in the south. The main trade area for the proposed bulky goods facilities at the Tallawarra Lands site is expected to experience steady population growth in the future, particularly due to the significant amount of greenfield land available for residential development in the primary sector. Accordingly, the PB report indicates that the bulky goods main trade area population is projected to increase from 142,350 to 154,725 by 2021, including 61,150 residents in the primary sector.

The PB report provides an analysis of the existing bulky goods retailing outlets and competitive environment within the Tallawarra Lands region which are shown on Map 3.2 and reproduced as **Figure 35**. As shown, there are multiple bulky goods facilities located within the main trade area.

Warrawong, located approximately 15 kilometres north-east of the Tallawarra Lands site, contains the most significant bulky goods precinct in the defined main trade area. The suburb contains approximately 56,300m^2 of bulky goods floor space. These bulky goods facilities are predominantly provided on the eastern side of King Street, stretching between Hoskins Avenue to the north and Shellharbour Road to the south.

The Central Business Park located at Albion Park Rail is the only bulky goods precinct in the primary sector.

Within the secondary south sector, Shellharbour is the main bulky goods precinct.

Additional bulky goods facilities in the region are provided beyond the trade area, within the Wollongong Central Business area.

There are no current bulky goods retail proposals within the main trade area.

The PB report provides an analysis of the market scope and sales potential for the proposed bulky goods facilities at the Tallawarra Lands site followed by an assessment of the likely economic impacts (both positive and negative) of such a development.

The PB report indicates that the current provision for bulky goods floor space within the main trade area is relatively comprehensive, with the strongest provision of space at Warrawong, and lesser provisions at locations such as Shellharbour and Albion Park Rail. PB estimates the total bulky goods provision within the main trade area to be approximately 90,400m^2.

On this basis, PB estimates that there is currently an undersupply of bulky goods floor space serving the main trade area population. They estimate that some 94,676m^2 of bulky goods floor space is supportable by the main trade area residents. This represents an under provision of 4,276m^2 of bulky goods floor space which would continue to increase each year without any additional bulky goods development within the main trade area. By

2021, continuing population growth within the main trade area will lead to a larger bulky goods floor space shortage, estimated at almost 31,000m^2 if no further bulky goods floor space is added.

Accordingly, PB advise that around 20,000m^2 of bulky goods floor space would be supportable at the Tallawarra Lands site in 2016. This provision is arguably a little high in 2016, when compared with the under provision of 17,207m^2. However, bulky goods centres are ideally built to cater for more than the day one demand in areas of such strong population growth.

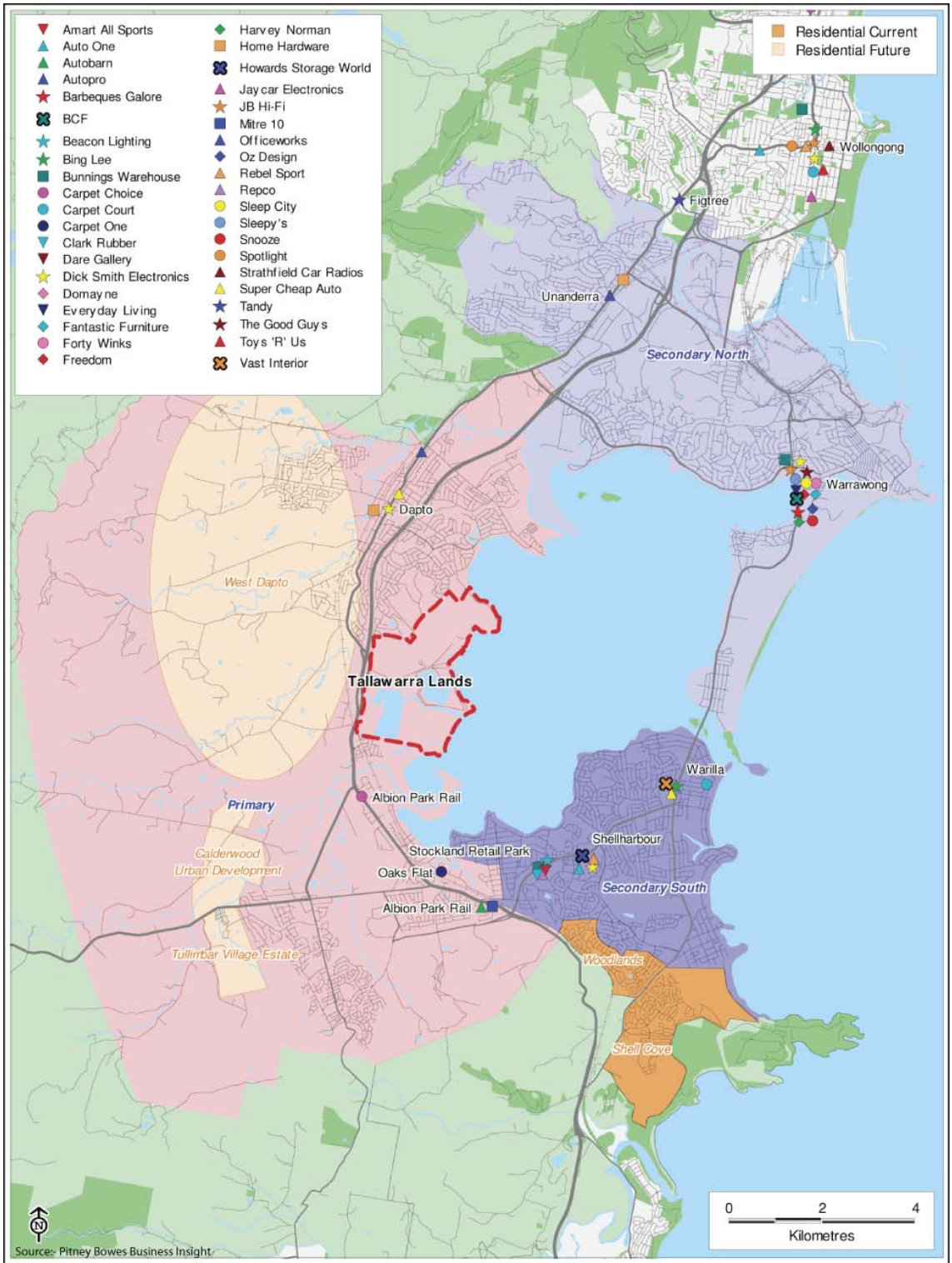
The PB report indicates that the provision of bulky goods facilities within the Tallawarra Lands site would result in a range of economic impacts including the following:

- **Choice and convenience** – PB advise that there are a number of national bulky goods tenants who are not currently represented in the region, which could be provided at the Tallawarra Lands site. This would promote price competition and greater variety for local residents.
- **Additional employment** – The Tallawarra Lands site bulky goods facility would create a number of additional jobs, both for the construction phase of the project and for the economy generally once the centre is operational. PB estimate that the bulky goods facilities at the Tallawarra Lands site would employ some 220 persons once completed, representing a net additional increase of some 215 persons (allowing for impacts on other centres).

The PB report advises that the major impacts likely to fall on the larger bulky goods centres in the region are as follows:

- The projected 10.9% impact on the bulky goods precinct at Warrawong reflects the current role of the precinct as the major bulky goods destination in the region. However, given the wide range of bulky goods facilities at Warrawong and the strong trading performance of the precinct in general, this impact is not likely to affect the viability of any bulky goods trader at Warrawong.
- Bulky goods facilities at Shellharbour are also expected to be significantly impacted (10%) by the Tallawarra Lands site bulky goods centre in 2016. However the bulky goods facilities at Shellharbour would continue to have solid trading levels and there viability would not be threatened by the Tallawarra Lands bulky goods facilities.
- Other projected impacts for main trade area bulky goods facilities range from 3.5% to 7.5%, largely reflecting the composition of each facility and their relative distance from the proposed bulky goods facilities at the Tallawarra Lands site.

PB comment that the impact of the proposed bulky goods facilities will ultimately depend on the tenant mix provided at the centre. In any event, these impacts would be expected to dissipate after a relatively short time, as the population growth in the region continues to drive retail demand.



Map 3.2: Tallawarra Lands

Bulky Goods Trade Area & Competition

Source:- Pitney Bowes Business Insight

Figure 35: Bulky Goods Trade Area and Competition

The PB Economic Impact Assessment report provides the following summary of impacts of the proposed retail facilities at the Tallawarra Lands site:

> *"It is the conclusion of this report that a substantial net community benefit will flow to the Tallawarra region area as a result of the proposed retail facilities at the Tallawarra Lands site. Offsetting the trading impacts on surrounding retailers, which will not impact on the viability of these centres and/or precincts, there are very substantial positive impacts including the following:*
>
> Table 24 *Improvement in the range of retail facilities that will be available to residents including a wider provision of bulky goods and convenience-based floor space.*
>
> *ii) The provision of conveniently located retail facilities in a region, in close proximity to a major growth area in NSW.*
>
> *iii) The creation of additional employment which will result from the retail developments, both during the construction period, and more importantly, on an ongoing basis once the centres are completed and are operational. This will include a significant number of youth employment opportunities."*

6.16 Employment Strategy

SGS Economics and Planning was commissioned to prepare an employment strategy for the Tallawarra Lands site. A copy of the document produced is attached at **Appendix 31**.

The employment strategy investigates industrial development opportunities on the site and considers the economic conditions and policy framework in Wollongong and Shellharbour local government areas along with local market dynamics and the competitive offer of the Tallawarra Lands site.

The strategy suggests that a specialised industrial park focussed on light manufacturing uses should be targeted and contains a list of recommendations to attract firms to the site.

6.17 Aboriginal Archaeological Heritage

Biosis Research has prepared an Aboriginal Archaeological Assessment report for the Tallawarra Lands Part 3A Concept Plan Application which is included in **Appendix 13**.

The Aboriginal Community consultation process was undertaken in accordance with the Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (DECC NSW 2005) for projects being assessed under Part 3A of the EP&A Act. Nine Aboriginal stakeholders registered an interest in the project, each group was invited to participate in the sub-surface archaeological investigations, consultation meetings and development of management and mitigation measures for this project.

The assessment involved subsurface investigations of a number of Potential Archaeological Deposit (PAD) locations and sensitive landforms within the Tallawarra Lands only. Due to the extent of previous archaeological work undertaken within the Tallawarra Lands, no additional archaeological field survey was completed. A 'gap analysis' was undertaken to ensure that all information relevant to Tallawarra Lands was captured. This included searches of relevant heritage registers and databases, along with a review of the environmental context, regional archaeological patterning based on previous studies, and predictive modelling to confirm placement of proposed test pits to be excavated during the sub-surface investigations.

The predictive modelling suggested that there is high potential for additional shell middens, stone artefact scatters and or isolated finds to be identified within the Tallawarra Lands. Where previous land use has resulted in high levels of disturbance, archaeological sites will have low integrity. The archaeological sub-surface investigations undertaken resulted in the in the identification of eight new Aboriginal archaeological sites across the

Tallawarra Lands including four isolated artefacts and four campsites. Areas of high, moderate, low and no areas of archaeological potential have been defined across the Tallawarra Lands.

Legislation	Item	Impact
Commonwealth Native Title Act including the National Native Title Register.	There is no land determined to have native title and no registered native title claims or indigenous land use agreements within the study area or its immediate vicinity have been made.	Nil
National Parks and Wildlife Act Register	9 previously recorded Aboriginal sites on the AHIMS Database are situated within the study area	
Wollongong LEP 2009 (Schedule 5)	No Aboriginal items listed Mt Brown listed as a Landscape Item (6339) which overlaps with the study area	Nil No development is proposed in this location. Further assessment would be required if infrastructure is proposed within the area.

Table 18: Listed Aboriginal Heritage

Figure 37 is an extract from the Biosis report which has been annotated to illustrate the proposed development footprint. The future General Industrial development area south of Yallah Bay Road has also been illustrated. This figure provides a comparison of proposed and future development footprint relative to:

- the location of the 9 previously recorded Aboriginal sites;
- the eight new Aboriginal archaeological sites recorded during the sub-surface investigations; and
- the areas of high, moderate, low and no areas of archaeological potential.

Biosis note that during the development of the Concept Plan, changes were made to the footprint in an attempt to conserve both natural and cultural values within the study area. The proposed Concept Plan footprint illustrated in **Figure 36** reveals that:

- Areas of high archaeological sensitivity are located substantially outside of the development footprint. There are some narrow slivers along the northern edge of Duck Creek and the tourist site. In this regard Biosis note that the environmental and recreation corridor along Duck Creek has been significantly widened to conserve these values. These areas are however areas for potential future development and would be subject to future investigations.
- Significant areas of moderate archaeological sensitivity are located outside of the development footprint being largely located in the wetlands in the south-eastern part of the site, the lower slopes of Mt Brown and western edge of the site. The northern, central and a small component of the southern precinct contain areas of moderate archaeological sensitivity.
- The majority of the southern precinct is in an area of low archaeological sensitivity.
- Two of the nine previously recorded aboriginal sites are located within the development footprint, one in the northern precinct and the other in the southern precinct.

- Three of the new aboriginal archaeological sites are located within the footprint of the central precinct.

Figure 36 : Location of all Aboriginal archaeological sites, PADs and archaeological sensitivity within the Study Area over the Masterplan

Biosis has considered the potential impacts of the Concept Plan upon the Aboriginal archaeological sites, areas of PAD and Aboriginal archaeological sensitivity which are the locations of the site they consider to constitute areas of constraint and conservation potential and that have the potential to be impacted by proposed ground disturbance works.

While the proposed Concept Plan identifies areas for development, the precise nature and extent of impacts to Aboriginal cultural heritage cannot be determined until the design of each precinct has been developed at the Project stage. Biosis has developed a suite of management recommendations that can be carried forward to future Project or development applications, including.

Biosis has developed a number of management recommendations to address the potential impacts upon Aboriginal archaeology, which are summarised below.

- Conservation through Avoidance. This is the primary mitigation and management strategy. As noted by Biosis the Concept Plan has been refined to take in to account aboriginal heritage where possible.
- Direct Impacts to known archaeological sites. Where registered Aboriginal archaeological sites, PADs and areas of high archaeological sensitivity cannot be avoided, further archaeological investigation will be required, including excavation and recording, to determine the archaeological and cultural significance of the site prior to ground disturbance. Where artefacts are recovered or require relocation, a Care and Control Agreement should be developed and implemented in consultation with registered Aboriginal stakeholders.
- Aboriginal stakeholder consultation. This has commenced and further consultation will be required as noted in Biosis report.
- Ongoing management. To successfully manage and mitigate Aboriginal cultural heritage within the Study Area, an Aboriginal Cultural Heritage Management Plan (ACHMP) should be developed, in consultation with relevant Aboriginal stakeholder groups and DECCW. This would consider the management and mitigation of Aboriginal cultural heritage at key stages of future development, including construction, and vegetation remediation/rehabilitation. The ACHMP will incorporate contingency plans to manage Aboriginal cultural heritage within the Study Area.
- Cultural heritage awareness training.
- Procedures for unanticipated Aboriginal sites identified during works
- Procedures for discovery of human remains identified during works.

A Statement of Commitment has been proposed in relation to the on going management of Aboriginal archaeology on the site.

6.18 European Heritage

The DGRs require the preparation of a Statement of Heritage Impact prepared in accordance with the NSW Heritage Office publication "*Statements of Heritage Impact*". Biosis Research has prepared a Statement of Heritage Impact for the subject site together with a Historical Archaeological Assessment of Item TH1 and a Photographic Archive Recording of Item TH1. Copies of their reports are attached at **Appendix 14A** and **Appendix 14B**.

Listed Heritage

Biosis Research's report has examined the following legislation and non-statutory registers to identify the location of heritage items within the Concept Plan area or within the vicinity of the site.

Legislation	Item	Impact
Commonwealth Environment Protection Biodiversity and Conservation Act, 1999 including listings under • National Heritage List; and • Commonwealth Heritage List	None within the site or within the vicinity of the site	None
Heritage Act, 1977 including • NSW State Heritage Register • Section 170 Register	None within the site. Section 170 listing relating to the RTA bridge No. 689 located adjacent to the site	
Wollongong LEP 2009 (Schedule 5)	Item No.6339: Mt Brown Reserve, Koonawarra/Dapto, Lot 4 DP 223746, Lot 12 DP 233464, Lot 109 DP 1050302, Lot 22 DP 774118. Local significance. Partly located within the site	Visual impacts are not expected to arise from the Concept Plan. Further assessment would be required if infrastructure is proposed within the area.
	Item No.61016: Military bunker, Mt Brown Reserve, Bright Parade, Dapto, Part Lot 4 DP223746. Local Significance. Located adjacent to the site.	No impacts (including visual impacts) have been identified.
	Item No.6437: House, Princes Highway, Yallah, Lot 1 DP 156657. Local significance. Located adjacent to the site.	No impacts have been identified to the item or its artilage as the item is outside of the Concept Plan area.
Non-Statutory Registers: • National Trust of Australia register	None	None

Table 19: Listed Heritage Items

In relation to Section 139 of the Heritage Act (Relic Provisions), Biosis Research note that there is the potential for relics associated with an early homestead, dairying sites and early industrial uses to occur within the study area. Under Part 3A of the EP&A Act, the need for a S.140 excavation permit is not required. However, should relics be found then Section 146 of the Heritage Act, 1977 will still apply which will require the proponent to notify the Heritage Council of NSW in the event of discovering such relics.

Potential Items

The research undertaken by Biosis has also identified the following potential heritage items within the study area:

- TH1 Existing structures in the north west corner of the site, most recently a riding school. Possibly "O'Brien's House" present at least by 1916.
- TH2 Potential archaeological site near a large fig tree to the west of the site and adjacent to the Princes Highway. Possibly part of "Jordan's Farm" in the late nineteenth century.

- TH3 Potential archaeological site slightly to the north of TH2. Possibly part of "Jordan's Farm" in the late nineteenth century.
- TH4 Potential archaeological site south of Duck Creek and adjacent to the Princes Highway. Possibly part of the Wollingurry Dairy, early 20th century.
- TH5 Potential archaeological site south of Duck Creek and east of TH4. House known as "Wollingurry" situated on Wollingurry Dairy, early 20th century.
- TH6 Former Yallah Platform. Removed to Albion Park rail museum in 1980s. TH7 Former Smelting Company rail alignment (adjacent to the Study Area)
- TH8 Pair of existing tanks at the base of Mount Brown, built c.1950.
- TH9 A more widespread group of structures in the southern part of the Study Area; grouped together as the aerial photographs are unclear. Shown as "Beachgrove" in 1970s and possibly part of Wollingurry Dairy, early 20th Century.
- TH10 Group of structures east of TH6. Shown as "Roscommon" in the 1970s and possibly part of Wollingurry Dairy, early 20th Century.

The listed heritage items are either located outside of the Concept Plan area or in the case of the Mt Brown reserve are not affected by the developable areas proposed by the Concept Plan.

In addition many of the potential items are located in open space areas providing the opportunity to retain and protect those potential items. For those potential items that fall within developable areas under the Concept Plan, the Statement of Heritage Impact has developed recommendations for further assessment and documentation which are discussed below. The Statement of Heritage Impact provides a preliminary assessment and recommends that further research into the history of the individual buildings on the site is necessary to establish the level of significance of the archaeological deposits should they exist. The following recommendations have been formulated by Biosis Research which can be incorporated into Statements of Commitment:

1. Where practicable, avoid impact to all identified heritage items and archaeological sites. Those sites have been identified as: TH1, TH2, TH3, TH4, TH5, TH9 and TH10. The area to the east of the Concrete House (LEP Item 6437) may also be archaeologically sensitive.
2. Prepare an archaeological assessment for each potential archaeological site (including the area around the Concrete House) if impacts are unavoidable. This would include areas which are not built upon but will be affected by landscape works, infrastructure, road making, etc, depending on impacts to the landscape and ground levels. The appropriate stage for the preparation of archaeological assessments would be after Project Application and prior to construction commencing.
3. There is existing road and rail corridor infrastructure on the site which can inform the location of new roads through the development. It is recommended that when designing the street layout and street hierarchy of the development the reuse of these alignments are considered.
4. There are historical road and boundary alignments which are no longer visible on the ground (for example the boundaries and road through "Jordan's Farm") which could also inform the layout of streets and blocks within the study area.
5. If significant variations occur, for example a significant increase in or relocation of development areas, then a reassessment of the impact of the development may be required. Depending upon the location any such variations, additional

archaeological survey and assessment by a qualified heritage consultant may be required.

6. Consult with the cultural heritage specialists if intending to do any invasive work on site (eg geotechnical investigation) in areas identified as heritage items or as potential archaeological sites.

7. Determine an interpretation strategy (location, content, design) as part of the subsequent detailed project application.

After conducting their initial heritage assessment for the entire Tallawarra Lands site, Biosis was commissioned to undertake an archaeological assessment and photographic archival recording of item TH1 which is located in the northern residential precinct intended for future residential development because the earthworks associated with clearing, levelling and the introduction of services will remove all elements associated with TH1. The reports produced are attached at **Appendix 14B**.

The assessment of archaeological significance and sensitivity undertaken by Biosis concluded that further archaeological work is not justified but that a photographic archival recording should be undertaken. This has now been undertaken (a copy is attached at **Appendix 14B**) and as such the Proponent seeks project approval pursuant to the provisions of Sections 75(J) and 75P(1)(c) of the EP&A Act to enable demolition of the structures that comprise TH1 without the need for further applications / consents.

6.19 Servicing Staging

Northrop has prepared a Report on Siteworks and Utilities Infrastructure which addresses the DGR relating to Utility Services. A copy of their report is attached as **Appendix 18**. In terms of servicing, their report determines the capacity of existing infrastructure and the required capacity to service the proposed development. Their investigations have been carried out in consultation with the relevant utility providers.

Sewerage

Northrop's preliminary investigations and discussions with Sydney Water has confirmed that there are no sewer connection points readily available for servicing the ultimate development of Tallawarra Lands. There might be some scope to service a stage (or portion) of development in the Central Precinct with access to sewer within Princes Highway. The Haywards Bay development has not been designed to accommodate any flows from Tallawarra Lands.

Northrop has estimated demands for sewer based on project annual population, land use and growth for the Tallawarra site and from consultation with Sydney Water.

The preliminary advice from Sydney Water indicates sewer servicing to Tallawarra Lands can occur by connection to existing Sydney Water infrastructure to the north of the development. This would necessitate at least one Sydney Water Sewage Pump Station to be established on-site. There are currently two options being considered by Sydney Water for connection in the context of regional development strategies although the preferred option will not be confirmed by Sydney Water until November 2011.

Northrop recommends that the strategy for sewer servicing for development of Tallawarra Lands is considered to comprise:

- Investigation into opportunities for connecting to local sewerage infrastructure that is convenient for the initial stages of development if development takes place prior to November 2011.
- Implementing the Sydney Water-preferred 'regional' solution by establishment of key infrastructure on-site (e.g. sewage pumping station/s) and connecting to the

relevant main carrier – once warranted by development and advised by Sydney Water.

The timing of much of the future development will therefore depend upon the establishment of key infrastructure on-site. A Section 73 (Feasibility) Application has been lodged with Sydney Water to obtain formal advice which will inform the future applications for the site.

Water

Northrop's preliminary investigations and discussions with Sydney Water has confirmed that water servicing to Tallawarra Lands can occur by extension of the Dapto Reservoir Supply system located at the north of the site.

The servicing strategy for provisions of water for the development should comprise

- The establishment of the main water supply connection point and extension to occur as part of the initial development phases. This will be the predominant source for potable, fire and back-up water supply.
- The implementation of rainwater harvesting and re-use opportunities to encourage mains water conservation (at least) through localised non-potable uses. This is expected to be promoted throughout all development stages.

A Section 73 (Feasibility) Application has been lodged with Sydney Water to obtain formal advice which will inform the future applications for the site.

Natural Gas

Substantial gas supply infrastructure already exists (being associated with the Tallawarra gas power station). However, Northrop's consultation with Alinta has confirmed that the site will not be serviced from the existing on-site infrastructure but from new local network services. Current network planning allows for servicing of the Tallawarra Lands.

Implementation of the network provisions by Alinta generally occurs as development demands. On this basis, the strategy for natural gas servicing will be progressive to suit the on-going demands and staging of the development.

Electricity Supply

Northrop has consulted with Integral Energy and established that the Tallawarra Lands will not be readily serviced by the existing major on-site infrastructure. Existing local infrastructure does not have the capacity to service much (if any) of the Tallawarra Lands.

Preliminary advice from Integral Energy to Northrop indicates that electricity supply to the ultimate development of Tallawarra will require establishment of a 132kV / 11kV Zone Substation. The likely timing for this to be established is in the order of three (3) to four (4) years.

On this basis the electricity servicing strategy recommended by Northrop involves the following:

- Investigation into any available supply from the existing local network for initial stages of the development of Tallawarra Lands, although this is unlikely.
- Provision of interim 11kV (high voltage) feeds from the surrounding supply system to service stages of the development where no low voltage supply is available – up to the time of establishment of the Zone Substation.
- Planning for establishment of the 132kV / 11kV Zone Substation by approximately year four (4) of development.
- Incorporation of sustainable energy initiatives into development (e.g. SMARTGRID; grid connected PV systems (e.g. larger commercial / business /industrial precinct

buildings); grid connected PV systems, low-energy lighting / light management systems (e.g. public areas)).

Telecommunications

Northrop has consulted with Telstra and confirmed that optical fibre will be available in July 2011 which will therefore be in place prior to development taking place.

Implementation of the telecommunications network will take place as development demands, and staging will therefore be progressive.

The proponent commits to implementing the utilities servicing strategies identified in the Report on Siteworks and Utilities Infrastructure, prepared by Northrop for future Project or development applications.

7 Ecologically Sustainable Development (ESD)

Urbis has prepared a Sustainability Report which is attached as **Appendix 12**. Urbis has developed a sustainability framework that adapts the principles of the Green Building Council of Australia in its Green Star Communities National Framework. Urbis consider that this framework will facilitate the potential for each of the Precincts to consider a rating under the tool currently being developed by the GBCA. This framework goes beyond that required by the DGRs by providing a consolidated framework for the delivery of all the desired sustainability outcomes set by the development, a mechanism for implementation and for monitoring.

TRUenergy has a long standing commitment to sustainability and intends to continue this commitment to sustainability through the planning and development of the Tallawarra Lands. TRUenergy's commitment to sustainable outcomes has also evolved through its consultation with the Community Liaison Group, Council and government agencies. Urbis have identified some of the principles for the sustainability vision for the Tallawarra Lands including;

- Leading practice sustainability initiatives that enhance the natural and urban environment.
- A quality residential component that capitalises upon and complements the unique scenic and environmental qualities of the site.
- Integrated and innovative development that creates shared benefits and allows diverse yet complementary uses.
- A project that returns value to TRUenergy and is in line with the company's commitment to sustainability.

Sustainability Framework

The GBCA's Green Star Communities Framework has been adapted by Urbis for the Tallawarra Lands which will potentially allow future development to consider a green star rating. This examines the following principles

- Liveability;
- Economic Prosperity;
- Environmental Quality; and
- Place Making Urban Governance.

Within each of these principles are more focused themes against which Urbis has set outcomes that will be employed in the Concept Plan that begin to address the desired outcomes for future development. A set of considerations for future action are also identified that could be implemented as part of subdivision certificates or civil works approvals.

Within this framework a wide range of sustainability actions are identified for each of the Principles and themes including such matters as:

- A range of lot sizes to provide diversity and promote affordability;
- CPTED principles;
- A network of cycle paths and footpaths;
- Clustering of activities to promote walking and cycling;
- A road network that responds to topography, provide connectivity and relationship with open spaces;
- Phasing of development to respond to progressive development and reduce headworks;
- Investigation by TRUenergy of installing optical fibre cables, partnering with Integral Energy to install Smart Grid technologies and on-site rainwater reuse;
- WSUD measures incorporated in to the landscape;
- Commitment to BASIX + 10% for the future residential development;
- Commitment to commercial and retail developments achieving a 40% reduction in energy and water use when benchmarked against similar standards in NSW;
- Rainwater tanks to residential lots;
- Management and recycling of spoil and green waste during excavation and clearing for use in the landscape works;
- Maximising public access to foreshore areas;
- Responding to environmental attributes, opportunities and constraints of the site;
- Underground services; and
- Tender documentation, joint venture arrangements or contracts for sale to require parties to provide an assessment against the framework established by Urbis.

In order to give effect to the sustainability framework developed by Urbis, TRUenergy is proposing a Statement of Commitment that the next phase of approvals be required to provide a response to the *desired sustainability outcomes* identified in the framework.

BASIX

The DGRs require that the development shows a commitment to complying with SEPP (Building Sustainability Index BASIX) 2004. The Concept Plan does not propose residential development to enable a BASIX assessment to be carried out. However, Urbis has established the following actions to facilitate BASIX at the Concept Plan stage:

- Tallawarra Lands commits to achieving energy and water reductions in the residential portions of the development equivalent to BASIX +10%. This will be achieved through a focus on lot orientation, maximising breezes, design guidance and though achieving infrastructure efficiencies. This does not commit the dwelling to BASIX 50 but to an energy / water reduction equivalent. This means that considerations outside the BASIX rating tool can be used to achieve the outcome.
- Additional steps required to meet the BASIX target will be delivered through infrastructure design, indigenous landscaping, grey water systems and solar thermal (hot water) or solar photovoltaic (electricity).

In addition to steps taken on the residential components TRUenergy proposes to adopt the principles of BASIX for the commercial and retail components proposed in Tallawarra Lands. This commitment will be achieved through delivering up to 40% reduction in energy

and water use compared to that of similar standards of development in NSW. The intent is to utilise Green Star and NSW Energy Savings Action Plans as a means to deliver and report on utility reductions.

Lot orientation

The Concept Plan does not nominate details of the individual lot orientation. The proposed road network and super lots have been defined to facilitate future lot orientation that maximises the assets of the land for both passive energy and amenity considerations. The roads have generally been aligned to a North Westerly or North Easterly direction which Urbis notes enables the long axis of future the lots to be between 20^0W of N to 30^0 E of N or between 20^0N of E to 30^0 S of E. Urbis notes that this can be achieved for over half of the lots to maximise passive solar design principles.

The remaining lots are oriented to provide for access to local or regional views or in line with topographical constraints but Urbis note that they can still adopt consider passive solar design principles and building orientation independent of lot orientation.

Water reuse

Sydney Water has confirmed their preferred strategy for water servicing for Tallawarra is connection to existing potable water system and rainwater harvesting for non-potable uses for residential development (where appropriate) and rainwater harvesting for non-residential development where appropriate.

Opportunities for water reuse are being considered at this stage, but would be confirmed at later stages of the project. Urbis has set out the actions that are being undertaken as part of the Concept Plan in line with Sydney Water's preferred servicing strategy including the following:

- Setting water consumption reduction targets for the residential, commercial and retail components of the development;
- Investigation of stormwater harvesting for the central precinct which would collect water from the street network for treatment and storage in tanks beneath the sports facilities. The harvested water would be used for irrigating the sports ground and possibly the landscaping in the neighbourhood centre. The sports field will ultimately become a Council asset and therefore this option would need to be further considered and developed in consultation with Council and confirmed at the civil works phase and agreements with Council.

Ubris has also identified other actions that can be investigated as part of future projects including the following:

- Installation of in-ground water tanks on lots at civil works stage;
- Investigation of opportunities to harvest and treat water from portions of the site for potential use in the neighbouring Power Station;
- Opportunities to provide a third pipe recycled water system for the development subject to further discussions with Sydney Water; and
- Consideration of using the lakes for irrigation of the public domain where water quality is appropriate, particularly having regard to salinity.

Waste minimisation

Urbis note that one of the outcomes for the Tallawarra Lands is to minimise operational waste sent to landfill. This can be achieved firstly through minimising the generation of waste and then through seeking reuse or recycling options before considering land fill. This earthworks strategy is documented in the *Report on Siteworks and Utilities Infrastructure* prepared by Northrop and attached at **Appendix 18**.

The sustainability framework developed by Urbis will require a response at the civil works and the subdivision phases which will facilitate appropriate actions to minimise waste at those stages.

Minimisation of energy use

Urbis note that the most energy and cost efficient means of minimising energy use in development is to focus firstly on reducing demand through behaviour change and passive design measures, then seeking key energy efficiency measures from structure, fit outs and appliances and then a focus on low carbon or renewable energy supply options. The actions identified by Urbis which form part of the Concept Plan include the following:

- Investigation into the use of Smart Grid technologies which has the potential to achieve improved energy efficiencies and provide effective support for renewable energy systems and demand management actions.
- The super lots and the road design in the concept plan have been arranged to maximise breeze corridors and solar access to facilitate building orientation to maximise the principles of passive solar design.
- Extending the energy target for residential development to achieve an equivalent to the BASIX +10%.
- Requiring future commercial and retail developments to aspire to a target of a 40% reduction in operational greenhouse gas emissions associated with energy use in comparison to similar types of development in NSW.

In addition there are other actions that are being considered and can be investigated in the preparation of future Project or Development Applications including:

- Considering the role of a distributed energy system using in ground generators providing efficient electricity, heat and cooling to the community.
- Investigating opportunities for networked gas. This may enable consideration of other energy options including gas boosted solar hot water / instant gas hot water / efficient heating or more energy efficient cooking. Industrial gas supplies are also being considered to provide opportunities for cogeneration systems for the community or energy intensive businesses.
- Consideration to encouraging any future display village to feature and promote sustainable housing design principles and examples of energy efficient homes.
- Investigations with Council and other relevant authorities for opportunities for low energy street lighting or on the off road footpaths and pedestrian/cycle share ways or potential electric car charging stations in appropriate locations around the development site.

These form part of the Statements of Commitments through the requirement for future development to address the Sustainability Framework.

Reducing car dependency

The Concept Plan provides a mix of uses that are all well connected through a network of footpaths, pedestrian/cycle share ways, dedicated cycle lanes and the local road network that will facilitate and encourage local non-car based trips.

Other actions being considered include:

- Investigating opportunities to extend the local bus network to run through the site to enable regional trips to be made via public transport.
- Identifying opportunities to extend existing local school bus routes to include Tallawarra Lands when the local student population demand is sufficient.

- Considering including provisions for cycle parking in the design guidance for the residential and commercial uses.
- Considering requiring a sustainable travel plan to be prepared as part of every commercial development DA.

8 Proposed Development Contributions

8.1.1 Director-General's Requirements

With respect to community infrastructure requirements, the Director-General's Requirements state:

> *"22. Contributions*
>
> *The EA shall address Council's Section 94 Contribution Plan or provide details of a planning Agreement for appropriate developer contributions in consultation with Council. The EA shall also address possible State Infrastructure contributions."*

Wollongong Council's Section 94A (s94A) Development Contributions Plan 2009 currently applies to the site and there are no planning agreements that have been entered into under Section 93F of the Act or draft planning agreements that the developer has offered to enter into at this time.

In addition to local development contributions, the *Draft Special Infrastructure Contribution Illawarra (West Lake Illawarra) Determination 2011* (the Draft SIC Determination) was publicly exhibited in early 2011.

The following subsections detail the community infrastructure levies that would be applicable under Council's Section 94A Plan and the Draft SIC Determination and the range of future local and/or State/Regional community infrastructure that may potentially be required as a consequence of the proposal, which could be delivered either through a new contributions plan, a planning agreement or the SIC levy.

8.1.2 Wollongong Section 94A Development Contributions Plan 2009

The Wollongong Section 94A Development Contributions Plan 2009 applies to the site and would be applicable to the proposed development in the absence of another development contributions mechanism such as a site-specific contributions plan or planning agreement.

The required contribution under the s94A Plan for the proposed development would be 1.0% of the cost of the development, calculated in accordance with clause 25J of the EP&A Regulation.

For the purposes a providing a base case contribution for the proposed development, the CIV as calculated by Rider Levett Bucknall has been used. This CIV of $184,820,000 would generate a total development contribution of $1,848,200 from the proposed development.

However, the community infrastructure requirements under the current Section 94A plan do not envisage the nature of development at Tallawarra that is currently proposed and it would not be appropriate to simply adopt this contribution rate without further detailed consideration of the community infrastructure demands of the proposed development.

In addition, the s94A Plan does not cover any State/Regional infrastructure requirements which may or may not be required as a partial or full consequence of development at Tallawarra.

8.1.3 Draft Special Infrastructure Contribution Illawarra (West Lake Illawarra) Determination 2011

The Draft SIC Determination was publicly exhibited in early 2011 and proposes to levy development within the 'Illawarra (West Lake Illawarra) Special Contributions Area' for a range of high level strategic infrastructure. DFP made a submission on behalf of

TRUenergy during the exhibition period. The key points from the submission are detailed in the following section.

The 'Illawarra (West Lake Illawarra) Special Contributions Area' comprises the West Dapto and Calderwood release areas as well as Tallawarra Lands. Tallawarra Lands comprises approximately 3% of the total anticipated residential dwelling yield and approximately 30% of the total anticipated employment land yield under the Draft SIC Determination.

The infrastructure works items in the SIC Determination include works on the State and Regional road networks and education facilities comprising primary and secondary schools. Many of these proposed works items have either negligible or zero nexus with the future development at Tallawarra Lands. This highlights the inequity of aggregating capital works across such a large region with some developments likely to significantly subsidise the demands generated by others.

The assessment of demand for community infrastructure undertaken in the following subsections of this report indicates that there is likely to be some demand generated by development at Tallawarra for places at existing nearby government schools and some minor road improvements. However, there is unlikely to be sufficient demand generated by Tallawarra Lands for the extensive State/Regional road works listed in the Draft SIC Determination or new schools in West Dapto and Calderwood.

With regard to roads, the Draft SIC Determination lists many improvements which, based on the traffic analysis undertaken as part of this Part 3A Concept Plan Application, are not required as a consequence of future development at Tallawarra Lands. This means that development at Tallawarra Lands will subsidise works which are required to cater for the demands of other developments at West Dapto and Calderwood.

Of particular note are the "Tallawarra on-ramp" and "Tallawarra off-ramp" listed in the Draft SIC Plan. The Traffic Impact Assessment undertaken by Gabites Porter as part of this EA indicates that future development at Tallawarra Lands does not generate a demand for these ramps and could operate satisfactorily without them. This demonstrates that the ramps are either not required or that they are required to cater for the demands of other development in the region. Accordingly, Tallawarra Lands should not be expected to contribute towards these works.

Furthermore, whilst the Draft SIC Determination includes works on roads upon which traffic from Tallawarra is likely to travel, the demand from Tallawarra for many of these works is negligible and if the Draft SIC levy is imposed on development at Tallawarra Lands, Tallawarra will be subsidising other development and/or natural increases in traffic on the network. In our opinion, this is unreasonable and inequitable.

In regard to schools, the Tallawarra Lands development is likely to generate approximately 280 children expected to utilise government primary schools and approximately 215 children likely to utilise government high schools. Neither of these numbers in themselves would give rise to a full additional school of either type.

Furthermore, it is highly likely that existing nearby schools would be capable or could be made to be capable of accommodating the demand from Tallawarra Lands. These schools include: Koonawarra Primary School, Lakelands Primary School and Mt Brown Primary School (between 1-4km from the proposed residential areas within Tallawarra) and Dapto High School and Kanahooka High School (between 2.5-5km from the proposed residential areas within Tallawarra).

Accordingly, the application of the Draft SIC levy for schools to Tallawarra Lands would mean that development at Tallawarra Lands will subsidise schools provided in West Dapto and Calderwood, the demand for which is generated by other developments. It is highly unlikely that children from Tallawarra will ever utilise the schools proposed in the SIC.

In addition to the inequities of seeking levies from Tallawarra Lands toward facilities for which demand is generated by other developments, the Draft SIC levy applicable to residential development is based on the Net Development Area (NDA) being developed, irrespective of the number of dwellings that may be achieved on that land.

This means that development on higher density land such as R3 Medium Density Residential and R4 High Density Residential will be required to pay less when aggregated to a per dwelling contribution than development on low density land such as R1 General Residential, R2 Low Density Residential and R5 Large Lot Residential.

This does not reflect the origin of the demand for State/Regional infrastructure and accordingly, low density residential housing forms will be subsidising high density housing forms.

By way of example, the Concept Plan for Tallawarra Lands includes ten (10) dwellings on lots of at least one hectare with a total land area of approximately 11 hectares. This is because the land in that zone is constrained by steep slopes and is not capable of accommodating higher densities.

At the exhibited Draft SIC levy rate of $73,219 per hectare of NDA, these ten dwellings would generate a total SIC levy of $805,409 or $80,541 per lot. This is not affordable and is considered unreasonable when compared to the average SIC levy of $6,180 per dwelling.

The Draft SIC Determination recognises that housing on environmentally constrained land in the E4 Environmental Living Zone should not be levied on the standard per NDA basis and clause 12 of the Draft SIC Determination limits the calculation to a maximum of 0.1 hectares per lot. This clause should also include low density housing in the R5 Large lot Residential Zone on lots larger than 0.1 hectares, such as those proposed at Tallawarra Lands.

In summary, the proposed future development at Tallawarra Lands has either negligible or zero nexus with the majority of the infrastructure works items in the Draft SIC Determination. Accordingly, if the Draft SIC levy were to be applied to Tallawarra Lands, this development will be subsidising other developments at Calderwood and West Dapto. This is inequitable and unreasonable.

Notwithstanding this, the assessment of community infrastructure demand in the following subsections indicates that the proposed development will provide for a range of facilities which will cater for the demands of Tallawarra Lands as well as providing a wider State/Regional community benefit.

8.1.4 Future Residential and Employment Population

The Concept Plan includes 94.2 hectares of land available for residential development and a dwelling yield comprising 1,000 low density lots, 10 x one hectare lots and 200 retirement living dwellings.

Table 20 provides a summary of the residential dwelling forecasts and population yield estimates which have been used for the purposes of this preliminary consideration of future community infrastructure requirements. This indicates a future residential population of approximately 3,250 persons. A similar age profile to West Dapto has been adopted for these preliminary considerations.

Precinct	Land Use	Net Area (ha)	Dwellings	Persons[1]
Northshore	Low Density Residential	22.3	310	899
Central	Low Density Residential	27	340	986
	Low Density (Large Lot) Residential	11	10	32
Lakeside	Low Density Residential	23.2	350	1,015
	Low Density (Retirement) Residential	11.2	200	316
	Total	**94.7**	**1,210**	**3,248**

Notes:
1. *Rounded to nearest whole number and calculated based on an assumed occupancy ratio of:*
   - 2.9 persons per 450-600m^2 dwelling;
   - 3.2 persons per dwelling greater than 600m^2
   from the Draft West Dapto Urban Release Area Section 94 Development Contributions Plan; and
   - 1.58 persons per retirement dwelling being the NSW average occupancy of persons aged 55 years and older living in private dwellings from the 2006 ABS Census.

Table 20: Forecast Residential Yield

The Concept Plan also includes employment lands occupying an area of 66.75 hectares (including tourism and retail zoned land). Of this total, about 40 hectares located on the southern side of Yallah Bay Road has geotechnical limitations which could limit its suitability for industrial development and will need to be the subject of further investigation. In addition, there is 3 hectares of land in the neighbourhood centre and 3 hectares of land zoned B6 Enterprise Corridor which are proposed to be future development lands. Accordingly, these areas have not been included in the following calculations.

Previous work undertaken by MacroPlan Australia (*Tallawarra Lands Review of Hill PDA Demand Assessment and Site Yield Estimates*, 2006) indicated that an average worker occupancy rate of 1 worker per 40m^2 GFA or 61 workers per developable hectare could reasonably be used to estimate the future workforce at Tallawarra.

Based on these rates, the proposed employment land area and the indicative GFA yields in the Concept Plan, Table 21 sets out the possible employment workforce. This indicates a potential for approximately 1,889 workers and a total employment GFA of approximately 70,660m^2.

Precinct	Zone/Use	Net Area (ha)	GFA (m^2)	Workers
Central	B1 – Neighbourhood Centre	1.25[A]	1,500	38
	IN1 – General Industrial	14[B]	34,160	854
	IN2 – Light Industrial			
	SP3 – Special Use (Tourism)	2.5	-	122[C]
Lakeside	B6 – Enterprise Corridor	9[D]	35,000	875
	Total	**26.75**	**70,660**	**1,889**

Notes:
A. Excludes 3ha of h land for future development
B. Excludes 40ha of general industrial land for possible future development
C. Based on 61 workers per developable hectare in the absence of GFA estimates
D. Excludes 3ha of business land for future development.

Table 21: Forecast Employment Yield

8.1.5 Demand for Community Infrastructure

With an anticipated additional residential and employment population on the site, future development will generate a demand for community infrastructure within the site and potentially on surrounding land. In addition, existing and future development surrounding the subject site may potentially benefit from the community infrastructure to be provided at Tallawarra Lands.

The core component of any future proposal to deliver community infrastructure must involve an assessment of the demands for community infrastructure likely to be generated by the future employment and resident population of the development. These demands may be fully or partially met by surplus capacity in existing community infrastructure in the area, embellishment of that infrastructure and/or by provision of new community infrastructure.

The range of community infrastructure that might be considered in conjunction with a development of a scale and nature to that proposed may include:

- Open Space and Recreational Facilities inclusive of:

  Conservation lands and passive open spaces;
  Playgrounds;
  Sport facilities such as a playing field and courts; and
  Bicycle/pedestrian pathways and tracks.

- Community Facilities inclusive of:

  Libraries and/or library resources;
  Child care and children's facilities; and
  Multi-purpose community facilities.

- Traffic Management inclusive of:

  New or upgraded collector roads;
  Intersection construction or upgrades; and
  Public transport facilities inclusive of bus shelters and laybys.

- Water Management Facilities inclusive of:

  Flood mitigation;
  Water quality works; and
  Drainage works.

The community infrastructure likely to be required for the proposed population at Tallawarra Lands has been determined giving consideration to the forecast population and employment yields identified above and the approach and service provision standards applied to infrastructure provision in the West Dapto Release Area, which is set out primarily in the Draft West Dapto Urban Release Area Section 94 Development Contributions Plan. This is considered to be an appropriate base as it is a recently prepared document for a similar urban release area in close proximity to the site.

In relation to facilities provision, the following general points are noted:

- the high allocation of open space in the Concept Plan provides abundant passive recreation opportunities;
- the Concept Plan includes kilometres of recreational shared-ways;
- Lake Illawarra provides an existing aquatic recreation asset; and
- a Council sports ground adjoins the north of the site.

Table 22 provides a summary of the potential community infrastructure requirements that could be associated with demand generated by future development at Tallawarra and how the proposal relates to those requirements.

Facility Type	Potential Requirement	Concept Plan Proposal
Open Space and Recreation		
Playgrounds	Two playgrounds based on the future residential population and spatial distribution of residential zoned land.	- One playground is provided for within the sports park in the Central Precinct. - Sufficient land area is available in the open spaces adjacent to the foreshore in the Northern Precinct and adjacent to the lake in the Lakeside Precinct for an additional playground.
Local Parks	Two local parks based on the future residential population and spatial distribution of residential zoned land.	- Sufficient land area is available in the open spaces adjacent to the foreshore in the Northern Precinct and adjacent to the lake in the Lakeside Precinct to accommodate local parks in those locations. - The sports park in the Central Precinct would also satisfy the demand for one of the local parks.
Sports Park	A facility is not required in its own right based on the future residential population although one Sports Park could meet the requirements for a local park and allow co-location of other recreation facilities.	A sports park is provided for in the Central Precinct of sufficient size to accommodate one playing field, several sports courts, playground, car parking and amenities block.
Indoor Recreation	A facility is not required in its own right based on the future residential population.	Not provided for.
Swimming Pools	A facility is not required in its own right based on the future residential population however, there is likely to be some demand and an apportioned monetary contribution to facilities external to the site could be warranted. This monetary requirement could be offset by other works of material public benefit (MPB) to be provided within the site.	Not provided for on-site.
Netball Courts	There would be a demand for one netball court based on Council's current service provision standards although provision of only one court does not accord with best practice which is to provide a multiple court facility. Such a facility is provided nearby in Council's "Planning Area 7" and accordingly an apportioned monetary contribution to this existing facility could be considered. This monetary requirement could be offset by other works of MPB to be provided within the site.	The sports park in the Central Precinct provides accommodation for three sports courts which could be used to cater for this demand or an alternate use subject to further discussions with Council.
Tennis Courts	There would be a demand for one tennis court based on Council's current service provision standards although provision of only one court may be inefficient in terms of operation and ongoing maintenance. A multi-court facility is provided nearby in Council's "Planning Area 8" and accordingly an apportioned monetary contribution to this existing facility could be considered. This monetary requirement could be offset by other works of MPB to be provided within the site.	The sports park in the Central Precinct provides accommodation for three sports courts which could be used to cater for this demand or an alternate use subject to further discussions with Council.

Facility Type	Potential Requirement	Concept Plan Proposal
Cycleways / Walkways	Cycleways and/or sharedways within the road reservation of local streets and collector roads would be warranted as a consequence of future development at Tallawarra. However, there would be very little demand for dedicated regional facilities such as the strategic north-south sharedway identified in Wollongong Council's Bicycle Plan. If such a facility were to be provided as works-in-kind, a substantial offset of the associated costs would be warranted against other potential monetary liabilities.	Allowance has been made for a network of pedestrian and bicycle facilities within the local street network which connects open spaces and activity nodes. Allowance has also been made for the strategic sharedway as envisaged by Council's Bicycle Plan.
Bicycle Tracks	A facility is not required in its own right based on the future residential population however, there is likely to be some demand and either a facility could be provided as a material public benefit or an apportioned monetary contribution to facilities external to the site could be provided. Any monetary requirement could be offset by other works of MPB to be provided within the site or any on-site facility could be used to offset other monetary liabilities.	A cycle track has been provided for within the Central Precinct under the proposed Concept Plan.
Conservation Lands (i.e. riparian and cultural heritage land)	There are substantial areas of the site designated as riparian corridors, wetlands and other areas of native vegetation (particularly areas containing items of cultural significance). These areas have passive recreation and intrinsic values for both the future population at Tallawarra as well as the wider regional community. It may be appropriate to dedicate these lands to Council for future use as passive regional recreation and to ensure ongoing management. It may also be appropriate for Plans of Management to be prepared for such land prior to dedication.	The Concept Plan proposal includes approximately 360 hectares of open space and conservation land which could be transferred to Council or other relevant authorities. The Concept Plan proposal also includes a Vegetation management Plan for these areas as required under the DGRs.
Other Passive Open Space	There is a considerable quantum of land along the Lake Illawarra foreshore that would be suitable for passive recreation and associated foreshore access. It may be appropriate to dedicate this land to the Lake Illawarra Authority for future use as passive regional recreation and to ensure ongoing management. It may also be appropriate for a Plan of Management to be prepared for such land prior to dedication.	The Concept Plan proposal includes approximately 360 hectares of open space and conservation land which could be transferred to Council or other relevant authorities. The Concept Plan proposal also includes a Vegetation management Plan for these areas as required under the DGRs.
Community Facilities		
Libraries	Based on the future residential population of Tallawarra and industry benchmarks, a very small library may be warranted at Tallawarra. However, further consideration needs to be given to the practicalities of such a small facility and whether this approach would meet the long term management and service objectives of Council. As an alternative, an apportioned monetary contribution to central facilities external to the site could be considered or any neighbourhood centre/facility provided within Tallawarra could have a learning centre focus.	Not specifically provided although the Concept Plan provides adequate land area within the neighbourhood centre for such a facility to be co-located with other community facilities such as a community centre and/or child care facility.

Facility Type	Potential Requirement	Concept Plan Proposal
Child Care	Based on the future residential population forecast and assuming around 400 children aged 0-5 years old, future development at Tallawarra would warrant some form of child care facility. This would ideally be co-located on the edge of the commercial centre or the proposed primary school site. Depending upon Council's approach to provision of such facilities, this could be Council owned/operated, Council owned/privately operated or privately owned and operated facility.	Not specifically provided although the Concept Plan provides adequate land area within the neighbourhood centre and adjacent to the school site for such a facility which could be co-located with other community facilities such as a community centre.
Community Centre	The forecast future residential population at Tallawarra is sufficiently small that it does not warrant a hierarchy of community centres. However, given the spatial separation of Tallawarra from other existing and foreshadowed community centres, it may be appropriate to provide one small neighbourhood centre, ideally located on the edge of the commercial centre. Such a facility could be co-located with a children's centre/before and after school care facility and incorporate a learning centre focus or be adaptable for indoor recreation.	Not specifically provided although the Concept Plan provides adequate land area within the neighbourhood centre for such a facility to be co-located with other community facilities such as a neighbourhood centre and/or child care facility.
Schools	There is no requirement for a school on-site based on DET standards.	A 3 hectare site for a private school has been allowed for in the Concept Plan.
Traffic		
Roads	The Traffic Impact Assessment undertaken by Gabites Porter has considered the requirements for internal and external road infrastructure in detail. That assessment includes the following requirements to cater for the demands of future development at Tallawarra: **External:** - Roundabout at Princes Highway / F6 Freeway northbound off-ramp; - Roundabout at Princes Highway / Cormack Avenue; - Roundabout at Princes Highway / Yallah Bay Road; - Roundabout at Princes Highway / Southern site access; Roundabout at site access point off Cormack Avenue; - Two laning of the Princes Highway southbound (from northbound freeway off-ramp to the southern site access); - Consequential works to facilitate the site access points. **Internal:** - Upgrade Yallah Bay Road to collector road; - Construction of the north-south collector road. The Northrop Report on Siteworks and Utilities Infrastructure contains a table which details the timeframe within which the abovementioned infrastructure should be delivered and the proportion of the cost of each infrastructure item that should be apportioned to the Tallawarra Lands development.	The works as identified in the Traffic Impact Assessment are proposed under the Concept Plan.

Facility Type	Potential Requirement	Concept Plan Proposal
Public Transport	The demand for local bus services linking Tallawarra with adjoining areas and existing/future rail stations requires further investigation and discussions with service providers. Local bus facilities such as laybys and shelters may be required on any future designated bus route through the site.	Local bus facilities such as laybys and shelters could be appropriately provided by individual developments as they occur.
Bushfire		
Fire Station	Based on previous discussions with the NSW Rural Fire Service, there is no requirement for on-site facilities.	Not provided for on-site.
Water Management		
Drainage and Water Sensitive Design Features	The Tallawarra Lands Concept Plan Drainage Assessment sets out the requirements for stormwater quality and quantity control.	The Drainage Assessment sets out a range of measures for stormwater quality and quantity control including biofiltration basins and swales, stormwater pipes systems, revegetated and stabilised watercourses, gross pollutant traps (GPTs), rainwater tanks and permeable paving.

Table 22: Summary of Community Infrastructure Requirements

8.1.6 Funding and Timing of Community Infrastructure

The potential community infrastructure requirements outlined in this report highlight that there is a combination of:

1. Local "trunk" infrastructure that could be delivered during the first stage/s of development by one of or a combination of the following methodologies:
    (i) Works undertaken by the developer (works-in-kind) with such works fully or partially off-set against monetary liabilities;
    (ii) Works undertaken by the developer prior to sale of the land with costs recouped by the developer through the land value attributable to improved land at the time of sale;
    (iii) Works undertaken by the developer under an agreement with Council that costs would be recouped from later developers through a development contributions plan.
2. Local infrastructure that can be and is most appropriately delivered by individual, precinct based developments as and when those developments occur;
3. Wider regional infrastructure could be provided by either of the following methodologies:
    (i) A reasonably apportioned monetary contribution to facilities that may be either inappropriate/inefficient to provide within the site but which are to be provided elsewhere;
    (ii) Provision of facilities within the site, a reasonably apportioned value of which could be used to offset other monetary community infrastructure liabilities.

Ultimately, the timing of community infrastructure should be linked to service level thresholds for facilities such as road infrastructure improvements, or population thresholds for open space, recreation and community facilities. This will be dependent upon the staging of development and can be more appropriately assessed at the time of future Project Applications.

8.1.7 Ownership and Management of Community Infrastructure

As indicated in Table 20, there is a range of future community infrastructure potentially required within the site which would be appropriately owned and managed by Council, the Lake Illawarra Authority or other statutory authorities such as the RTA. This includes:

- local streets and collector roads – Council;
- works within the regional road network – RTA;
- open space and recreation facilities – Council upon defined population thresholds being reached;
- conservation and foreshore lands – Council, the Lake Illawarra Authority or DECCW;
- community facilities such as neighbourhood centres, library and childcare, the land for which could be transferred to Council upon subdivision and facilities constructed by either the developer (as works-in-kind) or Council (using monetary contributions received from developers) prior to designated population thresholds being reached.

Ultimately, the timing and arrangements for ongoing management of these facilities can be negotiated between the applicant or developer and the relevant authority as part of future Project Applications.

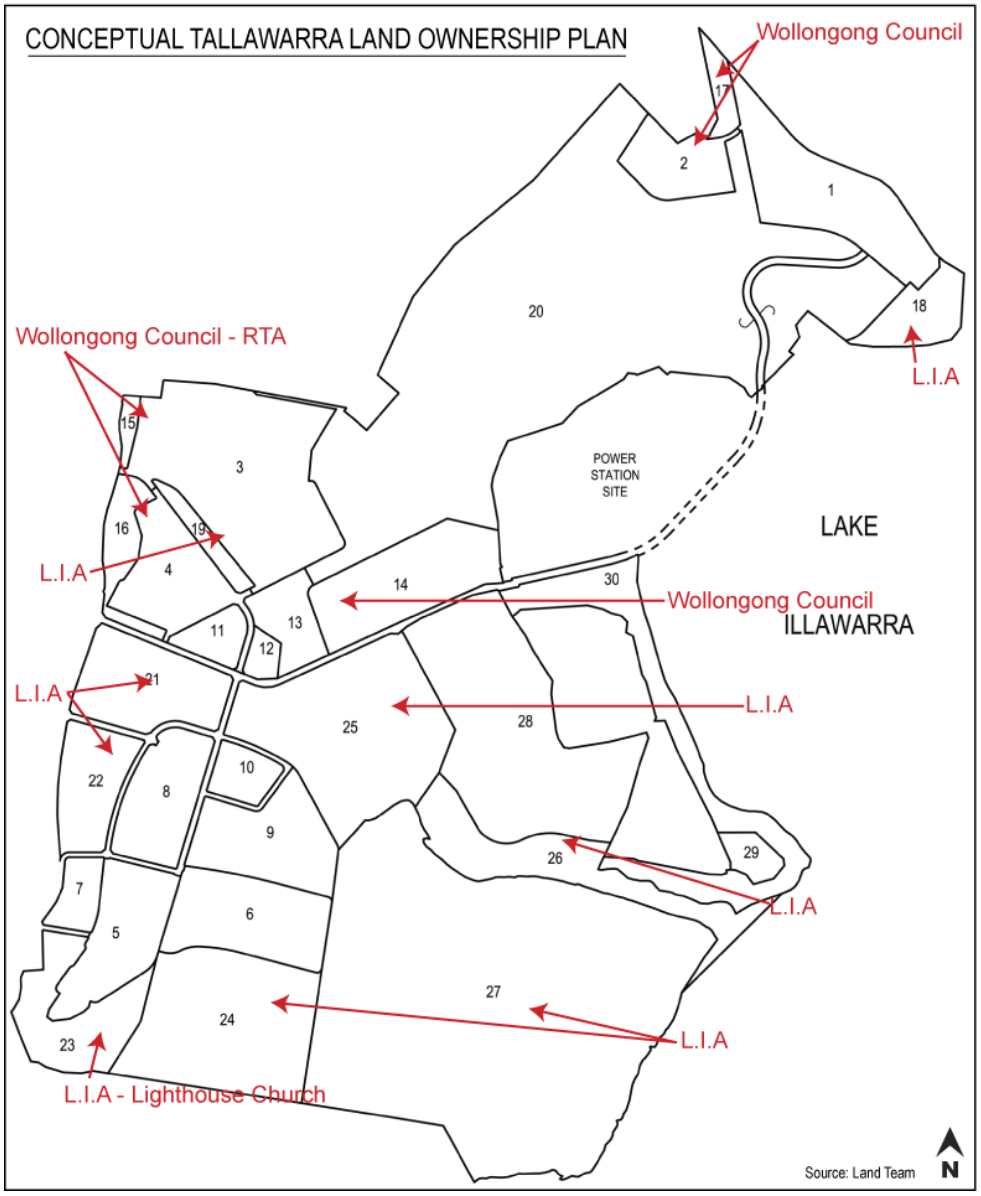


Figure 37: Conceptual Future Tallawarra Land Ownership Plan

Figure 37 has been prepared to illustrate the conceptual future land ownership plan for open space / environmentally sensitive / riparian areas within the site. The proposed superlot subdivision plan has been annotated to indicate which specific parcels could potentially be transferred into the ownership of public authorities / agencies (Council/RTA/Lake Illawarra Authority) subject to future VPA discussions.

8.1.8 Infrastructure to be excluded from any future funding/delivery mechanism

For the purposes of this assessment, it has been assumed that demand for community infrastructure such as local subdivisional streets, on-street car parking, local bus stops and streetscape works will be met by individual developments. Furthermore, previous investigations by Eco Logical Australia have indicated that dedicated bushfire facilities will not be required as a consequence of the proposal.

The provision of utility infrastructure inclusive of water, sewer, electricity, gas and telecommunications is to be the responsibility of the individual developer of each property as is the standard practice for new development.

Accordingly, any future community infrastructure mechanism such as a contributions plan or planning agreement will not include the funding and delivery of such infrastructure.

9 Draft Statement of Commitments

9.1 Introduction

This EA has identified a number of commitments to implement measures to manage or reduce impacts to ensure that the proposal is environmentally, socially and economically sustainable. The Statement of Commitments provided below is based on the various environmental assessments that have previously been undertaken for the site and those prepared for this Concept Plan application.

9.2 Statement of Commitments

Table 23 sets out the key commitments to be undertaken by TRUenergy as identified throughout this EA and supporting consultants' reports in order to minimise potential environmental impacts.

No	Subject	Commitment	Timing	Responsible Monitoring Body/Authority
1	Local Infrastructure	TRUenergy commits to entering into arrangements with Wollongong City Council to demonstrate that satisfactory arrangements will be made for the provision of local infrastructure.	Arrangements to be submitted as part of a future development application which seeks consent to subdivide the Tallawarra Lands site into a series of superlots generally consistent with **Figure 10**.	Wollongong City Council
2	State/Regional Infrastructure	TRUenergy commits to entering into arrangements with the State Government to demonstrate that satisfactory arrangements will be made for the provision of State/Regional infrastructure.	Arrangements to be submitted as part of a future development application which seeks consent to subdivide the Tallawarra Lands site into a series of superlots generally consistent with **Figure 10**.	Department of Planning & Infrastructure
3	Superlot subdivision	TRUenergy commits to lodging a development application with Wollongong City Council to carry out a superlot subdivision generally in the manner illustrated in the indicative superlot plan prepared by LandTeam and included at **Figure 10**. TRUenergy also commits to preparing more detailed subdivision plans and notes that further environmental assessment will not be required, having been adequately addressed	To be lodged after the approval of the Concept Plan application.	Wollongong City Council

No	Subject	Commitment	Timing	Responsible Monitoring Body/Authority
		through the Concept Plan application.		
4	Landscape Design	Future Development Applications will reference the Landscape Plan and adopt the Landscape Principles prepared by Corkery Consulting to guide the landscape treatment of the following: • the residential precincts areas, employment lands, and neighbourhood centre components of the Concept Plan, including the principles of visual amenity, function, ESD principles and biodiversity. • the open space zones (e.g. boundary zones, riparian zones, drainage lines and stormwater quality ponds, recreational areas) of each Precinct, including the recommended planting schedule. • the street network.	Landscape plans to be further refined during the preparation of subsequent applications for the development of the super lots (or part of the super lots)	Relevant development application consent authority
5	Geotechnical	TRUenergy commits to undertaking further geotechnical engineering assessment of those parts of the Concept Plan development footprint identified as being constrained in the Geotechnical, Contamination and Groundwater Investigation dated 30 July 2010, prepared by Coffey Environments.	To be undertaken as part of future development applications on affected land for residential subdivision, road works or construction of buildings.	Relevant development application consent authority
6	Land contamination	TRUenergy commits to continuing investigations into the areas of environmental concern (AECs) identified in the Geotechnical,	Further investigation to be undertaken as part of future development or Project applications on affected land.	Relevant development application consent authority

No	Subject	Commitment	Timing	Responsible Monitoring Body/Authority
		Contamination and Groundwater Investigation dated 30 July 2010, prepared by Coffey Environments. The AECs to be further investigated are those parts of the site that fall within proposed development areas.		
7		TRUenergy commits to undertaking any requirements for remediation and management as part of the findings from the further investigations of the AECs.	Recommended remediation works to be carried out at the time of (or just prior to) any earthworks for subdivision works in the AECs.	Relevant development application consent authority
8		The recommendations detailed in the Preliminary Hydrogeological Assessment – Ash Ponds dated 23 November 2010, prepared by Coffey Environments will be implemented.	To be undertaken as part of future development applications on affected land.	Relevant development application consent authority
9		The recommendations detailed in the Register of Hazardous Materials Report in Residences in Northern Precinct dated 15 March 2010 prepared by Coffey Environments will be implemented.		
10	Urban design strategies	The urban design strategies recommended in the Richard Lamb and Associates Visual, Landscape and Scenic Resource Management Considerations will be reviewed and adopted for future development in the following areas of the Concept Plan site as identified in the Report: • the large lot and central residential precinct in Visual Exposure Zone A and north shore residential precinct	To be considered during the preparation of future development applications for the identified zones only.	Relevant development application consent authority

No	Subject	Commitment	Timing	Responsible Monitoring Body/Authority
		in Visual Exposure Zone B • the lakeside residential precinct in Visual Exposure Zone D • the employment in Visual Exposure Zones A and D		
11	Traffic Management	TRUenergy commits to the following road improvements • the provision of a two lane circulating roundabout at the intersection of the northbound off ramp and the Princes Highway; • the conversion of the intersection of Cormack Ave and the Princes Highway into a two lane circulating roundabout; • two lane circulating roundabouts at each of the two access points to the site from the Princes Highway; • the provision of a roundabout at the site access point off Cormack Avenue; • Upgrade Yallah Bay Road to a collector road; • Two laning of the Princes Highway southbound (from northbound freeway off-ramp to southern site access) and • Construction of the north-south collector road. • Consequential works to facilitate the site	Details and apportionment to be incorporated into future VPA. The timeframe for delivery of the road improvements will be detailed in the future VPA.	Wollongong City Council

No	Subject	Commitment	Timing	Responsible Monitoring Body/Authority
		access points.		
12	Ecologically Sustainable Development	Precinct scale and other major development applications consistent with the Concept Plan will demonstrate how they address the relevant desired sustainability outcomes contained in the Sustainability Report prepared by Urbis and dated 18 October 2010.	Details of the response to be submitted with the relevant development application(s).	Relevant development application consent authority
13	BASIX	Future residential development will achieve potable water and greenhouse gas reductions equivalent to BASIX +10% (2010 = 50% reduction).	Compliance to be demonstrated in the development application submission	Relevant Consent Authority
14	Sustainability for commercial and retail	Future commercial and retail development will aspire to a target of a 40% reduction in: • operational greenhouse gas emissions associated with energy use; and • operational potable water use in comparison to similar types of development in NSW.	Compliance to be demonstrated in future development application submissions	Relevant Consent Authority
15	Utilities infrastructure	TRUenergy commits to implementing the utilities servicing strategies identified in the Report on Siteworks and Utilities Infrastructure, prepared by Northrop	Further investigations to be undertaken with development applications.	Relevant Consent Authority
16	Aboriginal heritage	TRUenergy commits to implementing the recommendations of the Aboriginal Archaeological Assessment.		
17	European Heritage	TRUenergy commits to implementing the management recommendations contained in Section 7.2 of the *Statement of*	To be reviewed and implemented during the preparation of future development applications involving site works to the	

No	Subject	Commitment	Timing	Responsible Monitoring Body/Authority
		Heritage Impact: Tallawarra Lands Part 3A, prepared by Biosis Research, dated September 2010.	areas identified in Section 7.2 of the *Statement of Heritage Impact.*	
18	Ecology	TRUenergy commits to implementing the mitigation measures detailed in Table 12 of the Ecological Assessment report dated 4 March 2011.	Table 12 details the timing requirements. The mitigation measures detailed in Table 12 should be included in any conditions of consent issued in relation to future development applications.	Relevant Consent Authority
19		TRUenergy commits to implementing the Vegetation Management Plan prepared by Eco Logical dated 4 February 2011.	Implementation of the Vegetation Management Plan should be required as a condition of consent on future development applications.	Relevant Consent Authority
20		TRUenergy commits to implementing the Environmental Management Strategy prepared by Eco Logical dated 4 February 2011.	Implementation of the Environmental Management Strategy should be required as a condition of consent on future development applications.	Relevant Consent Authority
21		TRUenergy commits to following the recommendations detailed at Section 5.1 of the GDE Risk Assessment prepared by Eco Logical Australia dated 13 December 2010 and implementing the mitigation measures outlined at Section 5.2 of the report.	Compliance with the recommendations of the GDE Risk Assessment may be regulated via the conditions of consent on future development applications.	Relevant Consent Authority
22	Bushfire	TRUenergy commits to implementing the recommendations and management measures contained in the Bushfire Planning Assessment, Vegetation Management Plan and Environmental Management Strategy prepared by Eco Logical Australia.		

No	Subject	Commitment	Timing	Responsible Monitoring Body/Authority
23	Climate Change	TRUenergy commits to implementing the recommendations contained in the Climate Change Assessment report prepared by BMT WBM.		
24	Access	TRUenergy commits to working with the Lake Illawarra Foreshore Authority to facilitate public access to the foreshore.		
25	Demolition	TRUenergy commits to undertaking demolition activities in accordance with AS 2601-2001*: The Demolition of Structures*.		
26		TRUenergy commits to employing licensed contractors to remove all contaminated material and to requiring them to comply with the provisions of the *Occupational Health & Safety Regulation 2001*.		
27		TRUenergy commits to ensuring that demolition activities will only be carried out between 7am and 5pm Monday to Saturday and that no demolition activities will be carried out at any time on a Sunday or a public holiday.		

Table 23: Statement of Commitments

10 Conclusion

The subject site has been identified as having urban potential for a number of years and its suitability for development has been considered in both the Local Environmental Study and rezoning processes which culminated with the gazettal of Wollongong LEP 2009 and facilitated the lodgement of this Concept Plan application. The many studies carried out conclude that the site is suitable to be developed in a manner consistent with the zoning controls applicable under the provisions of Wollongong LEP 2009. In this regard, it is noted that the proposed land uses are permissible under the various applicable environmental planning instruments.

The Concept Plan proposal will facilitate the development of an area of largely degraded and underutilised land adjoining Lake Illawarra and the existing suburbs of Koonawarra and Haywards Bay with a sustainable master planned development.

As demonstrated throughout this EA, development of the Tallawarra Lands site in the manner proposed in the Concept Plan is consistent with the State Government's regional planning policies for the Illawarra that relate to promoting economic growth, delivering new dwellings and protecting high value environments. Economic growth in the Illawarra region will be bolstered by both the large scale of the proposed development and the mix of land uses proposed which are all permissible under the provisions of the various applicable environmental planning instruments as detailed in Table 7. The commercial development envisaged together with the community infrastructure and facilities to be delivered will benefit both the incoming population as well as residents of existing surrounding suburbs.

This report has been prepared to assess the potential environmental impacts that could result from the proposal proceeding. Specialist investigations have been carried out and a number of potential environmental impacts have been identified. Mitigation measures to manage and ameliorate potential environmental impacts have been incorporated into the proposal via the Statement of Commitments and every effort has been made in the development of the concept design to incorporate the principles of environmentally sensitive development to minimise the likelihood of adverse environmental impacts occurring.

This EA demonstrates that no significant impacts associated with flooding and water quality, land stability and contamination, coastal processes, traffic flows, noise, views, flora and fauna, bushfire risk or Aboriginal or European heritage will arise provided that the mitigation measures proposed are adopted and implemented. The measures have been incorporated into the Draft Statement of Commitments.

The Economic Impact Assessment carried out also confirms that the Concept Plan proposal will not adversely impact the ongoing viability of surrounding centres and/or precincts.

The development is considered to be in the public interest as it will facilitate:

- extensive commercial, retail, tourism and industrial development and the associated employment opportunities;
- the provision of new housing near jobs;
- site remediation;
- the restoration and embellishment of large areas of degraded environmentally valuable areas; and
- the bringing of significant additional land around the foreshore of Lake Illawarra into public ownership.

Accordingly, the Concept Plan for which consent is being sought is considered to be an optimal form of development on the Tallawarra Lands site.

Given the assessments that form part of this EA assess all the potential environmental impacts of the proposed development, this report also requests pursuant to the provisions of Sections 75(J) and 75P(1)(c) of the Environmental Planning & Assessment Act that the demolition of structures associated with the former Riding School at Gilba Road Koonawarra may proceed without the need for any further application or consent.